

FINAL

**INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
2021-2025
UNITED STATES ARMY GARRISON, FORT GORDON
FORT GORDON, GEORGIA**

January 2021



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**INTEGRATED NATURAL RESOURCES
MANAGEMENT PLAN
(2021 THROUGH 2025)**

FORT GORDON, GEORGIA

APPROVAL

This Integrated Natural Resources Management Plan has been prepared pursuant to the Sikes Act (16 U.S.C. 670a et seq.) as amended. The signature below indicates the mutual agreement of the party concerning the conservation, protection, and management of fish and wildlife resources as presented in the Plan.

Shaw S. Pick
COL, US Army
Commanding
U.S. Army Garrison, Fort Gordon

Signature

Date

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Donald W. Imm, PhD.
Field Supervisor
Georgia Ecological Services
U.S. Fish and Wildlife Service

Signature

Date

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Rusty Garrison
Director
Wildlife Resources Division
Georgia Department of Natural Resources

Signature

Date

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**INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
UNITED STATES ARMY GARRISON, FORT GORDON
FORT GORDON, GEORGIA**

Prepared By:
*Fort Gordon Directorate of Public Works, Environmental Division,
Natural Resources Branch
Fort Gordon, Georgia*

January 2021

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EXECUTIVE SUMMARY

ES.1 Type of Document

This is an Integrated Natural Resources Management Plan (INRMP).

ES.2 Purpose of Document

The purpose of this document is to meet statutory requirements under the Sikes Act Improvement Act, Public Law 105-85, Division B, Title XXIX, 18 November 1997, 111 Stat 2017-2019, 2020-2022. In November 1997, the Sikes Act, 16 U.S.C. § 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 this program, the amendments require the Secretaries of the military departments to prepare and implement an INRMP for each military installation in the United States (U.S.) unless the absence of significant natural resources on a particular installation makes preparation of a plan inappropriate. The U.S. Army Garrison, Fort Gordon (Fort Gordon) has prepared this INRMP for all lands managed by Fort Gordon.

ES.3 Goals and Objectives of the INRMP

The goal of the INRMP is to sustain and enhance the military mission by implementing an ecosystem-based conservation program that provides for conservation and rehabilitation of natural resources; integrates and coordinates all natural resources; provides for sustainable multipurpose uses of natural resources; and provides public access for use of natural resources subject to safety and military security considerations. The INRMP covers a 5 year planning timeframe. Fort Gordon has identified eight broad goals with multiple objectives within each of the program element action plans.

- Goal 1:** Sustain and enhance military missions through sound natural resources management and stewardship.
- Goal 2:** Identify and maintain or restore native ecosystem types (i.e., longleaf pine [*Pinus palustris*]) and associated ecosystems) across their range of variation within natural managed areas of Fort Gordon.
- Goal 3:** Manage natural resources to maintain or restore essential ecological processes integral to species interactions and ecosystem resiliency on the installation.
- Goal 4:** Manage large areas over sufficiently long time periods to allow biological evolution and changing system dynamics on Fort Gordon.
- Goal 5:** Represent, maintain, or reestablish viable populations and genetic diversity of target species, especially rare or endemic species, in existing managed natural areas.
- Goal 6:** Monitor target species, communities, and sites; and conduct research to guide management and identify progress toward goals as part of the adaptive management process at Fort Gordon.
- Goal 7:** Build public and private understanding and support for the preservation of natural areas.
- Goal 8:** Conduct all management activities in compliance with all local, state, and applicable federal laws, regulations, and standards.

ES.4 Projects of the INRMP

Projects are discrete actions for fulfilling a particular strategy. Projects may be required in order for Fort Gordon to fulfill regulatory requirements regarding natural resources management, or to enhance existing measures for ensuring compliance. A general summary of the major actions/projects during the next 5 years, and the programs they support can be seen in Table ES-1. Many actions will take several years to implement and will appear in multiple years. For example, timber harvest in Fiscal Year (FY) 2021 will support red-cockaded woodpecker (RCW) recruitment cluster installation in FY 2022 and FY 2023. Annual work plans to be developed for each

FY will include a listing of projects, funding requirements, common levels of service supported, and manpower data to complete the action. This work plan will be used to track progress on INRMP implementation, budget expenses, request budget allotments for future months, and coordinate needed manpower requirements for labor-intensive projects.

Table ES-1. INRMP Projected Management Actions Fiscal Years 2021-2025

Fiscal Year	Location	Management Action	Project	Program Element Support
2021	Training Areas 32, 33, 38, and 49A	Mark Timber	RCW Habitat	ESMC, BO
	Training Areas 26, 36, 37	Harvest Timber	Forest Management	ESMC, BO
	Training Areas 15, 18, 26, and 27	Install RCW Recruitment Clusters*	RCW Population	ESMC, BO
	Ranges and AIA**	Prescribed Burn 6,155 acres	Mission Support	IWFMP, RCMP
	Training Areas**	Prescribed Burn (Dormant Season)	Ecosystem	IWFMP
	Training Areas**	Prescribed Burn (Growing Season)	Ecosystem	IWFMP, ESMC, BO
2022	Training Areas 32, 33, and 38	Mark Timber	RCW Habitat	ESMC, BO
	Training Areas 49A	Harvest Timber	RCW Habitat	ESMC, BO
	Training Area 36 and 37	Install RCW Recruitment Clusters*	RCW Population	ESMC, BO
	Ranges and AIA**	Prescribed Burn 6,155 acres	Mission Support	IWFMP, RCMP
	Training Areas**	Prescribed Burn (Dormant Season)	Ecosystem	IWFMP
	Training Areas**	Prescribed Burn (Growing Season)	Ecosystem	IWFMP, ESMC, BO
2023	Training Areas 49B	Mark Timber	RCW Habitat	ESMC, BO
	Training Areas 32, 33, and 38	Harvest Timber	RCW Habitat	ESMC, BO
	Training Area 32	Install RCW Recruitment Clusters*	RCW Population	ESMC, BO

Table ES-1, continued

Fiscal Year	Location	Management Action	Project	Program Element Support
	Ranges and AIA**	Prescribed Burn 6,155 acres	Mission Support	IWFMP, RCMP
	Training Areas**	Prescribed Burn** (Dormant Season)	Ecosystem	IWFMP
	Training Areas**	Prescribed Burn** (Growing Season)	Ecosystem	IWFMP, ESMC, BO
2024	Training Areas 42 and 43	Mark Timber	RCW Habitat	ESMC, BO
	Training Area 49B	Harvest Timber	RCW Habitat	ESMC, BO
	Training Area 38	Install RCW Recruitment Clusters*	RCW Population	ESMC, BO
	Ranges and AIA**	Prescribed Burn 6,155 acres	Mission Support	IWFMP, RCMP
	Training Areas**	Prescribed Burn (Dormant Season)	Ecosystem	IWFMP
	Training Areas**	Prescribed Burn (Growing Season)	Ecosystem	IWFMP, ESMC, BO
2025	Training Areas 39, 40, and 41	Mark Timber	RCW Habitat	ESMC, BO
	Training Areas 42 and 43	Harvest Timber	RCW Habitat	ESMC, BO
	N/A	Install RCW Recruitment Clusters*	RCW Population	ESMC, BO
	Ranges and AIA**	Prescribed Burn 6,155 acres	Mission Support	IWFMP, RCMP
	Training Areas**	Prescribed Burn (Dormant Season)	Ecosystem	IWFMP
	Training Areas**	Prescribed Burn (Growing Season)	Ecosystem	IWFMP, ESMC, BO

* If suitable RCW habitat is present

** The areas to be burned will be determined annually (and reported in the annual updates) based on site conditions

AIA Artillery Impact Area

BO Biological Opinion

ESMC Endangered Species Management Component

INRMP Integrated Natural Resources Management Plan

IWFMP Integrated Wildland Fire Management Plan

RCMP Range Complex Master Plan

Funding for implementation of this INRMP, other than forest management, will come from the U.S. Army Installation Military Command (IMCOM). A summary of funding required for implementation of all projects is presented in Table ES-2. All requirements set forth in this INRMP requiring the expenditure of Fort Gordon's funds are expressly subject to the availability of appropriations and the requirements of the Anti-Deficiency Act (31 U.S.C. Section 1341). No obligations undertaken by Fort Gordon under the terms of this INRMP will require or be interpreted to require a commitment to expend funds not obligated for a particular purpose. The natural resources programs and projects described in this INRMP are divided into mandatory and stewardship categories to reflect implementation priorities. Funding will be acquired to implement Department of Defense (DoD) mandatory projects in the timeliest manner possible. Stewardship projects will be funded through forestry revenues, DoD Forestry Reserve Account, U.S. Army 21X5095 account, Legacy Funds, or other fund sources.

Table ES-2. Estimated Environmental Quality (VENQ) Environmental Program Requirements (in dollars) Fiscal Years 2021 through 2025

Project	FY21 (\$)	FY22 (\$)	FY23 (\$)	FY24 (\$)	FY25 (\$)	TOTAL (\$)
Salaries Natural Resources Not Included Elsewhere	212,000	220,500	230,000	240,200	250,000	1,152,700
Implement Endangered Species Conservation Requirements	1,800,000	1,872,000	1,947,000	2,024,800	2,105,800	9,749,600
Implement Fish and Wildlife Management Plan (Sikes Act Funds)	48,000	48,000	49,000	49,000	50,000	244,000
Implement Integrated Natural Resources Management Plan	318,000	330,000	343,000	357,000	372,000	1,720,000
Review/Prepare NEPA Documents For Conservation *Includes Supplemental EA For INRMP Revision	100,000	100,000	150,000*	100,000	100,000	550,000
Conservation Supplies and Materials	35,000	35,000	40,000	40,000	40,000	190,000
Conduct Invasive Species and Pest Management	100,000	104,000	104,000	104,000	104,000	516,000
GIS Data, Supplies and Materials	18,000	18,000	19,000	20,000	20,000	95,000
Training & Certification Requirements	19,000	19,000	20,000	20,000	20,000	98,000
Total	2,650,000	2,746,500	2,902,000	2,955,000	3,061,800	14,315,300

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1.0 OVERVIEW

1.1 PURPOSE

The purpose of this plan is to integrate individual natural resources management programs at the United States (U.S.) Army Garrison, Fort Gordon (Fort Gordon) military installation with other land uses or affecting activities, which ensures good stewardship of Department of Defense (DoD) lands and complies with all federal laws and regulations while supporting the military mission. The plan is designed to provide necessary guidance for the orderly, economical maintenance of the lands and natural resources contained within the military installation at Fort Gordon. The plan provides documentation for enhancing and restoring ecosystem integrity and biodiversity, as well as the utilization of water resources, forest, and fish and wildlife resources, while allowing multiple-use of installation lands.

This 5-year update of the Fort Gordon Integrated Natural Resources Management Plan (INRMP) has been prepared in accordance with DoD's INRMP template (14 August 2006) and DoD INRMP implementation manual (13 December 2017). Section 1 provides a general overview of the purpose and intent of the INRMP, a description of the military mission and the processes for review, implementation, and revisions to the plan. Section 2 describes the current conditions and uses, including the general physical and biotic environment. Section 3 discusses the environmental management strategy and mission sustainability, and Section 4 outlines the ecosystem management elements and relates them to the goals, objectives, strategies, initiatives, and projects. Section 5 describes the INRMP implementation including cooperative agreements and funding. A list of acronyms and abbreviations used in the INRMP is provided as Appendix A. Appendix B provides a list of references used in the preparation of this INRMP.

1.2 SCOPE

The scope of the INRMP includes all applicable lands managed by Fort Gordon (Figure 1-1). Fort Gordon is operated under the jurisdiction of the U.S. Army Installation Management Command (IMCOM). The U.S. Army Training and Doctrine Command (TRADOC) is the senior tenant and mission commander at the installation. In Fiscal Year (FY) 2010, Fort Gordon assumed command and control of the Fort Gillem Enclave in Clayton County,

Georgia, just south of Atlanta (Figure 1-2). The Fort Gillem Enclave is only 260 acres, of which approximately 100 acres are wooded and natural area, and does not require an individual INRMP in accordance with Army Regulation (AR) 200-1 (1) INRMP (a) 1-6. The INRMP also has a dual purpose of complying with various natural resources-related laws while supporting the military mission of Fort Gordon.

1.3 GOALS AND OBJECTIVES

Fort Gordon's identification and prioritization of current and future projects are guided by a number of interrelated items including a vision statement, a mission statement, issues, goals, objectives, and desired future ecosystem processes.

Fort Gordon's approach to natural resources management is captured in the installation's vision of the relationship between its military mission and the natural resources upon which that mission depends. The installation also has developed a natural resources management mission statement that provides an overarching premise for how Fort Gordon will manage its lands.

1.3.1 Fort Gordon Natural Resources Management Vision Statement

Support the soldier and Fort Gordon's military mission while promoting the ecological integrity of the Fort Gordon landscape.

1.3.2 Fort Gordon Natural Resources Management Mission Statement

Through a collaborative effort between military personnel and natural resources professionals, Fort Gordon will promote the long-term ecological sustainability of its lands for military training and multiple-use opportunities. Fort Gordon will apply sound land management practices and adaptive management strategies that conserve ecological integrity through the restoration, maintenance, and conservation of natural biotic communities. This ecosystem management approach will encompass stakeholder interests, regulatory requirements, and fiscal constraints.

1.3.3 Goals and Objectives

The management goals define the overall natural and cultural resources management direction for Fort Gordon. In the context of this plan, goals are defined as the general targets or end results desired to be achieved through integrated resource management. Objectives are defined as more specific targets, attainment of which will contribute to the accomplishment of management goals. Goals and objectives will be adjusted over time using an adaptive

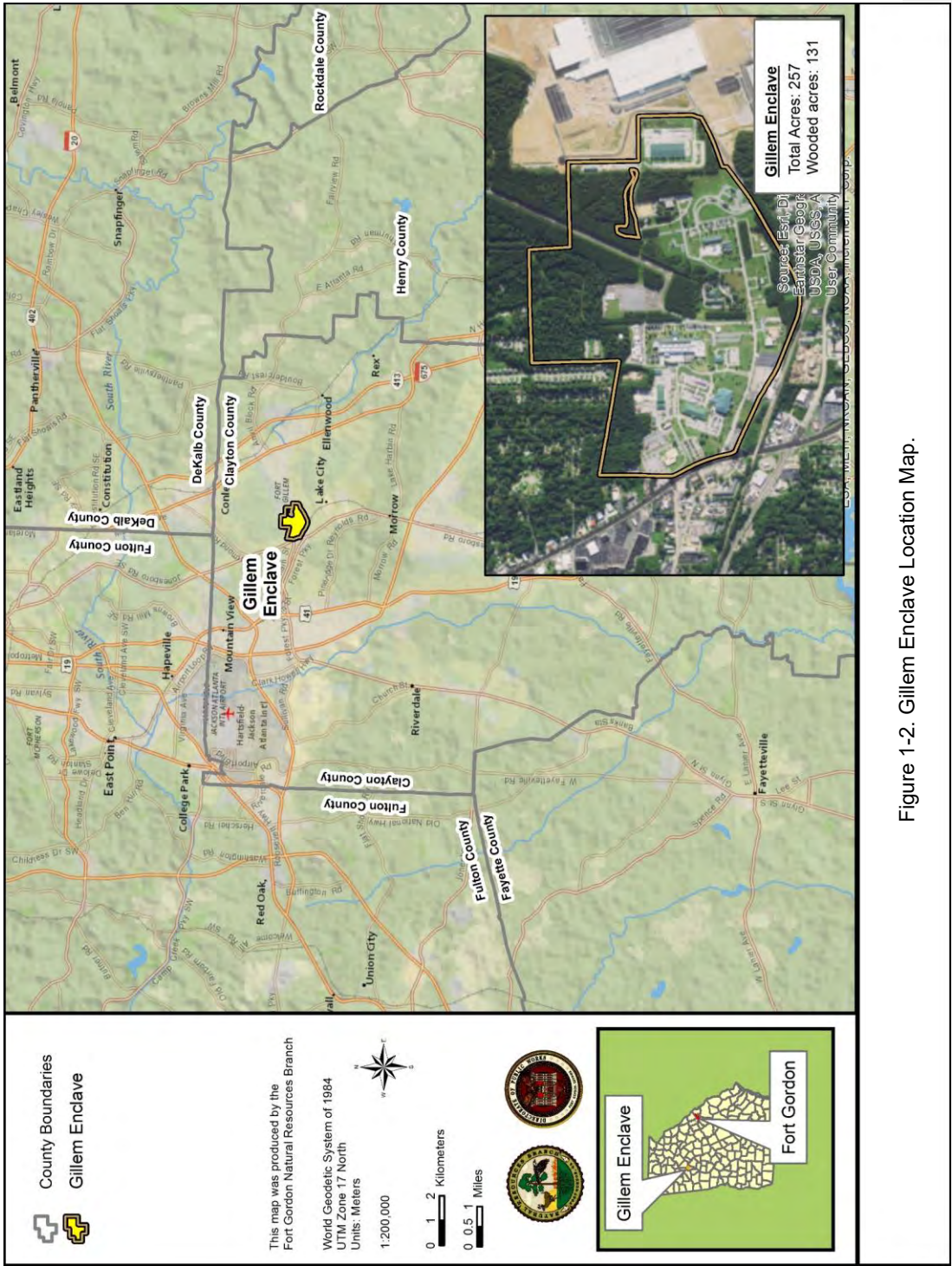


Figure 1-2. Gillem Enclave Location Map.

management approach and as Fort Gordon's military mission and ecological condition change. Fort Gordon has identified eight broad goals with multiple objectives within each of the program element action plans. The following are the goals of Fort Gordon's ecosystem-based management approach.

Goal 1: Mission Support - Sustain and enhance military missions through sound natural resources management and stewardship.

As stewards of DoD lands, resource managers must conduct all management activities in a manner that supports and enhances the military missions assigned to those lands.

Goal 2: Ecosystem Composition and Structure - Identify and maintain or restore native ecosystem types (i.e., longleaf pine [Pinus palustris] and associated ecosystems) across their range of variation within managed natural areas of Fort Gordon.

Identifying, mapping, and assessing the quality of natural communities on Fort Gordon will advance the goals of this plan by distinguishing managed natural areas from areas suitable for training and multiple-use management activities. Guidelines will subsequently be developed for appropriate activities within areas of different quality.

Goal 3: Ecosystem Processes - Manage natural resources to maintain or restore essential ecological processes integral to species interactions and ecosystem resiliency on the installation.

Two major abiotic processes, fire and hydrology, shape the natural communities found on Fort Gordon. Restoring these processes to more natural states will benefit native species. Fire management includes prescribed burns, wildfire suppression and a long-term multi-scale monitoring plan. Fire management maintains biodiversity, reduces fuel, and protects property from wildfire. Restoring and preserving natural hydrologic processes involves minimizing damming and upland erosion. Abating threats to natural hydrologic processes will maintain and protect aquatic species.

Goal 4: Landscape Dynamics (Time and Space) - Manage large areas over sufficiently long time periods to allow biological evolution and changing system dynamics on Fort Gordon.

To ensure the persistence of all levels of biodiversity on Fort Gordon including gene flow, species, populations and communities,

landscapes should be managed with ecological time frames in mind. A landscape approach to biodiversity conservation focuses on protecting interactions among ecosystems across large land areas (Leslie et al., 1996). Management strategies under this goal aim at preserving and restoring connectivity and managing for a vegetation mosaic. The goal focuses primarily on the dominant and more regionally endangered uplands of Fort Gordon and to a lesser degree on the wetlands.

Maintenance and restoration of intact longleaf pine forests with associated native groundcover is the major component of this goal. Currently, loblolly pine (*Pinus taeda*) and slash pine (*Pinus elliottii*) dominate large areas across Fort Gordon. These areas result from fire suppression and past logging practices followed by planting or natural reseeding of these species. In the long term, restoring longleaf pine and associated native groundcover on most suitable soils will reduce fragmentation and provide vegetation to fuel prescribed burns across large management units. Restoring longleaf pine and lengthening rotations will also result in more mixed-age stands than are present in many areas, especially on the droughty, nutrient-poor soils that are prevalent on the installation.

Goal 5: Target Species - Represent, maintain, or reestablish viable populations and genetic diversity of target species, especially rare or endemic species, in existing managed natural areas.

Most of the management strategies in the INRMP focus on restoring or maintaining the habitat or natural communities in which target species live. This broad-scale approach is both economically and ecologically reasonable. However, for some target species, shorter-term or more intensive management efforts will be required to guarantee their persistence or reintroduction across the installation. Strategies in this goal address specific and short-term needs for securing population success on the installation.

Fort Gordon is home to 17 target species with some level of federal or state designation. Installation management priorities for these target species will be based upon a combination of threat, urgency, and current population statistics. Setting priorities for limited single-species management will help allocate staff and financial resources.

Goal 6: Monitoring and Research Program - Monitor target species, communities and sites, and conduct research to guide management and identify progress toward goals as part of the adaptive management process at Fort Gordon.

To measure the success of the management strategies and activities proposed in this plan, a scientific monitoring program will be required. The primary objective of the monitoring program is to repeatedly measure specific variables to detect changes in the status of species, communities, and sites over time. Monitoring documents trends and allows assessment and development of new management strategies to respond to threats to native populations and natural communities. Monitoring also increases the biological understanding of target species, which is lacking for most species, with the exception of the red-cockaded woodpecker (*Picoides borealis*, RCW) and gopher tortoise (*Gopherus polyphemus*). For a more specific understanding of species and their habitat, research may be needed. Through scientific research, certain information can be obtained for management. Understanding what factors make some taxa vulnerable to extinction is an important step in protecting them and facilitating their recovery.

Goal 7: Public Outreach and Agency Relations - Build public and private understanding and support for the preservation of natural areas.

Developing relationships with the public and other agencies benefits the natural resources management program on Fort Gordon. Public outreach informs the public of the military mission and provides an avenue to avoid conflict between the military mission and the public's needs outside of the installation. Federal and state agencies provide technical support through the review of the INRMP and other natural resources management plans.

Goal 8: Legal and Regulatory Requirements - Conduct all management activities in compliance with all local, state, and applicable federal laws, regulations and standards.

As stewards of land held in the public trust, resource managers must conduct all management activities within a multi-level legal framework. Compliance with federal, state, and local laws, as well as U.S. Army, IMCOM, and installation regulations, is required.

1.4 RESPONSIBILITIES

1.4.1 Installation Stakeholders

The U.S. Army Garrison, Fort Gordon, is directly responsible for operations and maintenance of Fort Gordon, including the implementation and enforcement of the INRMP. This involves the

cooperation of many different organizations both on Fort Gordon and many outside agencies. An organizational chart of installation stakeholders responsible for implementation of the INRMP is presented in Figure 1-3.

1.4.1.1 Installation Commander

The installation Commander and other personnel in command positions at Fort Gordon fully support this INRMP. The command is dedicated to ensuring the long-term sustainability of the natural resources and the management of those resources necessary to support the military mission.

The installation Commander should lead in environmental stewardship by ensuring that personnel at all levels are fully engaged in the daily activities necessary for protection and enhancement of natural resources. To ensure top-down implementation of this INRMP, the command should project that natural resources protection is a vital part of mission implementation. Leadership should impress upon all personnel the importance of each individual taking responsibility for his or her role in carrying out the provisions of the INRMP. To put the need for appropriately managing natural resources into perspective, the command should emphasize that natural resources protection is just as important as other mission fundamentals. General Dennis J. Reimer, former Chief of Staff, Army, said it best: "Environmental responsibility involves all of us. The environmental ethic must be part of how we live and how we train. By working as a team we can preserve both the natural diversity of military training areas and our opportunity to train the way we plan to fight now and in the future." The command should hold each responsible individual accountable for actions required by this INRMP and other applicable environmental requirements by use of the established disciplinary system.

The installation Commander should require integration of natural resources stewardship early in the planning process. Proponents of projects or training should coordinate with the appropriate environmental staff in sufficient time to incorporate any input or make any necessary changes to the planned activity. This can be accomplished by inviting environmental specialists to participate in project planning meetings and submitting requests for environmental evaluations early in the process.

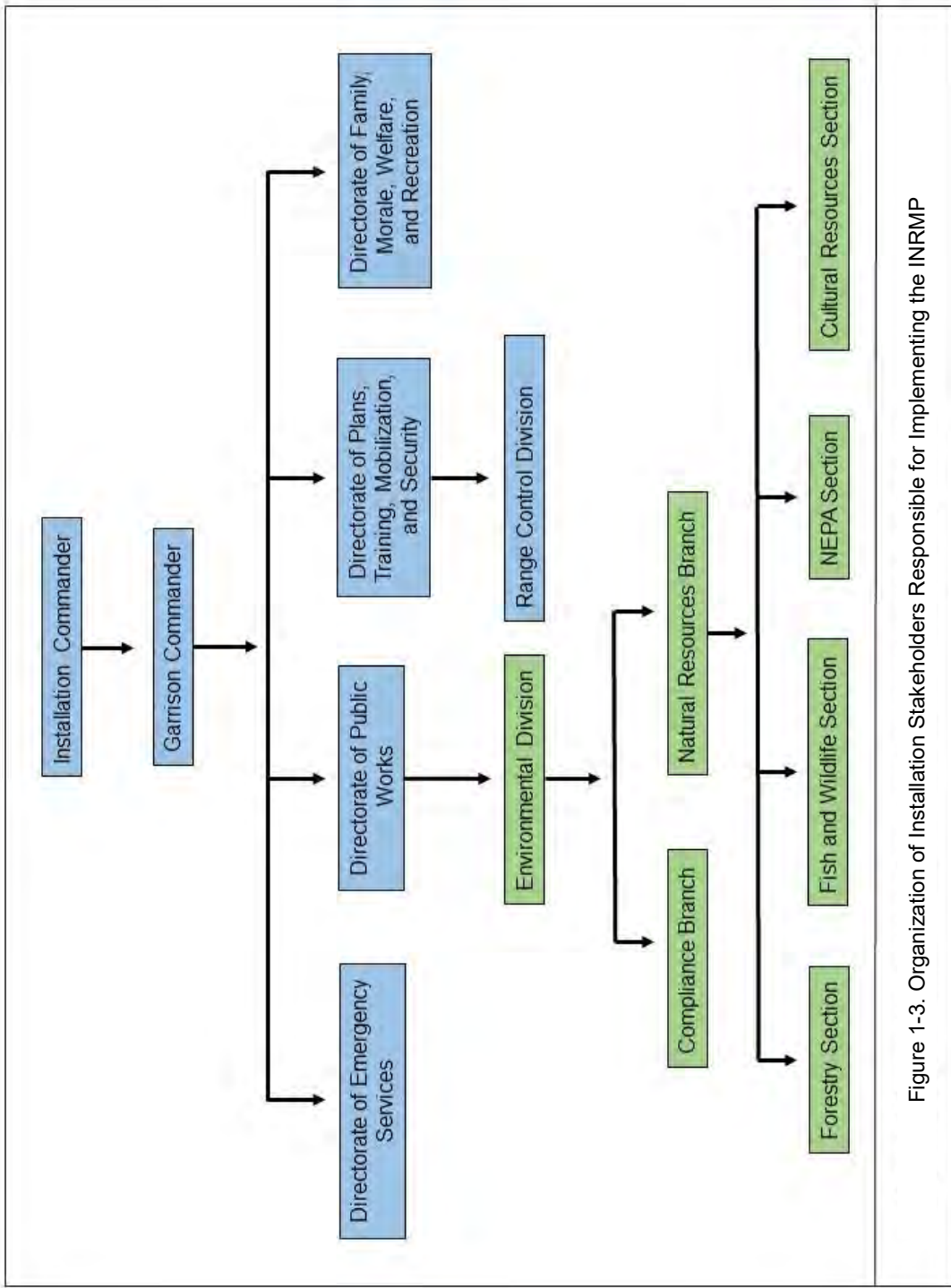


Figure 1-3. Organization of Installation Stakeholders Responsible for Implementing the INRMP

Implementation efforts must be realistically evaluated and revised as needed. The installation Commander has various committees tasked with duties that will assist with implementation of the INRMP, such as the Environmental Quality Control Council, Staff Assistance Visit, and specially designated Process Action Teams. Annual review processes, such as the installation Status Review, Environmental Compliance and Assessment, Environmental Quality Report, the annual Endangered Species Report to IMCOM, and the annual RCW status report to U.S. Fish and Wildlife Service (USFWS) and DoD are all mechanisms to monitor the success of INRMP implementation.

1.4.1.2 Garrison Commander

The Garrison Commander is responsible for land and facilities at Fort Gordon. The Directorate of Public Works (DPW) is the primary action agency with regards to the lands.

1.4.1.3 Directorate of Public Works (DPW)

Much of the responsibility for implementation of the INRMP is within the DPW, which acts as caretaker for the lands of Fort Gordon.

Environmental Division

Natural Resources Branch (NRB). The preparation and most of the implementation of the INRMP are the responsibility of the NRB of the Environmental Division (ED) at Fort Gordon. The NRB chief is the garrison designated installation natural resources coordinator responsible for execution of the INRMP and conducting appropriate internal and external stakeholder coordination as directed by AR 200-1 (Army 2007b). Other general NRB responsibilities with regard to this plan include:

- Provide training for personnel involved in the management of Fort Gordon's natural resources
- Provide personnel and equipment support for repair, maintenance, and construction of natural resources facilities, if assessed for in-house accomplishment
- Implement the Natural Resources Management prescriptions and coordinate prescriptions with the Range Control Division (Range Control) within the Directorate of Plans, Training, Mobilization, and Security (DPTMS) and other affected organizations
- Provide necessary equipment, personal protective gear, and materials to accomplish management strategies

Fish and Wildlife Section. The main responsibility for the implementation of this plan falls on the Fish and Wildlife Section. Below are responsibilities specific to the Fish and Wildlife Section:

- Plan and carry out fish and wildlife management tasks through biologically sound fish and wildlife management techniques
- Provide expertise and support to the Garrison Commander to ensure compliance with restrictions set forth in the Endangered Species Act (ESA) of 1973, as amended, and other applicable laws
- Set hunting season opening and closing dates, bag limits, and other regulations governing the harvest of fish and wildlife resources in cooperation with the Georgia Department of Natural Resources (GADNR)
- Coordinate, through the NRB, with state and federal fish and wildlife management agencies in fulfillment of the installation's fish and wildlife management duties and responsibilities
- Oversee and administer Fort Gordon's iSportsman program which is used as a platform for hunting, fishing and outdoor recreation-related permit sales, for the control of access to training areas for recreation, and for providing information to recreational users
- Coordinate with the DES to ensure enforcement of federal, state, and installation laws and regulations pertaining to fish and wildlife, outdoor recreation, natural resources, and the environment
- Develop information for outdoor recreationists, and the general public in coordination with the Public Affairs Office (PAO)
- Coordinate the preparation and implementation of the RCW Endangered Species Management Component (ESMC) by designating RCW habitat to be burned; providing direction on forest and fire management activities conducted in RCW habitat; and providing personnel and equipment resources to assist the Forestry Section during prescribed burning and wildfire suppression
- Support the Integrated Training Area Management (ITAM) Program, particularly Range and Training Land Assessment (RTLTA) and Land Rehabilitation and Maintenance (LRAM) components through the NRB

Forestry Section. The Forestry Section has significant responsibilities in the implementation of this plan. Below are the responsibilities specific to the Forestry Section:

- Maintain an inventory of Fort Gordon's forest resources
- Restore and manage for longleaf pine/wiregrass (*Aristida stricta*) ecosystem on suitable sites
- Conduct and manage the sale of Fort Gordon's marketable forest resources
- Implement and manage a wildland fire program to reduce forest fuels and support ecosystem management.
- Implement portions of the RCW ESMC pertaining to forest management
- Implement and incorporate Georgia's Best Management Practices (BMPs) for Forestry.

1.4.1.4 Directorate of Plans, Training, Mobilization and Security (DPTMS)

The DPTMS via its Range Control Division is a vital component in the implementation of portions of this plan. Below are responsibilities of Range Control, relative to the implementation of the INRMP:

- Coordinate with and inform DPW of military training requirements and objectives as they relate to the implementation of short- and long-term range development plans
- Coordinate with DPW on upcoming training activities that may affect natural resources
- Provide a weekly range and training area utilization schedule to the DES, Conservation Law Enforcement Officer (CLEO) Section and the NRB, and manage the open and closed areas in the iSportsman system for the control of recreational users

1.4.1.5 Directorate of Family, Morale, Welfare, and Recreation (DFMWR)

The DFMWR is responsible for some recreational aspects of certain hunting and fishing programs. Below are specific responsibilities of DFMWR:

- Plan and conduct group hunting and fishing activities, such as fishing tournaments, kid's fishing events, and operation of the Fort Gordon shooting preserve
- Operate and maintain the Fort Gordon Tactical Advantage

Sportsman Complex Range, which presently consists of an archery range, skeet and trap range, sporting clays course, long-distance range, and the Sportsman Club Lodge

- Plan and develop facilities relating to outdoor recreation resources such as camping areas
- Participate in national and state-sponsored hunting and fishing events such as National Fishing Week and National Hunting and Fishing Day

Outdoor Recreation Program. The DFMWR is responsible for developing the installation's Outdoor Recreation Plan (ORP) and coordinating with DPW. The Outdoor Recreation Program is also responsible for the movement of persons, special events, and organizational elements of outdoor recreation at Fort Gordon. Below are specific responsibilities:

- Plan and conduct group outdoor activities, such as use of the Hilltop Riding Stables and operation of the Pointes West Army Resort (PWAR)
- Plan and develop facilities relating to outdoor recreation resources, such as camping areas, hiking trails, and picnicking areas
- Develop rules and user fees, identification and maintenance of access points, and distribution of outdoor recreation user guidance (e.g., signs, maps, brochures, tour guides).

1.4.1.6 Directorate of Emergency Services (DES)

The DES is a consolidated law enforcement service including patrol operations, investigation, police, physical security, and CLEOs. The DES is responsible for enforcing laws on Fort Gordon, including those pertaining to hunting and fishing, and other natural resources recreation. Specific responsibilities of the Fort Gordon CLEO Section are listed below.

- Implement a Conservation Law Enforcement Program IAW DODI 5525.17
- Enforce federal, state, and installation laws and regulations pertaining to fish and wildlife, environmental and natural resources and other recreational use
- Monitor game harvests through the iSportsman system to ensure compliance with season bag limits

- Patrol woodlands and waters of the installation to enforce laws and regulations pertaining to fish and wildlife, environmental and natural resources and other recreational use
- Execute warrants pertaining to the violation of laws and regulations regarding fish and wildlife, environmental and natural resources and other recreational use
- Seize and take possession of all wildlife or parts thereof taken, caught, killed, captured, possessed or controlled in any manner or for any purpose contrary to the laws and regulations
- Seize as evidence any device other than a boat, vehicle, or aircraft when there is cause to believe that its possession or use is in violation of any provisions of laws or regulations
- Apprehend, if necessary, any person found violating laws or regulations
- Recommend and enforce suspension of access privileges for specified infractions of laws and regulations. Record such suspensions in the iSportsman system
- Coordinate with DPW Environmental Division and DPTMS Range Control on any issues pertaining to environmental regulations, hunting, fishing, and outdoor recreation regulations, training area access, etc.
- Coordinate with other state and federal law enforcement agencies as necessary for the proper completion of wildlife law enforcement duties and responsibilities
- Ensure that Fort Gordon CLEO personnel are qualified and trained to carry out all assigned duties and responsibilities
- Provide sufficient equipment to support the CLEO program for proper completion of program responsibilities
- Utilize the iSportsman system to determine area status, validate user's credentials, etc.

1.4.2 External stakeholders

The USFWS and GADNR are an integral part of the INRMP development, review, and revision process for Fort Gordon. They cooperate in the development of the INRMP and participate in the annual reviews and revisions. Furthermore, USFWS and GADNR participate in the formal 5-year revision of the Fort Gordon INRMP. Fort Gordon can help ensure that USFWS and GADNR remain committed as partners with the Army by implementing their

recommendations in future reviews and revisions of the Fort Gordon INRMP. A Cooperative Agreement between Fort Gordon, USFWS, and GADNR is provided in Appendix C.

1.5 AUTHORITY

This plan was prepared to meet statutory requirements under the Sikes Act Improvement Amendment (hereafter SAIA or Sikes Act), Public Law (PL) 105-85, Division B, Title XXIX, 18 November 1997, 111 Stat 2017-2019, 2020-2022. In November 1997, the Sikes Act, 16 U.S. Code (U.S.C.) § 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 appropriate military installations throughout the U.S. under their respective jurisdictions, unless the secretary determines that the absence of significant natural resources on a particular installation makes the preparation of such a plan inappropriate. In addition, the Act requires that the INRMP is prepared in cooperation with and reflects the mutual agreement of the Secretary of the Interior (acting through the Director of the USFWS) and the head of each appropriate state fish and wildlife agency for the state(s) in which the military installation is located.

AR 200-1 (*Environmental Quality – Environmental Protection and Enhancement*, dated August 2007) is the implementing regulation that ensures that the policies, procedures, and standards for the conservation, management, and restoration of natural resources on military installations are consistent with and in support of the military mission and in consonance with national policies. Additionally, the AR provides general requirements for the content of installation INRMPs, as well as criteria for achieving integration with the installation's mission and other activities. Cooperative agreements with federal and state fish and wildlife agencies set forth in this regulation are superseded, under the amended Sikes Act, by agency's approval of the INRMP.

1.6 STEWARDSHIP AND COMPLIANCE DISCUSSION

The responsibilities of the natural resources management program at Fort Gordon as provided by the U.S. Army can be classified as either meeting stewardship needs or compliance requirements. Stewardship projects (e.g., watchable wildlife project) are based upon the land management responsibility of the U.S. Army, and are not required to be implemented to meet regulatory needs.

Compliance projects (e.g., endangered and threatened species surveys) are mandatory and are required to be implemented to meet laws and regulations that apply to the operations of Fort Gordon.

Fort Gordon considers its stewardship responsibilities during the planning and analyses of natural resources and training projects. For example, potential erosion and mitigation measures to eliminate or reduce erosion would be considered when planning for the construction of a new range or facility. By considering its stewardship responsibilities during the planning and analysis phase, Fort Gordon would eliminate or minimize potential soil erosion and sedimentation in streams and other waterbodies on the installation.

1.7 REVIEW AND REVISION PROCESS

In accordance with the SAIA, DoD, and U.S. Army policy (DoD Instruction 4715.3), Fort Gordon will internally review the INRMP annually and coordinate with USFWS and GADNR. Further, Fort Gordon will formally review the INRMP every 5 years in coordination with USFWS and GADNR. DoD Instruction 4715.3 also requires installation conservation programs to be internally reviewed (installation personnel) annually and externally reviewed (DoD representative) at least every 1 to 3 years. The INRMP will be evaluated annually in the following seven performance areas:

- INRMP Implementation
- Partnership/Cooperation and Effectiveness
- Team Adequacy
- INRMP Impact on the installation's Mission
- Status of Federally Listed Species and Critical Habitat
- Ecosystem Integrity
- Fish and Wildlife Management and Public Use

Annual reviews of the Fort Gordon INRMP will include annual revisions so that the review and revision processes are integrated. Fort Gordon will coordinate annual updated versions of the INRMP with USFWS, GADNR, and IMCOM prior to implementation. Annual accomplishments, anticipated problems for future years, and proposed changes to the INRMP will be identified during the annual reviews. In addition, one year will be added to the plan during each annual revision so that the end result is a rolling 5-year document and the formal 5-year review should not require major revisions.

Appendix D displays the major INRMP implementation actions for the previous 5 years.

1.8 MANAGEMENT STRATEGY

The purpose of natural resources management at Fort Gordon is to support the military mission while maintaining the integrity and biodiversity of the ecosystem. Natural resources management at Fort Gordon relies on an ecosystem-based management philosophy. This strategy blends multiple-use needs and provides a consistent framework for managing military installations, while ensuring the integrity of the ecosystem. The principles, policies, and goals of this type of management system are provided below.

1.8.1 Ecosystem-Based Management Approach

Ecosystem-based management is the current management philosophy being endorsed by DoD and other federal agencies.

“Ecosystem-based conservation is a broad approach to natural resources management that involves identifying, protecting, and restoring complete ecosystems – including the structural components and the processes they undergo – while fully incorporating social, economic, and other human concerns into planning” (Leslie et al. 1996).

The natural resources staff takes an ecosystem approach to management of resources at Fort Gordon. This includes addressing concerns and managing resources at a landscape level and identifying the cumulative impacts of land management techniques.

This philosophy emerged in the 1990s as a response to scientific concerns over decreasing biodiversity at all levels of biological systems. Because DoD is responsible for more than 25 million acres of public lands within the U.S., the issue of biodiversity is relevant to the military. Specifically, the U.S. Army manages approximately 12.5 million acres, the U.S. Air Force (USAF) 9.0 million acres, and the Department of the Navy approximately 3.5 million acres. DoD is the fifth largest federal land manager in terms of acreage (Leslie et al. 1996).

DoD managed lands represent approximately 3 percent of the total federal land holdings. However, there is strong evidence that DoD lands have a disproportionately high biodiversity. According to the DoD there are more than 220 federally listed species confirmed as residents on military lands. In terms of acreage managed, the number of listed species on DoD lands is disproportionately high compared to other federal agencies (Leslie et al. 1996). This is a direct reflection of the wide range of training environments and

strategic locations maintained by the DoD to ensure military readiness. DoD lands include large holdings of a number of vegetative community types, which relates to the diversity of animal species that inhabit these community types. Because of the large land holdings, number of federally listed species compared to acreage, and variety of vegetative community types, DoD controlled lands have a substantial biological significance (Leslie et al. 1996).

The Future Ecosystem Condition (FEC) is a future state of ecological processes that can be realized if goals and objectives are met. FECs are expressed in the context of a military training environment and are organized around the central theme of ecological integrity. Desired ecosystem conditions should be achievable and based on the natural or historic range of ecosystem variation as best as can be determined. In 2008, the NRB conducted research to determine the presettlement vegetation conditions and natural fire regimes that historically occurred on Fort Gordon (Frost and Langley 2008). Results of this study should be consulted when management actions are considered on Fort Gordon. A map showing the presettlement vegetation types is also included in Figure 1-4. Some key FECs include, in abbreviated form:

- the RCW installation population goal (IPG) is obtained
- landscape-scale native species richness are maintained
- invasive species are controlled
- at least 25,434 acres on Fort Gordon are managed as pine and mixed pine/hardwood with longleaf as the predominant upland species
- fire-adapted communities burn every 1 to 5 years
- hardwood community diversity includes viable populations of all appropriate species
- and hydrologic regimes and erosion rates reflect natural rates

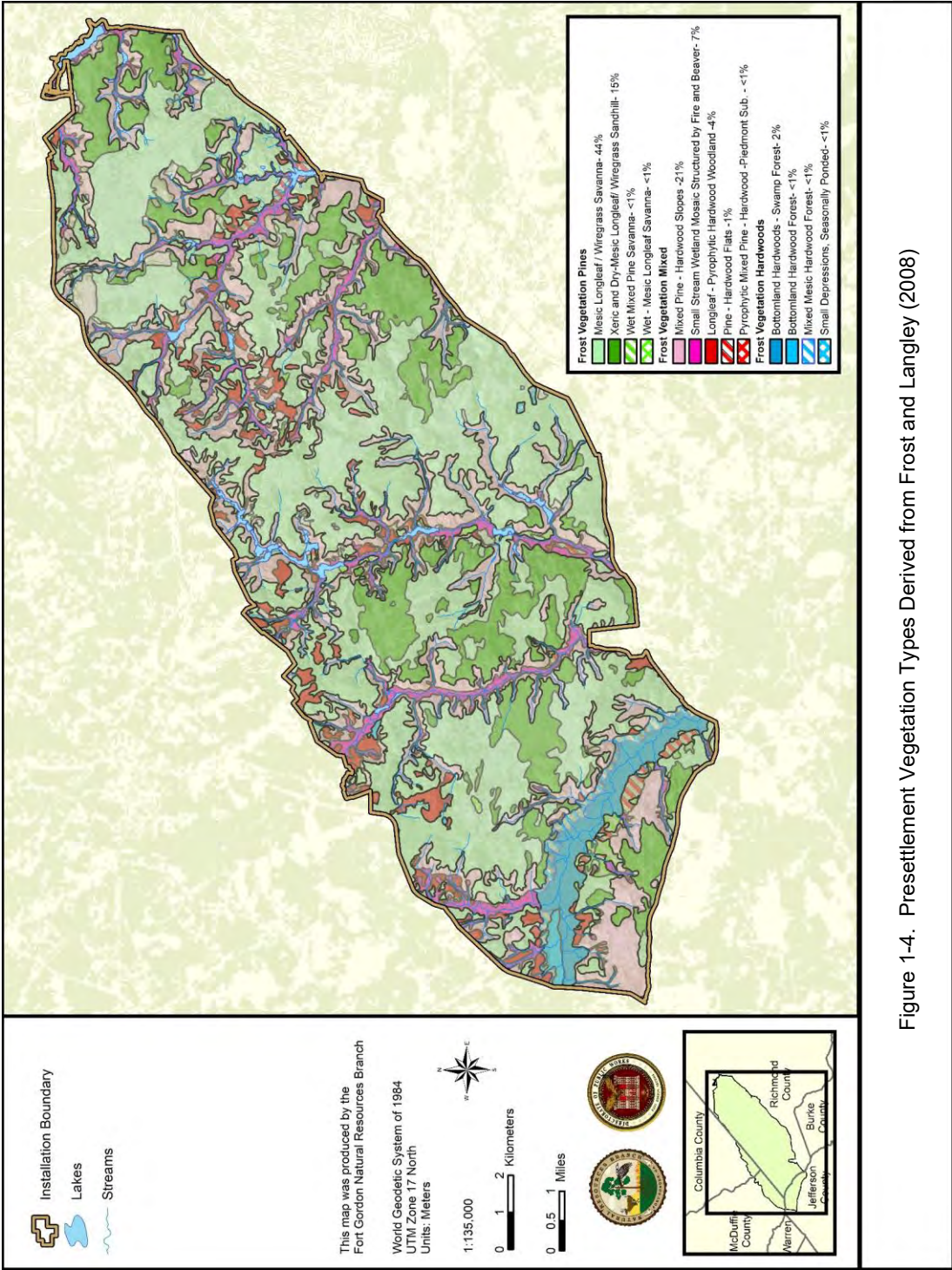


Figure 1-4. Presettlement Vegetation Types Derived from Frost and Langley (2008)

1.8.2 Policy Background

In the 1990s, the military reviewed its natural resources management philosophy in an attempt to improve performance through new management techniques. DoD's commitment to ecosystem management was evident in new policy set forth in 1994. On 8 August 1994, the Deputy Under Secretary of Defense (Environmental Security) issued a policy directive for the *Implementation of Ecosystem Management in the DoD* (Appendix E). This policy directive provides an important change in the philosophy of how DoD will manage its lands. The policy directive states:

“ecosystem management will include: a shift in focus from the protection of individual species to management of ecosystems (ecological approach); formation of partnerships to achieve shared goals (partnerships); public participation in decision making (participation); use of the best available science in decision making (information); implementation of adaptive management techniques (adaptive management).” (DoD 1994).

To further their commitment to ecosystem-based management, DoD and the U.S. Army both have signed a Memorandum of Understanding (MOU), along with 12 other federal agencies that endorse ecosystem-based natural resources management (Appendix F). The MOU sets forth the following policy:

“The Federal Government should provide leadership in and cooperate with activities that foster the ecosystem approach to natural resources management, protection, and assistance. Federal agencies should ensure that they utilize their authorities in a way that facilitates, and does not pose barriers to, the ecosystem approach. Consistent with their assigned missions, federal agencies should administer their programs in a manner that is sensitive to the needs and rights of landowners, local communities, and the public, and should work with them to achieve common goals” (DoD 1995).

Ecosystem components, living and non-living, are linked together by numerous flows of matter and energy. Ecosystems involve repetitive or cyclic phenomena and typically contain a great diversity and number of species, individual organisms, and abiotic components. The living members of ecosystems exhibit a wide array of behaviors,

and intra- and inter-species interactions are varied and often subtle. Recognizing that crucial interdependencies exist within and between ecosystem components is important in establishing successful environmental management policies.

Ecosystem management is the centerpiece of environmental policy in the late twentieth and early twenty-first centuries and is a unifying approach for the management of military lands. Ecosystem management's broad-based approach to natural resources management involves identifying, protecting, and restoring complete ecosystems (including abiotic structural components and natural processes) while fully incorporating social, economic, and other human concerns into planning (DoD 1994).

1.8.3 Ecosystem Management Goals

Fort Gordon has established eight management goals to integrate the ecosystem-based management. These goals were discussed in detail in Section 1.3.3 of this INRMP.

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2.0 CURRENT CONDITIONS AND USE

2.1 INSTALLATION INFORMATION

2.1.1 General Description

Fort Gordon encompasses approximately 55,500 acres in east-central Georgia. Fort Gordon's central installation is located at approximately latitude 33°20' North, longitude 82°15' West. The majority of the installation and the entire cantonment area lie within Richmond County, with a small portion of the training area in Jefferson, Columbia, and McDuffie counties. Fort Gordon also oversees Fort Gillem Enclave in Cobb County, Georgia. 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 bound to the north by U.S. Highway 78, on the east and south by U.S. Highway 1, and on its western perimeter by U.S. Highway 221. Interstate 20 (I-20), located 2 miles north of the installation, and Interstate 520 (Bobby Jones Expressway, I-520), located 2 miles east of Gate One, provide access to the installation. There are no public roads or highways on the installation (Figure 2-1).

Approximately 50,000 acres (90 percent) of Fort Gordon is used for training missions. The installation is subdivided into 49 training areas (TAs), two restricted impact areas (small arms and artillery), and two cantonment areas (main and industrial) (Figure 2-2). Impact areas occupy approximately 13,000 acres and on-post maneuver and TAs occupy approximately 37,000 acres. The remaining 5,500 acres is occupied by cantonment areas, which include military housing, administrative offices, community facilities, medical facilities, industrial facilities maintenance facilities, supply/storage facilities, lakes and ponds, recreational areas, and forested areas.

The installation 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 (MOUT) site/building clearings, one drop zone, and one nuclear, biological, and chemical (NBC) 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.

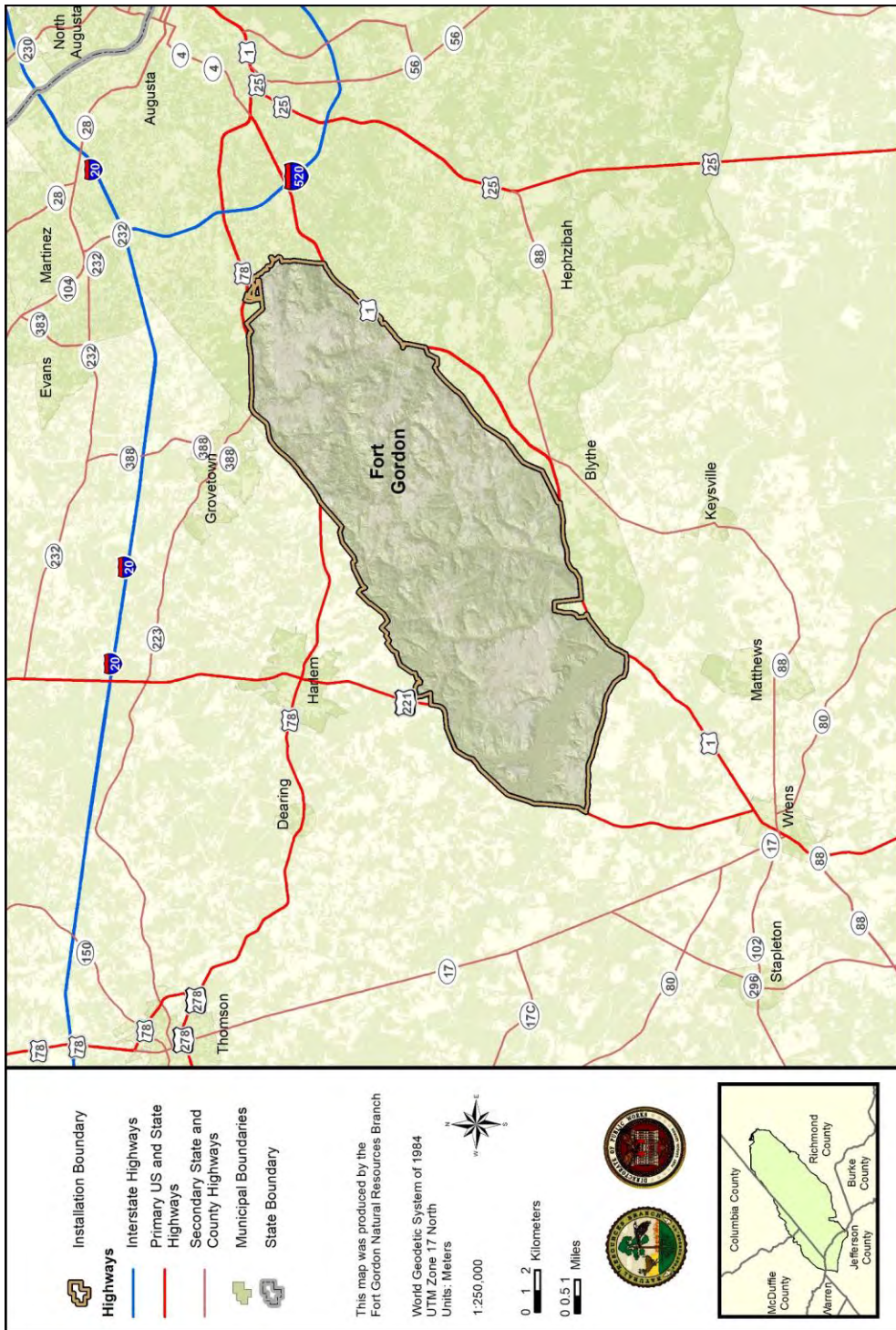


Figure 2-1. Major Transportation Routes Serving Fort Gordon.

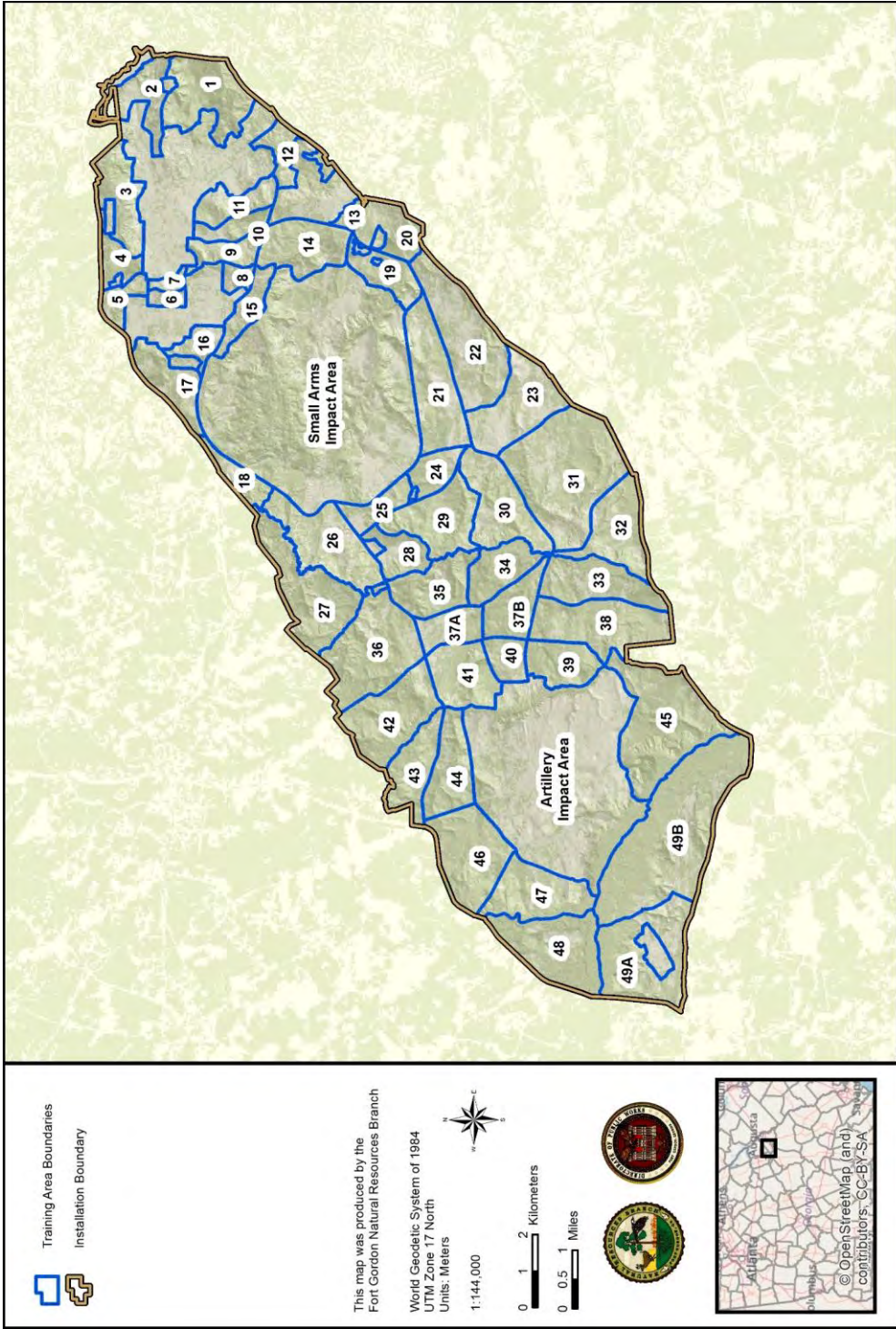


Figure 2-2. Training Areas on Fort Gordon.

2.1.2 Regional Land Uses

The metropolitan area around Fort Gordon encompasses five counties in the states of Georgia and South Carolina (Figure 2-3). Augusta, Georgia, and Aiken, South Carolina, are the largest cities within the metropolitan area.

Augusta is the center for commercial manufacturing, transportation, and medical activities in the metropolitan area. Fort Gordon is critical to the economy of the metropolitan area, generating thousands of jobs and billions of dollars in economic activity and tax revenue (Fort Gordon 2005). The area around Fort Gordon is primarily rural with the exception of two large urban population centers within Columbia and Richmond counties.

Fort Gordon is vital to the economy of the metropolitan area surrounding Fort Gordon.

Land use within one mile of Fort Gordon varies from semi-urban to rural. The area east and northeast 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 north of the installation along U.S. Highway 78/Gordon Highway is commercial. 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.

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.

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 northwest 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 currently under development and scheduled for completion in FY2019.

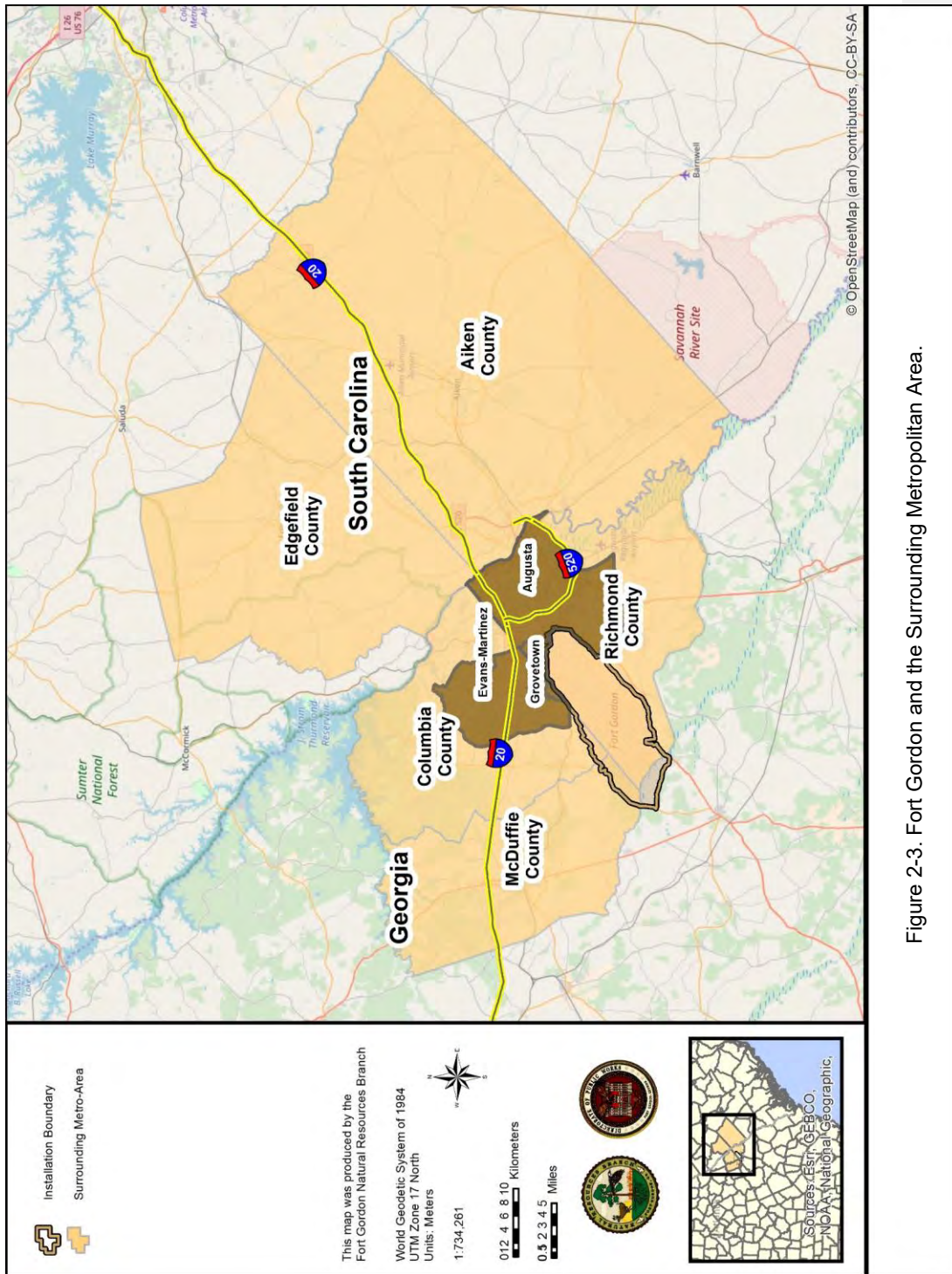


Figure 2-3. Fort Gordon and the Surrounding Metropolitan Area.

Fort Gordon is located within an area that produces a substantial portion of the world's commercial kaolin. Kaolin is an essential element in the production of fine paper used for high-quality printing, and it is also used as a pigment, opacifier, and strengthening agent in paint, plastic, and rubber. Forest production, kaolin mining, and agriculture are predominant land uses of rural areas surrounding the installation.

2.1.3 Abbreviated History and Pre-Military Land Use

2.1.3.1 Pre-Army History of the Fort Gordon Area

Historical records indicate that the first permanent occupation and use of the area in which Fort Gordon now lies began in the late eighteenth and early nineteenth centuries. The first settlers that moved into the area began damming the many streams in the area and constructing water-powered sawmills. Timber surrounding these millponds was cut and hauled to the mill to be sawn into lumber. The lumber was then transported by wagon to Augusta for sale. When all the timber surrounding the mill had been cut out, sawmill operators moved to the next drainage and the process was repeated again. The mill houses themselves were either dismantled and moved to the new location or were converted into gristmills. Some of the land that had been cleared of timber was converted into agriculture fields and most of the rest was left fallow. This process continued until the middle of the nineteenth century when most of the original timber that had been growing in the area had been cut out and agricultural became the primary use of the land in the area. Suitable fields were cultivated for cotton (*Gossypium hirsutum*), corn (*Zea mays*), wheat (*Triticum aestivum*), and tobacco (*Nicotiana tabacum*). Tenant farmers occupied most of the area until the early twentieth century.

After the turn of the century, families from Augusta began purchasing land in the area for use as recreational or leisure areas and began building summer residences and clubhouses surrounding many of the existing old millponds. During this period, Georgia Vitrified Clay and Brick Company purchased several hundred acres in the area to use as a source of clay for manufacturing bricks. Current owners of Georgia Vitrified retain mineral rights on a 96-acre tract in TA 35. Little or no timber management took place from the time the original timber was harvested until after Army occupation. Some of the few remaining longleaf pine trees in the area were used for Naval stores production and other trees were cut for local uses such as for fence posts and out-building construction. However, most occupants were concerned more with raising agricultural crops than with timber production.

After the beginning of the twentieth century, areas that were too wet to farm or that were left fallow began to naturally regenerate themselves with pine seedlings from the few trees that existed along fencerows and in wet areas. Historically, longleaf pine dominated the forested sandy uplands and loblolly pine grew in the wetter soils associated with drainages and in the Piedmont type soils found on the installation. Because of the longleaf pine's sporadic seed crops and their more demanding seedbed requirements, many areas once dominated by longleaf pine were taken over by the more aggressive regenerating loblolly pine. Little or no reforestation took place until after U.S. Army ownership. In 1941, the War Department began purchasing the first of the 559 tracts of land that would become Fort Gordon. Individual tracts ranged from less than 1 acre to several hundred acres in size and altogether totaled approximately 56,000 acres.

2.1.3.2 History of the Army at Fort Gordon

The installation was originally established as Camp Gordon in 1941 and was dedicated on 18 October 1941. It was named in honor of Confederate Lieutenant General John Brown Gordon, who also served as Governor of Georgia and as a U.S. Senator.

Construction of Camp Gordon began in May 1941, and was first occupied on 2 December 1941. During World War II (WWII), Camp Gordon served as a training base for infantry, mechanized infantry, armored cavalry, armor, and as the Southeastern Signal School. The first unit to occupy the new installation was the 4th Infantry Division; however, during WWII, soldiers from the 26th Infantry Division and the 10th Armored Division also trained there. All three units were active in Europe under General George Patton's Third Army. Fort Gordon still serves as home to the 10th Armored Division, although the unit is now inactive.

Camp Gordon also served briefly as a prisoner-of-war (POW) compound toward the end of WWII. A special cemetery was established on-post, near Gate 2, for POWs who died while in captivity at Camp Gordon.

Following the end of WWII, the U.S. Army Personnel Center was established at Camp Gordon. This facility, one of 25 located throughout the country, was responsible for processing returning servicemen and helping with their transition back to civilian life. The post also became home to a U.S. Disciplinary Barracks until 1947. This was a medium-security prison housing military prisoners with sentences of less than 5 years.

In 1948, Camp Gordon became home to the Signal Corps Training Center that moved from Fort Monmouth, New Jersey. The U.S. Military Police (MP) School also relocated from Carlisle Barracks, Pennsylvania. During the early 1950s, many other training units were located at Camp Gordon and during the Korean War saw the re-establishment of basic training at the installation, although this was terminated in 1955.



Military Training on Fort Gordon

The installation was designated as Fort Gordon on 21 March 1956, when it was established as a permanent U.S. Army installation. In August 1956, medical units assigned to Fort Gordon were re-designated Headquarters (HQ), U.S. Army Hospital 3441. This hospital eventually became the present Dwight David Eisenhower Army Medical Center (DDEAMC), a Regional Military Health Facility. In 1958, the Civil Affairs School from Carlisle Barracks, Pennsylvania, was relocated to Fort Gordon.

Combat training operations resumed at Fort Gordon during 1961 when the Army Training Center Infantry was activated, providing basic and advanced infantry training (AIT). In June 1962, Signal Corps training was expanded and the training center was designated the U.S. Army Southeastern Signal School. Basic and AIT brigades at Fort Gordon were deactivated in 1970.

Over the next decade, Signal Corps training was increasingly consolidated at the installation and in 1974, following the relocation of all Signal Corps training units from Fort Monmouth, Fort Gordon was re-designated the U.S. Army Signal Center and Fort Gordon, "Home of the Signal Corps". The Signal Corps training center ("Signal School") has, since that time, provided specialized instruction to Signal Corps military and civilian personnel as well as Marine Corps, Army (non-Signal Corps), Navy, and Air Force personnel and the armed forces of many U.S. allies.

In 2013, the Army decided to locate the Army Cyber Command Headquarters at Fort Gordon. Around the same time, it announced that a Cyber Center of Excellence would be established at Fort

Gordon to promote the training and development of soldiers engaged in cyberspace operations, electronic warfare, and cyber-related signals intelligence. In addition, the Army Chief of Staff approved the development of a new Cyber School at Fort Gordon within the Cyber Center of Excellence, which operates under the Training and Doctrine Command, to unify and integrate training for the Army's rapidly expanding cyber force. Fort Gordon is presently home of the U.S. Army Cyber Center of Excellence which includes the Signal School and a Cyber School. 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 premier site for all automation training and home to the Regimental Non-Commissioned Officer (NCO) Academy.

2.1.3.3 History of Natural Resources Management at Fort Gordon

When Fort Gordon was first established in 1941, the primary land use was farming. This land use was suitable for bobwhite quail (*Colinus virginianus*), rabbits (*Sylvilagus* spp.), mourning doves (*Zenaida macroura*), and many other small game and nongame species. However, as pine plantations replaced small family farms, the abundant small game



Pine Plantation on Fort Gordon

populations shifted to big game species such as white-tailed deer (*Odocoileus virginianus*) and eastern wild turkey (*Meleagris gallopavo silvestris*). Many pine plantations were planted with off-site species such as slash and loblolly pine. In these plantations, fire was excluded, which allowed the midstory to become heavily occupied by scrub oaks such as blackjack oak (*Quercus marilandica*), bluejack (*Q. incana*), and turkey oak (*Q. laevis*). As the midstory became too thick to allow light to reach the forest floor, the native ground cover of grasses and legumes was eliminated or suppressed. Efforts are being made to reestablish the native longleaf pine ecosystem and to reintroduce fire into the ecosystem, to help control the hardwood midstory on sites where longleaf pine and wiregrass once occurred.

In 1962, the Fish and Wildlife Conservation Committee was formed to monitor and guide the Fish and Wildlife Section in the

management of natural resources on Fort Gordon. Cooperative agreements were signed by the Commanding General of Fort Gordon and the Director of Georgia's Game and Fish Commission so that federal and state agencies could combine management efforts. These efforts were primarily for game species such as deer and quail. However, many other game and nongame species benefited from those efforts. Management actions mainly consisted of habitat manipulations such as the creation of 30 lakes, which were reserved as waterfowl and/or fishing areas; installing and maintaining wildlife clearings; and the use of prescribed fire. Those and other techniques are still being used today to benefit fish and wildlife on Fort Gordon.

In the mid-1980s the government was gearing toward privatization. In 1986, operation and management of the Fish and Wildlife Section was contracted to a private entity. The remaining civil service staff was responsible for the management and monitoring of the contract. This system was in place from 1986 until 1989 when the government decided to bring the Fish and Wildlife and Forestry Sections back under the control of the DPW, which is the operating system at the present time.

2.1.4 Military Mission

Fort Gordon Mission partners include all four Services and seven Major Commands that includes:

- Army Cyber Center of Excellence
- Army Cyber Command (ARCYBER)
- 2/100th Trusted Associate Sponsorship System (TASS) Brigade
- Joint Force (JF) HQ Cyber Command (CYBER)
- 7th Signal Command with associated Cyber Brigade
- 67th Signal Battalion
- 35th Signal Brigade (deployable)
- 513th Military Intelligence Brigade (deployable)
- Cyber Protection Teams
- Cyber Readiness and Accreditation Inspection Teams
- Network Enterprise Technology Command (NETCOM) South-Theater Network Operations and Security Center (TNOSC)
- Forces Command (FORSCOM) Signal Brigade

- Intelligence and Security Command (INSCOM) Military Intelligence Brigade
- 706th Military Intelligence (MI) Group/National Security Agency /Central Security Service (NSA/CSS) Georgia
- Naval Security Group Activity
- Air Force 480th Intelligence, Surveillance, and Reconnaissance Group
- Army Cyber Battalion
- Aerial Intelligence Brigade
- Processing/Exploitation and Dissemination Company
- Army Medical Command-Medical Treatment Facilities (MEDCOM MTF)
- Army Dental Command (DENCOM)
- Dwight D. Eisenhower Army Medical Center (DDEAMC)
- Army Regional Training Site-Medical
- Army Veterinary Command (VETCOM)
- Army Communications-Electronics Command (CECOM)
- Georgia National Guard Youth Challenge Academy
- IMCOM tenant units

Additionally, Fort Gordon supports multiple U.S. Army Reserve Components and National Guard units representing the MP, Field Artillery, Engineer, Transportation, Medical and Signal disciplines.

U.S. Army Reserves and National Guard: Fort Gordon supports over 80,000 man-days of reserve component training from units across the continental U.S., with emphasis on forces from Georgia and South Carolina. These units continue to increase with the return of forces from military action conducting home station training. This requirement is anticipated to grow as boots on the ground/dwell time increases.

Other Units: Fort Gordon supports a considerable amount of aerial gunnery and aviation missions with units such as: 3/160th Special Operations Aviation Regiment (SOAR); 3rd Combat Aviation Brigade (CAB) from Hunter Army Airfield (HAAF) in displaced operations and aerial gunnery, the U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC), as well as the Air Force 700th Air Squadron from Dobbins Air Force Base. In addition,

Security and Law Enforcement agencies from the Federal Bureau of Investigation (FBI), Department of Energy (DoE), Federal Law Enforcement Training, Department of Homeland Security, and several local law enforcement agencies utilize Fort Gordon's ranges and TAs.

Fort Gordon is a FORSCOM/Army Contingency Regional Training Support site. As noted above Fort Gordon is used extensively in that capacity to provide range and training area capabilities for units aligned with Fort Stewart (4/3ID, 3D CAB/3ID, 160th SOAR), Fort Bragg (112th Signal Battalion, 160th SOAR, other Special Operations Command [SOCOM] units), and Fort Benning (75th Rangers), as well as sister service support requirements such as the II Marine Expeditionary Force, and a variety of U.S. Marine Corps (USMC) Reserve units.

2.1.4.1 Training

The following is a general description of Fort Gordon's training mission. It was developed for use in the installation's Range Complex Master Plan (RCMP).

The Fort Gordon Training Complex consists of 19 active ranges, a Convoy Live Fire Course, 7 artillery firing points, three mortar points, one drop zone, one fixed-wing runway, special facilities, and 49 training areas. The ranges are supported by a 7,645-acre Small Arms Impact Area (SAIA) and a 5,217-acre Artillery Impact Area (AIA). Adjoining the ranges are 49 maneuver TAs covering 32,037 acres and capable of supporting Battalion and Brigade Combat Support, Service Support, and Heavy/Light Company or Light Airborne Battalion level maneuver. A 300-acre drop zone is embedded in TA 23. Fort Gordon's AIA is covered by Restricted Air Space R3004, which supports live fire in the AIA. Currently, ground observation is used in conjunction with R3004 to provide early warning for aircraft entering the Fort Gordon airspace. Range Control established a Small Arms Range Safety Area (SARSA) to cover small arms firing in the area not covered by Restricted Air Space.

Mechanized training historically occurred on Fort Gordon and is currently restricted to Georgia Army National Guard (GANGB) use. Expanded training sites for both mechanized training and engineer heavy equipment operations were analyzed in a FY2014 programmatic environmental assessment (Range Construction and Ongoing Field Training Operations) though no expansion has occurred to date. Heavy training impacts on Fort Gordon have been limited to two principal areas. The SAIA is located in the center of the installation and encompasses 16 active firing ranges. Heavy artillery detonation occurs in the AIA located on the western end of the installation (see Figure 2-2).



Heavy Artillery Training

Range requirements are based on the training strategies and requirements of Fort Gordon units, which include a deployable Theater Tactical Signal Brigade, a Strategic Military Intelligence Brigade, the U.S. Army Signal Center with an organic Signal Brigade, Regimental Noncommissioned Officer and Officer Academies, the School of Information Technology, a Tactical Signal Battalion (non-deployable), and a deployable MP Detachment. There is also a Joint Regional Security Operation Center, a U.S. Army Reserve Theater Tactical Signal Brigade, and an Army National Guard Engineer Battalion and MP Company on the installation. In addition, three Reserve Component brigade-sized medical units and an artillery battalion train on Fort Gordon and utilize its range and TA assets. Special Operations Forces utilize the AIA for aerial gunnery, and the USAF conducts heavy cargo drop training on Fort Gordon's drop zone day and night. The unit marksmanship strategies are based on guidance found in U.S. Army Pamphlet (PAM) 350-38, theater deployment and mobilization orders including those defining Soldier Focus Area/Warrior Tasks and Battle Drills requirements, and local command guidance.

Fort Gordon's Range Control and ITAM staff is composed of 41 personnel and one ITAM Coordinator (DAC). The staff is actively engaged in live-fire range management, Training Area (TA) management, scheduling of training resources, range safety oversight, range maintenance, land management, and supply functions for the Fort Gordon Training Complex. The Fort Gordon Range Operations Branch is staffed to sustain current and evolving range operational tempo. Staffing provides 18 hours training support for all live-fire operations and TA utilization requirements. With

written approval from DPW, the Range Division coordinates the design, solicitation, award, execution, and oversight of work execution of small range projects and minor range improvements.

Over the past 10 years, Fort Gordon has completed numerous range upgrades and construction projects as outlined in the long-term RCMP. The majority of current and new project work will become sustainment of existing training resources and to identify any emerging training requirements. Projected and planned projects include:



Convoy Training on Fort Gordon

- Convoy Live-Fire Course improvements which will increase capabilities by utilizing existing ranges. This will expand the soldier's training opportunities on the course while sustaining the existing course.
- Development of Electronic Warfare School training capabilities within Training Area 36. Alternate locations are also being considered and will be analyzed after the requirements are determined.
- Improvements, expansion, and sustainment of Preston Drop Zone (FY16-20) to provide increased capability for day and night personnel and equipment/cargo missions.
- Improvements and reconfiguration to the TA37A air strip to support a UAV training site. Improvements to the runway, hanger support, and parking aprons would be included.
- Reactivation and expansion of the field landing strip for C-130 and C-17 aircraft capable of Nighttime Vision Goggle operations.
- Construction of a new high explosive gunnery range capable of approximately one mile of forward maneuver for a Brigade Combat Team. Fort Gordon contains many narrow lakes that can simulate a riverine environment for zodiac special forces training which could support this training.
- Maintenance and improvements to the Artillery Firing Points for the return of GA Army National Guard 214 Field Artillery Battalion training in early FY19.
- Improvements to Range 3, Fire and Maneuver Range, to increase live-capabilities for both offensive and defensive training.
- Development of an Infantry Squad Battle Course in TA40.

2.1.5 Operations and Activities

The military mission and management of natural resources in support of the military mission have the potential to affect the natural environment on Fort Gordon. Military training has the potential to disturb the soil surface, thus resulting in increased soil erosion and sedimentation of surface waters on the installation. Timber harvesting practices associated with forest and wildlife management activities have the potential to disturb soils and increase soil erosion and sedimentation. Soil disturbance also has the potential to impact cultural sites. Any proposed activity with the potential to disturb soil will be reviewed and approved by the Cultural Resources staff as required by the ICMRP, Programmatic Agreement between Fort Gordon and the Georgia State Historic Preservation Office (SHPO) and the National Historic Preservation Act. In addition to soil disturbance, the construction of infrastructure to support the military mission can result in the permanent loss of natural habitats.

2.1.6 Training Constraints and Opportunities

Environmental laws and regulations can limit the military mission and training on DoD installations. Coordination between environmental staff and range planners, and proper management of resources can limit constraints on training. On Fort Gordon, the presence of RCWs and gopher tortoises as well as wetlands limits some training activities in certain TAs (Figure 2-4). Training is allowed in wetlands, but must be coordinated with DPW to ensure that training activities are not in conflict with Section 404 and 401 of the Clean Water Act (CWA). Additionally, military training is restricted to certain activities within 200 feet of active RCW trees.

This same coordination allows range planners to work with environmental staff to ensure future training mission plans align with natural resource management future planning. Areas of special environmental concern considered for planning military training and development are shown in Figure 2-4.

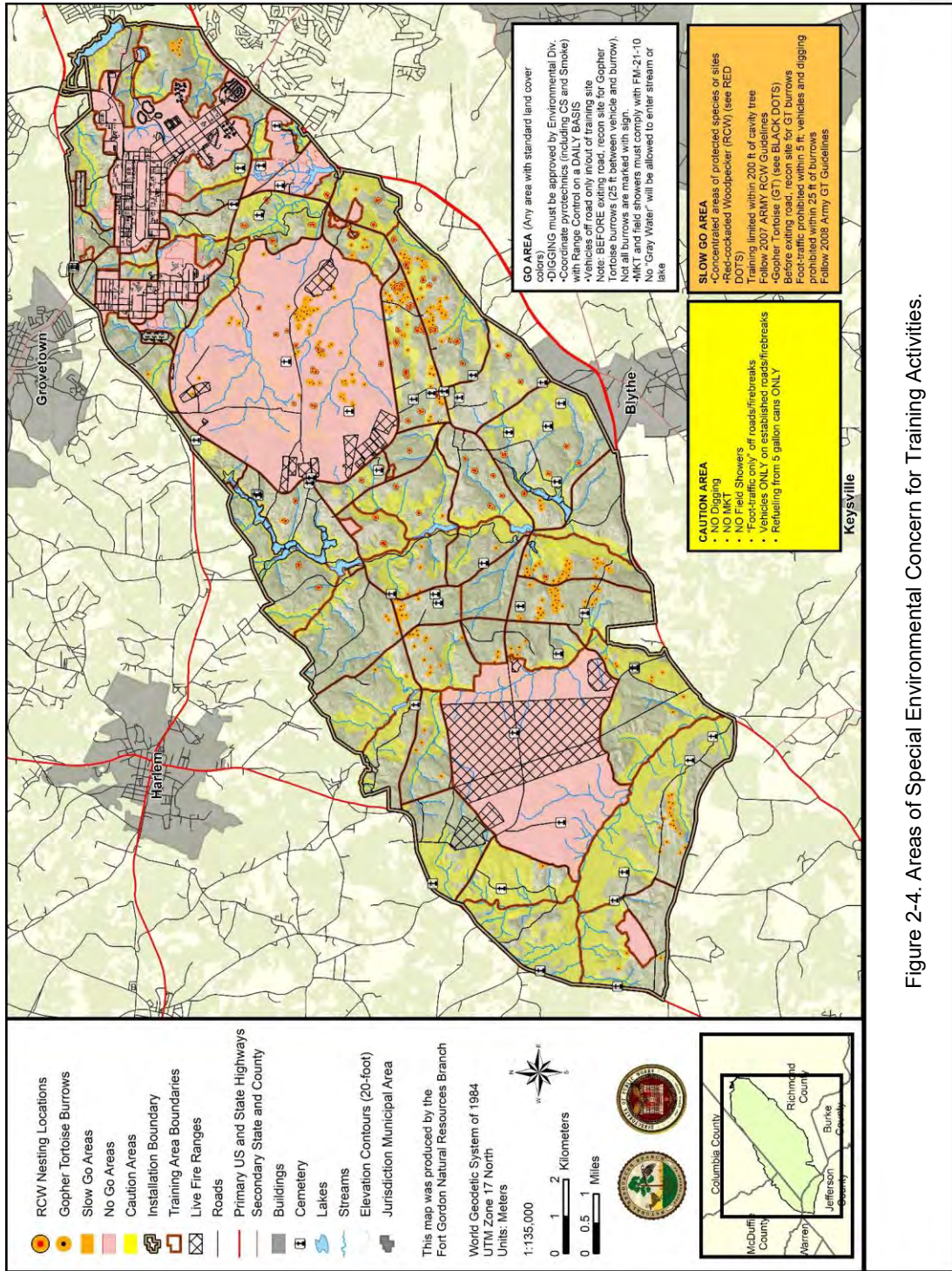


Figure 2-4. Areas of Special Environmental Concern for Training Activities.

2.2 GENERAL PHYSICAL ENVIRONMENT AND ECOSYSTEMS

2.2.1 Current Climate

Fort Gordon is located approximately 200 miles southeast of the Appalachian Mountains, 200 miles northwest of the Atlantic Ocean, and 250 miles northeast of the Gulf of Mexico. Due to the influences from the warm waters of the Gulf of Mexico and Atlantic Ocean, the installation's climate consists of warm, humid summers and short mild winters. The average daily temperature for the month of January is 45 degrees Fahrenheit (°F), and 80° F for the month of July. Measurable snow is rare and remains on the ground only a short time when it does occur. The maximum amount of snow ever recorded in the area was 15 inches, occurring in February 1974. Freezing of the ground is rare, and then to only 0.5 to 3 inches in depth for normally not more than 48 hours. The length of the growing season averages 241 days, lasting from mid-March to mid-November. The first freeze in the fall normally occurs on 12 November, with the last freeze in the spring normally occurring on 16 March. However, freezing temperatures have been observed as early as 17 October and as late as 21 April. Average annual rainfall is approximately 44 inches and is fairly evenly distributed throughout the year, with July normally recording the greatest amount, usually in the form of heavy thunderstorms (Fort Gordon 1998).

Winds are predominantly from the southeast during the spring and summer months and westerly or northwesterly during the winter. Average relative humidity is moderately high throughout the year with a daily fluctuation in excess of 90 percent at sunrise to less than 60 percent by mid-afternoon. Severe weather, such as tornadoes and hurricanes, most often occurs during the spring; however, hurricanes occurring in late summer to early fall can potentially affect the installation (Fort Gordon 1998).

2.2.2 Climate Change

Over the past decade, there have been increasing calls for action by government and non-governmental entities to better understand and address the impacts of climate change on natural resources and the communities that depend on them. On 25 November 2013, DoD issued DoD Manual 4715.03, which requires DoD components to address potential impacts on changing climate conditions in an installation's INRMP (DoD 2013).

The ecosystem effects of climate change will likely be incremental and challenging to distinguish and assess. DoD's analysis to assess potential impacts should be predictive in nature, relying on models to plan for probable complex and indirect changes that are likely to

happen in the future. The DoD components will require an adaptive process of developing, validating, and improving forecast models to develop new and improve existing natural resources management strategies to address global climate change impacts on protected species and species of concern (DoD 2013).

Forest systems provide essential ecosystem services to humans; as climate changes, dependence on these services will likely increase. Forests regulate the timing and flow of surface and groundwater discharges to streams, rivers, reservoirs, and bays; improve and protect water and air quality; store and sequester carbon; control stormwater runoff and prevent flooding; reduce stream temperature; reduce urban heat and provide energy savings; provide wildlife habitat; maintain pollinator communities; protect aquatic resources such as fisheries; provide recreational opportunities; and offer cultural, health, and historic connections between humans and the environment.

Climate-derived effects on forest ecosystems can be divided into four main themes: 1) impacts on forest processes, including tree demographics, productivity, and ecosystem carbon and nutrient cycling; 2) alteration of forest disturbance regimes; 3) shifts in plant and animal species distributions and viability (which may result in novel assemblages or extinctions); and 4) economic impacts on managed forests.

The National Fish, Wildlife and Plants Climate Adaptation Strategy (hereafter Strategy) identified seven primary goals to help fish, wildlife, plants, and ecosystems cope with the impacts of climate change (USFWS et al. 2014). These goals were developed collectively by diverse teams of federal, state, and tribal technical experts and are based on existing research and understanding regarding the needs of fish, wildlife, and plants in the face of climate change. Below is each of the seven goals identified in the Strategy, and how the Fort Gordon INRMP supports their implementation.

Strategy Goal 1: Conserve habitat to support healthy fish, wildlife, and plant populations and ecosystem functions in a changing climate.

- Under Fort Gordon INRMP Goal 1, the installation identifies, maps, and assesses the quality of the installation's habitats and manages across that range of ecological variation.
- Under Fort Gordon INRMP Goal 3, the installation develops management strategies that aim to preserve and restore connectivity and manage for vegetation mosaic across large

land areas over sufficiently long time periods to allow biological evolution and changing system dynamics.

Strategy Goal 2: Manage species and habitats to protect ecosystem functions and provide sustainable cultural, subsistence, recreational, and commercial use in a changing climate.

- Under Fort Gordon INRMP Goal 2, the installation manages natural resources to maintain or restore essential ecological processes integral to species interactions, and ecosystem resiliency on the installation will mimic the natural fire process and preserve natural hydrologic processes.
- Under Fort Gordon INRMP Goal 3, the installation develops management strategies that aim to preserve and restore connectivity and manage for vegetation mosaic across large land areas over sufficiently long time periods to allow biological evolution and changing system dynamics.

Strategy Goal 3: Enhance capacity for effective management in a changing climate.

- Under Fort Gordon INRMP Section 3.7 State Wildlife Action Plans (SWAP), Georgia's goal to conserve the states animals, plants, and natural habitats through proactive measures, habitat restoration, and management by public agencies and private conservation organizations are aligned with Fort Gordon's goals. The SWAP identifies Fort Gordon as containing significant examples of longleaf pine-scrub oak woodland, longleaf pine/wiregrass savannas, Atlantic white cedar swamps, mesic hardwood forest, and blackwater streams.
- Under Fort Gordon INRMP Section 3.4 Beneficial Partnerships and Collaborative Resource Planning, the planning and management of natural resources on Fort Gordon is a collaborative effort that requires input from federal and state agencies, educational institutions, contractors, and other interested parties. Fort Gordon actively shares data and provides access to other federal and state agencies and higher education institutions to conduct research and studies on the installation.

Strategy Goal 4: Support adaptive management in a changing climate through integrated observation and monitoring and use of decision support tools.

- Under Fort Gordon INRMP Goal 5, the installation relies on a scientific monitoring program to repeatedly measure specific variables to detect changes in the status of species, communities, and sites over time. Understanding what factors make some taxa vulnerable is an important step in managing, protecting, or facilitating their recovery. Data collected are used to guide management and identify progress toward goals as part of the adaptive management process.

Strategy Goal 5: Increase knowledge and information on impacts and responses of fish, wildlife, and plants to a changing climate.

- Under Fort Gordon INRMP Section 3.4 Beneficial Partnerships and Collaborative Resource Planning, see Strategy Goal 3 above.

Strategy Goal 6: Increase awareness and motivate action to safeguard fish, wildlife, and plants in a changing climate.

- Under Fort Gordon INRMP Section 3.5.2 Public Outreach, Fort Gordon fosters citizen participation in ecosystem education and stewardship, and participates in regional stewardship/research programs to increase the awareness of the importance of ecosystem management. This has included educational activities with local organizations such as local Boy Scout troops, environmental groups, conservation clubs, and school groups.

Strategy Goal 7: Reduce non-climate stressors to help fish, wildlife, plants, and ecosystems adapt to a changing climate.

- Under Fort Gordon INRMP Section 3.6 Encroachment Partnering, the installation's work with local communities through a Joint Land Use Study and implementation of our Army Compatible Use Buffer (ACUB) Program. The goal of both of these programs is to prevent encroachment of the military mission and protect key natural habitats, ecological systems, and associated wildlife and vegetation outside the installation's boundary. One of the requirements is that areas selected for protection are ecologically connected to the installation.

2.2.3 Topography

Fort Gordon is located along the fall line between the Lower Piedmont and Upper Coastal Plains physiographic provinces (Figure 2-5). In this zone of transition, the topography ranges from the gentle undulating sand hills of the south and middle sections, to areas of steep slopes and near-bluffs adjacent to some of the streams, which are characteristically small and bordered by heavy hardwood swamp areas. The elevation of Fort Gordon ranges between 221 feet and 561 feet above mean sea level (msl), and the majority of the land area (35,852 acres) is between 378 feet and 489 feet above msl.

2.2.4 Geology

Sedimentary rock of the Fall Line Region 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 (Frost 1981).

2.2.5 Mining

Fort Gordon is located within an area that produces a substantial portion of the world's commercial kaolin. Georgia's kaolin has traditionally been valued for its use in the manufacturing of fine paper (e.g., glossy finish) and ceramic goods (e.g., plates, cups, saucers, door and cabinet knobs, light switches). This tradition dates back to colonial times. Modern uses also include heat resistant brick and automotive catalytic converters.

Extensive mining and exploration in the Fort Gordon area indicates a high probability of substantial kaolin deposits on the installation.

A 1,450-acre site on the installation in Jefferson County was studied as an area that could potentially be mined for kaolin. However, kaolin mining would disrupt the military training mission and would have significant impacts on the environment. Therefore, Fort Gordon is not considering allowing any kaolin mining operations on the installation.

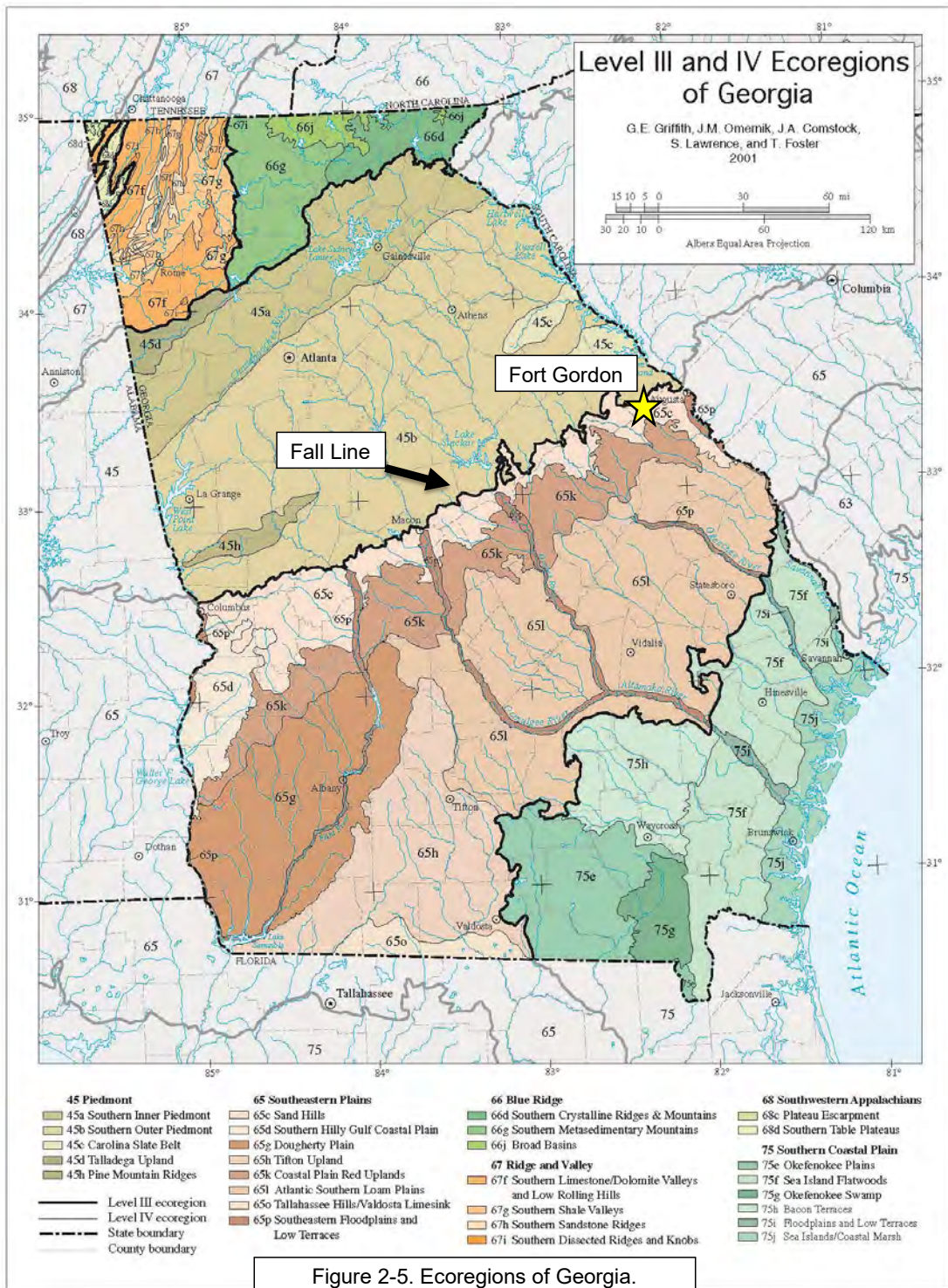


Figure 2-5. Ecoregions of Georgia.

2.2.6 Soils

The U.S. Department of Agriculture (USDA) has performed several soil surveys for this area. One survey was conducted in April 1967 under the sponsorship of the Central Savannah River Area Planning Commission. Another partial survey was completed in September 1978. The Richmond County survey was published in 1981. The soils type names differ between the 1967 and 1981 surveys, even though the soils themselves did not change. The nomenclature and descriptions from the 1981 survey are used in this plan.

The Fall Line Sand Hills Province consists of gently sloping to steep sloping soils derived from marine sands, loams, and clays that were deposited on acid crystalline and metamorphic rocks. The soils are predominantly sandy in character, low in organic matter and moisture holding capacity, very low in natural fertility, and strongly acidic, and require varying applications of lime, potash, and phosphate for growing agricultural crops. The surface and subsurface soil drainage is excessive, requiring more frequent fertilization.

Twenty-six soil classes have been identified on the installation; these soils are further classified by slope and content detail (Figure 2-6). These classifications include such common soil series as Ailey, Bibb, Dothan, Lakeland, Lucy, Orangeburg, Osier, Troup, and Vacluse. These and other soil series can be grouped into associations based on similarities of soils, relief, and drainage (Frost 1981; Paulk 1981). Creek drainages are characterized by well-drained soils such as Troup-Vacluse-Ailey associations. Low-lying, poorly drained soils within drainages typically consist of Bibb-Osier associations. These soils are generally dominated by bottomland hardwood communities. Dry upland habitats are characterized by Troup and Ailey sand series, and are generally dominated by pine/scrub oak communities. Table 2-1 summarizes the soil series found at Fort Gordon and their characteristics.

Table 2-1. 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 sandhills 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: Frost 1981 and Paulk 1981.

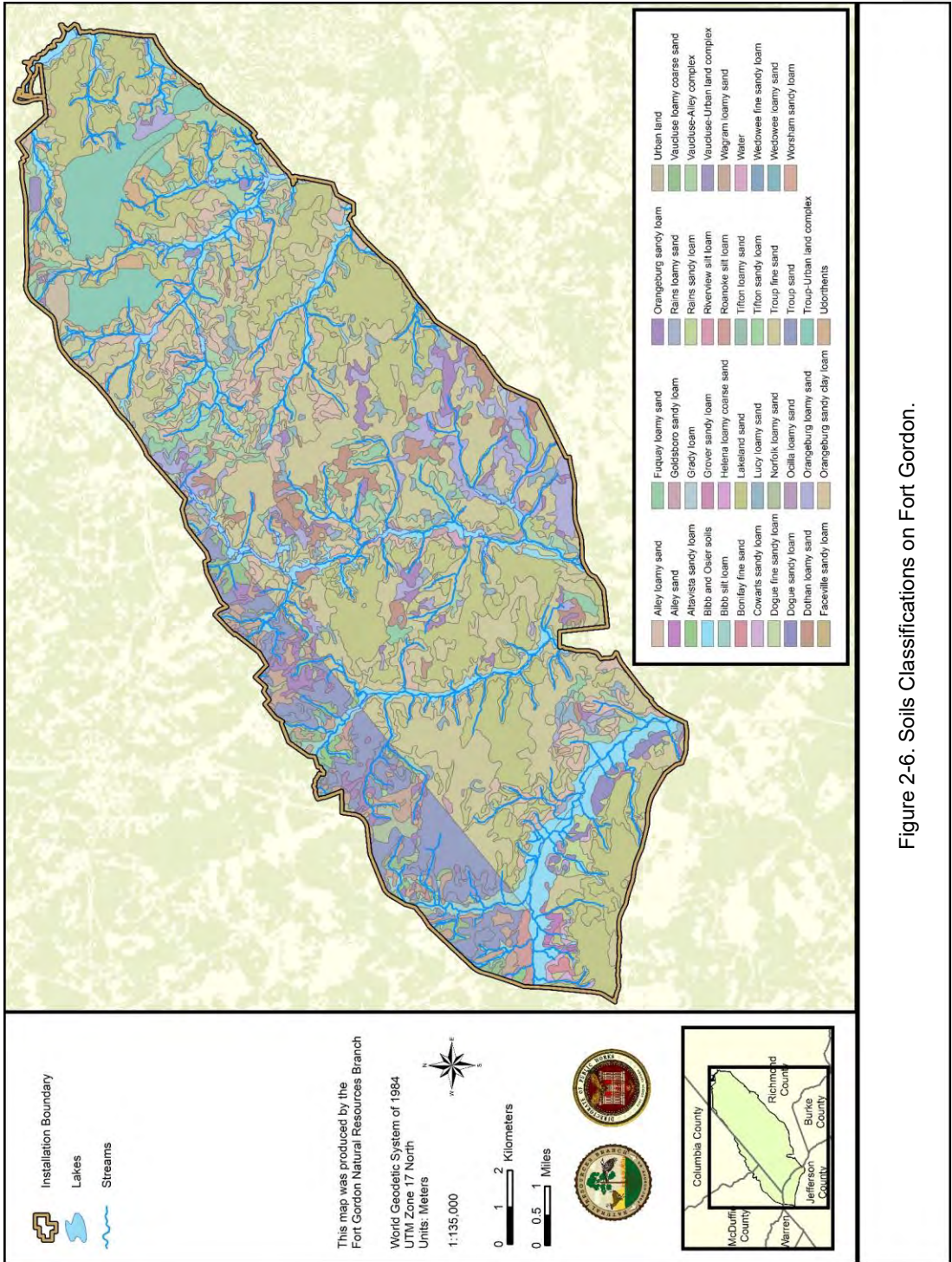


Figure 2-6. Soils Classifications on Fort Gordon.

Twelve of the soil types found on Fort Gordon are considered Prime Farmland under the Farmland Protection Policy Act (FPPA) of 1980 and 1995 (Public Law 97-98, 7 U.S.C. 4201). According to 7 U.S.C. 4201(c)(1)(A), Prime Farmland is defined as “land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oil, seed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, labor, and without intolerable soil erosion.” Additionally, six of the soil types found on Fort Gordon are considered Farmland of Statewide Importance. Farmland of Statewide Importance is defined as “land that is important for the production of food, feed, fiber, forage, and oilseed crops. It economically produces good yields if the soils are drained or protected against flooding, if erosion control practices are installed, or if additional water is applied to overcome droughtiness.” Soils considered either Prime Farmland or Farmland of Statewide Importance are protected under the FPPA. Approximately 5,091 and 2,652 acres of Fort Gordon are considered Prime Farmland or Farmland of Statewide Importance, respectively. The soils considered Prime Farmland or Farmland of Statewide Importance on Fort Gordon are listed in Table 2-2 and shown in Figure 2-7.

Table 2-2. Soils on Fort Gordon Classified as Either Prime Farmlands or Farmlands of Statewide Importance

Soil Type	Slope (percent)	Prime Farmlands (acres)	Farmlands of State Importance
Altavista sandy loam	0 to 2	135	
Dogue fine sandy loam	0 to 3	285	
Dogue sandy loam	0 to 2	250	
Dothan loamy sand	0 to 2	1104	
Faceville sandy loam	2 to 5	10	
Faceville sandy loam	2 to 6	14	
Goldsboro sandy loam		110	
Grover sandy loam	2 to 6	8	
Helena loamy coarse sand	2 to 6	23	
Norfolk loamy sand	2 to 6	256	
Norfolk loamy sand	6 to 10	148	
Orangeburg loamy sand	0 to 2	44	
Orangeburg loamy sand	2 to 5	1181	
Orangeburg sandy loam	2 to 6	264	
Orangeburg sandy loam	5 to 8	871	
Orangeburg sandy loam	6 to 10	354	
Riverview silt loam		1	
Tifton loamy sand	2 to 6	9	
Tifton sandy loam	6 to 10	6	
Wedowee loamy sand	2 to 6	18	
Cowarts sandy loam	5 to 8		21

Table 2-2. continued

Soil Type	Slope (percent)	Prime Farmlands (acres)	Farmlands of State Importance
Fuquay loamy sand	1 to 5		877
Lucy loamy sand	1 to 5		432
Lucy loamy sand	5 to 8		437
Ocilla loamy sand	0 to 2		36
Wagram loamy sand	2 to 6		677
Wagram loamy sand	6 to 10		168
Wedowee loamy sand	6 to 10		4
Total		5,091	2,652

Fort Gordon 2008a

2.2.7 Chemical Analysis

Chemical analyses of improved grounds, as well as other key areas that require planting, have periodically been conducted on the installation. The first was completed in 1953. A second was completed in 1968. The latest analysis on record was performed in 1990.

In 1960, samples were collected from four zones on the cantonment, as well as selected range areas. The analyses were done by the Soils Testing Laboratory, College of Agriculture, University of Georgia, Athens (UGA Athens). Analysis was for Calcium (Ca), Magnesium (Mn), Nitrogen (N), Phosphorous (P205), and Potassium (K20) content. The first analysis indicated that the soils were acidic (pH of 3.5 to 4.5), low in N, low in P205, and low in K20. The latest analysis indicated soils had a pH range from 5.8 to 6.2, low N, medium to high P205, and low to medium K20. Analyses are made on all newly developed areas including ranges and training sites to be grassed and some wildlife food plots. Fertilizer requirements are determined from these analyses. No mechanical analyses were performed with these tests.

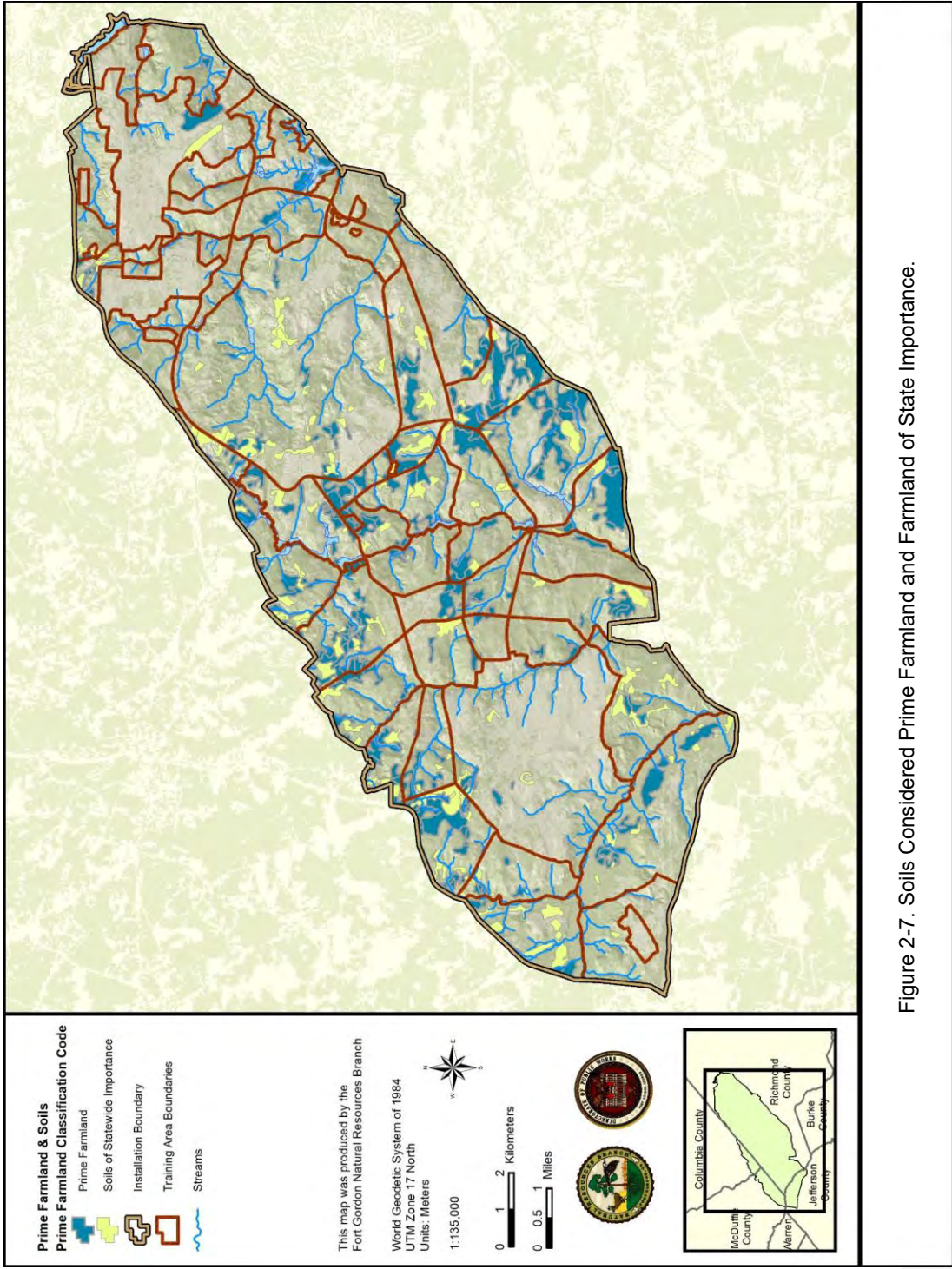


Figure 2-7. Soils Considered Prime Farmland and Farmland of State Importance.

2.3 GENERAL BIOTIC ENVIRONMENT

2.3.1 Target Species

Target species for the purpose of this plan refers to federally endangered and threatened species, as well as Georgia state-listed species (threatened, endangered, rare, or unusual) and Army Species at Risk (SAR). Species considered Army SARs are those that are federal candidate species for ESA listing or are categorized by NatureServe as imperiled or critically imperiled on a global scale, and/or a concern for ESA listing in the foreseeable future. A total of 9 animals and eight plants known to occur on Fort Gordon are listed as such. Table 2-3 lists these species and their status and describes each species' optimum habitat requirement for survival.

The USFWS maintains the list of threatened and endangered species that are protected by the ESA. The ESA provides federal protection for all species designated as endangered or threatened and provides a means to conserve their ecosystems.

The RCW is the only federally listed species known to reside on Fort Gordon. Fort Gordon's historic RCW population gradually declined in the 1980s and was considered extirpated in 1993. The last confirmed sighting was in the summer of 1990. In 1996 a single male RCW was discovered on Fort Gordon. The bird had fledged in 1995 at the Department of Energy's



Savannah River Site. Currently, there are 37 active RCW clusters known at Fort Gordon. Fort Gordon actively manages for the RCW through implementation of the installation's ESMC, provided in Section 4.1 of this INRMP. The ESMC also provides for the management of other target species on Fort Gordon.

In addition to the RCW, one other federally listed animal species, the wood stork (*Mycteria americana*), has been observed on the

installation. The wood stork is a federally endangered species that has been observed foraging and roosting on the installation. Because it is not known to nest on the installation, the wood stork is not considered a resident of Fort Gordon and the installation is not required to manage for this species.



Currently, the USFWS considers the eastern population of the gopher tortoise a candidate species under the ESA. This means that the species is under consideration for ESA listing and there is sufficient information to support such listing. Listing of the gopher tortoise as a federally protected species could create challenges for training and other land use on Fort Gordon. In a proactive effort to prevent future listing of the gopher tortoise under the ESA, the U.S. Army is increasing management efforts for the gopher tortoise on U.S. Army installations. A detailed discussion of gopher tortoise management is provided in Section 4.1.20 and in Appendix X.



Other species of concern present on Fort Gordon can be seen in Table 2-3.

Table 2-3. Target Species List

Common Name	Scientific Name	Status			Description of Habitat
		Federal	State	NatureServe	
Birds					
Bachman's sparrow	<i>Aimophila aestivali</i>	NL	R	G3	Pine savannahs or 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 ^a	<i>Haliaeetus leucocephalus</i>	NL	T	G5	Inland waterways and estuarine areas.
Wood stork ^a	<i>Mycteria americana</i>	E	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 open mature pine with low understory vegetation; forage in open pine stands.
Mammals					
Rafinesque's big-eared bat	<i>Corynorhinus rafinesquii</i>	NL	R	G3G4	Roosts in buildings, bridges, and culverts in forested areas. Forages in both upland pine stands and hardwood stands.
Reptiles and Amphibians					
Gopher tortoise ^b	<i>Gopherus polyphemus</i>	C	T	G3	Well-drained, sandy soils in forest and grassy area, associated with sparse pine overstory.
Southern hognose snake ^b	<i>Heterodon simus</i>	NL	T	G2	Open, sandy woods, fields, and floodplains.
Fish					
Bluebarred pygmy sunfish	<i>Elassoma okatie</i>	NL	E	G2G3	Heavily vegetated creeks, sloughs, and roadside ditches.
Plants					
Sandhill 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.

Table 2-3, continued

Common Name	Scientific Name	Status			Description of Habitat
		Federal	State	NatureServe	
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>	NL	R	G2G3	Bogs, marshes, and alluvial woods.
Indian olive	<i>Nestronia umbellula</i>	NL	R	G4	Dry open upland forest of mixed hardwood and pine.
Sweet pitcher plant	<i>Sarracenia rubra rubra</i>	NL	T	G4T3T4	Acid soils of open bogs, sandhill seeps, Atlantic white cedar swamps, and wet savannahs.
Pickering's morning glory ^b	<i>Stylisma pickeringii</i> <i>var. pickeringii</i>	NL	T	G4T3	Coarse white sands on sandhills near the Fall line and on a few ancient dunes along the Flint and Ohoopee rivers.
Silky camelia	<i>Stewartia malacodendron</i>	NL	R	G4	Steepheads, bayheads, and edge of swamps.

^aTransient presence on Fort Gordon

^bArmy Species at Risk

Status Key: E = Endangered, T = Threatened, C= Candidate, R = Rare, U = Unusual, NL = not listed, G2 = Imperiled, G3 = Vulnerable, G4 = Apparently Secure, G5= Secure, T3 = Vulnerable (subspecies), T4 = Apparently Secure (subspecies)

2.3.2 Wetlands and Deep Water Habitats

2.3.2.1 Wetlands

Approximately 4,395 acres of wetlands occur on Fort Gordon (Figure 2-8). These wetlands consist of both alluvial and nonalluvial wetlands. Alluvial wetlands are associated with stream channels and depend on the flooding regime of the stream system. With the exception of Brier Creek, the floodplain of most alluvial wetlands on Fort Gordon is inconspicuous due to rolling topography. These streams fit the description of “small stream swamps” where separate fluvial features and associated vegetation are too small or poorly developed to distinguish.

Nonalluvial wetlands are associated in areas where groundwater emerges or precipitation is held close to the soil surface. Nonalluvial wetlands on Fort Gordon included seepage areas and isolated wetlands. Seepage areas occur on saturated soils where the water table remains immediately below the soil surface. Plant species associated with these types of wetlands include, but are not limited to, sweetbay magnolia (*Magnolia virginiana*) in the midstory and sweetgum and yellow-poplar (*Liriodendron tulipifera*) in the overstory. Isolated wetlands include small isolated ponds with grasses and herbs as dominant vegetation. If present, the overstory consists primarily of sweetgum and blackgum (*Nyssa biflora*).

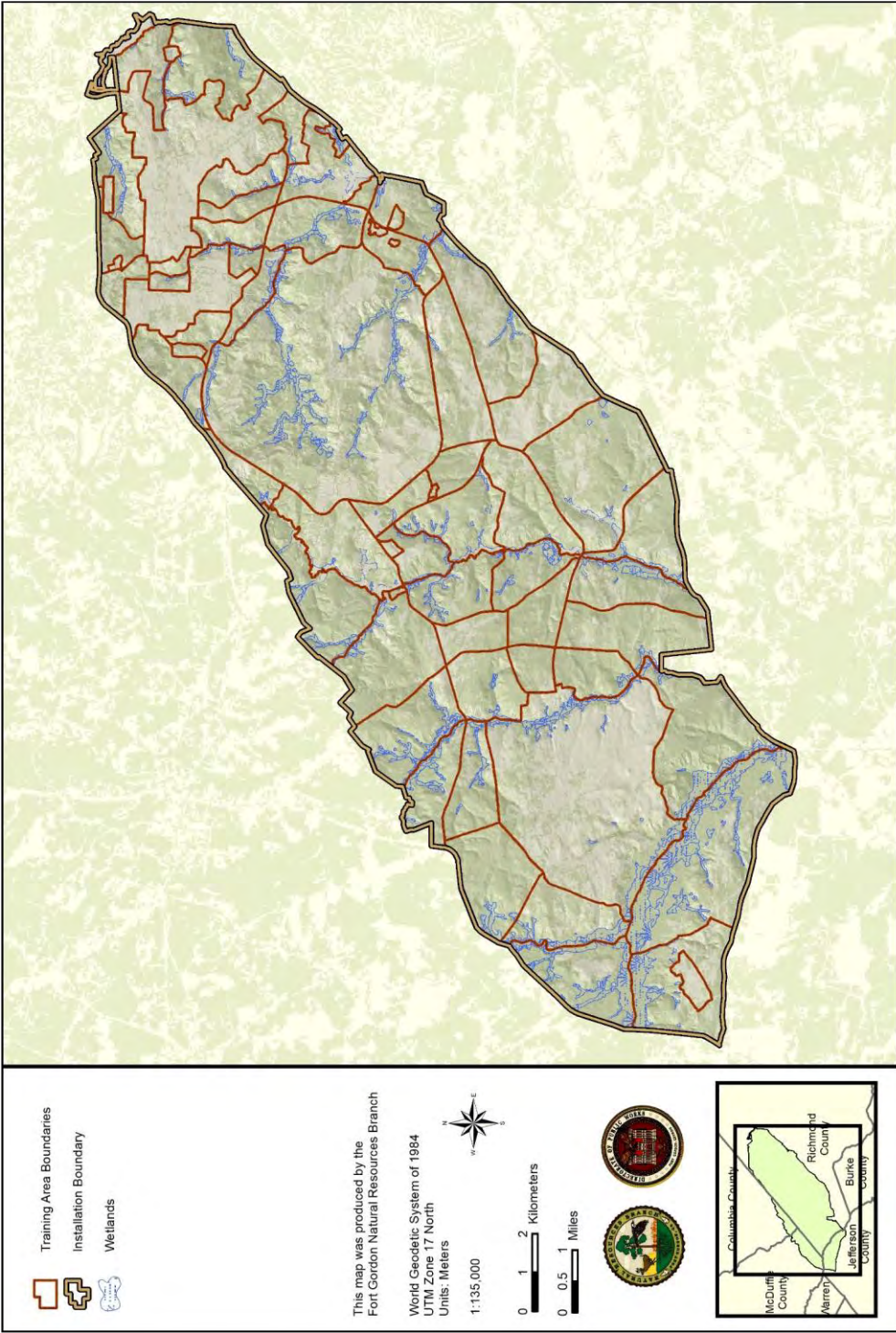


Figure 2-8. Wetlands on Fort Gordon.

2.3.2.2 Lakes and Ponds

Twenty-eight reservoirs and ponds totaling 426 acres are maintained on Fort Gordon (Figure 2-9). These reservoirs and ponds are considered deepwater habitat for aquatic species. A list of impoundments found on Fort Gordon is provided in Table 2-4. The largest are Butler Reservoir (95 acres), Gordon Lake (33 acres), Leitner Pond (33 acres), Lower Leitner Pond (28 acres), and Upper Leitner Pond (25 acres). Of these 28 lakes, 26 are managed for recreational fishing and are discussed in detail in Section 4.4.4 of the Fish and Wildlife Section of this INRMP. Several abandoned millponds were present on the installation at the time of land purchase. Those that were intact were retained for training, soil and water conservation, and recreational use; however, no great effort was made to improve water quality for fisheries until the late 1950s and early to mid-1960s. During that time there was great emphasis placed upon rehabilitating existing impoundments and constructing new ponds, coupled with improvement of the recreational fishing potential under a cooperative agreement with the USFWS Research Extension Service at UGA Athens. This resulted in creating a chain of artificial ponds in a stair-step fashion on Little Sandy Run Creek, Sandy Run Creek, Rachel Branch, and an unnamed tributary of Little Sandy Run Creek. This effort has provided many man-days of recreational fishing for military personnel and other authorized users. Lake and pond management is discussed in detail in Section 4.4.6 Fish Management of this INRMP.

2.3.2.3 Potable Water

Fort Gordon purchases water from the City of Augusta, Richmond County, for drinking and hydrant water. Water in the outlying area of the installation is supplied from six drilled wells.

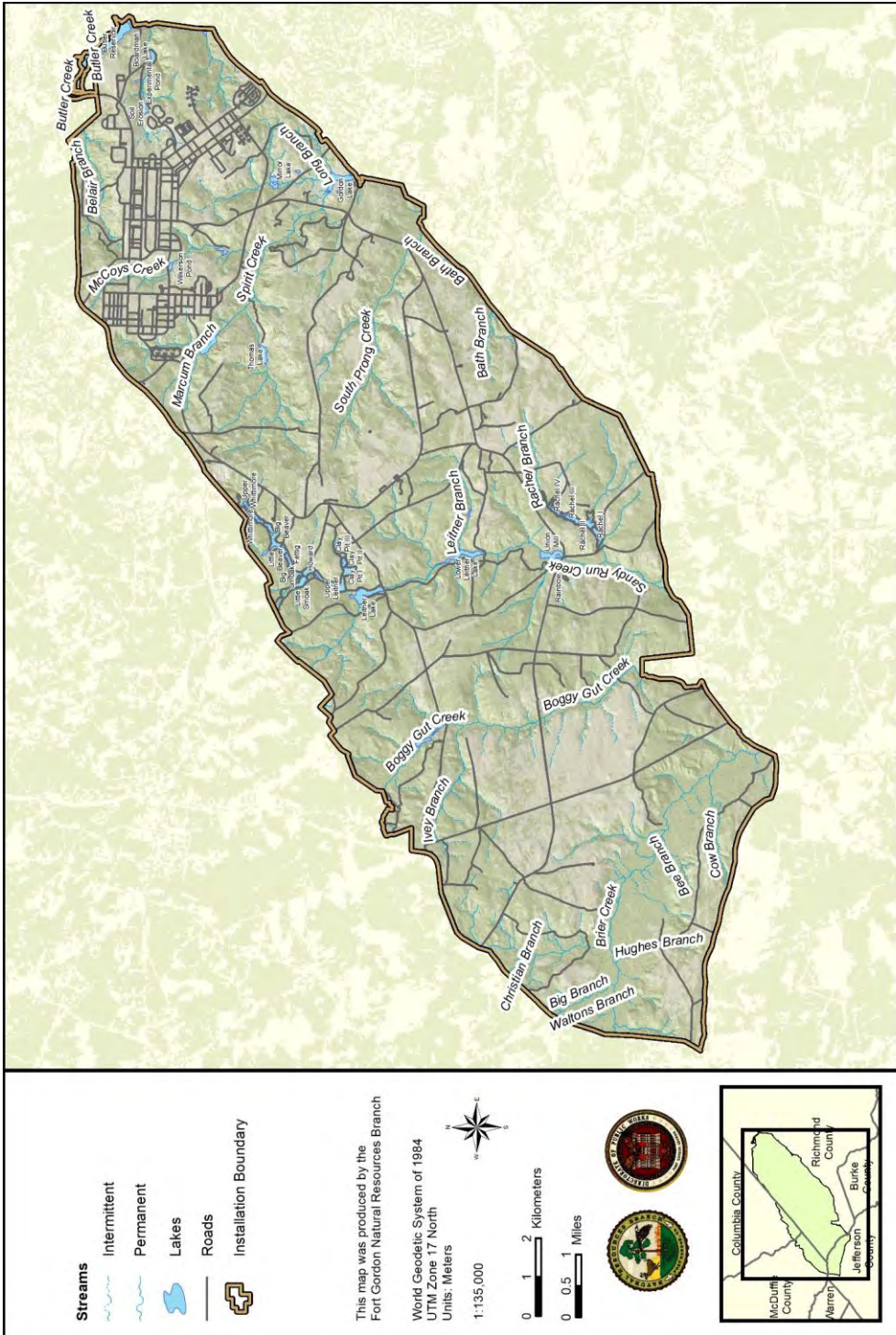


Figure 2-9. Surface Water on Fort Gordon.

Table 2-4. Impoundments Located on Fort Gordon

Lake/Ponds	Area (Acre)	Exist in 1941	Year Built/ Rebuilt	Volume (Acre-Feet)	Dam Type	Hydraulic Height (feet)	Hydraulic Length (feet)
Rainbow	4.6	No (N)	1960s	19	Earth	10	235
Union Mill	20.8	Yes (Y)	2017	69	Earth	8	580
Rachel I	13.6	N	1960s	52	Earth	9	1,020
Rachel II	9.4	N	1960s	35	Earth	11	565
Rachel III	11.3	N	2015	53	Earth	14	320
Rachel IV	5.2	N	2016	21	Earth	15	275
Lower Leitner	28	Y	Unknown	89	Earth	8	695
Leitner	33.1	Y	Unknown	112	Earth	9	300
Upper Leitner	24.7	N	1960	128	Earth	12	430
Clay Pit I	13.4	N	1960s	87	Earth	16	240
Clay Pit II	4.4	N	1960s	26	Earth	15	310
Clay Pit III	2.9	N	2018	15	Earth	11	240
Howard	9.5	Y	1960s	25	Earth	6	260
Little Smoak	11.5	N	1960s	40	Earth	7	240
Big Smoak	14.0	N	1960s	56	Earth	9	220
Fettig	7.5	N	1960s	29	Earth	8	270
Little Beaver	5.7	N	1960s	18	Earth	8	485
Big Beaver	20.7	Y	1960s	109	Earth	12	385
Whittimore	8.4	Y	1960s	32	Earth	9	230
Upper Whittimore*	8.7	N	1960s	50	Earth	8	285
Thomas	19.3	Y	1960s	101	Earth	12	310
Gordon	32.5	N	1987	120	Concrete	9	515
Mirror	10.7	Y	1930s	27	Earth	5	460
Wilkerson	4.3	Y	1960s, 1992	20	Earth	12	120
Soil Erosion	8.3	N	1960, 1977, 1992	121	Earth	23	270
Experimental*	1.7	N	1950s	11	Earth	19	250
Boardman	7.9	Y	<1920, 1992	34	Earth	11	210
Butler	94.8	N	1970, 1992	1,009	Earth	28	758

* Dam failure, little to no water impounded at this time.

2.3.2.4 Streams

Approximately 93 acres of streams of measurable surface area occur on Fort Gordon. Surface water drainage at Fort Gordon is generally toward the Savannah River to the northeast. The major drainage ways on the installation include Butler, Spirit, South Prong, Sandy Run, Boggy Gut, and Brier creeks (Figure 2-9). Spirit Creek originates west of the installation boundary, draining in a southeasterly direction to the Savannah River less than 15 miles south of the installation boundary. Butler Creek originates north of the installation boundary and, similarly, drains to the southeast into the Savannah River. Brier Creek originates in the Piedmont physiographic region northwest of the installation and drains approximately 70 miles southeast to the Savannah River.

There are 89 streams that account for approximately 88 miles of measured watercourses on the installation. The watercourses have been ranked in order using the objective Strahler System. In this classification, first-order streams lie in the highest parts of a drainage basin and are the uppermost runoff channels with well-defined banks. Streams of the order “n+1” are formed by the juncture of two streams of equal rank, and not otherwise. This ranking provides a view of the relative magnitude of stream courses. The ranking for streams on Fort Gordon are presented in Table 2-5. Land managers and planners can use stream rankings as a general guide to land-use capabilities as related to free-moving water. Given the terrain structure and the fact that the majority of the watercourses are low-order unbranched tributaries, drainage is quite good, and there is little likelihood of anything other than very localized flooding of very short duration (U.S. Army Corps of Engineers [USACE] 1999).

Table 2-5. Stream Rankings on Fort Gordon

Stream Ranking (Order)	1	2	3	4	5
Number of Streams	63	17	8	0	1*
Total Length (Miles)	46	18	18	0	6

*Brier Creek enters the installation as a fifth-order stream.
Source: USACE 1999

Suspended solid loads are normally low within these streams, except during periods of high water or floods. Pollution from industrial and municipal sources is generally low.

2.3.2.5 Watershed

Fort Gordon lies in the watershed of five separate watercourses. None of the watersheds are wholly within the installation.

Approximate acreages for watersheds found on Fort Gordon are presented in Table 2-6.

Table 2-6. Watersheds Occurring on Fort Gordon

Watershed	Area (acres)
Butler Creek	3,840
Spirit Creek (including South Prong and Bath branches)	19,200
Sandy Run	13,440
Boggy Gut	11,520
Brier/Headstall creeks	12,800

Source: U.S. Environmental Protection Agency 1999

As part of a larger effort to develop a comprehensive wildlife conservation strategy for the state, GADNR has identified high-priority waters for protecting aquatic biodiversity. High-priority waters and their surrounding watersheds are a high priority for a broad array of conservation activities, which include at least one of the following: watershed-level protection efforts; restoration activities; reforestation of banks and riparian areas with native vegetation; exclusion of livestock; maintenance or restoration of natural flow and temperature regimes; protection of surrounding lands through conservation easements or land acquisition; and development of physical and biological monitoring programs (Fort Gordon 2007).

Many of the streams identified by GADNR as high-priority waters are within Fort Gordon’s boundaries (Figure 2-10). These streams are included in Fort Gordon’s ACUB buffer and are afforded protection on the installation as such.

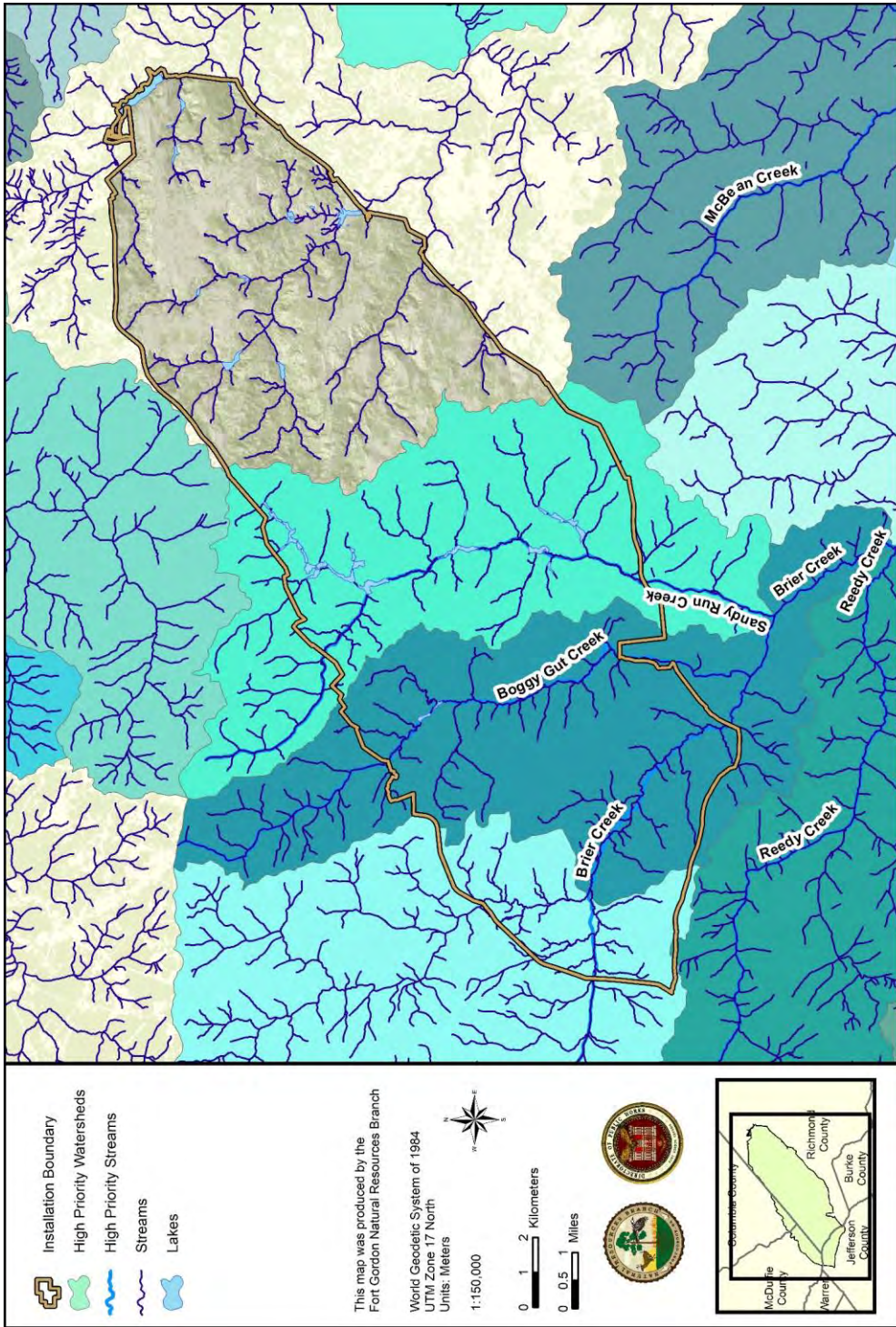


Figure 2-10. High Priority Watersheds and Streams.

2.3.3 Fauna

2.3.3.1 Terrestrial

Fort Gordon is inhabited by a wide variety of wildlife species. Approximately 136 species of birds have been identified on the installation. It is estimated that approximately 31 species of mammals and approximately 67 species of reptiles and amphibians inhabit Fort Gordon. These species are dispersed throughout the various habitats on the installation.

Common mammal species found on the installation include, but are not limited to, gray fox (*Urocyon cinereoargenteus*), opossum (*Didelphis marsupialis*), striped skunk (*Mephitis mephitis*), and coyote (*Canis latrans*). Common bird species found on Fort Gordon include, but are not limited to, northern bobwhite quail, turkey vulture (*Cathartes aura*), pileated woodpecker (*Dryocopus pileatus*), northern mockingbird (*Mimus polyglottos*), red-eyed vireo (*Vireo olivaceus*), tufted titmouse (*Parus biocolor*), and Carolina chickadee (*Parus carolinensis*). Common reptile and amphibian species found on the installation include, but are not limited to, eastern mud turtle (*Kinosternon subrubrum subrubrum*), eastern box turtle (*Terrapene carolina carolina*), southern fence lizard (*Sceloporus undulatus undulatus*), brown water snake (*Nerodia taxispilota*), and eastern kingsnake (*Lampropeltis getula getula*). White-tailed deer, red fox (*Vulpes fulva*), eastern gray squirrel (*Sciurus carolinensis*), raccoon (*Procyon lotor*), eastern cottontail rabbit (*Sylvilagus floridanus*), wood duck (*Aix sponsa*), eastern wild turkey, northern bobwhite quail, and mourning dove are actively managed for sport hunting on Fort Gordon.

2.3.3.2 Aquatic

The DPW, ED stocks designated fishing lakes with channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and redear sunfish (*Lepomis microlophus*). Stocked ponds are identified in the Section 4.4 (Fish and Wildlife Management) of this document. In addition to these stocked species, approximately 56 species of fish are known to occur on Fort Gordon, including the bluebarred pygmy sunfish. This is the only recorded observation of this species in the State of Georgia (Fort Gordon 2001). Common fish species on the installation include, but are limited to, yellow bullhead (*Ameiurus natalis*), flat bullhead (*Ameiurus platycephalus*), bowfin (*Amia calva*), carp (*Cyprinus carpio*), and gizzard shad (*Dorosoma cepedianum*).

2.3.4 Flora

2.3.4.1 Historical Vegetation

Historically, the installation landscape was dominated by longleaf pine forest, dissected by sluggish blackwater streams, seeps, swamps, and pocosins. The sandhill longleaf pine community is characterized by a scattered longleaf pine canopy. A variety of scrub oaks inhabit the understory and midstory, including bluejack oak, blackjack oak, turkey oak, and post oak (*Quercus stellata*). Longleaf pine communities support a species rich groundcover of herbs and graminoids. The longleaf pine community relies on fire to control midstory vegetation. Fire promotes the regeneration of both longleaf pine and herbaceous species. Once the dominant tree species across approximately 56 million acres and ranging over an additional 36 million acres, longleaf pine now occupies less than approximately 1.8 million acres of intact pine/wiregrass habitat (Frost 1993). European settlement has resulted in a loss of more than 95 percent of the natural plant communities that comprised the original range of longleaf pine dominated ecosystems. Logging of the southeast forest during the period 1870 to 1920 removed nearly all of the original timber in the southeast. Following the logging era, land uses such as agriculture, open range livestock grazing, logging, turpentine production, and the elimination of wildfires have contributed to the loss of longleaf pine communities. Large expanses of the original longleaf pine community range have been converted to off-site pine species such as loblolly pine and slash pine as a result of planting previously logged longleaf pine sites (Frost 1993). This is true on the installation where loblolly and slash pine occupy large expanses of historical longleaf pine habitat (Fort Gordon 2001). See Figure 1-4 which shows the most likely composition and distribution of historical vegetation types on Fort Gordon.

2.3.4.2 Vegetation Classification

Fort Gordon exhibits a large variety of native vegetation characteristic of both the Upper Coastal Plain and Lower Piedmont Plateau physiographic provinces. The type of vegetation is dictated partially by elevation. The small- and large-scale topographic diversity between upland areas and streams forms a gradient of moisture conditions along slopes and vegetation types. Natural communities range from xeric, fire-prone uplands to moist bottomland swamp forest, subject to periodic flooding. Nearly 78 percent of the installation is in forest cover. Common plant species on the installation include, but are not limited to, longleaf pine, loblolly pine, southern wiregrass, white oak (*Quercus alba*), hickory (*Carya* spp.), flowering dogwood (*Cornus florida*), blueberry (*Vaccinium*

spp.), water oak (*Quercus nigra*), and broomsedge (*Andropogon virginicus*).

In 2012, Fort Gordon completed a forest vegetation inventory for the entire installation. This inventory describes and quantifies ground cover vegetation, as well as midstory and overstory forest resources. The inventory is updated periodically to incorporate recent forest management actions such as thinnings and plantings. Table 2-7 provides a breakdown of the area occupied by each forest stand type on the installation.

Table 2-7. Vegetation Communities Found on Fort Gordon

Vegetation Community	Area (acres)	Percent of Installation
Pine forest, natural longleaf	8,302	15
Pine forest, planted longleaf	3,600	6
Pine forest, other natural pines	11,694	21
Pine forest, other planted pines	5,557	10
Mixed pine/hardwood forest	7,476	13
Upland hardwood forest	1,691	3
Bottomland hardwood forest	4,475	8
Water	592	1
Other (Not Inventoried)	12,096	22

Fort Gordon 2014

The following sections describe the forest stand types as identified in the 2012 forest vegetation inventory.

Pine Forest

This is the most common plant community found on Fort Gordon and it is located throughout the installation. It comprises approximately 52 percent of the installation’s vegetation communities. Dominant overstory species are loblolly pine, longleaf pine, shortleaf pine (*P. echinata*), and slash pine. Understory species consist of immature pines, honeysuckle (*Lonicera japonica*), scrub oak, sumac (*Rhus* spp.), poison oak (*Toxicodendron pubescens*), and short grasses. Approximately 16 percent of the installation consists of planted pine stands that have been established as a result of reforestation or restoration practices. The remaining 36 percent of pine forest consists of natural pine stands.

Mixed Pine/Hardwood Forest

This plant community is found in scattered small tracts over a wide area of the installation. It occurs on approximately 13 percent of the installation's vegetation communities. Dominant species include loblolly pine, longleaf pine, sweetgum, hickory, yellow-poplar, and various oak species. Undergrowth varies from light to dense, consisting of honeysuckle, wax myrtle (*Morella cerifera*), sumac, and scrub oak.

Bottomland Hardwood Forest

This plant community is less common throughout the installation and is present mostly in the area surrounding Brier Creek on the southwest end of the installation. Approximately 8 percent of the installation's vegetation communities are inhabited by this plant community. Common species in the overstory are white oak, American beech (*Fagus grandifolia*), hickory, red maple (*Acer* spp.), ash (*Fraxinus* spp.), blackgum, swamp chestnut oak (*Quercus michauxii*), willow oak (*Quercus stellata*), and yellow-poplar. The understory is medium to dense and consists of wax myrtle, sumac, scrub oak, and honeysuckle.

Upland Hardwood Forest

This community is even less common than the bottomland hardwood forest. It occupies 3 percent of the installation land area. Upland hardwood areas exist in small patches scattered throughout the installation, often adjacent to stands of upland mixed pine and hardwoods. Species in this community include white oak, hickory, sweetgum, dogwood, and various red oak species. Understory in this community is often sparse and consists of grape (*Vitis* spp.) vines, honeysuckle, and several *Vaccinium* species.

Other

This category encompasses all other land area not included in the above categories. It could include, but is not limited to openings, training sites, ranges and impact areas, open water, buildings, roadways, cemeteries, wildlife food plots, and other unclassified areas.

2.3.5 Non-native Species

Non-native species are plant and animal species that have become established outside their natural range as a result of intentional or unintentional introduction. Some of these species are more aggressive and prolific than native species and can have the potential to alter natural ecological process or replace native species.

Non-native species known to occur on Fort Gordon include kudzu (*Pueria montana* var. *lobata*), weeping lovegrass (*Eragrostis curvula*), Chinese privet (*Ligustrum sinense*), bamboo (*Phyllostachys aurea*), cogongrass (*Imperata cylindrica*), feral hogs (*Sus scrofa*), and red fire ants (*Solenopsis invicta*). The need for control of non-native species depends on their effect on native species, their ability to colonize new sites, and their potential to spread within sites. Control of these species should be determined on a case by case basis.

Kudzu is an example of a non-native species that is very aggressive and interferes with installed facilities such as utility poles, and progressively encroaches upon valuable woodland species and habitats. The species was originally planted to control erosion, which was unsuccessful, and in recent years the DPW and Forestry Section have initiated a program to eradicate kudzu from Fort Gordon. This program is discussed in detail in Section 4.9 (Pest Management) of this document.

2.3.6 Poisonous Plants

Poison ivy and poison oak are the only poisonous plants present in large quantities that would have any impact on humans. These plants are common members of the natural plant communities of the southeast, and can seriously affect sensitive people. Although these plants seldom occur in the immediate cantonment area or heavily maintained locations, they are eliminated physically or chemically when they do occur. There is no program attempting to eliminate these species from the entire training environment, as this would be cost-prohibitive and serve no real purpose.

3.0 ENVIRONMENTAL MANAGEMENT STRATEGY AND MISSION SUSTAINABILITY

3.1 SUPPORTING SUSTAINABILITY OF THE MILITARY MISSION AND THE NATURAL ENVIRONMENT

The NRB is a participant in the Sustainability Management System (SMS). This process allows an organization to control the impact of its activities, products, or services on the natural environment, allowing it not only to achieve and maintain compliance with current environmental requirements, but also to recognize and proactively manage future issues that might impact mission sustainability.

Fort Gordon's NRB staff assist in the implementation of the installation's ITAM Program, Forest Management Plan, and Recreation Plan, implement timber sales, and provide measures for water quality improvement in support of the sustainability of the military mission.

Monitoring and measurement is fundamental to adaptive management and mission sustainability. It ensures the effectiveness of the management, plans, controls, and training. Furthermore, it enables Fort Gordon to identify its progress toward achieving objectives and targets, as well as the reasons for the installation's level of achievement. Without effective monitoring and measurement it would be impossible for Fort Gordon to continually improve, which is the basis of sustainability. Monitoring protocols and standard operating procedures (SOPs) are maintained in the Natural Resources field office, but are tracked within the SMS document management system to ensure that the correct versions are being used.

3.1.1 Integrate Military Mission and Sustainable Land Use

The U.S. Army's ITAM is an integral part of the implementation of an INRMP on an installation. The ITAM is a comprehensive approach to land management on all U.S. Army installations. It is the U.S. Army's standard for sustaining the capability of installation land units to support their military training missions. The goals of the ITAM include the following:

- Achieve optimal sustained use of lands for the execution of realistic training by providing a sustainable core capability, which balances usage, condition, and level of maintenance.
- Implement a management and decision-making process that integrates U.S. Army training and other mission requirements for land use with sound natural and cultural resources management.

- Advocate proactive conservation and land management.
- Align U.S. Army training land management priorities with U.S. Army training, testing, and readiness priorities.

Through the ITAM and its constituent elements (e.g., RTLA and LRAM) Fort Gordon integrates the use of its lands for meeting the current and future military mission and ensuring the conservation of the natural resources on which effective training relies.

3.1.2 Impact on the Military Mission

The military mission at Fort Gordon requires available land for the training of military units. However, the installation must comply with environmental regulations and strive to conserve the natural resources on which effective training relies. Through the coordination of the various environmental programs (e.g., Forest Management, Fish and Wildlife Management) and the ITAM, Fort Gordon ensures the availability of quality training lands and the protection of the natural resources on these lands. During the planning phase of natural resources or training management, the NRB and DPTMS's ITAM Coordinator closely coordinate to ensure the compatibility between the military mission and training requirements and natural resources. During this planning process, resolutions are established to ensure that environmental regulations (e.g., ESA) are being satisfied while still providing sufficient land use to meet the military mission. For example, the signal training that occurs on Fort Gordon has a low impact on the environment. Signal units may train in TAs with a RCW cluster as long as only activities authorized by the 2007 U.S. Army Management Guidelines for the RCW on U.S. Army installations (Army 2007a) occur within the 200-foot buffer around an RCW cavity tree. Further, the NRB coordinates all natural resources management activities with DPTMS's Range Control to ensure that there is no conflict with military training.

3.1.3 Relationship to Range Complex Master Plan or Other Operational Area Plans

Through the INRMP, planning for both training activities and natural resources activities are coordinated between DPW and DPTMS. This ensures that the military mission is not compromised and that Fort Gordon is meeting the mandated environmental regulatory requirements. Through ITAM, environmental resources are considered during the planning of future sites to support the military mission. Additionally, the NRB considers future range plans when developing natural resources projects, such as establishing a recruitment cluster for the RCW.

3.2 NATURAL RESOURCES CONSULTATION REQUIREMENTS

The ESA requires federal agencies to ensure that their activities do not have an adverse impact on any species listed as threatened or endangered by the USFWS. It further requires that federal agencies implement measures to conserve, protect, and, where possible, enhance any listed species and its habitat.

Fort Gordon coordinates with USFWS on any actions that have the potential to impact threatened, endangered, or sensitive species. The installation maintains a dialogue with USFWS and conducts numerous informal Section 7 consultations every year. Early informal consultation with the USFWS is the key to resolving potential problems and addresses issues in a proactive and positive manner and is the preferred method of consultation. Informal consultation includes all discussions and correspondence between USFWS and Fort Gordon and occurs prior to formal consultation to determine whether a proposed federal action may affect listed species or critical habitat. In addition to this INRMP, many projects that are planned will require informal consultation with USFWS depending on the project scope. A flow chart of the informal consultation process is provided in Figure 3-1.

Fort Gordon works closely with USFWS to ensure the installation is in compliance with the ESA.

Fort Gordon may determine, through the informal consultation process or simply by the nature of the proposed action, that formal consultation is required for an action. If Fort Gordon determines that an activity may have an effect upon a listed species, the installation is required under Section 7 of the ESA to enter into formal consultation with USFWS to determine whether a proposed action is likely to jeopardize the continued existence of listed species, destroy or adversely modify designated critical habitats, or potentially result in the incidental take of a species.

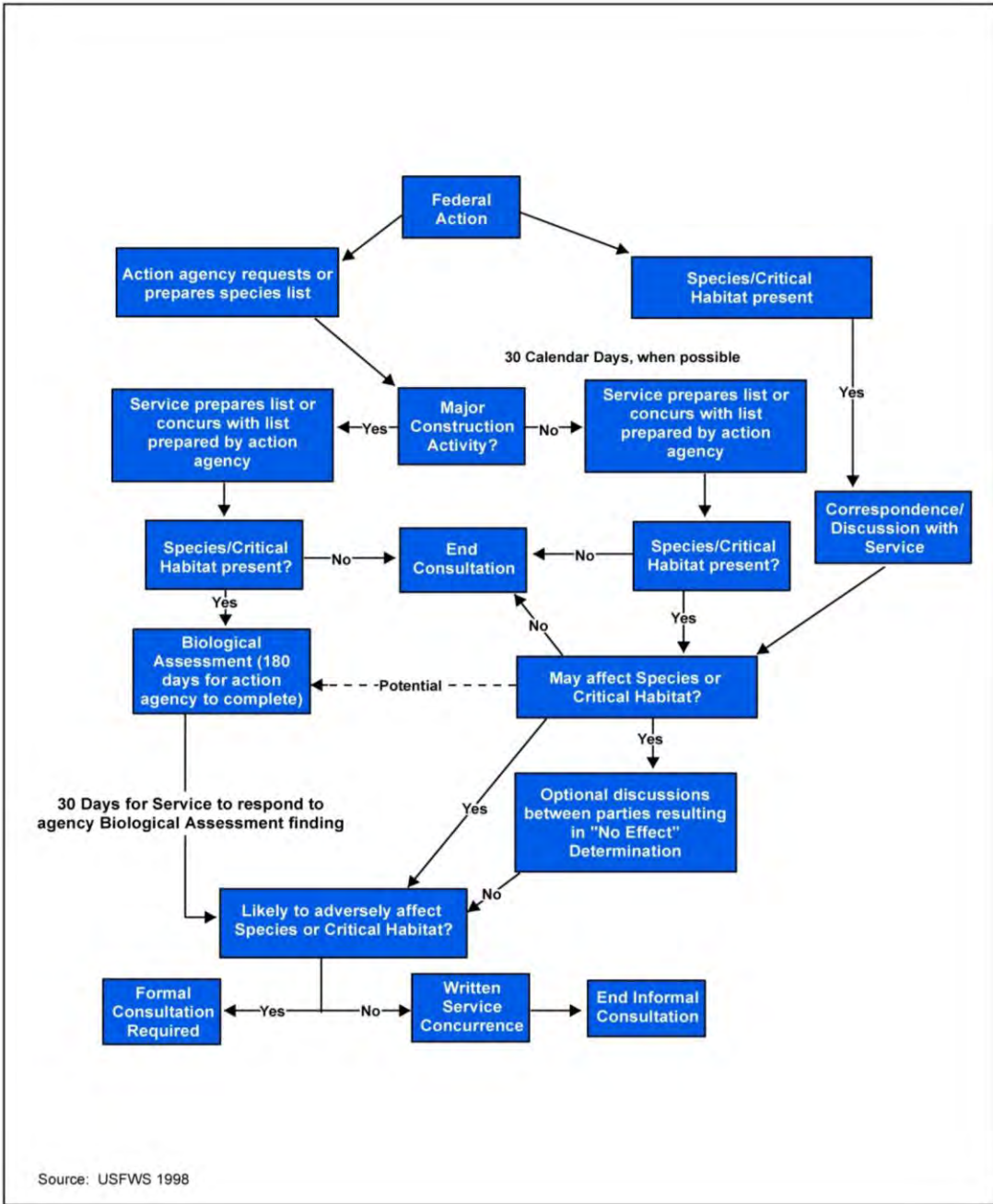


Figure 3-1. Organizational Chart for Informal Consultation Process

The consultation process begins with Fort Gordon's written request and submittal of a complete initiation package and concludes with USFWS's issuance of a biological opinion (BO) and "incidental take" statement, if applicable. The ESMC of this INRMP, due to the potential for management actions to result in the incidental take of a RCW, will require development of a biological assessment and formal consultation with the USFWS. Currently there are no other known projects on Fort Gordon that should require formal consultation. A flow chart detailing the steps of the formal consultation process is shown at Figure 3-2.

Migratory birds are specifically protected under the Migratory Bird Treaty Act (MBTA) of 1918, as amended and Executive Order (EO) 13186 of 10 January 2001, Responsibilities of Federal Agencies to Protect Migratory Birds. The MBTA makes it illegal to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products, except as allowed by the implementing regulations. EO 13186 requires that federal agencies avoid or minimize the impacts of their activities on migratory birds and make efforts to protect birds and their habitat. However, military preparedness and readiness activities such as signal training are exempt from the MBTA. Although exempt, the U.S. Army is responsible for monitoring the potential impacts on migratory birds from military readiness activities. This monitoring will be carried out in conjunction with monitoring and management conducted under EO 13186 as specified in the MOU between the DoD and the USFWS to Promote the Conservation of Migratory Birds dated 31 July 2006, and in DoD Guidance to implement said memorandum dated 3 April 2007. For information pertaining to migratory bird monument on Fort Gordon see section 4.7.

3.3 NEPA COMPLIANCE

The National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4371 et seq.) is the basic National charter for the protection of the environment. NEPA established the policy, sets goals, and provides means for carrying out the policy. Federal agencies' actions must comply with NEPA. NEPA requires that all federal agencies involve interested members of the public in their decision making, consider reasonable alternatives to proposed actions, develop measures to mitigate environmental impacts, and prepare environmental documents that disclose the impacts of proposed actions and alternatives.

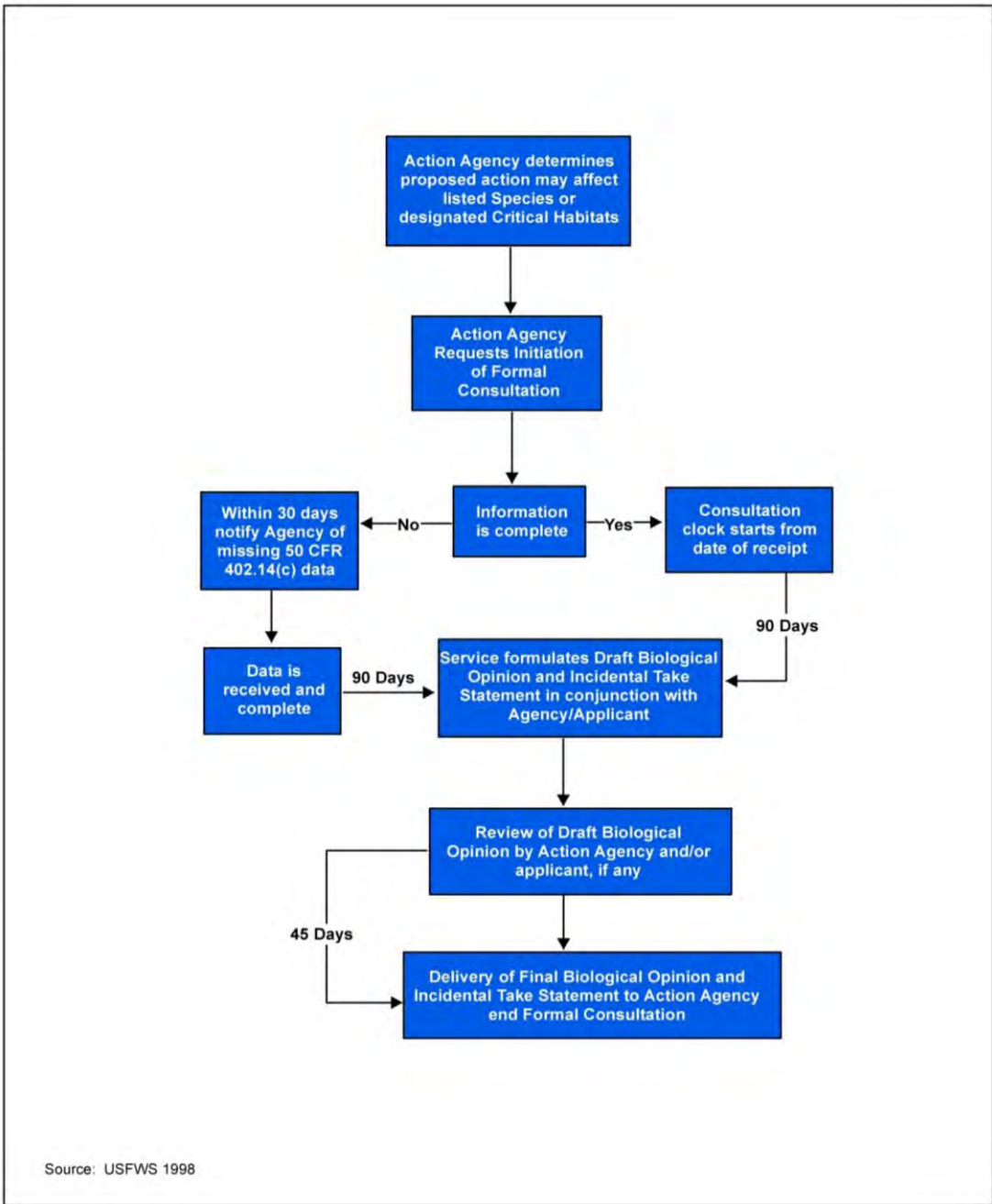


Figure 3-2. Organizational Chart for Formal Consultation Process

Fort Gordon actively incorporates environmental considerations into informed decision making, in a manner consistent with NEPA and Army regulations (32 Code of Federal Regulation [CFR] Part 651; Environmental Analysis of Army Actions). Communication, cooperation, and, as appropriate, collaboration between government and extra-government entities is an integral part of Fort Gordon's NEPA process. While carrying out this mission, the NEPA program also encourages the wise stewardship of natural and cultural resources for future generations. Fort Gordon decision makers are cognizant of the impacts of their decisions on cultural resources, soils, forests, rangelands, water and air quality, fish and wildlife resources, and other natural resources under their stewardship, and, as appropriate, in the context of regional ecosystems (32 CFR Part 651).

Fort Gordon continuously takes steps to ensure that its NEPA compliance program is effective and efficient. Early integration of the NEPA process into all aspects of Fort Gordon planning prevents disruption in decision making and ensures that NEPA supports Fort Gordon's planning process and leads to sound decisions. All NEPA analyses are prepared by an interdisciplinary team. When necessary, partnering or coordinating with agencies, organizations, and individuals who have specialized expertise will improve the NEPA process.

Most projects reviewed under the Fort Gordon NEPA program enter the process through the submission of a work request document (DA4283). A member of the NEPA staff attends a weekly meeting to review all new work requests submitted. Other actions such as Military Construction, military field training exercises (FTXs), ITAM annual work plans and plans like the INRMP or Integrated Cultural Resources Management Plan or projects developed in the Range Complex Master Plan also undergo NEPA review. On average, Fort Gordon reviews approximately 750 projects annually that most commonly result in a categorical exclusion. Annually, Fort Gordon usually prepares four environmental assessments (EAs). Project reviews, comments, requirements, and the administrative records are tracked and recorded in a database maintained by the NEPA program managers.

3.3.1 Public Involvement

The involvement of other agencies, organizations, and individuals in the development of EAs and Environmental Impact Statements (EISs) enhances collaborative issue identification and problem solving. Such involvement demonstrates that Fort Gordon is committed to open decision making and builds the necessary

community trust that sustains Fort Gordon in the long term. Public involvement is mandatory for EISs (see 32 CFR part 651.47). However, Fort Gordon is only required to involve environmental agencies and the public to the extent practicable in the preparation of an EA.

When considering the extent practicable for public interaction (40 CFR 1501.4(b)), factors to be weighed include:

- (1) Magnitude of the proposed project/action
- (2) Extent of anticipated public interest, based on experience with similar proposals
- (3) Urgency of the proposal
- (4) National security classification
- (5) The presence of minority or economically-disadvantaged populations

EAs, Findings of No Significant Impact and documents incorporated by reference are available for public review. To inform the public when documents are available for review and comment, a Notice of Availability (NOA) is placed in the legal section of the *Augusta Chronicle* newspaper. Copies of documents are made available at the Main Augusta Public Library, the Fort Gordon PAO, and the ED. All NOAs contain a point of contact and address where the public can obtain more information, ask questions, or send comments on the proposed project.

3.4 BENEFICIAL PARTNERSHIPS AND COLLABORATIVE RESOURCE PLANNING

The planning and management of natural resources on Fort Gordon is a collaborative effort that requires assistance from federal and state agencies, educational institutions, contractors, and other interested parties. The DoD and U.S. Army, actively seek input from external stakeholders (i.e., USFWS and GADNR). In 2013, an MOU between DoD, USFWS, and Association of Fish and Wildlife Agencies for a cooperative INRMP on military installations was signed to outline this collaboration. Brief descriptions of how each agency contributes to the management of Fort Gordon natural resources is provided below (Appendix G).

3.4.1 U.S. Fish and Wildlife Service

The USFWS has a field office in Athens, Georgia, which provides technical advice to Fort Gordon for the management of natural resources, particularly federally protected species. AR 200-1 provides cooperative guidance to be followed by installations with the USFWS regarding endangered species management on U.S. Army installations.

The USFWS is a signatory cooperator in the implementation of Fort Gordon's Fish and Wildlife program in accordance with the Sikes Act. Appendix C contains specific items of agreement among the USFWS and Fort Gordon, as required by the SAIA.

3.4.2 Georgia Department of Natural Resources

The State of Georgia, acting through the Director, GADNR, provides limited technical advice and assistance if funds are available and priority warrants. The Wildlife Resources Division is the primary support division within GADNR for assisting with the implementation of Fort Gordon's Fish and Wildlife program. Much of this support has been in fisheries. GADNR supplies some fish for stocking of lakes on Fort Gordon.

Fort Gordon and GADNR have entered into an annual agreement to sponsor Kid's Fishing Events as part of National Fishing Week. The state provides catfish under the condition that Fort Gordon feeds the fish and opens the designated pond for the fishing event. This will be an annual event as long as both parties desire to hold the event.

Fort Gordon and GADNR have also entered into a Memorandum of Agreement (MOA) concerning the National Bobwhite Conservation Initiative (Appendix H).

3.4.3 Georgia Forestry Commission (GAFC)

Under the terms of a mutual aid agreement for forest firefighting entered into between Fort Gordon and the GAFC, DPW may furnish fire equipment and personnel to assist adjacent county forestry units. All DPW firefighting units operating off-post will remain under the control of the installation forester or his designated representative, who will accompany all such units when they leave Fort Gordon. The Fire Marshall and Garrison Commander will be notified when a request from off-post is received, and will be kept informed of the situation while installation personnel and equipment are so committed. Direct control action will be taken by Fort Gordon forestry personnel against any wildfire that threatens or is a potential danger to government property, even though the fire is on private property.

DPW will be kept advised of all off-post activities involving U.S. Army personnel and equipment. A copy of the mutual aid agreement is included as an appendix to the installation's Integrated Wildland Fire Management Plan.

3.4.4 Conservation Organizations

Fort Gordon has an ongoing partnership with TNC to assist with a variety of projects, including identification and mapping of vegetation communities and implementation of monitoring protocols. Additionally, Fort Gordon has continued conservation efforts with the Central Savannah River Land Trust to acquire conservation easements on lands adjacent to Fort Gordon (discussed further in section 3.6).

In the past, the installation has been a long-time recipient of funding from the National Wild Turkey Federation for the improvement of turkey habitat on the installation. In addition, Fort Gordon has received materials from Ducks Unlimited and Quail Unlimited to support habitat management work to benefit waterfowl and quail. Fort Gordon also had a partnership with Waterfowl USA for management of waterfowl (i.e., wood duck boxes) on the installation. Currently, there are no projects or partnerships ongoing with these organizations.

3.4.5 Universities

Fort Gordon has cooperative agreements with several in-state higher education institutions to carry out research and studies on the installation. Furthermore, Fort Gordon periodically finds it necessary to hire additional sources of temporary labor to assist in the completion of some projects. The installation hires interns from universities to help fulfill temporary staffing requirements. The Student Conservation Association is another source of temporary employees. The following institutions cooperate with and assist Fort Gordon:

- Georgia Southern University
- Augusta University
- Georgia Military College
- University of Georgia

3.4.6 Directorate of Plans, Training, Mobilization and Security

The DPW cooperates with the DPTMS through the ITAM program to ensure the sustainability of land use for the military mission and

protection of the environment, including threatened and endangered species. The ITAM program requires an ecosystem approach to protecting and managing threatened and endangered species with the least impact on training. Fort Gordon's ITAM program incorporates conservation measures to protect the RCW. Field training exercises and natural resources management activities are closely coordinated between DPTMS and DPW to prevent adverse impacts on the RCW and other sensitive natural resources. Additionally, the ITAM program promotes environmental awareness, including the education of officers and enlisted troops to foster wise use of the land. Fort Gordon's NRB provides environmental awareness training, including conservation of sensitive species, to DPTMS and military personnel training on Fort Gordon.

Through the ITAM program, the NRB participates in the Land Condition Trend Analysis to inventory and monitor natural resources. These inventories and monitoring allows the DPW and DPTMS to document the condition of natural resources and assess the ability of the land to withstand impacts from training.

3.4.7 Oak Ridge Institute for Science and Education

Through Oak Ridge Institute for Science and Education (ORISE), the DoE Work for Others program allows DoE personnel or DoE contract personnel to perform work for non-DoE entities when the work is not directly funded by DoE. This program allow other federal agencies to accomplish goals that otherwise be unobtainable. Fort Gordon participates in the DoE Work for Others program to meet temporary manpower requirements for natural resources management.

3.5 PUBLIC ACCESS AND OUTREACH

3.5.1 Public Access and Outdoor Recreation

With the rapid increase in the human population, surrounding development and the decrease of private lands available for outdoor recreation, there is more demand than ever on public lands like Fort Gordon. Therefore, Fort Gordon, GADNR, and other conservation organizations will continue to work together to meet the increasing demands on Fort Gordon's limited resources.

AR 200-1 states that "installations where feasible will provide recreational access to these lands for the purpose of hunting, fishing, and trapping. Army lands with suitable natural resources will be managed to allow for outdoor recreational opportunities." The NRB strives to manage the resources on Fort Gordon for these opportunities within the constraints of the military mission. Fort

Gordon allows hunting, fishing, and outdoor recreation in most TAs; however, some areas are restricted for safety reasons (i.e., impact areas) or because their locations are near permanent training sites or the cantonment area. Seasons and bag limits are set by the NRB and coordinated with the GADNR. Seasons and bag limits usually follow those set by the State of Georgia or the USFWS for migratory game birds.

Fort Gordon is open to the general public through an annual lottery. Members of the general public can apply online through the web-based system, iSportsman, between 1 July and 15 July each year. Fort Gordon's NRB will set the number of chosen applicants based on the number of hunting permits sold the previous 5 years and the amount of use the resources can support. This number should range between 300 and 700 applicants.



Lottery Hunt Participant

Following the drawing the NRB will notify the selected individuals by e-mail and provide them with all necessary information. These selected individuals will be eligible to receive hunting, fishing, and other training area recreation privileges for no later than 1 August of the following year. Public access lottery entry fees collected for non-selected applicants will be transferred to DFMWR to augment hunting, fishing, and outdoor recreation related events.

Public access may be limited in order to remain consistent with security requirements and safety concerns for the military mission. Public access participation will be monitored to ensure that necessary background checks and administration of outdoor recreation can be performed satisfactorily by appropriate directorates. Fort Gordon's current staffing and resources may not be able to accommodate an increased demand to perform these requirements. Additional information about public access can be found in Section 4.14 (Outdoor Recreation) and Section 4.4 (Fish and Wildlife plans).

All hunters, fishermen, bike riders, and those entering training areas for other outdoor recreation are required to check in and out of areas open for recreational use on a daily basis by utilizing the iSportsman

system. Upon checking out, a harvest report must be completed through the iSportsman system if game was taken.

3.5.2 Public Outreach

To increase the awareness of the importance of conservation and ecosystem management, Fort Gordon fosters citizen participation in ecosystem education and stewardship, and participates in regional stewardship/research programs. This includes educational activities with local organizations such as Boy and Girl Scout troops, environmental groups, conservation clubs, and school groups. Further, as previously mentioned in Section 3.4.2, Fort Gordon and GADNR have entered into an annual agreement to sponsor kids' fishing events as part of National Fishing Week. The NRB participates in several educational and safety events throughout the year. The military units on Fort Gordon request and are given safety briefings on dangerous plants and animals that may be encountered during field exercises and how to handle such encounters. Approximately 2,000 soldiers are trained annually. The NRB also sets up information displays at events such as Earth Day, school career days, Stand Up Safety Day, and public outdoor exhibitions. Arrangements for guided tours of the nature trail or presentations are made through DPTMS and the PAO. Contact the NRB for scheduling procedures.

3.6 ENCROACHMENT PARTNERING

3.6.1 Army Compatible Use Buffer (ACUB)

Fort Gordon completed a Joint Land Use Study in August of 2005 (Fort Gordon 2005). As a result of this study, the four counties that Fort Gordon occupies have agreed to direct development in ways that should allow Fort Gordon's mission to continue without conflicts with land use outside the installation. In 2015 Fort Gordon and its four surrounding counties began an update of the JLUS which is expected to be complete in December 2019. In addition, in 2007 Fort Gordon began development of an ACUB proposal. Implementation of a comprehensive ACUB program would prevent encroachment that would disrupt, limit, or diminish training capabilities and as a secondary benefit, protect key natural habitats, ecological systems, and associated wildlife and vegetation. Under the authority provided in Section 2811, National Defense Authorization Act of 2003 (codified at 10 United States Cod Sec. 2684a), Fort Gordon entered into a cooperative agreement with

Encroachment partnering allows Fort Gordon to proactively address encroachment issues to ensure future training and mission development with minimal impacts from outside the installation's boundaries.

Central Savannah River Land Trust on 31 May 2012 to direct the goals, implementation, and administration of the ACUB partnership. Other potential partners include USFWS, TNC, GADNR, Natural Resources Conservation Service (NRCS), and Central Savannah River Area, Regional Development Center. Fort Gordon and its primary partner, Central Savannah River Land Trust, have identified priority areas surrounding the installation in which to acquire conservation easements under the ACUB program. Those properties that have high conservation values such as wetlands, GADNR high-priority streams, watersheds, species of concern, etc., provide the opportunity for the Army to protect its mission on-post by conservation of high-quality natural areas off-post.

3.6.2 Georgia Sentinel Landscape

On December 19, 2017, the Sentinel Landscapes Partnership announced its seventh designation as the Georgia Sentinel Landscape (GASL). The designation will provide the defense, agriculture, and conservation communities of southern Georgia with a framework to streamline investments and enhance outcomes in areas where their priorities intersect. The goal of the Sentinel Landscapes Partnership is to protect natural and working lands that surround military installations and ranges and thereby strengthen local agricultural economies, advance conservation efforts, and promote development compatible with the military mission.



Georgia's long legacy of support for the military, coupled with its wealth of natural resources and working lands, makes it an excellent environment for a Sentinel Landscape. Home to nine of the nation's key installations and ranges, the GASL hosts critical testing, training, and operational

missions for all of the Military Services. In addition to supporting numerous defense facilities, the GASL also has a high concentration of viable habitats for sensitive species, critical watersheds, and prime timber and agricultural working lands.

Given the fluidity of natural resources and sensitive species, the interests of southern Georgia's defense, agricultural, and conservation communities frequently overlap. The GASL will build upon existing cooperative efforts between the three communities, and provide a framework for future collaboration. The Georgia Sentinel Landscape works across conventional boundaries to support military readiness, protect threatened species and preserve

clean water. To learn more about the Georgia Sentinel Landscape, and its partners visit: <https://sentinellandscapes.org/>

3.7 STATE WILDLIFE ACTION PLAN

In December 2002, the WRD of GADNR began a process to develop a comprehensive wildlife conservation strategy also known as SWAP. Through the Wildlife Conservation and Reinvestment Program, WRD made a commitment to develop and initiate implementation of this comprehensive wildlife conservation strategy by 1 October 2005. Funding for this planning effort came from a federal grant to WRD through the State Wildlife Grant program; matching funds were provided through Georgia's Nongame Wildlife Conservation Fund. The goal of the strategy is to conserve Georgia's animals, plants, and natural habitats through proactive measures emphasizing voluntary and incentive-based programs on private lands, habitat restoration and management by public agencies and private conservation organizations, rare species survey and recovery efforts, and environmental education and public outreach activities. The SWAP was recently revised by GADNR in 2015.

3.7.1 Southeastern Plains Ecoregion

Fort Gordon is located in the Southeastern Plains ecoregion, which stretches across middle and southwestern Georgia, covering approximately 16,252,663 acres. It is bordered on the northwest by the Piedmont Plateau and on the southeast by the Southern Coastal Plain. The northwestern edge of this ecoregion is known as the Fall Line, a distinctive zone of transition between the topographically varied Piedmont Plateau and the relatively flat Coastal Plain. Approximately 426,775 acres are in permanent or long-term conservation ownership. GADNR manages approximately 116,308 acres owned in fee simple by the State of Georgia and an additional 63,838 acres in leases or management agreements. Federal land ownership includes approximately 288,300 acres managed by DoD, 14,050 acres managed by USFWS, 3,072 acres managed by NRCS, and 1,148 acres managed by the National Park Service. While this ecoregion is the largest in the state, it has the lowest percentage of lands in permanent conservation status (2.6 percent).

This expansive ecoregion of irregular plains and broad interstream areas contains a mosaic of cropland, pasture, woodland, and forest. Natural vegetation is mostly longleaf pine-wiregrass, longleaf pine-scrub oak, oak-hickory-pine, and southern mixed forest. Geologic strata of this region are of Cretaceous or Tertiary age. Elevations and relief are generally less than in the Piedmont Plateau and greater than in the Southern Coastal Plain. Streams in this region have relatively low gradients and sandy substrates. Subdivisions of the Southeastern Plains in Georgia include the Sand Hills, the Southern Hilly Gulf Coastal Plain, the Dougherty Plain, the Tifton Upland, the Tallahassee Hill/Valdosta Limesink, and the Southeastern Floodplains and Low Terraces.

The Sand Hills are a narrow, rolling to hilly, highly dissected belt stretching across the state from Augusta to Columbus. The region is composed primarily of Cretaceous and Eocene marine sands and clays deposited over the crystalline and metamorphic rocks of the Piedmont Plateau. Soils are mostly excessively well drained and low in nutrients, although soils in some areas contain more loamy and clayey horizons. The driest sites have typical sandhill vegetation characterized by longleaf pine and turkey oak. Other areas have shortleaf-loblolly pine forests or mixed oak-pine forests. Atlantic

The Longleaf Pine Ecosystem

Longleaf pine forests and savannas once covered approximately 92 million acres across the Southeast. Today, less than 3 percent of this habitat remains, and what is left is being lost at an estimated rate of 100,000 acres per year. In the last 30 years alone, longleaf pine acreage in North Florida has declined by 84 percent. Rangeland, longleaf pine-dominated ecosystems support more than 300 globally imperiled species; the steady decline in abundance and health of this habitat is thus linked with increasing imperilment of these species. Longleaf pine-wiregrass savannas and embedded wetlands comprise some of the most biologically diverse natural communities in North America. In Georgia, most of the remaining longleaf pine habitat is found on military bases or on quail plantations and other large privately owned tracts in the Red Hills and lower Dougherty Plain. Throughout its former range, the longleaf pine ecosystem is being impacted by forest conversion, fire suppression, habitat fragmentation, and invasive exotics species.

Several organizations, including the Longleaf Alliance, TNC, the Georgia Wildlife Federation, Tall Timbers Research Station, Georgia Forestry Commission, Joseph Jones Ecological Research Center and GADNR have focused research, education, and conservation efforts on this globally significant ecosystem. In addition to protecting high priority sites through fee-simple ownership or conservation easements, ongoing efforts include promotion of prescribed fires, providing technical guidance to private landowners wanting to reforest with longleaf pine, developing educational materials explaining the significance of this habitat, and conducting field research on ecosystem functions and restoration techniques. A number of private landowners and forestry consultants have been instrumental in efforts to restore and maintain habitat quality in the longleaf pine ecosystem.

white-cedar swamps can be found in a few areas in the western portion of the Sand Hills region.

3.7.2 High-Priority Sites and Landscape Features

The current assessment and previous conservation planning efforts have identified a number of ecologically important sites and landscape features in this region of the state. An assessment of the East Gulf Coastal Plain conducted by TNC in cooperation with state natural heritage programs in Alabama, Georgia, Florida, Mississippi, and Louisiana identified 15 high-priority areas of conservation interest in Georgia (TNC 1999). A similar assessment conducted for the South Atlantic Coastal Plain in cooperation with state natural heritage programs in Georgia, Florida, and South Carolina identified 38 high-priority conservation areas in Georgia (TNC 2002). Field surveys conducted by GADNR staff and others have brought additional areas of conservation interest to light in recent years. Fort Gordon is included on the list of some of the most significant sites and landscape features identified to date for the Southeastern Plains ecoregion.

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4.0 PROGRAM ELEMENTS

4.1 THREATENED AND ENDANGERED SPECIES MANAGEMENT AND SPECIES BENEFIT, CRITICAL HABITAT, AND SPECIES OF CONCERN MANAGEMENT

As part of the 5-year review and update of the INRMP, the ESMC has been updated to reflect protected species management practices on Fort Gordon over the next 5 years. This ESMC will guide natural resources management on Fort Gordon and will be implemented as part of the current INRMP. The objective of the ESMC is to conserve federally threatened and endangered species as required by the ESA of 1973, as amended, while preserving training readiness and other mission requirements on Fort Gordon. Section 7 of the ESA requires Fort Gordon to carry out a program for the conservation of federally protected species. Federal properties are required to employ all methods and procedures necessary to bring federally protected species to the point where ESA measures are no longer necessary. The RCW is the only federally threatened or endangered species that is a resident of Fort Gordon; therefore, the RCW is currently the focus of Fort Gordon's ESMC. However, the ESMC does provide guidance for target species other than the RCW on Fort Gordon. These species are discussed in Section 4.1.20. Currently, there are no critical habitat designations on Fort Gordon (Appendix I).

Fort Gordon's current RCW population is small and vulnerable to extirpation. As of August 2020, there are 42 active, 6 inactive, and 10 recruitment clusters in the Habitat Management Unit (HMU) on Fort Gordon. Of these, there are four active, one inactive, and four recruitment clusters in the Small Arms Impact Area (SAIA), which is a direct fire area and has limited management potential (Figure 4-1). To avoid decline of this population and to remain in compliance with the ESA, appropriate management efforts need to be successfully implemented in the next few years.

The intent of the ESMC is to (1) present information on the RCW; (2) define conservation goals; and (3) outline a plan for management of the RCW and its habitat that will enable achievement of conservation goals. Manpower requirements for conservation efforts and impacts on other installation activities are discussed Section 5.0.



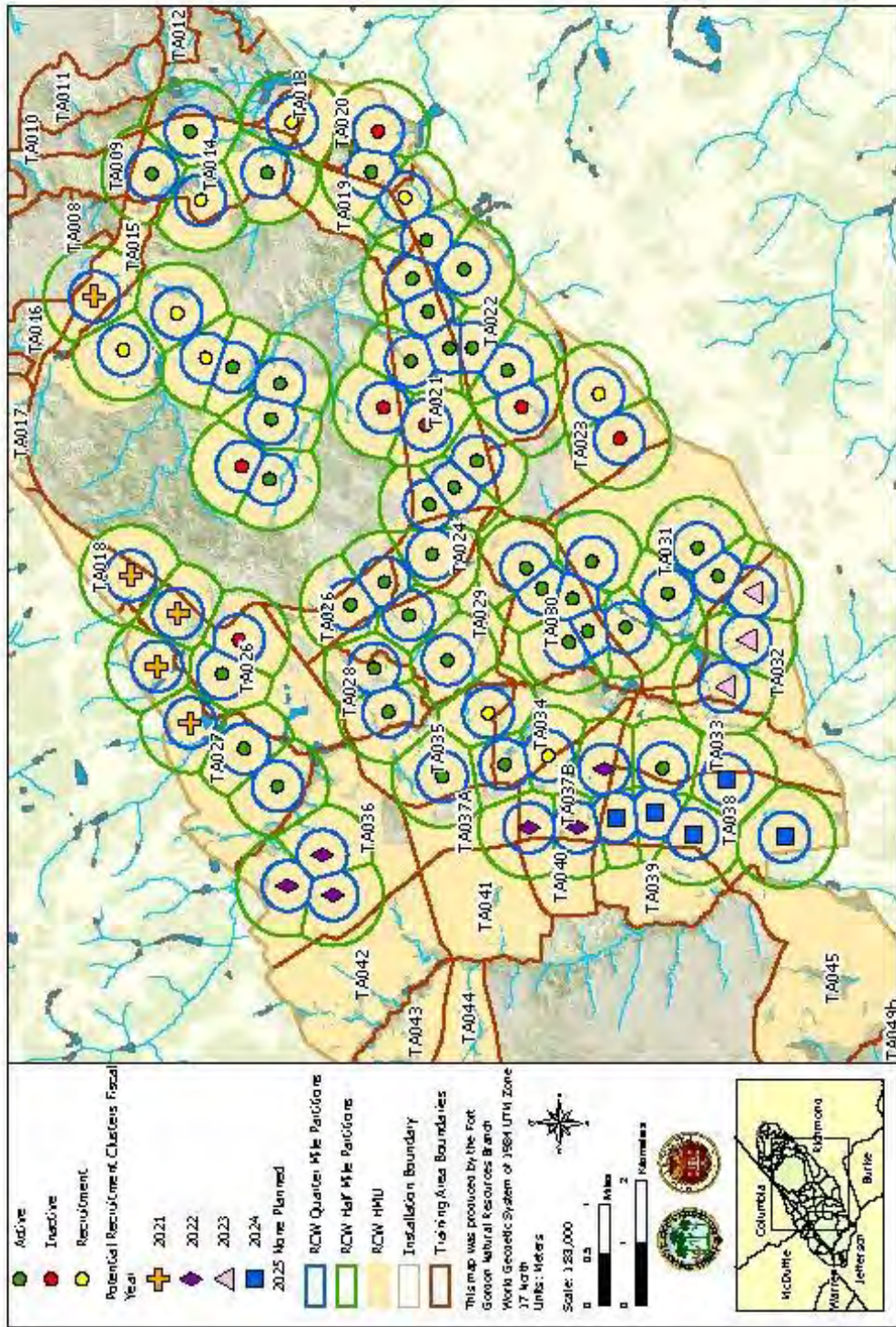


Figure 4-1. Red-cockaded Woodpecker Active, Inactive, and Potential Recruitment Clusters on Fort Gordon (2021-2025)

The management goals of the ESMC cover a 5-year period. Annual updates will continue to make the plan a working document. Current goals for this planning period will be modified as needed. The ESMC will be revised when a significant change occurs in Fort Gordon's training mission, when management techniques are generally outdated, or other changes render the current plan obsolete. Significant changes to the ESMC will require consultation with USFWS.

The ESMC attempts to design an HMU that will remain intact for the long term. The objective is to establish an area where RCW habitat can be maintained indefinitely. This approach is necessary because long periods are needed to develop suitable RCW habitat; however, the HMU is designed with knowledge only of short-term land-use requirements. The boundaries of the HMU are considered long-term but subject to change due to changing circumstances, changing missions, or new scientific information. Significant changes to the HMU will require consultation with USFWS.

4.1.1 Army Guidance Used to Develop the ESMC

The Department of the Army provides two primary resources for developing an ESMC for RCW: the *2007 Management Guidelines for the Red-cockaded Woodpecker on Army Installations*, hereafter referred to as the Guidelines (Department of the Army (Army) 2007a, (Appendix J), and Chapter 4-3 of AR 200-1 (Army 2007b).

4.1.2 Coordination with Other Agencies and Individuals

The ESMC was developed in cooperation with USFWS. Representatives from USFWS, including the RCW coordinator, provided information to assist with plan development and the establishment of a population goal.

Management actions in the ESMC and military training activities on Fort Gordon have the potential to affect the RCW. Fort Gordon has determined that these activities may affect, but are not likely to adversely affect, the RCW. However, implementation of the ESMC will have an overall beneficial effect on Fort Gordon's RCW population. Fort Gordon prepared a biological assessment analyzing potential effects on the RCW from implementation of the ESMC and has requested formal consultation for the RCW with USFWS. As part of formal consultation under Section 7 of the ESA, Fort Gordon has requested incidental take of the RCW for management and training activities (see Section 4.1.18.2).

4.1.3 Species Information

The RCW is endemic to old growth pine forests of the southeastern U.S. Within its range, the RCW is most commonly associated with longleaf pine, although it can be found in other pine habitats, including loblolly, shortleaf, slash, and pond (*P. serotina*) pines. Under optimum conditions these forest stands contain mature pine with an open canopy, low densities of small pines, little or no hardwood or pine midstory, limited hardwood overstory, and abundant native bunchgrass and forb groundcovers.

The RCW is unique among woodpeckers in that it excavates cavities in living pine trees. The excavation process can take several years to complete (Copeyon 1990); however, cavities are subsequently used for roosting and nesting. The minimum age of pines selected for cavity trees is approximately 60 to 70 years and minimum diameter at breast height (dbh) is typically 15-18 inches (USFWS 1985).

Red-cockaded woodpeckers exist as "families", and are referred to as groups or clusters. Groups normally consist of a breeding pair, helpers (usually male offspring of one or both of the breeding pair from previous years), and the current year's offspring. Helpers excavate new cavities, defend territories, and feed the young.

While RCWs feed mostly on forest insects, they may also eat small fruits and seeds. They forage primarily on the surface of living pine trees within pine-dominated forest stands. Large pines, normally greater than 10 inches dbh, are preferred as foraging substrate (USFWS 1985). Pine-dominated stands are generally not considered potential foraging habitat until they reach 30 years of age (USFWS 1989) but will forage in younger trees if the midstory is controlled.

Developing RCW habitat, especially nesting sites, where none exists currently requires a long-term commitment. Cavity trees must be of sufficient age and diameter to support the excavation of an RCW cavity. Trees at a minimum must contain 6 inches of heartwood to allow for cavity construction. Research indicates that for most pines to reach this size requires 60 to 80 years. For management purposes, the minimum cluster area size is 10 acres. Pine-dominated stands must grow for extended periods, well beyond the age trees are initially selected for cavity excavation. In cases where potential cavity trees are present, adequate foraging habitat surrounding these mature trees may be lacking. Providing adequate foraging habitat may require 30 years.

The above species information is very general. Those wishing to learn more about the RCW should refer to the revised 2003 RCW Recovery Plan (USFWS 2003) or a compilation of literature on the RCW prepared by Costa et al. (1996). A wealth of information is also available in four published proceedings of symposia on the RCW (Kulhavy et al. 1995, Thompson 1971, Wood 1983, Costa et al. 2005).

4.1.4 Training Mission

The Fish and Wildlife and Forestry sections of the NRB have the primary role and responsibility for the implementation of this INRMP, including the ESMC. The ITAM of DPTMS also is an integral participant. To minimize conflicts between endangered species management and training these groups will closely coordinate their individual efforts through implementation of the INRMP. A detailed discussion on the training mission is provided in Section 2.1.5. Figure 4-2 depicts lands set aside to support the current and future military mission and are not available to be used as part of the RCW HMU.

Fort Gordon's ITAM program should incorporate RCW conservation. Close coordination between DPTMS and DPW ensures that field training does not adversely affect RCW. Through a similar program conducted by DPW, a member of each military unit, usually at the company level, is educated about a wide variety of environmental subjects, including conservation of endangered species. This unit member, the Environmental Compliance Coordinator, is charged with educating other members of the unit. Specific civilian employees are also educated through this program.

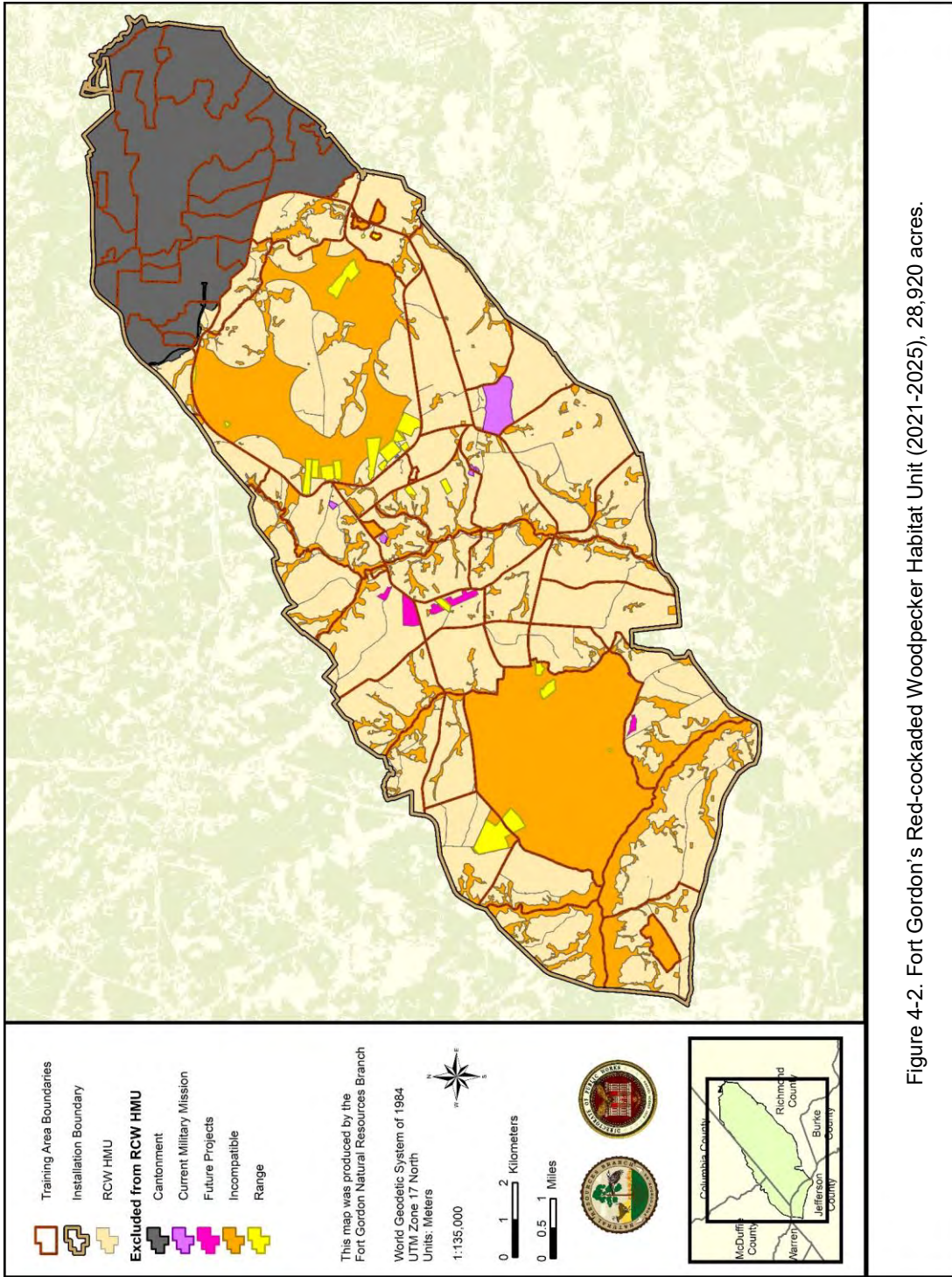


Figure 4-2. Fort Gordon's Red-cockaded Woodpecker Habitat Unit (2021-2025), 28,920 acres.

4.1.5 Population Goal

Fort Gordon's RCW population was extirpated in 1993. The last confirmed activity on the installation was in the summer of 1990 in TA 22 (Fort Gordon 2008a). On 23 February 1996, NRB personnel confirmed the presence of a single RCW in TA 21. The RCW had been banded and was later confirmed as a migrant from the Savannah River Site, approximately 30 to 35 miles southeast of the installation. Monitoring of the reactivated site during the winter of 1997 revealed that the bird was a male, and plans to translocate other birds were initiated that March. Single females were moved during the breeding season in 1997 and 1998, with both attempts being unsuccessful. Translocation of multiple RCWs (single female and two pairs) in 1998 was successful. Since 1998, NRB has created numerous recruitment clusters and conducted multiple translocations to bring the population to the current level.

The Guidelines (Appendix J) and the revised 2003 RCW Recovery Plan established Recovery Units and population goals for federal, state, and private lands within those recovery units (Army 2007a and USFWS 2003). The Installation Population Goal (IPG), measured as active clusters, established under the ESMC is in accordance with goals established in the revised 2003 RCW Recovery Plan (USFWS 2003). The IPG should be considered long-term but is subject to change, through consultation with USFWS, based upon changing circumstances, changing missions, or new scientific information. In conjunction with the 1-year and 5-year reviews of the ESMC, Fort Gordon will re-examine population goals to adjust for changing conditions.

4.1.5.1 Summary of Population Goal Determination

Fort Gordon's NRB used steps detailed in the Guidelines to develop the HMU and identify the long-term population goal (Army 2007a). The procedure for developing the population goal is discussed in Section 4.1.5.2. Due to Fort Gordon's size and isolation from adjoining populations, Fort Gordon's population is not a primary recovery population as defined in the RCW Recovery Plan. Fort Gordon has been designated as a significant support population, contributing to the regional recovery goal. The IPG reflects Fort Gordon's contribution to the regional recovery goal, as outlined in the 2003 revised RCW Recovery Plan (USFWS 2003). The IPG for Fort Gordon is 103 active clusters. Based on current 5-year population data, 71 percent of Fort Gordon's active RCW clusters support a PBG.

4.1.5.2 Installation Population Goal

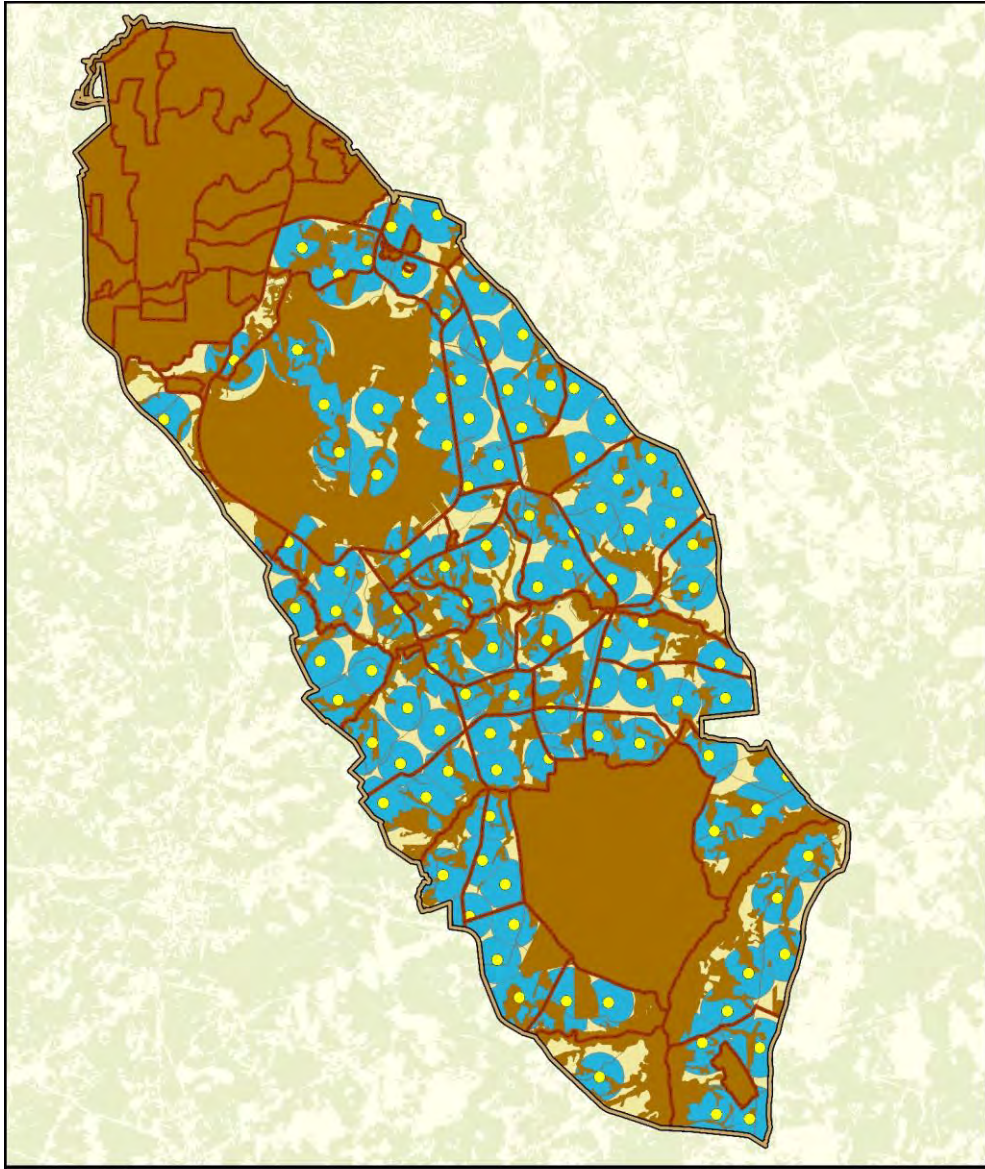
The general procedure for developing the RCW population goal for Fort Gordon can be summarized in four steps, as follows:

- (1) Fort Gordon's land base encompasses approximately 55,500 acres. A map of the current and potential RCW habitat for the entire installation was created (see Figure 4-2). Potential RCW habitat areas currently contain pine or pine-hardwood forest or areas where these types of stands can be developed.
- (2) Current and future land uses that would prohibit management for the RCW include, with a few exceptions, the developed cantonment and surrounding areas, portions of the SAIA, the Artillery Impact Area (AIA), current and future mission requirements, bottomland hardwood stands, swamps, marshes, and ponds. The total land base excluded from RCW management is 26,563 acres. The RCW HMU is the remaining land available for RCW management, which is approximately 28,920 acres.
- (3) Fort Gordon's IPG is 103 active clusters. Previous iterations of the RCW IPG were determined by dividing HMU acres by the local forage habitat required to support one cluster (200 acres). This calculation did not take into account the irregular shape of the HMU. Since partitions cannot perfectly utilize the space, this simple calculation overestimates the IPG. A new process to determine the IPG was developed using Geographic Information Systems (GIS) modeling, which were iterated through the following steps until no more cluster points could be added. Cluster center points were placed in the HMU no closer than 0.25 mile from other cluster points. The 200-acre area covered by each cluster was determined by creating partitions at 50-foot intervals between 1,650 feet and 2,650 feet radius. The partition that included 200 acres of HMU was selected for that cluster. That partition was then removed from use for further iterations. This process was repeated until no more cluster points could be added that could cover 200 acres of HMU within 0.5 mile of the cluster. The cluster points created through this process represent hypothetical cluster locations if the installation was filled with clusters. These points are not actual future locations. Refinements to the HMU, population modeling techniques, and the population goal will be an ongoing process. Figure 4-3 shows the results of the modeling and a potential spatial distribution of the hypothetical cluster build-out.

- (4) The delineated HMU and associated population goal should be realistic for at least the next 5 years unless there are significant changes to Fort Gordon's mission, training base expansion is required, or scientific knowledge of RCW management significantly changes. Throughout this plan, "long-term" will refer to the time frame that exceeds the 5-year planning period. A forest inventory of the entire Fort Gordon installation was completed in 2012, using a variable plot sampling technique. Since that time two additional timber inventories were completed. One in the winter of 2015 and another in the winter of 2018 during these inventories those areas that had been substantially changed due to timber harvesting during the preceding three years were inventoried. In the future areas where timber harvesting occurs will be re-inventoried every 2 to 4 years as funds become available. When this plan is reviewed in 5 years, the HMU will also be reviewed using the updated forest inventory information.

Projecting the population growth for the next 5 years is difficult because many factors that affect population growth interact in complex ways (Walters 1990). Factors include survival of adults and young, reproductive success of pairs, number and sex of birds available for translocation, success of attempted translocations, the reproductive success of translocated birds, and availability of suitable habitat. The projected optimum RCW population rate of growth, 5 to 10 percent, was determined in consultation with USFWS and is based on the rate of growth of other small RCW populations. All managed RCW clusters are surveyed annually in early spring and recent results are summarized in Table 4-1. Based on a 5 percent annual increase, Fort Gordon's estimated population by FY 2025 will be approximately 54 active clusters (Figure 4-4).

Based on an average annual increase of 5% the number of clusters that Fort Gordon will be able to support for at least the next 20 years is approximately 103 which is the Installation Population Goal (Figure 4-4). This estimate is mainly constrained by current available habitat. Thousands of acres containing off-site species must be converted to native, site-appropriate species. Many stands contain trees that are too young to serve as cavity trees and much of the suitable, on-site habitat is in relatively small blocks and is not contiguous with larger blocks of suitable habitat. Creating large, contiguous blocks of additional suitable habitat will require 30 years following conversion.



-  RCW Buildout Cluster Centers
-  RCW Buildout Cluster Partitions
-  RCW HMU (Not covered by Partition)
-  Excluded from RCW HMU
-  Training Area Boundaries
-  Installation Boundary

This map was produced by the Fort Gordon Natural Resources Branch

World Geodetic System of 1984
UTM Zone 17 North
Units: Meters

1:135,000



0 1 2 Kilometers

0 0.5 1 Miles

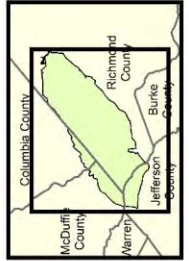


Figure 4-3. Hypothetical RCW Clusters and Foraging Partitions Used to Determine the Installation Population Goal.

Fort Gordon estimates that an initial long-term goal of 60 active clusters should be reached around 2028 (Figure 4-4). At that time, the existing native pine stands will be suitable nesting habitat. The remainder of the HMU and many of the stands that are converted in the next 5 to 10 years should be suitable RCW foraging habitat.

Table 4-1. RCW Census Data on Fort Gordon (2011 to 2020)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of active clusters	17	18	21	21	24	27	31	37	38	42
Number of PBGs	11	14	14	16	14	18	24	29	34	37

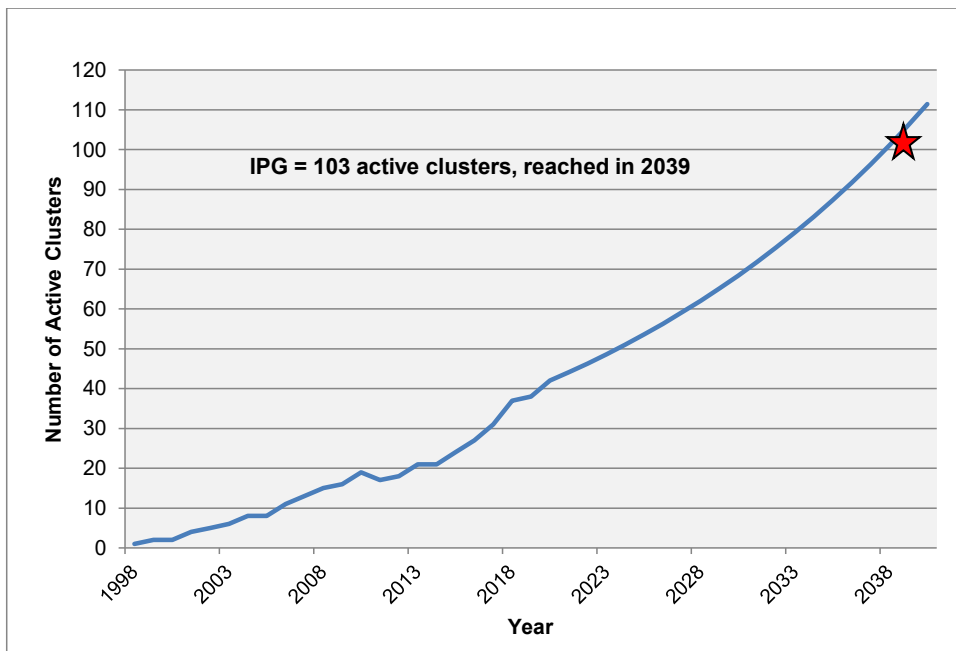


Figure 4-4. Projected Red-Cockaded Woodpecker Population Growth on Fort Gordon

4.1.6 Relocation of Mission Requirements

During the development of the HMU, mission requirements that could be relocated to avoid RCW distribution on the installation were identified. The map of mission requirements was overlaid on habitat within 0.5 mile of active clusters and recruitment clusters. This exercise determined that mission requirements do not currently conflict with RCW cluster habitat. Future mission requirements will be reviewed and evaluated to assess potential impacts as appropriate. Mission requirements that cannot be relocated, such as archaeological sites (and their buffers) and solid waste management units, were not addressed. To avoid RCW habitat loss, the extent of tree clearing required for future proposed projects (Section 4.1.16.4) will be coordinated with DPW and DPTMS and minimized as much as possible.

4.1.7 Management Guidelines and Prescriptions

Management procedures detailed in the Guidelines (Army 2007a), as well as the revised 2003 RCW Recovery Plan (USFWS 2003), were followed to meet specific management needs at Fort Gordon. Some areas of potential habitat have not been included in the HMU due to training mission and limited management access. These areas include the AIA, the cantonment, and portions of the SAIA. Areas requiring other changes or limitations to the methods are discussed in Section 4.1.16 and Section 4.1.17. A summary of RCW management actions on Fort Gordon is provided in Table 4-2.

Table 4-2. Summary of RCW Management Actions

Management Action	Objective
Establish the HMU	Defines the geographic future area of the installation's RCW population. HMU must provide sufficient nesting and foraging habitat for installations RCW population goal.
Timber management	Use silvicultural methods and other forestry practices in HMU to develop and maintain the habitat necessary to support the installation's RCW population goal.
Restoration and construction of cavities	Repair existing artificial and natural cavities, and install artificial cavities or inserts to provide suitable cavities within HMU.
Reduce depredation and competition for RCW cavities	Implement actions to protect RCW cavities from predators (e.g., flying squirrel). Install protection devices to protect the integrity of RCW cavities.
Protect RCW clusters	Implement actions (e.g., signage and policy) to restrict activities within RCW clusters.
Translocation and augmentation of RCWs	Translocate individual RCWs from the installation or off-site to expand the installations RCW population.
Population monitoring	Monitor active and provisional recruitment clusters to assess population status and management actions needed.

4.1.8 General HMU Practices

Nesting and foraging areas sufficient to attain and sustain the installation's RCW population goals were identified in the HMU. Delineation of an HMU is an important step in the planning process because it defines the future geographic configuration of the installation's RCW population. Areas designated as HMUs for all active and recruitment clusters, regardless of training restriction status, must be managed according to the Guidelines (Army 2007a). As shown in Figure 4-2 the current HMU is 28,920 acres.

4.1.8.1 Areas Included in the HMU

The HMU encompasses all clusters, areas designated for recruitment, and currently or potentially adequate foraging areas. Clusters that have been documented as continuously inactive for a period of 5 consecutive years or more may be deleted from RCW management requirements. Cavity trees that have been monitored as inactive for 5 consecutive years and whose cavities have been deemed unsuitable may be deleted from management requirements. Designated recruitment clusters that have not been occupied for a period of 5 consecutive years may also be deleted from management. Once deletion of a cluster from management is approved by USFWS, existing cavities may be covered to discourage reactivation. Figure 4-5 depicts three inactive clusters that are scheduled to be removed from management in 2020.

Efforts will be made to reduce fragmentation by attempting to link suitable habitat with corridors, allowing for demographic interchange throughout the installation population. Adequate acreage and quality RCW foraging habitat (75 to 125 acres) must be provided within recruitment sites. Fort Gordon will determine availability and management of RCW foraging habitat in accordance with guidelines established in Chapter 8.1 of the 2003 RCW Recovery Plan (USFWS 2003).

Fort Gordon may formulate population-specific foraging guidelines in consultation with USFWS. Population-specific guidelines must be based on site-specific studies consisting of multiple-year (typically 3 to 5 years) data on RCW groups and population health and their relationships to quantity and quality of foraging habitat. Section 8.1.4 of the 2003 RCW Recovery Plan provides guidelines for determining population-specific foraging guidelines (USFWS 2003). The HMU was delineated using forest inventory data and in cooperation with DPTMS so there will be a minimum impact upon current and planned

installation missions/operations and is consistent with land use requirements in the Real Property Master Plan.

Prescribed burning is an effective means of midstory control and is recommended as the primary means of maintaining a healthy ecosystem. Prescribed burning will be conducted at least every 3 years in longleaf, loblolly, slash, and shortleaf pine systems. Burning must be conducted in accordance with applicable federal, state, and local air quality laws and regulations. Prescribed fires will be conducted in accordance with Fort Gordon's Integrated Wildland Fire Management Plan (Fort Gordon 2008b). With the agreement of USFWS, the burn interval may be increased to no more than 5 years after the hardwood midstory has been brought under control. Cavity trees will be protected from fire damage during burning. Burning should normally be conducted in the growing season because the full benefits of fire are not achieved from non-growing season burns. Winter burns may be appropriate to reduce high fuel loads. Use of fire plows in RCW clusters (within the 200-foot buffer) will be used only in emergency situations. Emergency situations consist of an immediate threat that could destroy an active RCW cavity tree.

While other areas within the HMU do not require the same level of intense management as active clusters and recruitment clusters, the quality of RCW foraging stands must be maintained by a variety of methods including a prescribed burning program sufficient to control hardwood growth, eliminate dense midstory, and reduce fuel levels to prevent wildfires. Current alternatives to prescribed burning for hardwood midstory control include the following:

- (1) Mechanical – Rotary mowers (both tractor-drawn and skidder mounted), and drum-choppers drawn by rubber-tired skidders and bulldozers.
- (2) Manual – Hand-operated chainsaws and gas-powered line trimmers with saw blades.
- (3) Chemical – Registered herbicides can be applied by any approved methods in accordance with label requirements.

These methods may be used in conjunction with prescribed burning to control a well-advanced hardwood midstory. All three alternatives above may be used in both nesting and foraging habitat. Application of herbicides will be consistent with applicable federal, state, and local laws and regulations.

4.1.8.2 Cluster Management

Due to RCW biological needs, nesting habitat requires a more

intense level of management than other habitat. Maintenance priority will be given to active clusters over both inactive and recruitment clusters. Fort Gordon's NRB will manage habitat within active and recruitment clusters in accordance with guidelines established in the revised 2003 revised RCW Recovery Plan and the Guidelines (USFWS 2003 and Army 2007a). Across Fort Gordon, some active clusters and recruitment clusters contain specific cavity trees that are inappropriate for continued management. Such trees will not be cut or actively managed. Examples include trees containing cavities that are no longer suitable for the RCW or trees located in areas that will not be managed as RCW habitat (e.g., upland or bottomland hardwood areas). Natural resources personnel trained in RCW management will determine which cavity trees will no longer be actively managed.

In all active clusters, a minimum of four suitable cavities or at least the number of cavities equal to the number of birds that remain after all young have fledged will be maintained. A minimum of four suitable cavities will be maintained in all recruitment clusters, including new recruitment clusters once they are provisioned (Section 4.1.9). Active clusters and recruitment clusters will be kept clear of dense midstory vegetation. An open, park-like pine stand of at least 10 acres is optimal. All RCW foraging stands should consist of no or sparse hardwood species maintained below 7 feet in height. Canopy hardwoods will comprise less than 10 percent of canopy trees in longleaf pine stands and 30 percent in loblolly pine stands. Pines within 50 feet of an existing cavity tree that are large enough or old enough to provide foraging habitat will only be removed if deemed necessary by an RCW biologist.

4.1.9 Recruitment Cluster Selection

Given current stand conditions, over the next 5 years, Fort Gordon can potentially provide 26 new recruitment clusters. This number is dependent on timber stand improvements and availability of suitable habitat. Recruitment cluster selection criteria is discussed in Appendix K and tentative installation year and location of future recruitment clusters are depicted in Figure 4-1.

Commented [JM1]: Update

4.1.10 Timber Management in the HMU

Timber management in the HMU should develop the habitat necessary to support the installation's RCW population goal. Additionally, timber management will be consistent with RCW conservation and comply with silviculture guidelines in Section 8J of the revised 2003 RCW Recovery Plan (USFWS 2003). Silvicultural methods that maintain or regenerate the historical pine ecosystem

will be used. Timber management methods will be carefully designed to achieve and maintain historical conditions. Presettlement vegetation data (Frost and Langley 2008) will be consulted in the development of timber prescriptions.

High-quality RCW foraging habitat includes some large old pines, low densities of small and medium pines, sparse or no hardwood midstory, and groundcover consisting of bunchgrass and forbs. Based on the 2003 Recovery Plan, high-quality RCW foraging habitat has all of the following characteristics (USFWS 2003):

- a. There are 18 or more stems/acre of pines that are equal to or greater than 60 years in age and equal to or greater than 14 inches dbh. Minimum basal area (BA) for these pines is 20 square feet/acre. Recommended minimum rotation ages apply to all land managed as RCW foraging habitat.
- b. BA of pines 10 to 14 inches dbh is between 0 and 40 square feet/acre.
- c. BA of pines less than 10 inches dbh is below 10 square feet/acre and below 20 stems/acre.
- d. BA of all pines equal to or greater than 10 inches dbh is at least 40 square feet/acre. Thus, the minimum BA for pines in categories (a) and (b) above is 40 feet/acre.
- e. Groundcovers of native bunchgrass or other native, fire-tolerant, fire-dependent herbs total 40 percent or more of ground and midstory plants and are dense enough to carry a growing season fire at least once every 5 years.
- f. No hardwood midstory exists, or if a hardwood midstory is present it is sparse and less than 7 feet in height.
- g. Canopy hardwoods are absent or less than 10 percent of the number of canopy trees in longleaf forests and less than 30 percent of the number of canopy trees in loblolly and shortleaf forests. Xeric and sub-xeric oak inclusions that are naturally existing and likely to have been present prior to fire suppression may be retained but are not counted in the total area dedicated to foraging habitat.
- h. All foraging habitat is within 0.5 mile of the center of the cluster, and preferably 50 percent or more is within 0.25 mile of the cluster center.
- i. RCW foraging habitat is not separated by more than 200 feet of non-foraging habitat. Non-foraging habitat include (1) any predominantly hardwood forest stand, (2) pine stands less than 30 years in age, (3) cleared land such as agricultural

lands or recently clearcut areas, (4) paved roadways, (5) utility rights of way, and (6) bodies of water.

The objective of these parameters is to provide high-quality RCW foraging habitat as close as possible to the cluster.

In general, where site conditions permit, the goal for RCW foraging habitat will be to maintain or establish stands with 40 to 80 feet/acre of pine BA and a minimum of 18 pines 14 inches in dbh or larger per acre. Stocking levels on Fort Gordon may vary from those levels on which the revised 2003 RCW Recovery Plan is based (USFWS 2003). In coordination with USFWS, Fort Gordon may develop site-specific criteria for foraging analyses based on acreage.

Fort Gordon will assign forage habitat to clusters with overlapping 0.5 mile foraging areas using a method called habitat partitioning. A habitat modeling tool known as the RCW Matrix has been developed using GIS, based on the recommendation within previous foraging guidelines that all foraging habitat be within 0.5 mile of the center of a RCW cluster (USFWS 1985). The technique consists of first creating 0.5 mile foraging circles around the center of each RCW cluster, then applying tabular data of stand characteristics to determine availability of foraging habitat within the newly created circular polygon. Where foraging circles overlap, the area of overlap is partitioned into equal sections and allocated accordingly. Technical resources are available to assist managers and researchers in partitioning the complex overlaps that are common in areas with high RCW cluster densities (Lipscomb and Williams 1996, 1998). Complete and partitioned foraging circles are referred to as foraging partitions.

4.1.10.1 Restrictions on Forestry Activities

With the exception of prescribed burning activities and emergency construction of artificial cavities, timber and pine straw harvesting and habitat maintenance activities will not be conducted in active clusters during the nesting season (1 April through 31 July).

4.1.10.2 Regeneration Methods

Several different types of regeneration methods such as clearcutting, seedtree, and shelterwood harvests can be used to regenerate pine stands on Fort Gordon. Longleaf pine can be regenerated using single tree or group selection methods where enough trees exist to support this method. Loblolly pine will be regenerated using seedtree or shelterwood methods. Pine seedlings may be planted where needed to ensure adequate stocking of seedlings. Regeneration methods to be used for off-site stand conversions are

discussed in the following paragraph. When available, six to 10 residual trees/acre of the native pine species being regenerated will be left standing indefinitely when a stand is regenerated. More specific information regarding regenerations methods can be found in the Forest Management Section of this INRMP (Section 4.5).

4.1.10.3 Stand Conversions

Stand conversions involve the reestablishment of the pine species adapted to a particular site after off-site pine or scrub oak has been removed. Historically, off-site species replaced longleaf pine because of its relatively slow growth and problems with regeneration. Sites believed to historically support longleaf pine have not been converted to other pine species since 1986. Native pines stands will not be converted to off-site species.

Fort Gordon's priority is to convert appropriate sites to longleaf pine; however, the tree species to be restored on each conversion site will depend on soil type and site conditions. The majority of 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 native pines. Slash pine stands within the HMU that appear to be healthy and growing vigorously may be managed the same as native pine stands until a need for a final harvest is determined, at which time they will be converted to native pines. Slash pine stands may need to be retained for RCW management until native species are large enough to be used as forage habitat.

Two approaches can be used to plant pine seedlings. The first approach is to plant bare rootstock using a mechanical machine planter, and the second approach involves planting containerized seedlings either by hand or mechanical planter. The type of planting method to be used will vary depending on the site.

Sites that historically supported hardwood stands, in both upland and bottomland areas, will not be converted to pines. These hardwood stands are not considered part of the HMU and managing them as hardwoods will not change the installation's RCW population goal. Timber stand prescriptions will use data developed by Frost and Langley (2008) to manage these stands.

More specific information concerning stand conversions can be found in sections 4.5.6.7 and 4.5.10.2 of the Forest Management Section of this INRMP or Section 8.J. of the revised 2003 RCW Recovery Plan (USFWS 2003).

4.1.10.4 Forest Pest and Disease Management

Trees within the HMU affected by infectious tree diseases or beetle infestation (e.g., Ips beetles [*Ips* spp.] or southern pinebark beetle [*Dendroctonus frontalis*]) will be evaluated for treatment. Treatments for beetles may include the use of pheromones, cutting and leaving, cutting and removing, or cutting and burning infected trees. Before cutting an infected cavity tree, a suitable replacement cavity tree will be identified and provisioned. Forest pest and disease management is discussed under Forest Management (Section 4.5.15.1) of this INRMP.

4.1.10.5 Consultations Regarding Forest Management

Thinning pine stands and conversion of stands to historically native, site appropriate pines are designed to maintain, develop, and restore quality RCW habitat. These procedures may require removal of potential foraging habitat and possibly reducing current foraging habitat below recommended guidelines.

USFWS will be consulted before implementing these procedures. Fort Gordon will consult with USFWS on all proposed stand treatments that will reduce foraging habitat in active or recruitment RCW clusters below minimum requirements.

4.1.11 Pine Straw Harvesting

Pine straw management and harvesting is discussed in detail under Forest Management in Section 4.5.8 of this INRMP.

4.1.12 Restoration and Construction of Cavities

4.1.12.1 Restoration of Cavities

Active and inactive RCW cavity entrances and starts, whether naturally or artificially constructed, found to be in poor condition during periodic inspections will be repaired whenever feasible to prolong cavity use. When deemed necessary by an RCW biologist cavity restrictors will be installed on enlarged RCW cavity entrance holes (greater than 2 inches in diameter) to optimize the availability of suitable cavities. Where suitable cavities are limited, the threat of enlargement is great.

Restrictors may be installed to protect RCW cavity entrances that have not been enlarged. Priorities for the installation of restrictors will include active single tree clusters, single bird clusters, clusters with less than four suitable RCW cavities, and other clusters. Restrictors will not be placed on the entrances of cavities no longer being managed.

Techniques for installation of restrictors will be based on Carter et al. (1989). An opening size of 1.75 inches will generally be used. Reaction of RCWs to restrictors will be monitored when they are placed on the entrance of active RCW cavities. Monitoring will be conducted the same day a restrictor is placed around the entrance of an active RCW cavity. If avian competitors larger than the RCW continue to use the cavities, restrictors with 1.5-inch openings will be used and closely monitored. Adjustments to the positioning of the restrictors will be made to ensure that competitors are excluded and that RCW access is unencumbered. All inserts installed on Fort Gordon have cavity restrictors installed on them.

Additional measures to maintain the suitability of a cavity will be used on inactive RCW cavity trees if these are deemed likely to benefit the RCW. For example, if a usable cavity has two entrances and one has been enlarged beyond repair, the enlarged entrance will be closed with a metal plate covered with wood filler. The effect of these measures on the RCW will be monitored if the tree is reactivated.

4.1.12.2 Construction of Cavities

Artificial cavities or inserts will be placed in areas designated for recruitment or translocation and in clusters where the number of suitable cavities is a limiting factor. The objective is to provide at least four suitable cavities per active or recruitment cluster. All cavity inserts will be installed with restrictor plates and have polyvinyl chloride (PVC) pipe glued to the cavity entrance.



Artificial RCW Cavity Insert

Priorities for installation of artificial cavities will include active clusters with a single cavity tree, active clusters with insufficient cavities to support a breeding group, and recruitment clusters in the order specified in Appendix K. In instances where group size is greater than four, additional cavities may be provided to ensure that all adults in the cluster have access to a cavity.

Cavity construction will be by either the drilling or insert technique and accomplished by fully trained personnel. Copeyon's (1990) technique will be used to construct drilled starts. Drilled cavities will be built using Taylor and Hooper's (1991) method. Allen's (1991)

technique, with minor modifications developed by the U.S. Forest Service, will be used to install inserts.

Insert and restrictors used to protect inserts may be modified to prevent competitors from destroying or modifying the cavities or their entrances. Examples of such modification include:

- (1) Glue PVC pipe to the entrance of inserts (Richardson and Bradford 1996). Fort Gordon has converted all inserts on the installation to have a PVC entrance.
- (2) Modify the full-face plate restrictor to extend beyond the edges of the insert. The sides of the restrictor would be nailed to the tree.

Red-bellied woodpeckers (*Melanerpes carolinus*) and pileated woodpeckers (*Dryocopus pileatus*) create holes in the inserts from the box, where the tree and the side of the box meet. A restrictor enlarged to cover this gap would prevent this from happening. The restrictors will be adjusted to make them small enough to permit face plate construction by the RCW but large enough to prevent other species from entering inserts from the side.

4.1.13 Measures to Reduce RCW Predation and Competition for RCW Cavities

In small RCW populations, it is important to use all management techniques possible to ensure that predation of adults, offspring, and eggs are minimized. Techniques that reduce competition for cavities will also provide greater potential for population expansion. Initial studies on squirrel excluder devices (SQEDs) and snake excluder devices (SNEDs) indicate that these tools help reduce cavity competition and predation on RCW (Montague 1995, Montague et al. 1995, Neal et al. 1993, Withgott et al. 1995). Competition for RCW cavities may be further reduced by placing nest boxes or alternate potential roost sites for competitors near the clusters (Kappes and Harris 1995, Loeb and Hooper 1997). Flying squirrels, as well as other predators, will be removed as required by the most effective means possible.

SQEDs and SNEDs are currently not in use at Fort Gordon. Fort Gordon will evaluate and use these devices in coordination with the appropriate agencies as deemed necessary by NRB biologists. If these devices are used, the NRB will install them according to installation procedures in the revised 2003 revised RCW Recovery Plan and currently accepted methodologies (USFWS 2003).

Creation of snags is one technique that can be used to provide cavities for RCW cavity competitors and reduce nest loss. At this time

there is no shortage of snags in any current RCW clusters. Snags will only be created in or near clusters experiencing problems with red-bellied woodpeckers, or other avian competitors, roosting in managed RCW cavities that have a shortage of suitable snags. As deemed necessary by NRB biologist, a minimum of three snags, including suitable existing snags, will be created/managed in or near such clusters. In no case will relict pines be used for snag creation

No new SQEDs, SNEDs, or nest boxes/snags will be erected or created when NRB biologists determine that their associated costs are higher than the benefits obtained. SQEDs, SNEDs, and nest boxes in place may be removed if it is believed that lack of maintenance may cause adverse impacts on the RCW.

Other techniques designed to reduce competition for cavities or predation on the RCW will be considered. Appropriate monitoring will be performed to ensure that these techniques do not adversely affect the RCW. Fort Gordon will consult with the USFWS prior to the use of any technique designed to reduce competition or predation.

4.1.14 Protection of Clusters

4.1.14.1 Markings

Clusters and individual cavity trees must be easily recognizable by all personnel entering active clusters if they are to be protected. Therefore, all living cavity trees located within designated clusters will be marked with two white bands approximately 4 to 6 inches wide and 6 to 12 inches apart. The bands will be centered approximately 4 to 6 feet from the base of the tree, but may be centered higher on trees with SNEDs to preclude painting bands on these devices. A uniquely numbered small metal tag will be affixed to the cavity tree for identification purposes.

A 200-foot buffer around each cavity tree in active clusters and provisioned recruitment clusters will be marked with warning signs posted at reasonable intervals facing to the outside of the buffer and along roads, trails, firebreaks, and other likely entry points into the buffer. Where cavity trees are within 400 feet of each



RCW Buffer Signage

other, the marked buffer will overlap and surround the aggregate of trees. Where cavity trees are separated by more than 400 feet, separate marked buffers will be established. Signage will follow the specifications outlined in the Guidelines (Army 2007a). Signs posted at the marked buffer will be constructed of durable material, 10 inches square, oriented as a diamond, and white or yellow in color. A RCW graphic and the lettering "Endangered Species Site" and "Red-cockaded Woodpecker" will be printed in black. The lettering "Do Not Disturb" and "Restricted Activity" will be printed in red. All lettering will be 0.375 inch in height. Where warranted, reflective tape can be affixed to cavity trees and certain trees at the edge of the buffer zone to increase their visibility during nighttime maneuvers. The reflective tape will be placed on buffer trees at likely vehicle entry points. Markings must be as uniform as possible on U.S. Army installations to reduce the possibility of misguiding soldiers who must train on different installations.

Buffer markings, including signs on trees, may be removed around cavity trees that will not be managed but that occur in active clusters and provisioned recruitment clusters, (e.g., trees with cavity entrances that are too large for restrictors or cavities that are no longer useable). Generally, removal of the buffer will depend on the trees' locations relative to other, managed cavity trees. The decision to remove the buffer markings will be made by an RCW biologist.

Following consultation with USFWS, buffer markings will be removed around cavity trees in clusters to be removed from management (Section 4.1.18). All cavity trees will retain the numbered metal tree tag, but the two white bands will be removed.

4.1.14.2 Training

The purpose of training restrictions associated with RCW clusters is to avoid or minimize the potential for "take" as defined under Section 9 of the ESA. Implementation of training restrictions on U.S. Army installations will balance support of RCW population growth to achieve an installation's population goals and flexibility to achieve training mission requirements.

Designation of Protected Clusters

In accordance with the Guidelines (Appendix J), installations with population goals less than 250 PBGs can, in cooperation with the USFWS, reduce some training restrictions as data becomes available from installations where training restrictions have been decreased or removed (Army 2007a). Other factors to consider will be training mission, population aggregation, and results (based on

monitoring and research) of training impacts on unprotected clusters from the subject installation and other installations. Based on information presented and discussions at the 2008 U.S. Army RCW coordination meeting with USFWS and informal consultation during the development of the 2008-to-2013 ESMC, Fort Gordon negotiated to protect approximately 40 PBGs. In order to monitor success of protected versus unprotected clusters, it was also negotiated to unprotect 10 percent after reaching 40 PBGs. Therefore, the next four recruitment clusters after 40 PBGs is reached can be installed and left unprotected by not posting buffer signs or banding individual trees. In accordance with the Guidelines (Appendix J), certain activities such as refueling points, generators, smoke generators, smoke pots, and mechanical digging will not be allowed within the buffer zone of any unprotected cluster (Army 2007a). Selection of these unprotected clusters will be done in close coordination with DPTMS in order to prevent any training conflicts. Additionally, NEPA review and approval of environmental field training checklists will assist in preventing training conflicts. All other clusters will be protected with the normal buffer and tree markings. Protected and unprotected clusters are defined as follows:

- Protected Clusters. Clusters subject to training restrictions as identified in Appendix 1 and paragraph V.C.5 and guidance for certain activities identified in paragraph V.C. of the 2003 RCW Recovery Plan (USFWS 2003).
- Unprotected clusters. Clusters not subject to training restrictions identified in Appendix 1 of the revised 2003 RCW Recovery Plan (USFWS 2003). These clusters are still subject to guidance for certain activities under paragraphs V.C. and V.C.5 of the 2003 RCW Recovery Plan (USFWS 2003), unless otherwise authorized through consultation with USFWS (preferably through the ESMC process).

Data collected from the unprotected clusters will be compared to data collected from protected clusters. This performance data can be used to support removing protection from additional clusters. As Fort Gordon reaches 40 PBGs, the installation will consult with USFWS to establish unprotected clusters. Removal of training restrictions is dependent on growth or maintenance of the installation's RCW population. Schedules for removing training restrictions will be implemented after appropriate consultation with USFWS.

The protection of clusters and recruitment clusters on Fort Gordon depends on an understanding of the goals and requirements of RCW conservation by the military personnel training in the field. Soldiers

are informed of endangered species issues by the Environmental Compliance Coordinator and as part of the Range Training Area Safety Certification courses.

Damage and disturbance in clusters outside the AIA is controlled by U.S. Army Cyber Center of Excellence and Fort Gordon (USACCoE&FG) Regulation 420-7 (USACCoE&FG 2018a) and U.S. Army Cyber Center of Excellence and Fort Gordon (USACCoE&FG) Regulation 350-19 (USACCoE&FG 2018c). Entry into an RCW cluster is strictly regulated. Appendix 1 of the Guidelines summarizes the training activities that are permitted or restricted in marked buffer zones around cavity trees (Army 2007a). Additionally, USACCoE&FG Regulation 420-7 provides guidance for activities in proximity to endangered species sites (USACCoE&FG 2018a). Some training activities that are not allowed within 200 feet of a marked cavity tree include generators, smoke generators and smoke pots, establishment of signal sites, artillery firing points, and fueling points. However, certain activities will be allowed within the 200-foot buffer. Some of these activities are blank firing of 7.62 millimeter and smaller calibers, artillery and hand grenade simulators, smoke grenades, foot traffic through the cluster, and cutting natural vegetation (hardwood only) for camouflage. Removal of pines anywhere on Fort Gordon is prohibited unless prior approval is received from DPW (Section 4.1.6). Removal of hardwoods for camouflage is permitted, and will be encouraged in RCW habitat where hardwood midstory control is needed. Range Regulations will be amended to make training restrictions consistent with the Guidelines (Army 2007a). Military vehicles are not permitted within 50 feet of marked cavity trees unless the vehicles are traveling on existing roads, trails, or firebreaks. Military training within marked cavity tree buffers will be limited to transient activities that may not exceed 2 hours.

RCW nesting habitat will be managed by clusters or adjacent timber stands. However, training restrictions will apply only within marked buffer zones around RCW cavity trees. RCW-related training restrictions, except removal or destruction of pines, do not apply to unprovisioned recruitment clusters, inactive clusters removed from management, and areas outside of the marked buffer of active clusters and recruitment clusters. The restrictions will apply to a cluster once it is provisioned and the cavity trees and buffer are marked. These restrictions do not prohibit DPW natural resources personnel from using prescribed fire, silviculture treatments, or any other accepted management practice in the performance of their duties. Prescribed fires will be conducted in accordance with Fort Gordon's Integrated Wildland Fire Management Plan (Fort Gordon 2008b).

Units are required to report damage to any cavity tree or extensive soil disturbance within and around marked RCW cavity tree buffers to Range Control. Range Control, as soon as possible after notification by the unit, will report this damage to the NRB, which will assess the damage. An artificial cavity will be constructed within 48 hours if a cavity tree is destroyed in an active cluster or provisioned recruitment cluster. Cavity trees destroyed in the SAIA, which will likely be discovered only by NRB personnel entering clusters in this area, will be replaced when access long enough to construct replacements is permitted. Significant soil disturbance within or adjacent to marked buffers outside the SAIA will be repaired as soon as practicable to prevent degradation of RCW habitat. The Range Regulation (USACCoE&FG Regulation 350-19) will continue to require all digging for military training in the HMU to be filled at the completion of training (USACCoE&FG 2018c).

If the measures previously described fail to control damage and disturbance, trails and firebreaks located within the cluster may be closed by erecting gates and, if necessary, allowing these areas to revegetate. Fort Gordon will consult with USFWS prior to the establishment of new trails, roads, or firebreaks that permit vehicle travel through an RCW cluster. Finally, habitat protection measures will be actively enforced through training and natural resources enforcement programs as described in Chapters 1 and 11 of AR 200-1 (Army 2007b).

4.1.15 Translocation and Augmentation

Both translocation and augmentation can involve intrapopulation (within the same population) or interpopulation (between populations) movement of individuals. Augmentation is a specific form of translocation involving translocation of female juveniles. Interpopulation translocation provides a means to maintain genetic viability in populations with less than 250 PBGs. Interpopulation and intrapopulation translocation can be a useful tool to expand and disperse a RCW population into designated habitat. They also permit biologists to increase the number of breeding pairs, thus increasing the rate of recovery via production of additional young. Normally translocation and augmentation involve movement of juveniles because the techniques for moving adults have proven less successful to date.

Fort Gordon's RCW population is currently above the recommended 30 PBG threshold and further interpopulation translocations are not planned. However if translocations become necessary they will be accomplished in the following ways:

- (1) Augment clusters containing individuals of one sex with one bird of the opposite sex from another population. Ideally, the birds should come from areas similar to Fort Gordon in latitude, elevation, and forest type (Haig et al. 1993, Haig and Rhymer 1994). However, individuals from other populations not meeting these requirements may also be used when birds are not available from preferred locations. This should provide additional breeding pairs and increase the genetic diversity of the population.
- (2) Create new breeding groups by moving juvenile birds of the opposite sex into a recruitment cluster. New groups will be translocated into areas where provisioning has been accomplished and has the ability to support six recruitment clusters where three pairs of RCWs can be released. This process is necessary in order to demographically stabilize the installation's small population. Efforts will be made to receive birds from different populations or as far apart as possible from the same population. Close coordination will be done with donor population biologist to insure genetic diversity. Creation of new breeding groups strictly by intrapopulation translocation may be possible when Fort Gordon's RCW population is larger. Fort Gordon will rely on experts and USFWS concurrence to determine when this is appropriate.

Red-cockaded woodpeckers will not be translocated into nesting habitat until a suitable number of cavities are available, midstory in the cluster or recruitment cluster has been controlled, and minimum forage is available. Until the population is considered stable (30 PBG), sites for translocation will generally follow the same priority as those identified for recruitment clusters (Appendix K). Exceptions to these priorities include:

- (1) Solitary birds will receive the highest priority for augmentation.
- (2) Sites that were or have become recently inactive will receive high priority for re-activation translocation.

This priority scheme may be modified as appropriate by the installation's RCW biologist. Factors in addition to those listed above, such as quality of the nesting and foraging habitat must be considered when the final decision is made regarding cluster priority for translocation.

The group and or cluster receiving a bird(s) will be monitored to determine the success of the translocation. Post-release monitoring will be performed to determine if pairs have formed, if birds continue

to use the cluster, and if translocation has been successful, as follows:

- (1) Once a translocated bird is released, no further monitoring will be conducted for at least a week after the release to allow the bird(s) to become accustomed to its new cluster and to form a pair bond.
- (2) Employ intensive monitoring during the next breeding season to document nesting effort and success. If still present, schedule groups for breeding season monitoring, including monitoring eggs, nestlings and fledglings.
- (3) Translocations will be considered successful if birds remain in the population for 6 months, including a breeding season, or reproductive behavior or production of eggs, nestlings, or fledglings is observed.

Modifications to this monitoring scheme may be necessary if birds are translocated into direct fire or other limited access area.

Translocations will not be undertaken without the approval of and close coordination with USFWS. Fort Gordon has an ESA Section 10 sub-permit (scientific purposes) for RCW management, including translocations. Persons marking, banding, or handling birds shall have the appropriate permits prior to performing these activities, or be in the presence of permitted individuals. Permits will be kept current.

4.1.16 Monitoring Plan

The entire installation, except the AIA, was surveyed for RCW cavity trees from 1990 to 1992. Resurvey of the installation was completed in 1997 as required under the 1996 Management Guidelines for the Red-cockaded Woodpecker on Army Installations (Army 1996). Inventories of all managed clusters (active, inactive, and provisioned recruitment) and group checks at those with cavity trees appearing active, are conducted annually to document the status of each cluster. These inventories should take place beginning 1 March each year and provide the data to complete the USFWS Annual RCW Report. Annual inspections of active RCW clusters and provisioned recruitment clusters are needed to determine the management necessary to maintain nesting habitat. Monitoring the number of birds in active clusters will also be required to determine demographic trends within the population. Fort Gordon will annually report RCW population data and actions taken to improve RCW habitat to the USFWS. This information may be supplied in

conjunction with a required annual Section 10 sub-permit report.

4.1.16.1 Inspections

All active, inactive, and provisioned recruitment clusters will be inspected annually. These are prescriptive inspections used to develop treatments and modifications of treatments to maintain suitable nesting habitat. Inspections in the AIA will not be performed. At a minimum, Fort Gordon will inspect and record data for the following:

- (1) Density and height of hardwood encroachment
- (2) Height of new RCW cavities
- (3) Condition of RCW cavity trees and cavities
- (4) Damage from training, fires, etc.
- (5) Evidence of RCW activity for each cavity tree, including each cavity in the tree, within the cluster

Inactive clusters removed (deleted) from management will not be included in the annual inventory process. Three clusters will be removed from management for the 2021-to-2025 INRMP; all three clusters are located in the SAIA. Clusters that will be removed from management are shown in Figure 4-5.

Commented [JM2]: update

Forest stand inventories are needed periodically to properly manage the forest, including RCW nesting and foraging habitat. Forest stand inventories will be conducted according to accepted sampling techniques. Inventories on the ground will only be accomplished where deemed safe (not in duded impact areas, for example).

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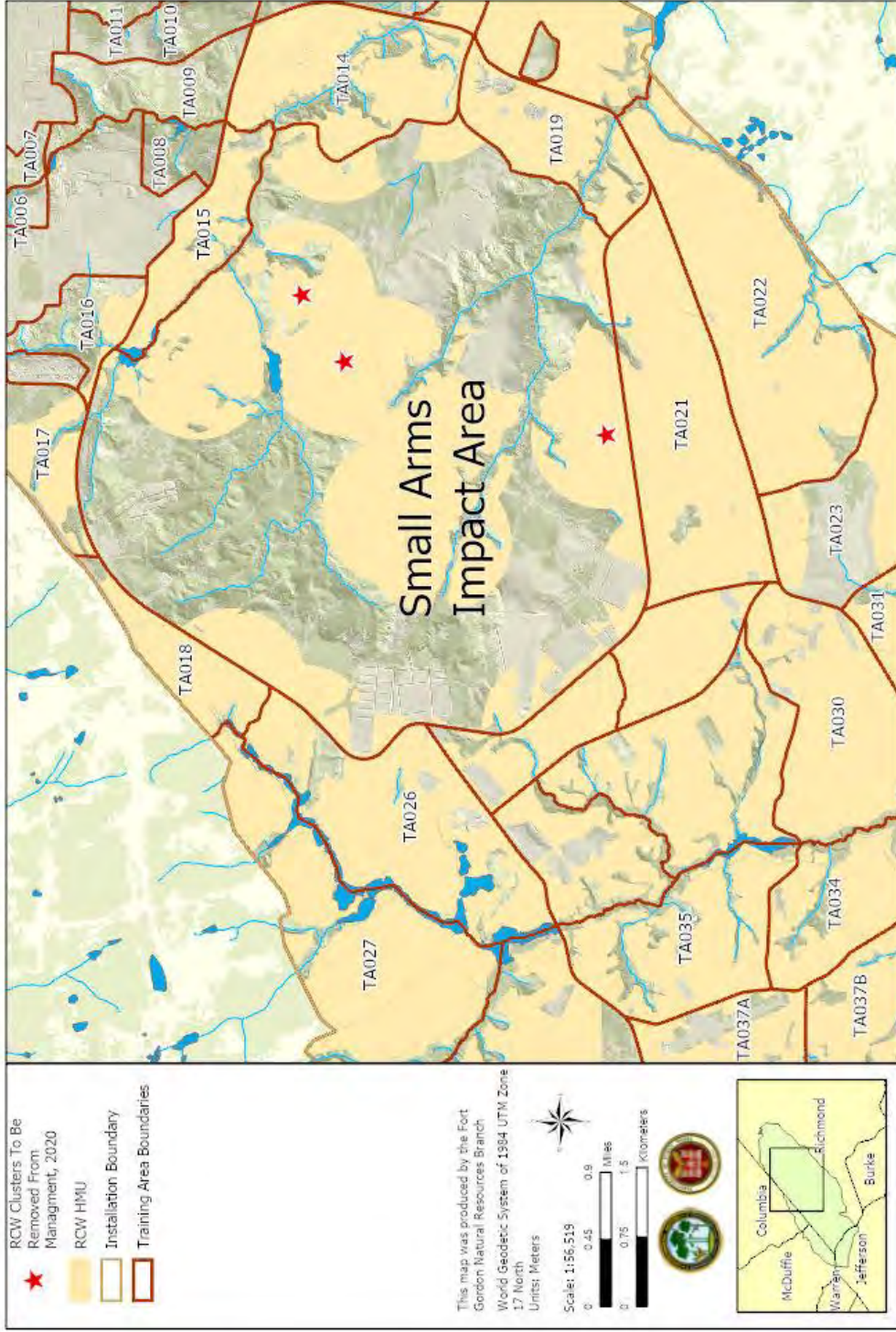


Figure 4-5. Inactive RCW Clusters Scheduled for Removal from Management on Fort Gordon in 2020

4.1.16.2 Monitoring Programs

Fort Gordon will conduct monitoring programs to scientifically determine the demographic trends of the RCW population. Population monitoring will follow the Guidelines, which state that all active clusters will be monitored annually in populations with less than 100 active clusters (Army 2007a). Monitoring in the AIA will not occur.

Currently, Fort Gordon has 42 active RCW clusters; thus, all active clusters will be monitored for demographic trends. When the number of active clusters and PBGs exceeds 100, 50 percent of the active RCW clusters will be monitored. Clusters activated by translocations will also be monitored. Monitoring activities will be performed annually to determine the number of adults and fledglings per site, sex of birds, number of breeding groups, and number of nests. Birds will be color banded to enable the monitoring of group size and reproductive success. Nestlings will be banded between the ages of 5 to 10 days old and will follow procedures in Appendix 2 of the 2003 RCW Recovery Plan (USFWS 2003). Monitoring results will be recorded and retained permanently for purposes of trend analysis.

Group checks of provisioned recruitment clusters inside the HMU will be performed twice/year during the late summer/fall and pre-breeding dispersal periods. Those in the SAIA will be checked at least once per year in accordance with the 2003 RCW Recovery Plan criteria to determine group size (USFWS 2003). These checks will determine which sites have been activated by natural dispersal. The newly active recruitment clusters will be monitored as described in the previous paragraph.

Fort Gordon may monitor training activities occurring in all TAs inside the HMU that contain monitored active clusters and provisioned recruitment clusters through the Range Facility Management Support System. This monitoring will occur irrespective of the status of the provisioned recruitment clusters. These data will help determine if training has any adverse effect on RCWs. The following data will be recorded:

- (1) Type of training that occurred
- (2) Training duration
- (3) Training date
- (4) The units and approximate numbers of soldiers involved
- (5) An approximate number and types of vehicles and equipment involved

- (6) Other relevant information that would contribute to an understanding of the effects of military training on RCW or its habitat

4.1.16.3 Comprehensive Population Survey for New Cavity Trees and Clusters

Comprehensive surveys for new cavity trees and clusters within occupied and potentially occupied habitat should be conducted at approximately 10-year intervals by trained personnel following specific protocol according to the Guidelines (Army 2007a). These surveys can also be accomplished by completing approximately 10 percent annually, installation-wide. The NRB will survey pine and pine-hardwood stands greater than 60 years old, along with all clusters that have been inactive for greater than 5 years. This can also include areas surveyed during timber marking operations by personnel trained in the identification of RCW cavity trees.

4.1.16.4 Project Surveys

Surveys are used to determine whether the nesting or foraging habitat of an RCW group will be adversely impacted by a proposed project, such as a timber sale or development activity, on a particular tract of land. This is an important part of the conservation and management of this endangered species, and therefore USFWS has developed standard survey and analysis procedures for such determinations. These determinations must be undertaken prior to the initiation of any project within the southeastern U.S. that requires the removal of pine trees 30 years or older; typically such trees will be at least 10 inches dbh or larger.

The boundary of the project site is determined for each project by evaluating the impacts of the project to the area. For example, the project site to be surveyed for the construction of a range will consist of the area to be cleared for the range plus the surface danger zone for the weapons. The area to be adversely impacted is determined through consideration of such factors as the weapon systems involved, the type of berm constructed, and the topography of the site and its surroundings. In this case, the project site consists of the area where tree mortality is most likely to occur due to use of the range.

For all categories of projects other than projects not requiring surveys and projects requiring surveys of only the project site, a survey of the project site will always be conducted if the project site itself has not been surveyed in the previous year. If the project site has been surveyed in the previous year, then a project site survey is not required. The only exceptions to this requirement concerns forest

thinning projects and stands that have been provisioned for recruitment clusters. Forestry project sites generally cover larger acreages than construction projects; however, forestry projects are designed to provide better habitat for RCW. NRB personnel will view pines in the project site during marking for thinning, and this will suffice as a survey of the project site. This procedure will also be considered an adequate survey of the stands to be harvested. Project site surveys for single-tree or group selection regeneration projects will be treated similar to a thinning as discussed above.

Surveys will not be conducted off-post. The relatively small amount of nesting habitat that exists around Fort Gordon generally has extensive hardwood midstory problems. GADNR has not located any RCW clusters in the vicinity of the installation.

Not all of the varied projects conducted at Fort Gordon require surveys of the entire affected area. Projects at Fort Gordon are being placed in categories as discussed in the following subsections. For safety reasons, no surveys will be performed in the AIA (Section 4.1.17.3).

Projects Not Requiring Surveys

Unless deemed necessary by an NRB biologist, surveys will not be conducted for the following:

- (1) Projects in unsuitable RCW habitat. Unsuitable habitat includes areas that are not nesting habitat and do not fulfill the definition of foraging stands in Section 4.1.10.
- (2) Prescribed burning.
- (3) Project sites not requiring pine tree removal.
- (4) Projects that require only removal of pine trees less than 30 years old or less than 10 inches dbh. Removal of pines less than 10 inches dbh normally will have no adverse impact because RCW usually forage on larger pines (USFWS 2003) and cavities are not typically constructed in pines this small.
- (5) Infrequently, pine tree removal for repairs and maintenance to utility lines and rights of way is necessary. In most cases, these repairs will occur in the developed cantonment areas. Personnel who perform these repairs and maintenance will have been trained to recognize marked RCW cavity trees and not disturb them, and to remove only those trees absolutely necessary to complete the job. Some training on recognition of RCW cavities has been provided to help personnel identify previously unknown cavity trees. An NRB biologist will be

contacted to properly identify suspected cavities. Surveys by trained personnel generally will not be performed prior to these repairs or maintenance.

- (6) Projects that occur inside the developed main and industrial cantonment areas and are outside of the 49 numbered TAs identified on the Fort Gordon Military Information Map, Edition 3-SRP, Series V745S, 2017.

Projects Requiring Surveys of Only the Project Site

The RCW cavity tree survey to be performed for this category of projects involves inspecting the potential cavity trees to be removed only if these trees or the area where they occur have not been surveyed within the previous year. Projects include the following:

- (1) Projects on the installation that requires removal of 150 feet x 150 feet (0.5 acre) or less in area and are more the 0.5 mile from an active RCW cavity tree. Unless an RCW cavity is present, removal of such a small number of pines, which may be potential RCW foraging habitat, is highly unlikely to adversely impact the RCW.
- (2) Timber salvage operations will be limited to trees expected to succumb, unless the cause of tree damage is expected to spread, as may occur with disease or pest infestation. If spreading is expected, additional trees may be removed to curtail damage to surrounding areas. A wildlife biologist may determine that dying pines should be left standing if the disease or infestation is unlikely to spread, and the resultant snags will not create safety hazards. This determination may be made based on foraging habitat being at or below minimum requirements.

Projects Requiring Survey of the Project Site and Surrounding 0.5 Mile

Site specific surveys will be conducted for all proposed timber harvest, new construction, and maintenance actions that have not been discussed above and will require pine stem removal. All projects that occur within 0.5 mile of an active RCW cavity tree will be surveyed with this method regardless of project size.

The first step in the survey procedure is to determine if suitable RCW nesting or foraging habitat exists within the area to be impacted by the project. If no suitable nesting or foraging habitat is present within the project impact area, further assessment is unnecessary and a "no effect" determination is appropriate. If no suitable RCW nesting

habitat is present within the project impact area but suitable RCW foraging habitat is present within 0.5 mile of the project and will be impacted, potential use of this foraging habitat by RCW groups outside the project boundaries must be determined. This is accomplished by identifying any potential nesting habitat within 0.5 mile of the suitable RCW foraging habitat that would be impacted by the project. Any potential RCW nesting habitat is then surveyed for cavity trees. If no active clusters are found, then a "no effect" determination is appropriate. If one or more active clusters are found, a foraging habitat analysis as described in Section 8.1 of the 2003 RCW Recovery Plan is conducted to determine whether sufficient amounts of RCW foraging habitat will remain for each group post-project (USFWS 2003). All surveys will follow the methods described in Appendix 4 of the 2003 RCW Recovery Plan (USFWS 2003).

4.1.16.5 Sharing Data with USFWS

Fort Gordon will annually report to the USFWS population data, all actions taken to recruit RCWs, and habitat improvement measures. Population data will be analyzed for trends and reported to the USFWS annually. Data gathered before the initiation of this plan will serve as a baseline for comparison to future data and will help identify trends. Trend analysis will be conducted at least once every 5 years after population stabilization.

The Guidelines call for the U.S. Army to work closely and cooperatively with USFWS to discuss installation RCW conservation (Army 2007a). Fort Gordon will routinely engage in informal consultation with the USFWS to ensure that proposed actions are consistent with ESA requirements. When data suggest that Fort Gordon's population is declining, USFWS will be consulted to determine if another course of action is needed to prevent further decline. If needed, a new plan will be developed in consultation with USFWS. Fort Gordon will also consult with the USFWS if over a period of several years the installation is accomplishing less than 50 percent of the population growth goals noted in this ESMC.

4.1.16.6 Ten-Year Forest Inventory

In addition to surveys, Fort Gordon will conduct an installation-wide forest inventory at least every 10 years, as required by AR 200-1 (Army 2007b). Alternatively, Fort Gordon may inventory 10 percent of the installation annually. Information about the quantity and quality of available RCW foraging habitat, nesting habitat and ground cover required for use in the RCW Matrix will be collected during the forest inventory. Forest inventories will be conducted using a recognized

plot sampling technique, such as a line plot cruise, a point sample cruise, or line strip cruise method. Forest inventories in the AIA may be conducted using aerial photography interpretation methods, if needed.

4.1.17 Management of the Cantonment, Impact, Dud, and Direct Fire Areas

Fort Gordon has designated the RCW HMU to contain enough existing or potential nesting and foraging habitat to attain and sustain the installation's RCW population goal. Fragmentation of nesting habitat was avoided in designating the HMU and corridors will connect all nesting areas allowing for demographic interchange throughout the installation's RCW population. Delineation of the HMU is an important initial step in the planning process because it influences the future geographic configuration of the installation RCW population. Updating the HMU will be an ongoing process and the areas designated as the HMU will be managed according to this ESMC.

Management activities and practices in the HMU will be consistent with the conservation of other federally listed species and those proposed for listing. Conservation of candidate species and Army SARs will be considered to the extent possible. Fort Gordon will consult with USFWS should conflicts between management of RCW and another federally listed species arise.

Only the HMU can be managed within the standard management practices described in previous sections of this plan in support of the population goal. However, there are areas of the installation that could support RCWs, but management of the species is limited and does not allow Fort Gordon to manage in compliance with the standards. These areas include dud areas, the AIA, the cantonment area, and portions of the SAIA collectively known as limited management areas. These areas will be managed in a fashion similar to safe harbor on private land. The RCW will not be intentionally partitioned in these areas and incidental take will be given for all naturally occurring disbursement of RCW to areas outside the HMU. Incidental takes are discussed in detail in Section 4.1.18.2.

Natural resources management in dud areas, AIA, portions of the SAIA, cantonment area, and metal damaged areas (limited management areas) will follow ecosystem management principles and have some elements of RCW management but are limited in some way and therefore not included in the HMU. Safety of personnel is the primary consideration behind the management decisions for these areas. The hazardous conditions resulting from

management actions, such as prescribed fire near the cantonment area and TAs, the concentration of unexploded ordnance (UXO), and other hazardous materials (radiological and toxic chemicals) in these areas, pose a high risk to personnel.

4.1.17.1 SAIA

The SAIA, containing approximately 7,500 acres, is the largest direct fire area outside the AIA. This area also includes 15 small arms ranges, a shoot house, the sportsman's ranges and complex, and 214 acres of dud area.

Due to new range construction, increased weapons firing requirements, dud areas and surface danger zones, access to the majority of the SAIA is restricted most of the year. However, portions of the SAIA contain potentially suitable RCW habitat and are included in the HMU. With close coordination with DPTMS to enter the SAIA as the mission allows, RCW management activities will be conducted in the SAIA in the following ways:

- Maintain and monitor the eight existing clusters.
- Install one additional recruitment cluster.
- Midstory removal for cluster and forage habitat will be conducted with a combination of fire, mechanical, or chemical controls.
- Conduct prescribed burns on the HMU portion of the SAIA on a minimum 3-year rotation.
- Timber management within the HMU will follow the Guidelines and 2003 RCW Recovery Plan (Army 2007a and USFWS 2003).

As missions continue to change the ability to access and manage the SAIA, it will be re-evaluated annually for inclusion in future ESMC plan revisions.

4.1.17.2 Cantonment Area

The cantonment area includes administrative areas, barracks, housing, classroom buildings, and fixed field training sites that augment classroom instruction. The metropolitan area outside this part of the installation is also the most developed and encroached upon. Due to high numbers of people and buildings both on and off the installation, management with fire is difficult in this wildland urban interface. There will be only occasional prescribed fire and minimal midstory or other habitat improvement work beyond timber harvest

in the cantonment area. Additionally, no new recruitment clusters will be established in the cantonment area. Master planning directs the development and expansion of buildings to occur in this area partially due to the proximity of other infrastructure (roads and utilities) and similar facilities.

4.1.17.3 AIA

Range Control and the safety office must approve entrance into the AIA prior to management in this area. The AIA contains unexploded artillery, mortar rounds, and other types of UXO. Several target engagement sections of this impact area have a high concentration of duds and continue to receive rounds that may produce additional UXO. Conservation benefits to be gained by management in high-risk areas, other than prescribed fire, are not justified and shall not be pursued in these areas.

No known active RCW clusters occur within the AIA at this time, although some RCW habitat, including one inactive cluster, has been identified. Surveys for new cavity trees will not be conducted in the AIA. Current management strategies for RCW do not include establishment of recruitment clusters in this area. No soil-disturbing activities, including those requiring use of vehicles, will be performed in the AIA.

Prescribed burns to reduce the fuel load are conducted annually during the non-growing season to minimize the possibility of a severe wildfire. Prescribed burning of the majority of the AIA is restricted to the non-growing season because large sections must be burned at one time. However, growing season fires may be considered and conducted if fuel loads permit and must be agreed upon by NRB and DPTMS. Burning is the primary management action that will be conducted in the AIA. To complete this large fire in 1 day, Fort Gordon personnel burn the AIA using a ring-fire technique.

In addition to prescribed burning, the aerial application of herbicides may be used to achieve both range management and ecosystem restoration and maintenance objectives in the AIA. As previously stated most areas within the AIA are inaccessible to ground vehicles due to the dangers of UXOs. While aerial application of herbicides in the AIA will not be conducted specifically to benefit the RCW, this species will undoubtedly benefit. For more information on the aerial herbicide use see section 4.9.10.5 and Appendix P.

4.1.17.4 Dud Areas

Management of other areas containing UXO will be similar to that described for the AIA, with the exception of the burning regime. Burning will be conducted in appropriate stands every 3 to 5 years if considered safe. For safety reasons, personnel burn only from the edges of the road and are prohibited from leaving the road to set additional backfires or inspect the effects of a burn.

4.1.17.5 Metal Damaged Areas

Clusters and surrounding RCW foraging areas in the AIA and inside the SAIA will be designated as "no fire areas" to the degree practicable to protect clusters from projectile damage. Habitat protection, such as additional berms behind certain ranges, will be employed if practical.

Forest stands adjacent to the AIA and inside the SAIA that have been heavily damaged by small arms fire and continue to receive contamination have been deleted from the HMU. These areas are not considered manageable for the long-term. Areas protected from significant damage in the future by such measures as construction of berms, which will support pine or pine-hardwood stands, will be added to the HMUs if management of these sites is practical.

4.1.18 Special Considerations

4.1.18.1 Inactive Cluster Deletions

Current inactive RCW clusters not in the HMU and those located within the HMU that have been monitored as inactive for more than 5 years and are not planned for recruitment in the next 5 years will be permanently removed (deleted) from management. Three clusters will be removed from management for the 2021-to-2025 INRMP: the three clusters are located in the SAIA. Clusters that will be deleted from management are shown in Figure 4-5. Multiple attempts have been made to maintain suitable cavities and improve habitat around these clusters and make them attractive to RCWs to no avail. Deletion of these clusters will permit resources to be directed to other areas where maximum benefits to the RCW will be realized.

RCW cavity trees in deleted clusters may be protected or removed as deemed necessary by the installation's RCW biologist. In addition, cavity entrances will not be covered unless reactivation of the inactive cluster would be harmful to RCWs or the cluster is not in the HMU and reactivation would create problems with critical missions. RCW clusters deleted from management will not be

included in the annual inventory process.

4.1.18.2 Incidental Take

Incidental take of an RCW, both directly and through removal of habitat, could occur during management activities designed to conserve the species. During consultation with USFWS, Fort Gordon will request incidental take of RCWs for the following management activities:

- *Prescribed Burning.* Individual RCWs, nests containing eggs or nestlings, cavity trees, and foraging habitat can be injured or destroyed as the result of prescribed burning. Measures taken to prevent damage or destruction to RCWs or cavity trees include raking or burning around cavity trees, the use of water, and fire-retardant materials. RCW foraging habitat is protected during prescribed burns by following a burn plan. The burn plan describes parameters such as weather and fuel conditions and equipment and personnel required to accomplish prescribed burn objectives that do not adversely affect RCW habitat. Even with these precautions, local weather changes, higher-than-estimated fuel loads, and other unforeseen factors may cause escaped prescribed burns or out-of-prescription burns. Measures will be taken to extinguish prescribed burns that are out of prescription. Fire plows will be used in clusters only during emergency situations. The presence of UXO in the AIA and dud areas prevents the use of reasonable and prudent fire protection measures such as raking or burning around cavity trees. Standard fire suppression activities cannot be performed within the AIA, and wildfires are controlled at the perimeter of the AIA only. Fort Gordon has requested one incidental take for any losses as a result of prescribed burning. This take may be in the form of harassing, harming, wounding, killing, or loss of nest, active cavity, or adult. The BO will give further information on the take status.
- *Activities Outside the HMU (dud areas, AIA, cantonment area and a portion of the SAIA).* Incidental take of RCW or RCW cavity trees will be requested during formal consultation procedures with USFWS if RCWs occupy areas outside the HMU. Fort Gordon will manage these areas in a similar manner as safe harbor on private lands. Natural dispersal of RCW into these areas will not be discouraged, but if birds populate the area and mission requirements require the birds or habitat to be removed, there will already be a take in place.
- *Activities Inside the SAIA.* Fort Gordon has requested three

incidental takes for active RCW clusters within the SAIA due to habitat degradation since NRB personnel may have limited access to perform management requirements. The take may be in the form of harassing, harming, wounding or killing.

Installation staff will immediately notify their major command and the USFWS in the event of an incidental take. Fort Gordon will also comply with paragraph 4-3 of AR 200-1 (Army 2007b).

4.1.18.3 Ecosystem Management

Conservation of RCW and other species is part of a broader goal to conserve biological diversity on U.S. Army lands consistent with the U.S. Army's mission. Biological diversity and the long-term survival of individual species such as RCW ultimately depend upon the health of sustaining the longleaf pine ecosystem; therefore, the success of Fort Gordon's ESMC depends on the integrity of the longleaf pine ecosystem. Management of this ecosystem will benefit a variety of species, including RCW. Maintenance of ecosystem integrity and health also benefits Fort Gordon, the U.S. Army, and the Nation by preserving and restoring training lands for long-term use.

4.1.18.4 Maintaining the HMU

One of the major challenges Fort Gordon will face over the long term is maintaining the size and location of the HMU. The main reason is because the HMU was designed with knowledge of short-term mission requirements. The current mission of the military is in a state of flux, and consequently the short-term mission requirements of the installation are subject to change. Due to recent and ongoing expansion and relocation of several communications, intelligence, and cyber security organizations there has been steady growth in personnel and infrastructure on Fort Gordon which has had some impact on the HMU.

Should a significant threat to National security occur, Fort Gordon may have to expand facilities to train additional soldiers. Plans for expanding this training base will continue to change with any realignments occurring. The extent of development of facilities in the HMU required beyond the current plan is unknown at this time, but portions of the HMU would likely be involved. In the event that training base expansion is required, Fort Gordon will consult with USFWS regarding potential adverse impacts on RCW.

Unplanned projects are likely to occur in the HMU. Consultation with USFWS regarding a change to the HMU will not be initiated unless the cumulative unplanned removal in 5 years exceeds 200 acres of

the HMU. Projects requiring removal of less than 0.5 acre of the HMU will not be included in these calculations. Consultations will be conducted on situations potentially affecting active RCW clusters, recruitment clusters, or their foraging habitat outside the scope of this ESMC. Consultations will be initiated before major construction projects in the HMU, such as new ranges or other training facilities, are initiated. Annual total HMU removal will be reported to USFWS and the ESMC, including the HMU and resultant population goal, will be revised after every 5-year period.

4.1.18.5 Regional Conservation

The interests of Fort Gordon and the RCW are best served by encouraging conservation measures off the installation. Fort Gordon has participated in efforts by the RCW Conservation Coalition to conserve RCWs and longleaf pine habitat on private lands in Georgia. Fort Gordon will continue to participate in promoting cooperative RCW conservation plans, solutions, and efforts with other federal, state, and private landowners in the surrounding area.

4.1.18.6 Conservation on Adjacent Lands

Necessary habitat for RCW includes nesting and foraging areas. Both of these habitat components for a given cluster may be located entirely on installation lands, or there may be instances where one of these components is located on installation lands and the other is located on adjacent or nearby non-Army lands. USFWS and Fort Gordon will initiate cooperative management efforts with these landowners if such efforts would complement installation RCW conservation initiatives.

4.1.18.7 Cooperation with the USFWS

Fort Gordon will work closely and cooperatively with USFWS on RCW conservation and ecosystem management. The installation will routinely engage in consultation with USFWS to ensure that proposed actions are consistent with ESA requirements. Consultation, if necessary, will occur prior to any significant changes to this plan. Fort Gordon will work closely with USFWS on the installation or its surroundings to ensure that adverse impacts on mission requirements are minimized and the best options for conservation of this endangered species are considered.

In situations of a catastrophic event such as a tornado or hurricane, Fort Gordon will make every effort to coordinate with USFWS to the best of its ability to recover RCW. This will be coordinated through USFWS, GADNR, DPTMS, and the Fort Gordon Garrison to ensure this process.

4.1.19 Effects on Training

Implementation of this management plan will have positive and negative effects on training in the short term. Deletion of inactive RCW clusters near critical TAs, especially if cavities are covered, should reduce the possibility of conflicts at these sites. Deletion of other inactive clusters will also permit training in these areas. Incidental take authorization will eliminate training-related liability of personnel for accidents that may occur outside the HMU. Management practices outlined within the framework of this document will be utilized in the assessment of changes in mission requirements that could potentially impact RCW habitat. Projects that conflict with current habitat may not receive final approval.

Planning will require close coordination between NRB personnel and trainers to ensure that any adverse effects are minimized. This will be accomplished through the INRMP and its annual work plan. At times, the specific location of clusters interferes with field exercises designed to simulate battle conditions. However, this is not a major impediment to training and may actually increase the effectiveness of the training by requiring commanders to be creative in overcoming this "obstacle," just as they would have to overcome obstacles encountered in battle.

The ESMC's effect on training in the long term is more difficult to predict because of unforeseeable changes. There will be more PBGs where limitations on training may occur. The recruitment clusters identified in this section are considered long-term recruitment clusters and may change in priority as new clusters occur or as habitat becomes available. Because the potential for clusters to affect certain types of FTX does exist, research is being conducted to determine the effect of certain training activities on RCW behavior. Restrictions may be lifted if the results of this research indicate that the activities have no adverse effect on RCW.

Time required to review projects planned in or near the HMUs may increase as the number of active clusters increases. This is due, for example, to the more frequent cavity tree surveys that will be required. One benefit to Fort Gordon may be that certain training restrictions will be relaxed or removed as the population increases.

4.1.20 Target Species

Target species for the purpose of this plan refers to federally endangered or threatened species as well as Georgia state listed species (threatened, endangered, rare, or unusual) or Army SAR. Species considered Army SARs are those that are federal candidate

species for ESA listing or are categorized by NatureServe as imperiled or critically imperiled on a global scale. A list of target species on Fort Gordon is provided in Section 2.3.1 of this INRMP. Three of the target species, gopher tortoise, southern hognose snake, and Pickering's morning glory are on the Army SAR priority list and require special management consideration to prevent further degradation which could result in listing under the ESA. Management of SARs on Fort Gordon follows the guidance and requirements provided in the U.S. Army's memorandum, *Army Species at Risk Policy and Implementing Guidance* (15 September 2006). This memorandum is provided in Appendix W.

In 2008, the U.S. Army released the final Management Guidelines for the Gopher Tortoise on Army Installations (Army 2008 [2008 Gopher Tortoise Guidelines], Appendix X). These guidelines

establish baseline management standards for U.S. Army installations to support the conservation of the gopher tortoise and its habitat and a goal of no net loss of tortoises. Fort Gordon will implement the 2008 Gopher Tortoise Guidelines as part of



Gopher Tortoise

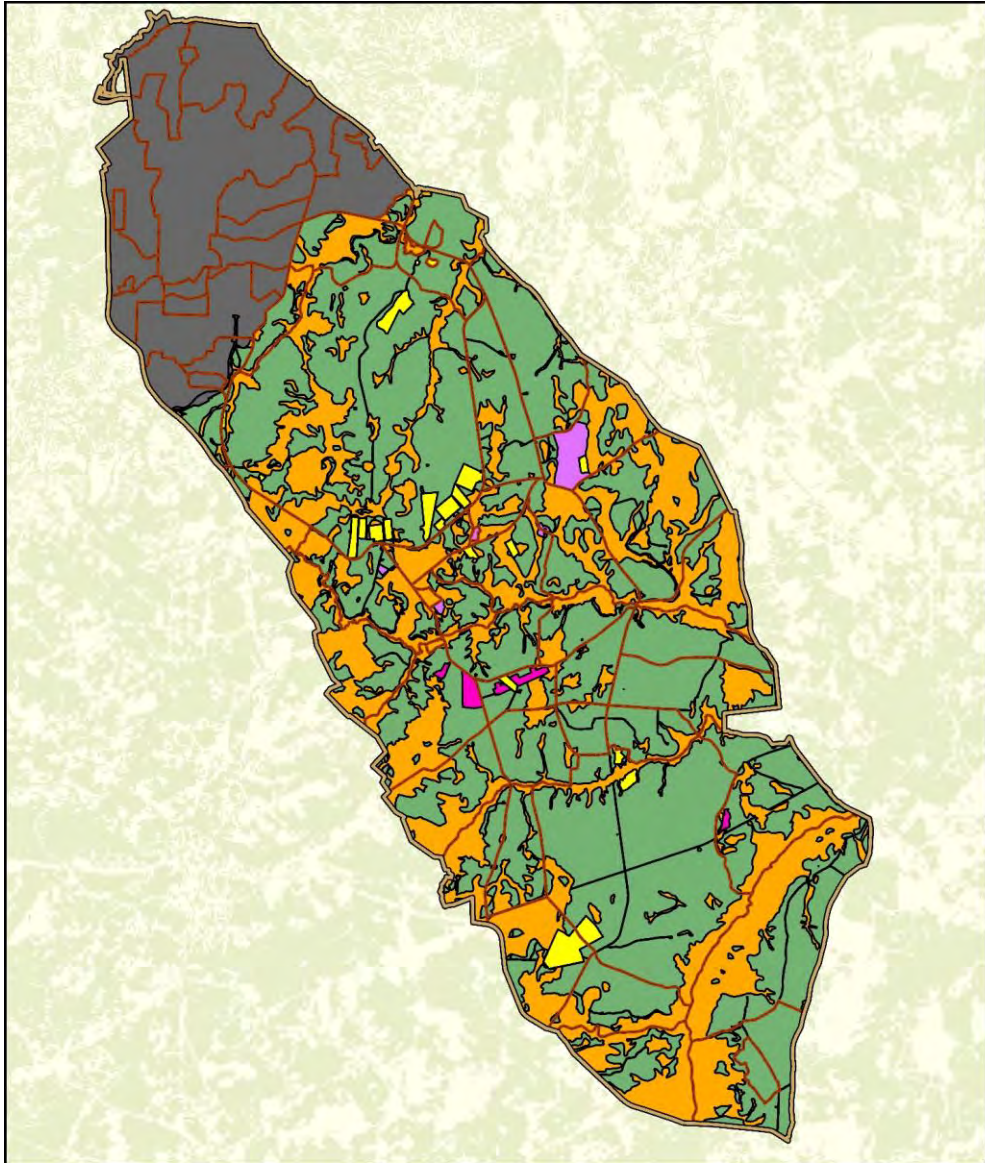
the INRMP. In accordance with the 2008 Gopher Tortoise Guidelines, Fort Gordon has established an HMU for the management of the gopher tortoise (Figure 4-6) and completed a 100 percent population baseline survey in 2011. A re-survey was also conducted in 2015. Survey areas included the Gopher Tortoise HMU, except for the AIA. The overall estimated population size derived from the 2011 baseline survey was 273 (95% confidence interval = 186 to 400). The 2015 re-survey estimated a population of 249 (95% confidence interval = 173 to 357). As of 2011 all known burrows have been recorded and input into NRB's GIS and were subsequently updated as part of the 2015 survey. These burrows will continue to be monitored periodically for activity status and suitability. In 2020 another survey was initiated and one third of the HMU was completed. Within the approximately 9,501 acre Summer 2020 project area, the population size estimate was 94 (95% confidence interval = 47 to 189). In addition, the NRB marks any tortoises captured opportunistically. These marks, which are unique

to individual tortoises, will aid in future population surveys. Since 2003 49 tortoises have been marked.

Some training restrictions are in place for areas where gopher tortoise burrows occur (Figure 2-4). In general, vehicular traffic is prohibited within 25 feet of a burrow (unless the burrow is directly adjacent to a training area road or fire break) and individuals on foot are prohibited within 5 feet of a burrow. More specific, detailed restrictions can be found in the gopher tortoise guidelines (Appendix X) as well as the USACCoE&FG Regulation 420-7 (Appendix V).

Fort Gordon's ecosystem-based management strategy and management for RCW has and will continue to benefit the gopher tortoise and its habitat. In a study conducted by the USACE, Construction and Engineering Research Laboratory, it was determined that management standards and targets established in the 2003 Revised RCW Recovery Plan (USFWS 2003) were consistent with gopher tortoise management (Tuberville et al. 2007). Both species benefit from longer timber rotations, lower stem density, frequent growing season burns, and replacement of off-site pines with native, site-appropriate pines.

Management summaries for each of the target species on Fort Gordon, including SARs, are provided in Appendix Y. Additionally, a management plan for the bluebarred pygmy sunfish on Fort Gordon is provided in Appendix Y. The NRB has maintained and will continue to maintain nest boxes for the southeastern American kestrel on the installation. The locations of kestrel nest boxes on the installation are provided in Figure 4-7.



- Training Area Boundaries
- Installation Boundary
- Gopher Tortoise HMU
- Non-Habitat**
- Cantonment
- Current Military Mission
- Future Projects
- Incompatible Range

This map was produced by the Fort Gordon Natural Resources Branch
 World Geodetic System of 1984
 UTM Zone 17 North
 Units: Meters
 1:135,000

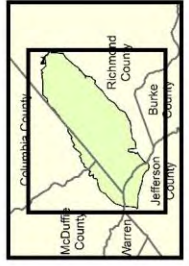
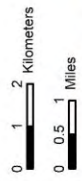


Figure 4-6. Gopher Tortoise Habitat Management Unit (2021-2025), 28,200 Acres.

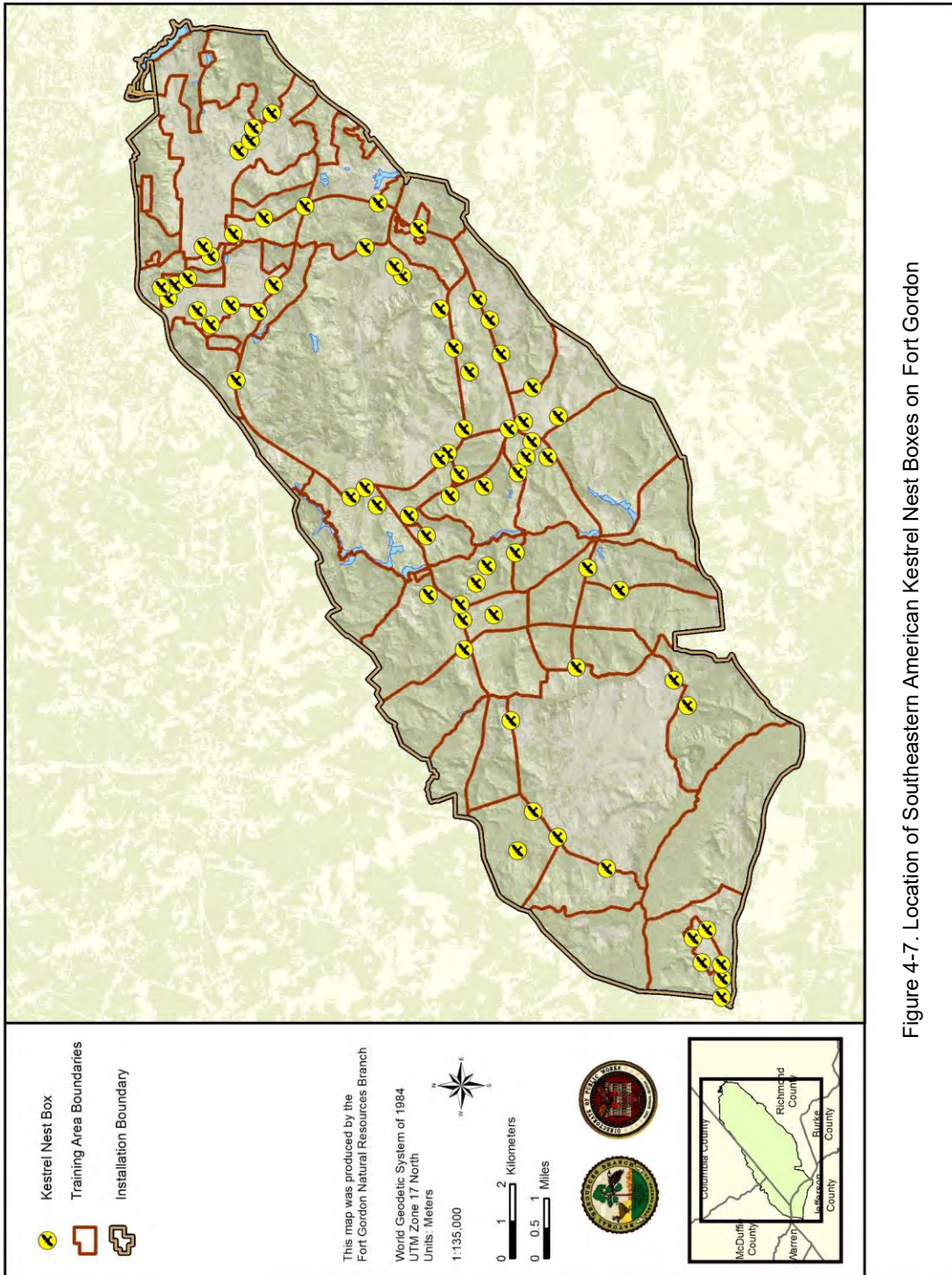


Figure 4-7. Location of Southeastern American Kestrel Nest Boxes on Fort Gordon

4.1.21 Resources Required

The initial planning and funding period for the implementation of this ESMC is 5 years, though some components extend beyond this time frame. Projected staffing requirements for implementation of the INRMP, including the ESMC, are presented in Section 5.0. In addition to the required staff, assistance from other agencies and contractors will be required to implement all the tasks outlined in this ESMC. Assistance is required in performing annual surveys for cavity trees, reforestation activities, habitat improvements, prescribed burning, and translocating RCWs to Fort Gordon. Equipment needed to support implementation of this plan is accounted for within ED. Additional equipment needs identified will also be obtained and accounted for by ED.

4.2 WETLANDS, FLOODPLAINS, AND DEEP WATER HABITATS MANAGEMENT

The discussions on wetlands, floodplains, and deep water habitat have been consolidated into one discussion for the purpose of this INRMP. This is a slight modification from the DoD INRMP template that suggests separate discussions for wetlands, floodplains, and deep water habitat. This modification was done to consolidate all water resources into one section.

4.2.1 Objectives

Wetlands, floodplains, and stream buffers are critical in the protection and maintenance of living resources. Wetlands are also important in the protection of surface waters in accordance with the Rivers and Harbors Act of 1899; EO 11990, Protection of Wetlands; Sections 401 and 404 of the CWA; and Presidential policy mandating “no net loss” of wetlands (National Policy Issuance #91.01, Wetlands). Meeting the President’s Challenge, the U.S. Army has a mandate to protect wetlands, to the maximum extent practicable. The following regulations, laws, and EOs are pertinent to wetlands, floodplains, and stream buffers for the State of Georgia:

- EO 11990 Protection of Wetlands
- Section 401 of the CWA
- Section 404 of the CWA
- Coastal Zone Management Act of 1972
- EO 11988 Floodplain Management

U.S. Army policy is to avoid adverse impacts on existing aquatic resources and offset those that are unavoidable. The U.S. Army’s

goal is no net loss of values and functions to existing wetlands and no overall net loss of wetlands on U.S. Army controlled lands. Furthermore, the U.S. Army takes a progressive approach to protecting existing wetlands, rehabilitating degraded wetlands, restoring former wetlands, and creating wetlands to increase the quality and quantity of the Nation's wetlands resource base. Similarly, EO11988 Floodplain Management addresses floodplain impacts, and the Coastal Zone Management Act mandates consistency with state coastal zone regulations, if applicable. Fort Gordon is not within the Georgia coastal zone; therefore, there is no compliance issue with this resource.

4.2.2 Wetland Management

Fort Gordon will identify and maintain a current inventory of wetlands and surface water resources through planning level surveys. A Memorandum dated 21 March 1997, Army Goals and Implementing Guidance for Natural Resources Planning Level Surveys, provides guidance for planning level surveys. The following steps will be taken to mitigate the effects of specific projects on wetlands:

- Through NEPA and Watershed Impact Assessment, decide whether alternatives are available that do not impede wetlands. Avoiding or reducing the amount of wetlands affected by the action often economically benefits the U.S. Army.
- The USACE Savannah District will determine the boundaries of affected wetlands through wetland delineation in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual*. Assemble all pertinent associated material, including aerial images and maps (topographical, etc.).
- When all wetland information is assembled, request that the USACE determine whether the wetland is jurisdictional and whether a Section 404 permit is required. If the site requires a Section 404 permit, a detailed design and permit application will be prepared and the Section 401 Water Quality Certification application will also be submitted.
- If the wetland is jurisdictional, determine if a Nationwide Permit might apply to the intended action, if not obtain a Section 404 permit from USACE before performing any work associated with the discharge of dredged or fill material into the wetland.

- If the wetland is isolated, USACE may not have jurisdiction. A Section 401 Water Quality Certification will still be completed under their jurisdiction.
- During the planning stages and NEPA process, determine whether any other laws or regulations apply to a proposed action in a wetland. This focuses on the ESA, MBTA, and National Historic Preservation Act. Regarding the ESA, if an action may affect a listed species, consult with USFWS.
- Determine whether the state requires a Section 401 Water Quality Certification or the locality has individual permit requirements related to watershed, wetland, or stream quality.
- If the project requires Section 404 permits, demonstrate avoidance and minimization of wetland impacts followed by mitigation as a last resort, per the MOA between USACE, Environmental Protection Agency (USEPA), and USFWS.

4.2.3 Floodplains Management

EO 11988 requires all federal agencies to provide leadership and take action to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values of floodplains when acquiring, managing, or disposing of federal lands. Prior to implementing a proposed action, Fort Gordon’s planners consult the National Flood Insurance Program maps distributed by the Federal Emergency Management Agency to determine if the proposed action occurs in a floodplain. If National Flood Insurance Program maps do not cover the affected area, a professional engineer will prepare floodplain map contours. Fort Gordon implements the floodplain requirements through planning review and stormwater management programs. The erosion and sediment programs of the state and local issuing authorities review all development and prevent construction of structures from within critical floodplains. Additionally, Fort Gordon Hydrologic/Hydraulic Study maps and the project’s storm magnitude severity are reviewed to determine potential impacts on floodplains. The following steps are taken to minimize impacts on floodplains:

- Through NEPA and Watershed Impact Assessment, decide which projects are located in a floodplain. Investigate alternatives that are available to relocate or prevent life, health and safety issues

Fort Gordon’s environmental staff maintains protective buffers around wetlands to improve water quality and minimize impacts on wetlands and stream channels from stormwater discharge from impervious surfaces such as runways and roads.

that are potentially located in a floodplain.

- Fort Gordon staff, contract personnel, or the Local Issuing Authority under the Georgia Erosion and Sediment Act will determine the boundaries of the floodplain in accordance with the Fort Gordon Hydrologic/Hydraulic Study or the Federal Emergency Management Agency Floodplain maps.
- Assemble all pertinent associated material, including aerial images and maps (topographical, etc.).
- If the project is located in a floodplain, investigate alternatives that are available to relocate the project to prevent the loss of property, loss of life, and health and safety issues.
- If practical alternatives are available, the Army prepares a Finding of No Practical Alternative.

4.2.4 Deepwater Habitat

As previously mentioned in Section 2.3.2 (Wetlands and Deep Water Habitats) a total of 28 impoundments are located on Fort Gordon. The Fort Gordon NRB is responsible for the management of the impoundments on the installation and management guidelines are provided Section 4.4.6 of the Fish and Wildlife Plan.

4.2.5 Stream Buffer Management Zones

Streams and creeks on Fort Gordon are protected under the Georgia Erosion and Sedimentation Act 391-3-7. Streams must have a 25-foot-wide undisturbed vegetative zone to protect the waters of the state. The state provides variances to this requirement only under permits granted by the National Pollution Discharge Elimination System (NPDES) program. The variances are required for activities that disturb the riparian areas along the streams. The following steps will be taken to avoid and minimize the effects of specific projects on Fort Gordon's streams and creeks:

- Permit all activities requiring variances.
- Map all streams with buffers.

4.3 ENFORCEMENT OF NATURAL RESOURCES LAWS AND REGULATIONS

Section 107 of the Sikes Act (16 U.S.C. 679e-2) requires, to the extent practicable and using available resources, professionally trained natural resources management personnel and natural resources law enforcement personnel to be available and assigned responsibility to perform tasks necessary to carry out Title I of the Sikes Act, including the preparation and implementation of INRMPs.

Training requirements for natural resources staff implementing this INRMP are described in Section 4.17. In addition, natural resources manpower requirements are discussed in Section 5.5.

The Directorate of Emergency Services (DES) is responsible for enforcing laws and regulations on Fort Gordon, including those pertaining to hunting, fishing, other outdoor recreation, and the environment. The responsibilities and policies for hunting, fishing, bicycle riding, and other training area recreation on Fort Gordon are established in USACCoE&FG Regulation 420-5 (Appendix L). Specific responsibilities of the Fort Conservation Law Enforcement Section are provided in Section 1.4.1.6.

A number of laws and regulations apply to the natural resources management at Fort Gordon. Table 4-3 lists the federal laws and regulations applicable to Fort Gordon.

Table 4-3. Laws, Regulations, and Instructions Applying to Natural Resources Management at Fort Gordon

Number	Title	Description (where necessary)
EO 11990	Protection of Wetlands	Requires agencies to take action to minimize destruction, loss, or degradation of wetlands.
EOs 11989/12608	Off-Road Vehicles on Public Lands	Provides for closing areas to off-road vehicle (ORV) use where natural resources are adversely affected.
USACC&FG Reg 420-7	Endangered Species Regulation	This regulation provides guidance to U.S. Army Signal Center and Fort Gordon (USASC&FG) on activities in proximity to endangered species sites.
USACC&FG Reg 420-5	Hunting, Fishing, Bicycling and Training Area Recreation Regulation	Establishes responsibilities and policies for hunting, fishing, and training area recreation on the Fort Gordon military installation.
AR 215-2	Management and Operation of Army Morale, Welfare and Recreation Programs and Nonappropriated Fund Instrumentalities	Prescribes policies and procedures and assigns responsibilities for the operation and use of recreational land and water on U.S. Army facilities/activities.
AR 200-1	Environmental Protection and Enhancement	This regulation addresses environmental protection and enhancement and provides the framework for the Army Environmental Management System.
TM5-635	Outdoor Recreation and Cultural Values	Provides guidance, standards, and technical information for the protection and management of outdoor recreation and cultural resources on U.S. Army installations.
DODDIR* 6050.2	Use of Off-Road Vehicles on DOD Lands	Off-road vehicles prohibited without environmental assessment.
MOU – 7 April 1978	MOU - Outdoor Recreation on Military installations	MOU between the Department of Interior and DoD for the development of public outdoor recreation resources on military installations.
DoDINST** 4700.2	The Secretary of Defense Natural Resources Conservation Award	Establishes an annual program to recognize outstanding achievement in support of DoD's policy to develop, maintain, and improve natural resources.
DoDINST 4715.3	Environmental Conservation Program	Implements policy, assigns responsibilities, prescribes procedures for integrated management of natural and cultural resources.
DoDINST 7310.5	Accounting for Production and Sale of Forest Products	Provides for the accounting of forest products and the sales of those products.
DoDDIR 4700.4 (also 32 CFR 190)	Natural Resources Management Program	Provides DoD policy on natural resources management.

* DoDDIR – DoD Directive

** DoDINST – DoD Instruction

4.4 FISH AND WILDLIFE MANAGEMENT

4.4.1 Introduction

4.4.1.1 Purpose

Under AR 200-1, Fort Gordon's NRB of the ED has prepared this fish and wildlife plan as part of the INRMP. The fundamental purpose of Fort Gordon's fish and wildlife program is to protect, conserve, enhance, and utilize the fish and wildlife resources on the installation.

Army Regulation 200-1 sets forth goals that integrate natural resources stewardship and compliance responsibilities. This AR also states that INRMPs will develop, initiate, and maintain programs for the conservation, utilization, and rehabilitation of natural resources on U.S. Army lands to achieve sustainable ranges, and TAs, as well as other land assets. The regulation also sets forth the following objectives:

- Manage installation natural resources to provide the optimum environment, which sustains the military mission.
- Develop, initiate, and maintain progressive programs for land management and utilization.
- Maintain, protect, and improve environmental quality, aesthetic values, and ecological relationships by:
 - Protecting Army real estate investment from depreciation.
 - Complying with environmental protection and enhancement policies and procedures as outlined in AR 200-1.
 - Protecting and sustaining natural resources from impacts of military missions through proactive conservation.
 - Implementing measures such as soil erosion control and prescribed fire.
 - Preventing damage and destruction of valuable natural resources from fire, insects, invasive species and disease.
 - Protecting plants and animals and the habitat they depend upon, especially endangered or threatened species, by conducting surveys that map and show the occurrence, habitat distribution, and management areas.

- Responding to the increasing need for food, fiber, and timber products and outdoor recreational opportunities by managing lands capable of producing these resources as is consistent with the assigned military mission, and conservation of healthy ecosystems and biodiversity.
- Support military missions, especially training and field exercises, in a manner that will best accomplish the mission while protecting the environment.
- Protect environmentally sensitive areas such as floodplains, wetlands, steep slopes, aquifer recharge zones, and riparian zones.

4.4.1.2 Management Plan

Fort Gordon's fish and wildlife management plan consists of nine main parts: Introduction, Management History, Management Goals and Actions, Fish and Wildlife Resources, Hunting and Fishing Program, Fishery Management, Wildlife Management Practices, Personnel Responsibilities, and Outside Assistance. The management actions contained in this plan are based on sound scientific research and history of past management success at Fort Gordon. Biodiversity and ecosystem management strategies are incorporated in this multiple land use management plan.

4.4.2 Management History

A detailed discussion of the history of natural resources management at Fort Gordon is provided in Section 2.1.3.3 of this INRMP.

4.4.3 Management Goals and Actions

The fish and wildlife program's primary goal is to maintain a variety of native flora and fauna at levels that support biodiversity and will allow for a sustainable yield for recreational purposes, in conjunction with supporting the military training mission in a multiple land use strategy. Fort Gordon will be managed within adequate thresholds of ecological representation while providing an optimum mix of social and economic benefits (Haufler et al. 1996). Successful ecosystem management considers not only the ecological objectives but also incorporates social and economic objectives like natural resources-based economies, recreation, aesthetics, and cultural and archaeological values (Haufler et al. 1996).

The goals listed below are broad statements that will benefit the whole ecosystem and can be applied to other ecosystems in other areas but are not specific enough to lead to an action (Table 4-4). Due to this, objectives and specific actions have been devised that take into account the actual conditions and uses of the land at Fort Gordon (Table 4-5). Many actions below are listed more than once because they help to accomplish numerous goals. Work plans to accomplish these management actions and goals are provided in Appendix K.

Table 4-4. Goals and Objectives of Fort Gordon’s Fish and Wildlife Program

Goal 1:	Maintain viable populations of all native species insitu.
Objective 1.1:	Maintain and manage all populations of wildlife, game, nongame, threatened and endangered species on Fort Gordon.
Objective 1.2:	Maintain and manage fisheries in the waters of Fort Gordon to allow for recreational harvest of fish.
Objective 1.3:	Maintain and manage wildlife game species on the lands of Fort Gordon to allow for the recreational harvest of game.
Goal 2:	Represent, within protected areas, all native ecosystem types across their natural range of variation.
Objective 2.1:	Integrate ecosystem management and multiple land use strategies in the actions taken on Fort Gordon, in accordance with DoD and U.S. Army policy.
Goal 3:	Maintain and mimic ecological processes (e.g., disturbance regimes, hydrological processes, and nutrient cycles).
Objective 3.1:	Maintain and enhance water quality and protect wetland habitats.
Objective 3.2:	Maintain and manage the land on Fort Gordon to provide a variety of habitat types to allow for greater species diversity.
Objective 3.3:	Accommodate human use and occupancy within the constraints of military training, hunting and fishing, other recreational uses, and forest product harvests.
Goal 4:	Manage the lands of Fort Gordon in accordance with all applicable federal and state laws and U.S. Army regulations and policies.
Objective 4.1:	Coordinate and consult with GADNR and USFWS on management of game species of fish and wildlife.
Objective 4.2:	Maintain and update the Fort Gordon hunting, fishing, and training area recreation regulation (USACCoE&FG Regulation 420-5).
Goal 5:	Monitor and research management activities to quantify effectiveness of actions and incorporate scientifically proven methods used by wildlife managers.
Objective 5.1:	Monitor flora and fauna populations.
Objective 5.2:	Partnership with DPTMS and state universities.
Goal 6:	Provide technical assistance and education programs to local community on fish and wildlife management and activities occurring on Fort Gordon.

Source: Fort Gordon 2008a

Table 4-5. Natural Resource Management Goals and Actions Related to Fish and Wildlife Management

Action	Goals
Prescribed fire	1, 2, 3
Ecosystem restoration	1,
Mid-story control	1, 2
Establish native species	1, 2, 4
Protect water quality	1
Cover/fish attractors	1
Supplemental fish stocking	1
Supplemental fish feeding	1
Aquatic weed control	1
Fertilizing	1
Liming	1
Fish tissue analysis	1
Repair, restore, and maintain water control structures	1
Hardwood mast management	1
Winter strip disking	1
Wildlife clearings and plantings	1, 3
Edge maintenance/creation	1
Dove fields	1,4
Restore ecological processes	2
Fuel reduction	2
Growing season burns	2
Restore and establish native plants	2
Maintain water quality in accordance with the CWA	2, 3
Protect riparian areas	2, 3, 4
Protect wetlands	2, 3, 4
Restore native hardwood species	1, 2, 3
Stand conversion/clearcutting	3
Vegetation mosaic	3
Control of hardwoods in upland pine stands	1, 2, 3
Herbicide	3
Roller chopping/flail mowing	3
Control of exotic, invasive and weedy species	3
Roads and firebreaks	3
Section 7 consultation	4
RCW reintroduction/translocation	4
AR 200-1	4

Table 4-5, continued

Action	Goals
Coordination with Game Warden Section, DES	4, 6
Wildlife game species surveys	5
Fish creel surveys	5
Fish electro-shocking surveys	5
Game harvest records	5
Flora photograph monitoring	5
Vegetation surveys	5
Coordination with ITAM	5
Land Condition Trend Analysis	5
Student Conservation Association	5
Nature trails	6
Wildlife displays at local schools	6
On-post safety, dangerous plants, and animal briefings to soldiers	6
Kids' fishing derbies	6

4.4.4 Fish and Wildlife Resources

4.4.4.1 Fisheries

Fort Gordon has a large number of game and nongame fish species. Bass (*Micropterus* spp.), bream (family Centrarchidae), and catfish (*Ictalurus* spp.) are the most popular game fishes. A wide variety of darter, sunfish, and minnow species also occur on Fort Gordon.

There are 27 functioning reservoirs located on Fort Gordon totaling 430 acres. For the purpose of the following reservoir descriptions, a lake is defined as any water body impounded by a dam that is at least 25 feet in height or has a capacity at maximum water storage elevation of 50 acre-feet or more. All other water bodies are considered ponds. The following is a list, including a description, of the 27 functioning reservoirs located on Fort Gordon:

- Butler Lake (94.8 acres): This reservoir provides the irrigation water supply to Fort Gordon. Efforts are made to reduce or eliminate any contamination or pollution from entering the lake. Butler Lake is the location used for fishing tournaments hosted by the Fort Gordon Sportsmen's Club (FGSC). Only this type of controlled fishing (supervised tournaments) is allowed in the lake. A fence along the northern portion of the lake serves as the installation boundary; however, it does little to prevent unauthorized access to the lake.

- Boardman Pond (7.9 acres): Located within the Boardman Lake Housing area, this pond is restricted to residents and their guests. Fishing is allowed for these individuals. It is stocked with bass, bream, and catfish. The pond currently has one functioning fish feeder.
- Wilkerson Pond (4.3 acres): The pond is open all year to fishing. Its proximity to the cantonment area results in very heavy fishing pressure. Picnic and playground areas are located next to this pond. Wilkerson Pond was dredged in 2012 and improved by installing a new disabled accessible parking lot, access walkways, and fishing pier. It currently has two functioning fish feeders. The pond was restocked with bass, bream, and catfish in 2012. A 2013 electrofishing survey determined that several fish attractors/cover should be installed on the north side of the pond to increase fishing success and improve fish habitat. Since 2014 Wilkerson has been stocked each winter with rainbow trout as part of a popular special fishing opportunity.
- Mirror Pond (10.7 acres): Mirror Pond is used a sport fishing lake as well as a water hazard for Gordon lakes golf course. The water control structure was replaced in 2013 by the USACE. The pond has been refilled and stocked with bass, bream, and catfish by the NRB. The eastern side of the pond is off limits to fishing and is considered part of the golf course, however the remaining area is open to sport fishing. No boats are allowed.
- Gordon Lake (32.5 acres): Gordon Lake provides a water hazard as well as a water source for irrigation at Gordon Lake Golf Course. A project is being developed by DFMWR to install a water control mechanism between Gordon Lake and the irrigation retention pond. This will be used to regulate flow into the irrigation retention pond which should improve irrigation capabilities. Sport fishing is permitted in designated areas near the dam. The lake has been and will continue to be treated with aquatic herbicides to control the weed problem. Several fish kills have occurred within this impoundment in the past and efforts will be made to monitor for potential contamination and act as needed.
- Thomas Pond (19.3 acres): Thomas Pond is located in the SAIA (Block D). The dam for this pond was lost in a flood in 1990. The NRCS designed a water control structure that allows the pond to be managed as a moist soil management area and waterfowl impoundment. There are five wood duck boxes that are managed on Thomas Pond. Fishing is allowed

in this pond, but because of its location within the SAIA, access is very limited (only when there are no ranges firing and the SAIA is in a “cold” status). Thus, it is not managed for fisheries.

- Soil Erosion Lake (8.3 acres): Soil Erosion Lake was created to reduce the effects of erosion. Due to its location near several Military residential housing areas, a fence has been installed around 65% of the lake. A large double access gate was installed at the boat ramp to allow boat access. This gate is to remain closed at all times unless allowing for boat access. This lake will continue to be managed for sport fishing. The lake is stocked with bass, bream, and catfish. There are no future plans for conducting supplemental feeding at this lake. The spillway and drainage structure will continue to be monitored and repairs will be made as they are needed.
- Upper Whittimore Lake (historical, 8.7 acres, currently 3.4 acres): Historically, this lake has never maintained a full pool level. The lake will no longer be managed as a sport fishing lake; however, the lake will remain open to fishing. There are no current plans to repair the standpipe structure or dam but as funding becomes available this may be an option.
- Whittimore Pond (8.4 acres): Whittimore Pond is managed for sport fishing. It has been stocked with bass, bream, and catfish. Due to the shallow depth of this pond on one end, aquatic weeds are a problem. The weeds will continue to be monitored and treated with herbicides as needed. This pond currently has two functioning fish feeders. In the spring of 2013 it was used for a special put-and-take trout fishery. This event was deemed a success and has continued each year as of 2018 and may continue on an annual basis if funding allows.
- Big Beaver Lake (20.7 acres): Big Beaver Lake has been managed and will continue to be managed as a sport fish lake. It has been stocked with bass, bream, and catfish. Aquatic weeds have been and will continue to be monitored and treated with aquatic herbicides as needed. Supplemental feeding will continue with the use of two solar-powered feeders. Currently, the lake’s drainage structure requires maintenance and the lake will not maintain full pool. As funding becomes available, maintenance efforts will be conducted on the lake’s drainage structure.
- Little Beaver Pond (5.7 acres): Little Beaver is managed as a

sport fishing pond and has been stocked with bass, bream, and catfish. The pond will continue to receive supplemental feeding with the use of two solar-powered feeders. The establishment and growth of aquatic weeds will be monitored and aquatic weeds will be treated with herbicides as needed. Stocking level surveys will be conducted to maintain the appropriate stocking levels of fish species. While the control structure on this pond is old and in disrepair, it still maintains a full pool.

- Fettig Pond (7.5 acres): This pond is stocked with bass, bream, channel catfish, and grass carp (*Ctenopharyngodon idella*). It has one solar-powered fish feeder. The existing drainage structure (standpipe) is deteriorating and is in need of repair or replacement.
- Big Smoak Lake (14.0 acres): In 2012, its water control structure failed and the dam collapsed, draining most of the lake. The drainage structure and dam were repaired in 2013, and the lake was restocked with bream and catfish. The lake has two solar-powered fish feeders.
- Little Smoak Pond (11.5 acres): Little Smoak Pond is managed for sport fishing and waterfowl habitat. It is a shallow water pond with chronic aquatic weed problems. The upper reaches are also impounded in several places by beavers (*Castor* spp.). The pond has two water control structures that are failing and in need of repair. Two wood duck boxes are maintained at Little Smoak Pond.
- Howard Pond (9.5 acres): Howard Pond is stocked with bream, channel catfish, and grass carp. However, the stocking level is unknown at this time since it was partially drained in 2012 to facilitate the repair of the drainage structure and dam at Big Smoak Lake. Two solar-powered fish feeders are maintained at the pond.
- Upper Leitner Lake (24.7 acres): Upper Leitner Lake is managed for sport fishing. It is stocked with bass, bream, and catfish; however, other species such as crappie (*Pomoxis* spp.) and suckers can be found. The establishment and growth of aquatic weeds are monitored and maintained using aquatic herbicides as needed. Stocking level surveys are conducted at the lake in order to make management decisions.
- Leitner Lake (33.1 acres): This lake is managed as a sport fishing and recreation facility. The lake is stocked with bass, bream, catfish, and grass carp. Aquatic weeds are monitored

annually and controlled with aquatic herbicides as needed. Stocking level surveys are conducted and used for management decisions. A recreation area is situated adjacent to this impoundment. Primitive and recreational vehicle camp sites, a lodge, playground equipment, and other related amenities are provided. Three wood duck boxes are maintained at this lake.

- Lower Leitner Lake (28 acres): Lower Leitner Lake contains bass, bream, catfish, and sucker species. It is managed for sport fishing and for waterfowl habitat. There are 7 wood duck boxes that are maintained and monitored annually. Fish stocking level surveys are conducted and are used to determine management actions. This lake has aquatic weed problems; therefore, winter drawdowns and aquatic herbicides are used to control the spread of aquatic weeds. Summer drawdowns are also used on a periodic basis to improve habitat for waterfowl. Fishing is not allowed during the waterfowl season.
- Claypit I Lake (13.4 acres): This lake is currently stocked with bass, bream, channel catfish, and grass carp. However, the lake has been identified for trophy bass management in the future. It is currently being used as one of the kids fishing derby lakes until Claypit III Pond is repaired and restocked. Three solar-powered fish feeders are maintained at the lake.
- Claypit II Pond (4.4 acres): This pond was drained in 2016 to facilitate repair of the Claypit III dam and control structure. This pond was restocked with channel catfish in 2018. It routinely receives supplemental stockings of channel catfish to support the kid's fishing derbies, which currently occur twice per year. Two solar-powered fish feeders are maintained at the pond.
- Claypit III Pond (2.9 acres): In 2013, the dam and drainage structure failed, draining the lake. The repair work began in 2016 and was completed in 2017. In 2018 the pond was restocked with channel catfish and will be utilized again for the kids' fishing derbies.
- Union Mill Lake (20.8 acres): Union Mill Lake is managed for sport fishing and waterfowl habitat. This lake currently contains largemouth bass, catfish, bream, chain pickerel (*Esox niger*), and suckers. There are 11 wood duck boxes that are being maintained and monitored around this lake. Aquatic weeds are a problem in this lake; therefore, winter drawdowns and aquatic herbicides are used to control their establishment and growth. In 2010, this lake was included as

part of a waterfowl refuge area along with all other water bodies in TAs 30 and 34. Water levels can be manipulated to produce food and cover vegetation for wintering waterfowl. The water control structure was completely replaced in 2016 and the lake was restocked with bass, bream and catfish and was reopened for fishing in 2018.

- **Rainbow Pond (4.6 acres):** This spring-fed pond contains largemouth bass, bluegill, and redear sunfish and is open for recreational fishing year-round. Rainbow Pond will continue to be managed for recreational fishing. Fish stocking level surveys will be conducted and fish species will be restocked as needed. The pond will be monitored for aquatic weeds and will be treated with aquatic herbicides as needed. The water control structure for this pond is outdated and deteriorating. Currently, there are no plans for replacing the water control structure.
- **Rachel I Lake (13.6 acres):** Rachel I Lake is managed for sport fishing and for waterfowl hunting. It is stocked with bass, bream, and catfish. The water control structure (standpipe) is deteriorating and is currently inoperable. When funds become available the water control structure will be repaired or replaced. Aquatic herbicides are used to maintain the establishment and growth of aquatic weeds when needed. The lake is closed to fishing during the waterfowl hunting season.
- **Rachel II Pond (9.4 acres):** This pond is managed for sport fishing and for waterfowl hunting. One wood duck nesting box is maintained and managed at the pond, and the pond is closed to fishing during the waterfowl hunting season. The water control structure (standpipe) is deteriorating and is currently inoperable. When funds become available the water control structure will be repaired or replaced.
- **Rachel III Lake (11.3 acres):** This lake is managed for sport fishing and for waterfowl hunting. Rachel III Lake is stocked with crappie and hybrid striped bass (*Morone chrysops* x *Morone saxatilis*). Two wood duck nesting boxes are maintained and managed at the pond, and the lake is closed to fishing during the waterfowl hunting season. The control structure on this lake was replaced in 2014.
- **Rachel IV Pond (5.2 acres):** Rachel IV Pond is managed for sport fishing and for waterfowl hunting. It has been stocked with crappie and hybrid striped bass. Three wood duck nesting boxes are maintained at the pond, and the pond is closed to fishing during the waterfowl hunting season. The

control structure on this lake was replaced in 2015.

One reservoir, Experimental Pond (1.7 acres), has been removed from the list of functioning reservoirs and is no longer managed. This pond was completely drained and the dam and water control structure completely removed. It no longer impounds water and has been permanently eliminated as a pond.

4.4.4.2 Streams and Creeks

In addition to the lakes and ponds, there are also approximately 74 square miles of drainage supplied by several streams and creeks on Fort Gordon. These creeks offer excellent fishing opportunities for redbreast sunfish (*Lepomis auratus*), bass, and other species. Streams and creeks on Fort Gordon are discussed in detail in Section 2.3.2.5 of this INRMP.

4.4.4.3 Wildlife

Fort Gordon is inhabited by a wide variety of wildlife species. Wildlife species found on Fort Gordon are discussed in detail in Section 2.3.3 of this INRMP. Many of these species are actively managed for sport hunting and fishing. A list of wildlife and fish game species is provided in Table 4-6.

Table 4-6. Wildlife and Fish Game Species Found on Fort Gordon

Common Name	Scientific Name
Birds	
Wood duck	<i>Aix sponsa</i>
Eastern wild turkey	<i>Meleagris gallopavo</i>
Bobwhite quail	<i>Colinus virginianus</i>
Mourning dove	<i>Zenaida macroura</i>
Mammals	
Eastern gray squirrel	<i>Sciurus carolinensis</i>
Eastern fox squirrel	<i>Sciurus niger</i>
Eastern cottontail rabbit	<i>Sylvilagus floridanus</i>
White-tailed deer	<i>Odocoileus virginianus</i>
Raccoon	<i>Procyon lotor</i>
Fish	
Largemouth bass	<i>Micropterus salmoides</i>
Bluegill	<i>Lepomis macrochirus</i>
Redear sunfish	<i>Lepomis microlophus</i>
Channel catfish	<i>Ictalurus punctatus</i>

Common Name	Scientific Name
Redbreast sunfish	<i>Lepomis auritus</i>

Hunting

Hunting and fishing are allowed on the installation under the Sikes Act and are regulated by AR 200-1, USACCoE&FG Regulation 420-5, Fort Gordon NRB personnel and GADNR. The most sought-after game species on Fort Gordon are white-tailed deer, wild turkey, mourning dove, and waterfowl. Those individuals authorized to hunt on Fort Gordon are established in USACCoE&FG Regulation 420-5 and are discussed in detail in Section 4.4.5.1.

Predators

Several species of predators can be legally hunted on Fort Gordon. A list of common game predators on Fort Gordon is provided in Table 4-7.

Table 4-7. Common Predator Species on Fort Gordon

Common Name	Scientific Name	Population Problem
Bobcat	<i>Lynx rufus</i>	None
Gray fox	<i>Urocyon cinereoagenteus</i>	None
Red fox	<i>Vulpes fulva</i>	None
Coyote	<i>Canis latrans</i>	None

At this time, as well as in the foreseeable future, Fort Gordon does not see a need for any additional control of the above-listed predator species. Overall, there are no major problems beyond the natural checks and balances these species provide for other wildlife species.

Nongame Species

State law prohibits the taking of nongame wildlife, except for armadillos (*Dasypus novemcinctus*), starling (*Sturnus vulgaris*), pigeon (*Columbia livia*), English sparrow (*Passer domesticus*), beaver (*Castor canadensis*), feral hog (*Sus scrofa*), and coyote (*Canis latrans*). Feral hogs and coyotes may only be taken on Fort Gordon during any open hunting season or during the special coyote and feral hog season. Additionally, rats, mice, frogs, spring lizards, freshwater crayfish, and freshwater mussels may be taken, with the exception of species on Georgia's protected species list. Enforcement of these protective measures, prescribed burning,

forest management, and management of wildlife openings are several tools used for management of nongame species on Fort Gordon. Other actions that benefit nongame species include artificial nest structures and plantings designed to benefit both game and nongame wildlife. Fort Gordon maintains American kestrel and bat boxes. Further emphasis placed on management of nongame species (other than threatened and endangered species) will reflect public demand and availability of funding and personnel.

4.4.4.4 Plants

Fort Gordon's geographical setting provides for a diversity of plant communities and species. Vegetation on the installation is discussed in detail in sections 2.3.4 and 4.5.4 of this INRMP.

4.4.4.5 Education and Safety

The NRB participates in several educational and safety events throughout the year. Events conducted or attended by NRB personnel were discussed in Section 3.5.2 of this INRMP.

4.4.5 Hunting and Fishing Program

Fort Gordon consists of approximately 55,500 acres of land that is broken down into 49 different TAs, the SAIA, AIA, and cantonment area. Approximately 43,400 acres are managed for hunting, and the remaining 12,500 acres are considered designated no-hunting areas. The no-hunting areas consist of the AIA, dud areas, and developed portions of the cantonment area. Fort Gordon's hunting and fishing program, including the public access lottery drawing, were discussed in detail in Section 3.5.1 of this INRMP.

4.4.5.1 Regulations and Laws Applicable to Fort Gordon Access for Hunting, Fishing, Bicycling and Other Training Area Recreation

The USACCoE&FG Regulation 420-5 establishes who is authorized to hunt, fish, ride bicycles and participate in other training area recreation on Fort Gordon. These privileges are extended to active and retired DoD personnel, DoD civilian employees and their family members, as defined in the The Joint Federal Travel Regulation (Volume I, Appendix A), and their bona fide guests.

Members of the U.S. Army/Air National Guard, drilling reservists, and a number of public access individuals set by the NRB and chosen through a public access lottery are extended these same privileges on Fort Gordon. However due to the size of the installation and military mission, Fort Gordon can limit the total number selected in the public access lottery in order to ensure compatibility with public safety and mission activities, as well as availability of resources.

Other activities of the Fish and Wildlife plan are also covered under several DoD, state, and federal laws and regulations that are discussed in Section 4.3 of this INRMP.

4.4.5.2 Permit Sales

As set forth in AR 200-1 user fees may be collected to recover expenses of managing natural resources for outdoor recreation. On Fort Gordon these fees are collected in the form of hunting, fishing and other outdoor recreation permits. All fees collected will be accounted for in accordance with guidance provided for the appropriation titled *Wildlife Conservation Military Installations*, Army account 21X5095 (AR 37-100 and 37-108). These funds (21X monies) may be used only for fish and wildlife management on the installation where they were collected. Funds required to administer the collection of these funds will not exceed 10 percent of the annual revenues from hunting and fishing permit sales. All Fort Gordon permits are sold through a web-based system called iSportsman. Qualified personnel must possess both a State of Georgia license and a Fort Gordon permit to legally hunt or fish on the installation.

4.4.5.3 Funding

U.S. Army guidelines require Fort Gordon's NRB to implement management actions for reasons other than game management, so the bulk of game management's actions may be accomplished with little added 21X expenditures. The most effective management actions available to the Fort Gordon NRB are prescribed fire, strip disking, and thinning or restoration of the forest. Fort Gordon's NRB is required to conduct prescribed fires for endangered species management and for wildfire control purposes. Prescribed fires will be conducted in accordance with Fort Gordon's Integrated Wildland Fire Management Plan (IWFMP, Appendix T). Forests need to be thinned or restored to improve endangered species habitat and to improve conditions for military training.

The budget for actions pertaining only to hunting and fishing is largely supported by user fees (21X monies) generated from the sale of Fort Gordon hunting and fishing permits. The costs of these permits are set so that all individuals who wish to participate can afford to do so. Funding for hunting and fishing management and permit costs are discussed in Section 5.4.3.

The average number of permits sold per year over the last 5 years (FYs 2013 through 2017) has been 2,400. The sale of these licenses has generated an average of approximately \$46,000 for the

management of the hunting and fishing program on Fort Gordon annually.

4.4.5.4 Fort Gordon Sportsman Club

The FGSC, under the Sports and Leisure Branch of DFMWR, works in conjunction with the NRB to sponsor and manage several outdoor events throughout the year. The club conducts fishing tournaments on Butler Reservoir. They also are sponsors of the kids fishing rodeos along with Fort Gordon's NRB



Kids fishing rodeo on Fort Gordon

and GADNR. Additionally, FGSC operates a shooting range for sighting in hunting weapons as well as recreational shooting. The club also operates a shooting preserve in portions of TAs 23 and 30 (Figure 4-8). The FGSC maintains a permit for the release of quail, ring necked pheasant (*Phasianus colchicus*) and chukar (*Alectoris chukar*). A copy of the current shooting preserve permit, renewed annually, is kept on file at the NRB field office. The FGSC may charge a user fee for these types of optional hunting and fishing services that do not contribute to the 21X account; however, individuals participating in these activities must possess Fort Gordon hunting or fishing permits (with the exception of kids fishing rodeos), obtained through the iSportsman system.

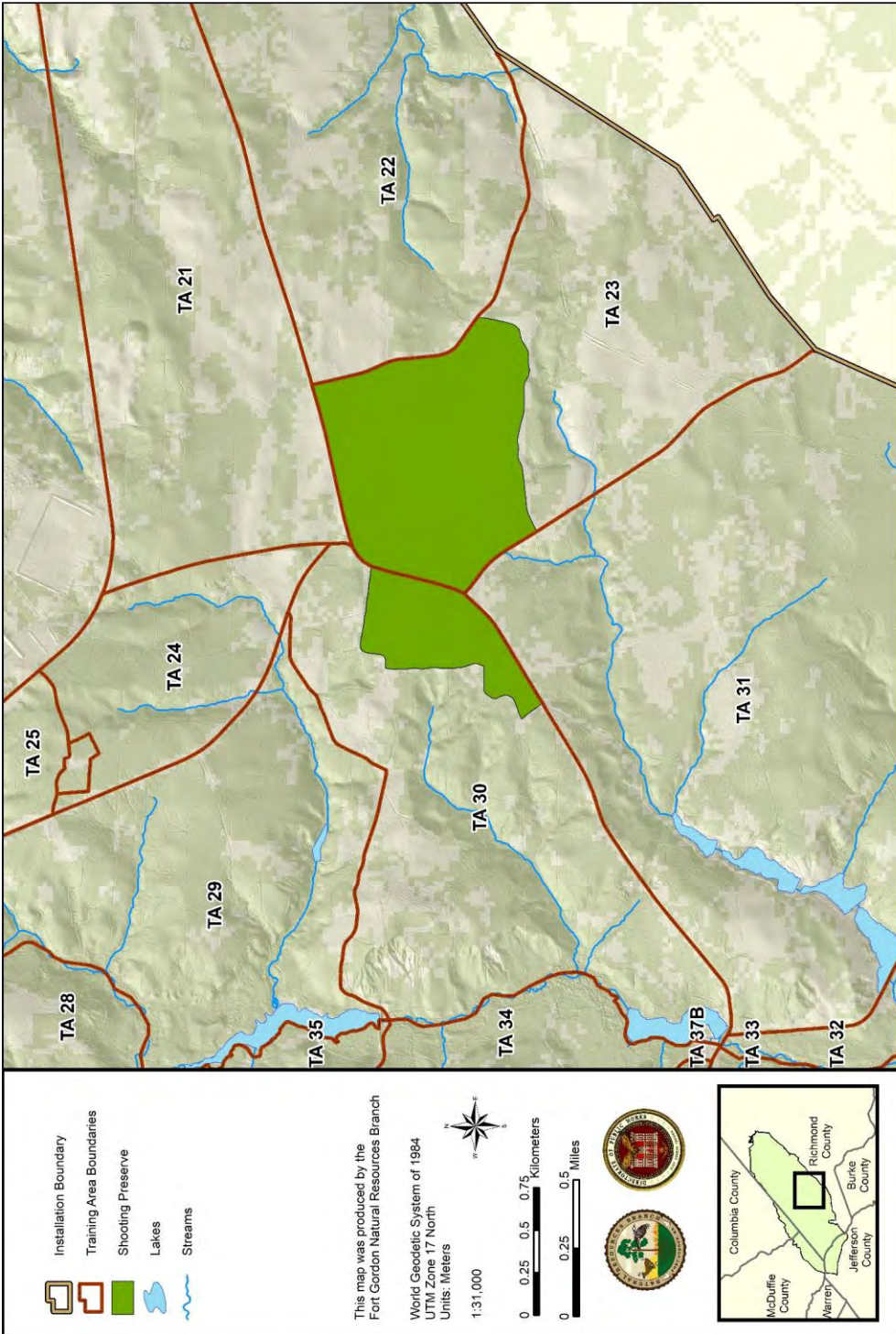


Figure 4-8. Location of Shooting Preserve Area on Fort Gordon

4.4.6 Fisheries Management

4.4.6.1 Water Quality

Water quality on all lakes and streams will be periodically monitored to determine if management actions are required. Water will be monitored for pH, color, point and nonpoint source pollution, total hardness, and turbidity. Additionally, heavy metals or other toxic materials that bio-accumulate in fish tissues will be monitored. Several established sampling points are located on the installation's streams and creeks.

Erosion and sediment will be controlled in areas where it is impacting water quality. Riparian areas and vegetative buffer strips will be maintained, where possible, to help reduce the effects of erosion and sediment and pollution. Some riparian areas will be planted with native species purchased with money received from grants for the protection of watersheds.

4.4.6.2 Lime and Fertilizer

Lime and fertilizer will be applied to managed lakes to maintain the productivity of those waterbodies. A brief description of methods to be used follows:

- Lime - Several lakes on Fort Gordon have soft water (low total hardness) and fail to achieve a satisfactory plankton bloom unless some form of lime is added. When a lake's total hardness drops below 10 parts per million (ppm), agricultural (dolomitic) lime must be added in order to achieve a satisfactory bloom (Gilbert and Lewis 1988). In lakes that have a total hardness greater than 15 ppm, liming will have little effect on fish production. Most ponds require application of at least 1 ton of lime per acre every 3 to 4 years. Lime will be applied as money and resources become available. Lime will increase the amount of phytoplankton, which is the base of the food chain in many pond systems, stabilize the pH of bottom mud and increase the availability of phosphorus. The increase of food availability will support more fish production in the lake (Gilbert and Lewis 1998). Lakes will be monitored for a lime deficiency every 2 to 3 years by checking the total hardness.
- Fertilizer - Fertilization increases the capacity of a pond to produce fish (carrying capacity). In a bass-bream-catfish lake, carrying capacity increases from about 100 pounds per surface acre in natural lakes to 300 pounds or more per surface acre in fertilized ponds. Fertilizing a pond increases

phytoplankton. This gives the pond a dark green color or bloom. Therefore, as more food becomes available through the food chain, smaller fish populations such as bluegill increase and supply more forage for larger predators species such as largemouth bass.

Fertilization will begin in February or early March when water temperature stabilizes above 60°F. The initial application rate, or until a bloom has developed, of 80 pounds (dry) of 20-20-5 fertilizer (or the equivalent) per surface acre or 2 gallons of liquid (10-34-0) fertilizer per surface acre will be applied. When proper color develops, a bright object cannot be seen more than 18 inches below the surface of the water; treatments will then be reduced to half the initial application rate. If proper color does not develop after the third application, the water will be tested to determine if lime is needed. Treatments will occur throughout the summer to maintain the proper water color. This consists of approximately eight to 12 applications per year. Fertilization will stop when water temperature stabilizes below 65°F, which is generally in October or November (Gilbert and Lewis 1988).

4.4.6.3 Aquatic Weed Control

Dense stands of aquatic vegetation, especially submerged and emergent plants, may bind up nutrients and eventually reduce the amount of food available for fish. Excessive small bream may indicate a stunted population. If aquatic weeds are excessive, control measures will be used.

Weeds will be treated using the integrated pest management system. This system implements the most effective, most inexpensive, and most current scientific methods available. Aquatic weeds are recognized as a natural and necessary part of a lake ecosystem and will only be treated when their growth becomes excessive. Several methods under the integrated pest management philosophy will be used to help control the aquatic vegetation in the ponds. A brief description of methods to be used follows:

- Winter Draw Down - In the fall of the year, the lake levels will be reduced to allow winter frost to kill the weeds that occur at the edges of the impoundments. This will also help in driving small baitfish out into open water and increase the food source for game fish over the winter months. Levels will be restored in the spring of the year as fishing pressure begins to increase in the ponds and as spawning seasons begin. Union Mill and Lower Leitner lakes will not follow this

schedule, as they are waterfowl management lakes, which will follow the moist soil management program.

- **Herbicide** - Herbicide application should be used as early in the spring as possible to bring aquatic vegetation under control before a complete infestation has occurred. Diquat, Reward, 2-4-D, Sonar or other herbicides approved for aquatic applications will be applied as needed to control weeds during the spring and summer months. Manufacturer directions will be followed and the chemical application will comply with all DoD and USEPA requirements. Usually only a small portion of the lake will be treated at any one time to protect against lowering oxygen levels and causing fish kills. Treated lakes will be closed to fishing during the application and for the required time in accordance with the herbicide label. All herbicide applications will be conducted by a DOD or State of Georgia certified pesticide applicator. Contracted work will be managed by a DOD certified pesticide applicator.
- **Biological control (grass carp)** - Triploid grass carp will be added to some ponds on a limited basis to feed on and reduce aquatic vegetation. This fish is known to aggressively feed eating two to three times their body weight per day on aquatic plants and will help reduce the need for other methods. This method should reduce the need for herbicides and provide control for as long as 10 to 15 years. Triploid fish are stocked preventing the natural reproduction of the species. Fish are usually purchased from a local certified supplier who can provide proof of purchase and certificate of triploidy.

4.4.6.4 Cover\Fish Attractors

Fish attractors in ponds can benefit all species of fish. Benefits include the aggregation of baitfish, additional substrate for aquatic invertebrate production, increased spawning habitat, and shelter. Many of the ponds on Fort Gordon lack structure that would be used as cover by fish species. Several types of fish attractors may be used at Fort Gordon, including sunken Christmas trees, PVC structures, and pallets. Attractors may be marked with buoys anchored near the attractor site to allow anglers to locate and fish on the sites. Fish attractor site selection is based on the amount of naturally occurring structure, water depth, pond size, and angler use (Lewis no date).

4.4.6.5 Population Census

Fish population sampling has traditionally emphasized ponds and lakes under management. Sampling is conducted from April to September to evaluate the presence and relative abundance of largemouth bass and bream reproduction; the presence and relative abundance of intermediate-sized bream and bass; the condition of all species; and the presence and relative abundance of competitive nongame species.

Several methods will be used to estimate the number, species composition, and age class of fish in Fort Gordon lakes and ponds. This is required to make decisions on management of the fisheries resources. Some or all of the following methods will be used:

Creel Survey

Creel surveys are an integral component of managing recreational fishing. Creel surveys can assess:

- Quality of sport fishing, expressed as species caught and number and weight of fish caught per unit of fishing effort.
- Fishing pressure, expressed as angler-hours of fishing effort for all species or separate species.
- Total yield of fish in terms of species numbers and weights for specific segments of time.
- Composition of the catch, as a percentage of total numbers, and weights for various species and classes of fish.
- Characteristics of the fishery, such as socioeconomic information about the angling population and value of the fishery to surrounding communities.
- Statistics about the fishing population, such as annual exploitation rate of various year classes of selected species, appraisal of new year classes recruited into the fishery, and population estimates and mortality rates for selected species.
- Other miscellaneous data decided upon prior to design and implementation of surveys.

Creel surveys must be repeated periodically to observe trends and record changes that may impact the fishery. Changes in fisheries management may be required to keep abreast of changes in fishing pressure, catch rates, etc. as determined from survey results. Creel surveys can also measure effects of management techniques, such as drawdown, fish population control actions, or fishing regulations.

Finally, creel surveys furnish information of interest to anglers that may aid them in their own fishing efforts.

The creel survey must be statistically valid and cost-effective. Survey design should be based on random sampling. The survey should incorporate a stratified sampling scheme to increase the homogeneity of each sampling unit. Because of time, cost, and logistical constraints, it may be necessary to divide the fishery into smaller units with different sampling probabilities. Such a design can minimize cost and labor and increase survey precision. Survey types include roving creel or access point surveys, telephone surveys, questionnaires, or combinations thereof.

Electro-Shock Survey

Electro-sampling is conducted from March through November using 500 to 1,000 volts, pulsed DC current adjusted for conductivity and other water conditions. Data obtained include species composition, length frequencies and reproduction verification. These data aid in management decisions made for fishery resources.

Basket Survey

Baskets or traps will be used to catch species not usually caught in other survey methods. This helps to alert the biologist to the presence of unwanted species such as yellow bullhead (*Ameiurus natalis*).

Gill Net Survey

Historically, gill net fishing for sucker species has been allowed in certain lakes with written permission from the DPW, ED. This type of sucker fishing has been very popular with local fishermen and is a beneficial way to remove nongame species. When used, fishermen will be surveyed to gather data on species composition of the catch. Past surveys have shown over 95 percent of the catch as nongame species.

Slot/Creel Limits

Based on survey information, size limits for particular species may be set on certain lakes and ponds to keep the balance of predator and prey species in the lake. Lakes may also be designated as catch and release only for certain species. Creel and slot limits are subject to change at any time in lake management. Current creel and slot limits can be found in USASCoE&FG Regulation 420-5 (Appendix L).

4.4.6.6 Potential for Fisheries

Recreational fisheries on Fort Gordon is improving. This is mostly due to the improvements made to several of the lakes and the ability to work with several fisheries contractors. With the recent repair of Union Mill, and Clay pit 3 along with supplemental feeding, and the initiation of a yearly “put and take” trout program the Fort Gordon fisheries program is looking bright.

4.4.6.7 Sportfish Management

Fort Gordon has 25 lakes managed for fisheries. Currently one lake, Upper Whittimore, has major problems with its dam and water control structure and may not be repaired. Most lakes are managed for bass, bream, and catfish species. A listing of managed lakes can be seen in Table 4-8.

- Creel limits post-wide are currently 10 bass, 5 catfish (channel, blue, or white species), and 30 bream. Creel limits are listed in USASCoE&FG Regulation 420-5 (Appendix L).
- Supplemental stocking of catfish and bream has been conducted in several lakes to increase angler success for these species. At the present time ten lakes have received supplemental stocking. This program will be expanded as fish and funds become available.
- Herbicide treatment for weed control will continue in lakes.
- The amount of fertilizer applied to lakes will be increased to allow for more algae bloom and a larger food source for fish populations. A secchi disk will be used to determine when enough fertilizer has been applied and proper water color has developed.
- Structure will be added to lakes that have little or no natural features. This will include natural structures such as Christmas trees and man-made objects such as freshwater fish attractors.

Table 4-8. Lakes Managed for Sport Fishing on Fort Gordon

Lake	Acres	Species	Boats	Ramp	Supplemental Catfish	Feeders	Comments
Rainbow	4.6	B,Bm,C	Y	N	N	N	
Union Mill	20.8	B,Bm,C	Y	Y	N	N	
Lower Leitner	28	B,Bm,C	Y	Y	N	N	
Leitner	33.1	B,Bm,C	Y	Y	Y	Y	
Upper Leitner	24.7	B,Bm,C	Y	Y	N	N	
Rachel I	13.6	B,Bm,C	Y	N	N	N	
Rachel II	9.4	B,Bm,C	Y	N	N	N	
Rachel III	11.3	HB, CR	Y	N	N	N	
Rachel IV	5.2	HB, CR	Y	Y	N	N	
Clay Pit I	13.4	B,Bm,C	Y	N	Y	Y	kids' fishing derby
Clay Pit II	4.4	C	N	Y	Y	Y	Kids' fishing derby
Clay pit III	2.9	C	N	Y	Y	Y	Kids' fishing derby
Howard	9.5	B,Bm,C	Y	Y	Y	Y	
Little Smoak	11.5	B,Bm,C	Y	Y	N	N	
Big Smoak	14	B,Bm,C	Y	Y	Y	N	
Fettig	7.5	B,Bm,C	N	N	Y	Y	
Little Beaver	5.7	B,Bm,C	N	N	Y	Y	
Big Beaver	20.7	B,Bm,C	Y	Y	Y	Y	
Whittimore	8.4	B,Bm,C	Y	Y	Y	N	Trout
Gordon	32.5	B,Bm,C	N	Y	N	N	
Mirror	10.7	B,Bm	N	N	N	N	
Wilkerson	4.3	B,Bm,C	Y	N	Y	N	Trout
Soil Erosion	8.3	B,Bm,C	Y	N	N	N	
Butler	94.8	B,Bm,C, CR	Y	Y	N	N	restricted use
Boardman	7.9	B,Bm,C	Y	N	N	N	restricted use

B=Bass, Bm=Bream, C=Catfish, HB=Hybrid Striped Bass, CR=Crappie
 N/A = not applicable

Table 4-9. Lakes Not Managed for Fisheries on Fort Gordon

Lake	Acres	Species	Boats	Ramp	Supplemental Catfish	Feeders	Comments
Experimental	1.7	N/A	N/A	N/A	N/A	N/A	Dam partially removed, no longer managed as a pond
Upper Whittimore	8.7	N/A	N/A	N/A	N/A	N/A	Dam leaking, holds very little water
Thomas	19.3	N/A	N/A	N/A	N/A	N/A	Waterfowl and moist soil mgt area

4.4.6.8 Drain and Restock

When data from surveys indicate that the fish population of a lake is extremely out of balance or when the number of game species becomes too low, the lake may be drained and restocked. The specifications listed in Table 4-10 will be used as a guide in the determination of draining ponds (Lewis 1981b). The cost of draining and restocking will have to be considered due to the condition of standpipe structures. Most of the standpipe structures are in disrepair and will need to be fixed in order for the lakes to refill. As funding becomes available, lakes can be drained and restocked as required.



Supplemental fish stocking

Table 4-10. Indicators for Determining Pond Draining and Restocking Requirements

Catch	Population Condition	Action
Bluegill, 6 inches and larger, bass, all sizes caught (Average 1 to 2 pounds)	Desirable balanced	No Action
Bluegill, 3 inches to 5 inches, bass, very few, 2 pounds and larger	Overcrowded bluegill	Drain and restock
Bluegill, exceed 0.3 pound average, bass, less than 1 pound	Bass heavy	Drain and restock
Small crappie, sunfish, bullheads carp, suckers, golden shiner	Species competing with bluegill	Drain and restock

Source: Lewis 1981b

Lakes to be drained will be drawn down slowly until just enough water remains that may be drained in one day. On the final day of the draining, fishermen with a valid state fishing license and Fort Gordon fishing permit will be allowed to remove all the fish they can from the drained lake.

After the lake is completely drained, the remaining pools will be treated with chlorine or rotenone to kill any fish that remain. Rotenone™ will be applied in the fall when water temperatures are between 65°F and 75°F. The rate of application will follow label and manufacturer instructions. Rotenone-treated water is detoxified after 3 to 5 days at water temperatures above 70°F. Detoxification takes longer at cooler temperatures. The lake will then be left empty of water for most of the winter season, which could help to control aquatic weeds. The lake will then be refilled and restocked with fingerling bass, bream, and catfish at the appropriate time. The lake will remain closed to fishing for a minimum of one season to allow fish to grow. This program will be managed in such a way that a new lake will open to fishing while one lake is drained each year.

- Stocking - Bass, Bream, and Catfish Lakes: Rates of stocking are determined by management practices to be carried out. The recommended rates for initial stocking for fertilized versus unfertilized lakes are listed in Table 4-11.

Table 4-11. Stocking Rates for Fertilized and Unfertilized Ponds

Species	Rate per Surface Acre for a Fertilized Pond	Rate per Surface Acre for an Unfertilized Pond
Bream (Bluegill 70 percent) (Redear sunfish 30 percent)	1000	500
Largemouth bass	100	50
Channel catfish	100	50

Source: Lewis 1981b

- Supplemental Stocking - To maintain populations of channel catfish within the lakes on Fort Gordon, supplemental stocking will be used. On a rotational basis, 6- to 9-inch channel catfish will be stocked in lakes and fed to allow for an increased harvest of this species. Fingerling catfish will not be used because most lakes on Fort Gordon are managed as multi-species lakes that already have established bass populations. These larger bass would rarely allow the immature catfish to survive. Supplemental stocking rates of 150 to 500 channel catfish per acre in an established pond are recommended (Henderson 1999).

Beginning in 1999, five lakes (Little Beaver, Big Beaver, Fettig, Claypit I and Howard) have received supplemental stockings of channel catfish annually. These fish were either purchased from a private vendor or provided by GADNR. Plans are to open one of these lakes at the beginning of each month during the summer peak fishing season (May, June, July, and August). Additional fish will be supplemented each year as fish or funds become available. Nine automatic feeders have been purchased and attached to docks in these lakes, allowing for easy maintenance and filling with feed while using minimum labor. This will reduce the amount of time required to feed fish as feeders are filled only twice a month. Additional automatic feeders will be purchased as funds become available.

A put and take trout fishery has been established in Whittimore and Wilkerson Ponds. Approximately 1,000 trout can be stocked in the winter and fed a pelletized food from automatic fish feeders until the opening of the fishing season in late winter. The NRB will continue to provide this put and take trout fishing opportunity as funding and participation allows.

- Kids Fishing Events - Due to their small size and controlled location, Claypits I, II, and III were chosen as the site for the

bi-annual children's fishing rodeos. Claypits I, II, and III are annually supplementary stocked with channel catfish, which are supplied by the GADNR, Fisheries Division, at no cost to the Fort Gordon NRB; however, supplemental feeding is accomplished by Fort Gordon. These catfish are approximately 9 inches in length when stocked. Some of these lakes can be opened after the children's fishing rodeos; however, these lakes may only remain open for the remainder of the month following the children's event. Past events have had participation levels of 100 to 350 children between the ages of 4 and 15 years.

4.4.6.9 Feeding

Automatic feeders are installed and used to supply supplemental nutrition for lakes stocked with catfish. Presently, automatic feeders are maintained at 10 lakes. Feeding can be expanded as supplemental stockings of catfish occur in additional lakes. Automatic feeders can be set to provide 3 percent of the fish body weight in food on a daily basis, which is the desired rate of feed. These feeders are attached to docks and can be refilled with minimum effort and labor cost. This will allow for fast growth of fish and better sport-fishing opportunities in these lakes.

4.4.6.10 Fish Consumptions Guidelines

Fish caught on Fort Gordon are generally of good quality and are safe to eat and provide an excellent source of protein. However, freshwater fish may contain high levels of mercury, which can pose a risk to human health. Due to the presence of heavy metals and polyaromatic hydrocarbons, consumption advisories are posted for all lakes and streams on the installation. These guidelines are posted on Fort Gordon's iSportsman website and are provided in Appendix M.

4.4.6.11 Fish Kill Investigations

Should a fish kill occur in waters of the installation, the Chief of ED will be notified immediately. The Field Manual for the Investigation of Fish Kills (USFWS Publication 177) will be used to assist in the investigation. In summary, an on-site investigation is made; water samples (and occasionally mud samples) are taken; and live and dead fish are collected. Water samples are tested for dissolved oxygen, pH, carbon dioxide, alkalinity, and hardness (all within in-house capabilities). Should a pesticide, oil, or other toxic agent be suspected of causing the kill, water and mud samples and fish specimens will be forwarded either to a locally contracted water analysis toxicology laboratory or to the United States Army Center

for Health Promotion and Preventive Medicine for toxicological assessment. Georgia DNR and USFWS Athens Office will be notified of all significant fish kills after the DPW is notified.

A portion of live fish collected will be immediately preserved in a 10 percent formalin solution, while the remainder will be kept alive, if possible. Specimens will be saved for necropsy and microscopic identification of parasites and disease. Should a parasite or disease be identified as the cause of the kill, available treatments will be considered. In most cases, treatment of a moderate-sized body of water is not economically feasible, and the fish kill is allowed to run its course. However, if a treatment is known and feasible, the pond will be closed and treated appropriately. Examination of the air bladder in fresh specimens is used to determine whether explosives were used to affect the kill. Further pathogen identification is obtained from the state if necessary.

Best estimates of the numbers of fish, species composition, and length groups affected are determined. An estimate of the monetary cost of the fish kill is assessed. Fish count methods and monetary values are based on the American Fisheries Society Special Publication #13, Monetary Values of Freshwater Fish, and Fish-kill Counting Guidelines. These documents are incorporated here as references and copies are maintained at the ED. In the case of a large-scale fish kill, the NRB will notify the following individuals and agencies:

- Chief, NRB
- Chief, ED
- Director, DPW
- GADNR
- USFWS, Athens Office
- Game Wardens, Provost Marshal
- PAO

Once the cause is determined, all appropriate groups will be notified. If it is determined that corrective action is economically feasible, corrective action will be taken. If mitigation is possible and required, appropriate measures will be implemented. The affected area will be closed to the public if deemed necessary from a public health or public relations standpoint.

4.4.7 Wildlife Management

4.4.7.1 Habitat Development

In order to maintain and enhance the wildlife on Fort Gordon a variety of habitat types will be maintained or restored. Using a Pre-European Settlement Vegetation Map (see Figure 1-4) developed

specifically for Fort Gordon, habitat management efforts are directed towards restoring native vegetation communities. Some of the most prominent communities include longleaf-wiregrass savannah, longleaf-wiregrass sandhills, and mixed pine-hardwood slopes. Management for these communities will benefit multiple species, both game and nongame. A few species-specific activities will be utilized for the most popular game species on Fort Gordon.

The Fort Gordon forester and wildlife biologist work together to manage Fort Gordon's forests for the benefit of both game and nongame wildlife species.

Prescribed Fire

Prescribed fire is one of the most cost-effective methods to set back plant succession over large acreages. Game species that benefit the most with regard to prescribed fire are quail, rabbits, turkey, and deer. The RCW is the primary featured species with regard to growing season burns, as described in Section 4.1 of this INRMP.

Prescribed fire is one of the most important tools utilized in quail management. In pine habitat, prescribed fire benefits deer by improving the palatability and nutritional level of understory plants; reducing large, woody understory stems; encouraging production of new sprouts; improving the growth of forbs and grasses; keeping browse within reach of deer; and encouraging understory fruit and mast production. Prescribed fire also creates conditions important for ground nesting birds and cover for white-tailed deer fawns. To achieve the most beneficial vegetation response prescribed fire should be conducted in the growing season (March through July). Because the loss of nests of ground-nesting birds such as quail and turkeys is a concern, prescribed fire during these months should be broken up into small blocks (150 acres or less) in a mosaic pattern.

Prescribed fire is also used for the prevention of large wildfires within impact and firing ranges. With a few exceptions for ranges and RCW habitat most areas will be burned on a 3- to 5-year rotation. Fire maintains an open understory that will provide native grasses and legumes, recycle nutrients, and provide bare mineral soil for seed germination. These results will provide a valuable food source in seeds and bugging grounds for many animal species.

More detail can be found in Section 4.5 and Section 4.16 of this INRMP. All prescribed fires will be conducted in accordance with the IWFMP (Appendix T).

Native Grasses

Native grasses can be established in a variety of sites for erosion control, access road and logging deck closures, and stabilizing TAs, as well as restoring native ground cover throughout the installation. Native grasses have a wide variety of benefits for wildlife and the ecosystem. First, they are native and non-invasive. They are part of the natural system and drought-tolerant due to their root system, and can be burned or mowed with no adverse effects.

Many native grasses grow in low fertility soils where other species have difficulty becoming established. Little bluestem (*Schizachyrium scoparium*) and coastal panicgrass (*Panicum amarum* var. *amarulum*) are among these. Native grass provides good cover for wildlife such as quail, rabbits, and grassland birds in two ways:

- They are primarily bunch grasses; the space between bunches allows smaller wildlife to run into and through the stand and forage easily in the open areas for seeds and insects.
- Many warm season grasses, such as big bluestem (*Andropogon gerardii*) and switchgrass (*Panicum virgatum*), grow 4 to 6 feet tall, easily tall enough to provide cover, even from aerial predators.

Native grasses typically have a well-developed seed head and provide good browsing and wildlife food. When combined with plants such as partridge pea (*Chamaechrista fasciculata*) and ragweed (*Ambrosia artemisiifolia*), superior food and cover can be achieved in one stand.

Native grasses can be established in a variety of ways to include the use of a grain drill specifically designed to plant the fluffy native grass seed, by the hand planting of containerized plugs, or by direct seeding (broadcast) on a prepared seed bed. Examples of some of the species to be planted and associated site quality is provided in Table 4-12.

Table 4-12. Native Grass and Forb Species to Be Planted on Fort Gordon

Common Name	Scientific Name	Site Quality		
		Fertile	Infertile	Closed Roads
Coastal panicgrass	<i>Panicum amarum</i> var. <i>amarulum</i>		X	
Wiregrass	<i>Aristida</i> spp.		X	
Little bluestem	<i>Schizachyrium scoparium</i>		X	
Splitbeard bluestem	<i>Andropogon ternaris</i>		X	
Indiangrass	<i>Sorghastrum nutans</i>	X	X	X

Table 4-12, continued

Common Name	Scientific Name	Site Quality		
		Fertile	Infertile	Closed Roads
Partridge pea	<i>Chamaechrista fasciculata</i>	X	X	X
Switchgrass	<i>Panicum virgatum</i>	X	X	X
Big bluestem	<i>Andropogon gerardii</i>	X		
Florida beggarweed	<i>Desmodium tortuosum</i>	X		X
Common ragweed	<i>Ambrosia artemisiifolia</i>			X

Native seeds from the Fort Gordon longleaf/wiregrass ecosystem can be collected and used to reestablish areas where the native ground cover has been lost. Plans and efforts have been made to continue restoring native ground cover with seeds collected from Fort Gordon. Seeds can be collected using a tractor with seed-collecting attachments in open areas large enough for equipment use. Seeds will then be stored until the appropriate time for planting. Areas that might receive seeding could be forestry site preparation areas or areas that have little or no ground cover in native pine stands. Seeds will usually be collected in the fall following a growing season fire where studies have shown this to be best for seed harvesting. Native warm season grasses may also be used to reclaim closed roads for ecosystem restoration.

4.4.7.2 Ecosystem Restoration and Midstory Control

Fort Gordon is actively translocating RCWs to the installation. This activity requires artificial cavity inserts and midstory control to restore habitat for use by the RCW. Details of the RCW translocation program can be found in Section 4.1 of this INRMP. Although the main reason for midstory reduction is to increase and improve habitat for the RCW, many other species also benefit from this activity. By reducing the midstory, more light will be able to penetrate to the ground and encourage the growth of native grasses, forbs and shrubs that are used as a food source by many wildlife species. Areas to be treated will be surveyed to determine the quality of the existing ground cover which will aid in determining treatment method. The most effective, economical, and ecologically sound methods



Roller Chopping Operation

will be selected and approved by the Natural Resources Branch Chief to provide the greatest benefit with the least harm to the environment. The following activities may be used in midstory control.

Roller Chopping

In areas where midstory hardwoods such as turkey oak have shaded out the understory, roller chopping can be used to knock down and break up the trees. Wherever roller chopping is used, equipment will run on long straight lines through the woods, to the extent possible, to minimize the need for turning and reduce the amount of ground disturbance. Survey plots can be established in areas before and after treatment to determine the success of roller chopping.

Herbicide

Herbicides may be used to kill hardwood species and open the upland pine forest to allow light to reach the forest floor. This will encourage the growth of native weedy ground cover that will benefit wildlife and improve the understory of RCW habitat. The herbicide type will be chosen based on the target species and the other desirable species present so that the least number of desirable species are affected. Herbicides will be applied following the manufacturer's directions and application rates. All herbicides are applied in accordance with DoD and other applicable laws and regulations. All herbicide applications will be conducted by a DOD or State of Georgia certified pesticide applicator. Contracted work will be managed by the Natural Resources Branch DOD certified Pest Management Coordinator or a DOD certified pesticide applicator.

Bush Hog/Flail Mowing

In areas where the understory encroachment is not as severe or where there is higher-quality ground cover, mowing can be used to reduce woody understory vegetation. Rubber tire tractors using bush hogs and flail mowers will run along straight lines through the woods, to the extent possible, and clear woody understory vegetation. Tires on the tractors will cause less ground disturbance than roller chopping with bulldozers. Mowers may also be used in conjunction with roller chopping to clear areas closer to individual trees that cannot be reached by roller chopping.

Hand Clearing

Hand clearing may be used in areas where understory encroachment is very minor or to remove vegetation very close to the base of large trees. This will include the use of chainsaws, axes, and bank blades.

Mulching/Grinding

Mulching/grinding machines will be utilized in areas where the midstory is more developed and tree size is larger. These areas often preclude the effective use of herbicide, bush hog/flail mowing, and roller chopping. Using this method, midstory trees will be felled and the portions of the trees that extend



vertically from the ground will be mulched to put the debris in contact with the ground. This allows the debris to break down faster and puts it within reach of prescribed fire. Care must be taken not to harm beneficial ground cover or create areas of bare soil. Areas where hardwood midstory was mulched often have to be treated the following year with herbicide to control vigorous stump sprouting.

Maintenance

Once areas have been cleared of excess midstory vegetation, fire will primarily be used to maintain the habitat in the more open setting preferred by RCW, as well as other wildlife species. If fire fails to maintain the open understory, a site assessment will be conducted by the Natural Resources staff and additional appropriate control methods will be used.

4.4.7.3 Preston Drop Zone / Dove Field / Shooting Preserve

The Preston Drop Zone must be maintained as an opening to allow for training of airborne troops, as well as other soldiers. This area is also one of the most heavily used areas by sportsmen. It is used for dog training, and the FGSC's shooting preserve where ring-necked pheasant, chukar, and quail hunts are held. The drop zone will be mowed in late August to clear the ground and allow for the retrieval of doves during dove hunts.

The drop zone has also historically been the main site of the dove field on Fort Gordon. Incorporated into the design of the drop zone, strips were left out for wildlife plantings. Strips to the east of McDuffie Road and north of the drop zone will continue to be managed as dove

fields, as training allows. Corn, sunflower (*Helianthus annuus*) and millet (*Panicum miliaceum*) are the main species planted, and are also used by songbirds, quail, and turkeys. The large opening also provides good bugging ground for turkey. This open area also supports several species of hawks as well as several successful nesting boxes for the southeastern American kestrel. Additionally, part of TA 28 southwest of Gibson road landfill will be managed as dove fields.

4.4.7.4 Hardwood Mast Management

Hardwood mast is an important food source for deer, turkey, quail, squirrels, some ducks, and many nongame species in the fall and winter. For optimum mast production, most oaks must be greater than 50 years old and have a dbh of 14 inches to 30 inches. A wide distribution of age classes should be available to ensure future mast production. Figure 1-4 shows areas where mast-producing hardwoods were most likely to have occurred prior to European settlement. These areas include a variety of sites, such as bottomland, slopes, and uplands, and contained either pure hardwood stands or stands of mixed pine/hardwoods. These areas make up approximately 20,000 acres and should be considered in any timber management planning as areas where hardwoods could be selected for release from pine competition to increase mast production.

During tree marking for timber harvests in those areas identified on Figure 1-4, efforts should be made to release well formed, high-mast potential hardwoods from pine competition. Old home sites with large mast-producing hardwoods can be protected from prescribed fires. In some areas, such as food plots, mast producing hardwood trees may be established. Species suitable to habitat and soil type will be used. These mast producers will provide a supplemental food source for wildlife with less effort than required for the annual food plot planting.

4.4.7.5 Strip Disking

Disking is used to change the composition of plants and improve habitat for early succession wildlife species. Disking breaks up areas with thick mat-forming grasses and favors annual forbs and legumes.



Where feasible, strip disking will be used to encourage weedy ground cover. This will produce brooding, feeding, and nesting habitat for quail, turkey, and songbirds. Disking is used to encourage the development of native food plants such as ragweed and partridge pea. In some pine plantations where trees



Results of Winter Strip Disking

are spaced far enough apart, disking can be done to enhance habitat for early successional species. Strip disking may be done in areas that have been thinned or burned, or within windrows of older plantations. Disking during the winter months (November through February) will create brood habitat the following summer; therefore, any areas such as food plots, skid lanes, logging decks, power lines, firebreaks, and open woodland patches near acceptable cover are suitable for this method of habitat management (Moser and Palmer 1997).

The Fort Gordon wildlife biologist manages the Installation's food plot program in support of hunting use and ecosystem management.

This technique not only aids in food production but increases "edge" which is very important in habitat management. Additionally, annual wildlife plantings in established clearings are planted on a rotational basis. This enables ground that was harrowed the previous year to produce native food plants the following year. Many preferred annual wildlife food plants seed in after disking.

4.4.7.6 Wildlife Clearings

The optimum amount of open area in a forest for wildlife is at least 5 percent of the total area with each opening ranging 0.5 to 5 acres in size (GADNR no date). On Fort Gordon there are approximately 43,516 acres managed for wildlife and available for recreation. Therefore, the optimum amount of maintained open space is approximately 2,175 acres. In 1981, 2,400 acres were managed as wildlife openings on Fort Gordon. Due to the lack of staff and funding to manage that amount of land, a minimum of 800 acres of wildlife openings will be maintained to provide sites for feeding, brooding, and nesting for all wildlife. This will give Fort Gordon approximately 2 percent of the total managed area in maintained openings. This amount is large enough to provide a benefit but small enough to be managed with current resources.

Food plots can provide an important source of high-quality food for deer and other wildlife when they need it most. Two percent of the land area in food plots can have significant impacts on deer harvest, population size, and condition (GADNR 2003). Each year some clearings will be left unplanted (fallow) while others will be planted with selected



Maintained food plot on Fort Gordon

species, to include clover (*Trifolium* spp.), wheat (*Triticum ispahanicum*), winter pea (*Pisum sativum*), brown top millet (*Panicum ramosum*), sorghum (*Sorghum bicolor*), chufa (*Cyperus esculentus*), oats (*Avena* sp.), corn, soybeans and peas. These plantings will benefit both nongame and game species. Providing wildlife openings in most TAs across the installation will encourage hunting pressure to be more evenly distributed. Labor for planting food plots may be contracted out and performed under the supervision of a wildlife biologist. Of the openings that are planted, usually approximately 0.5 percent of planted openings will be left fallow. No new wildlife clearings will be established within the 200-foot buffer zone around an RCW cavity tree. However, those clearings that are already on the landscape or where recruitment clusters are being established can be maintained in early succession plants or planted in supplemental food sources. Wildlife clearings that are in proximity to rare, threatened, or endangered species will be evaluated to determine species benefit. Many wildlife clearings

are heavily used by gopher tortoise for foraging and burrowing sites. These clearings will be monitored and care will be taken to leave any burrows unharmed during normal operations. Typical planting schedules can be seen in Table 4-13. Some existing openings may be converted to perennial plantings such as clover, mast-producing trees, and native grasses and forbs, which will provide long-term supplemental food sources.

Table 4-13. Seeding Rates for Supplemental Food Plots

Crop	Seeding Rate ¹	Approximate Planting Date	Planting Depth ²
Fall Plantings			
Oats	B: 120, D: 80	September 1 – October 15	1 - 2
Wheat	B: 120, D: 80	September 15 – October 15	1 - 2
Austrian winter pea	B: 50, D: 35	September 1 – October 30	1 - 2
Clover, crimson	B: 25, D: 15	September 1 – October 10	1/4
Spring and Summer Plantings			
Corn	D: 13	March 15 – May 10.	1 - 2
Browntop millet	B: 25, D: 15	April 1 – August 15	1/4 - 1/2
Japanese millet	B: 25, D: 15	April 1 – August 15	1/4 - 1/2
Pearl millet	B: 30, D: 20	April 1 – July 15	1/4 - 1/2
Proso millet	B: 30, D: 20	April 1 – August 15	1/4 - 1/2
Sorghum	B: 10, D: 6	April 15 – July 15	1
Iron clay pea	B: 75, D: 50	April 1 – June 30	1/2 - 1
Soybean	B: 40, D: 28	April 1 – June 30	1/2 - 1
Partridge pea	B: 10, D: 7	February 1 – May 1	1/4 - 3/4
Egyptian wheat	B: 15, D: 10	April 1 – May 30	1/2
Sunflowers	B: 25, D: 18	April – June	1 - 2
Chufa	B: 50	May 15 – July 31	1 - 2

¹ seeding rates are expressed as pounds per acre where B=broadcast and D=drilled; seeding rates are for single species planting, so seeding rates for mixed species plantings will have to be adjusted accordingly

² Planting depth in inches

4.4.7.7 Habitat and Population Management for Game Species

Due to the popularity of hunting for certain game species, species-specific management actions will be conducted to enhance and maintain the populations and habitat of those animals.

Harvest of Game

To help maintain stable populations of game species and provide recreational opportunities, hunting seasons will be opened annually. These seasons and bag limits will, for the most part, follow those set by GADNR. All game harvested will be accounted for by information entered by the hunter when checking out using the iSportsman system. All harvest records and associated biological data will be organized and maintained by an NRB wildlife biologist.

Historic Harvests

Historically, the annual deer harvest on Fort Gordon averaged approximately 300 deer in the 1990s and around 260 deer in the 2000s. The wild turkey harvest averages approximately 43 turkeys per year on the installation. Harvest levels for deer and turkey for the past 10 years are shown in Figure 4-9.

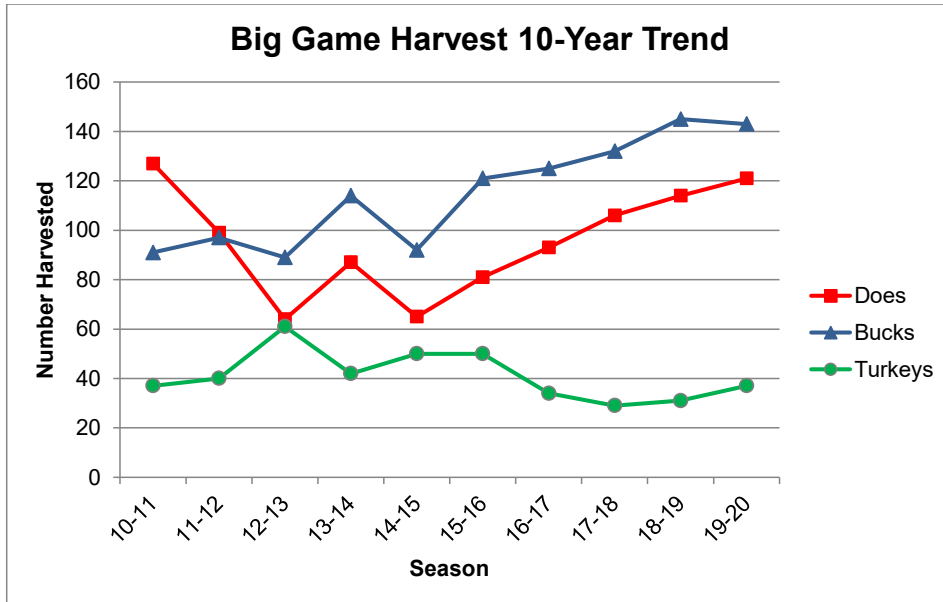
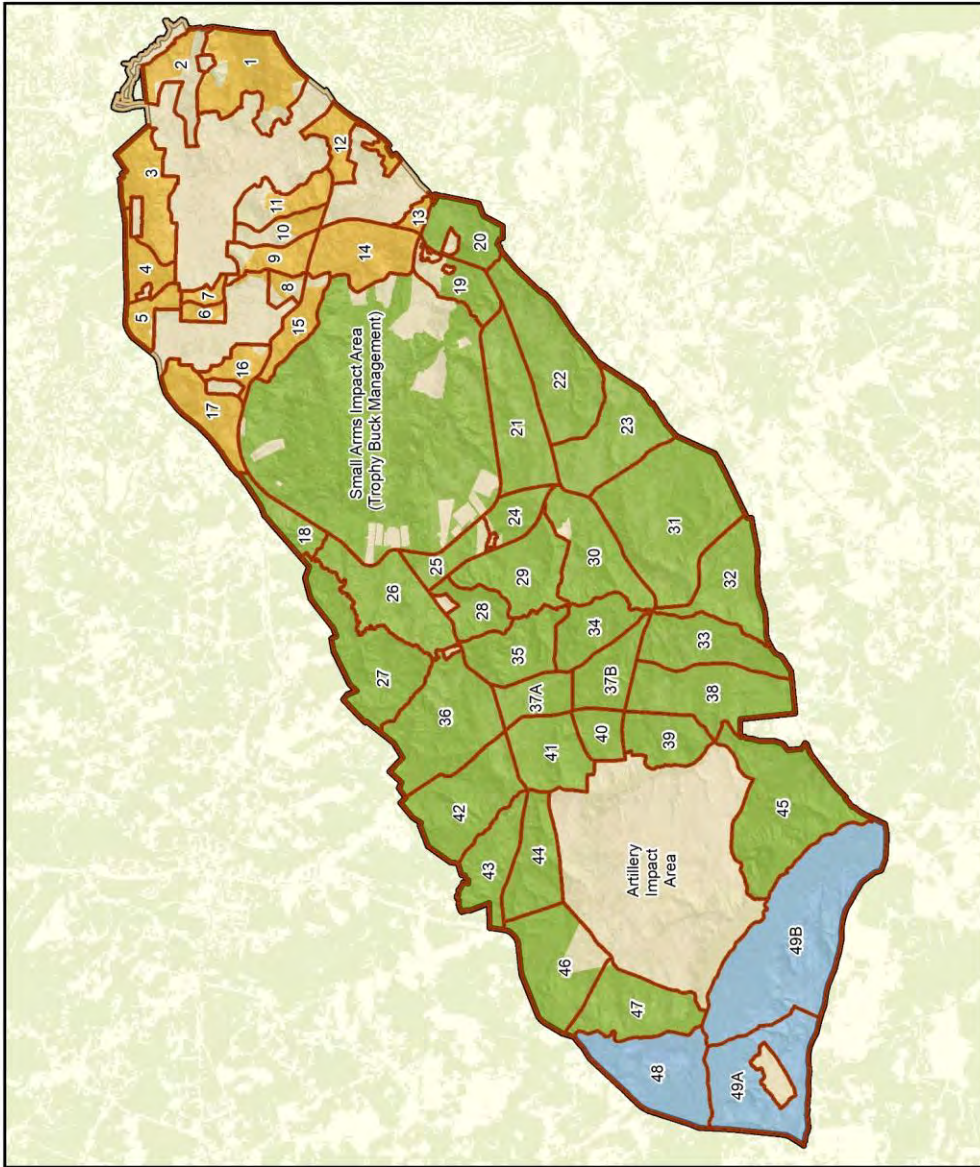


Figure 4-9. Ten-Year Trend of White-tailed Deer and Wild Turkey Harvest on Fort Gordon



- Hunting Restriction Boundaries**
- All Weapons (5,102 acres)
 - Primitive Weapons and Shotguns Only (32,782 acres)
 - Archery Only (6,018 acres)
 - No Hunting
 - Installation Boundary
 - Training Area Boundaries

This map was produced by the Fort Gordon Natural Resources Branch

World Geodetic System of 1984
 UTM Zone 17 North
 Units: Meters



1:135,000

0 1 2 Kilometers

0 0.5 1 Miles

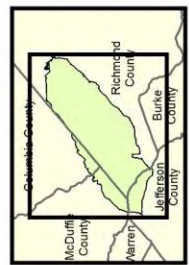


Figure 4-10. Hunting restriction boundaries on Fort Gordon

Deer

The white-tailed deer is the most sought-after game species in Georgia and on Fort Gordon. The goals for management of deer on Fort Gordon vary between the following three management zones:

- Archery Zone (TAs 1-17): Provide sustainable hunting opportunity while keeping the population at a low level in order to reduce deer-human conflicts such as vehicle collisions and destruction of landscaping around cantonment-area buildings and housing.
- TAs 18-49 Zone: Maintain a population that allows maximum harvest while keeping the population at a healthy and highly productive level.
- Trophy Management Zone (SAIA): Provide opportunity to harvest trophy bucks. Trophy bucks are defined as bucks with antler characteristics typical of bucks in older age classes (4.5 years old and above).

Each of these goals will be achieved using a variety of strategies that depend on what the population's current level is relative to the goal. Metrics such as deer per square mile, buck-to-doe ratios, fawn-to-doe ratios, lactation rates, average weights, average antler measurements, and kidney fat indices will be used to develop strategies to reach goals for each management zone. These metrics are determined from annual camera survey data, as well as harvest data.

White-tailed deer habitat should include adequate fawning cover, available suitable forage, and adequate bedding/escape cover. Good fawning, bedding, and escape cover are areas with dense groundcover containing native bunch grasses, herbaceous plants, woody shrubs, and brambles. These conditions can be created with frequent prescribed fire in open areas or in forested stands where the forest canopy is open enough to allow adequate sunlight to reach ground level. Good forage habitat is similar to good fawning, bedding, and escape cover and provides an abundance of herbaceous plants available throughout the year in addition to soft mast produced by grapes (*Vitis* spp.), persimmon (*Diospyros virginiana*), pokeberry (*Phytolacca americana*), plums (*Prunus* spp.), black cherry (*Prunus serotina*), and other species. In addition to frequent prescribed fire, these habitats will be created and maintained on Fort Gordon through mechanical and chemical means, as well as appropriate timber thinning as a part of ecosystem restoration and RCW management. Management of cover should

be done in a mosaic pattern with varied timing so that adequate cover is always available. Oaks found in hardwood drainages and those occurring sparsely in upland forest stands also provide hard mast in the fall and winter. The white-tailed deer population on Fort Gordon will be monitored through the annual deer camera survey and through hunter harvest data. Each of these are discussed in Section 4.4.7.8.

Wild Turkey

Good wild turkey habitat contains a mixture of conifers for roosting sites, scattered clearings for feeding and strutting areas, and mature hardwood trees for mast production. Forested stands with open canopies and a well-developed understory as well as early successional areas provide the proper structure necessary for nesting, and escape cover. These conditions will be created and maintained on Fort Gordon with frequent prescribed fire, as well as mechanical or chemical treatments which favor native grasses, forbs, and scattered shrubs.

The turkey population on Fort Gordon will be monitored through harvest data, hen-poult surveys, and the white-tailed deer camera survey, which records the count and sex of any turkeys in the photos. The latter two are discussed in Section 4.4.7.8.

Northern Bobwhite Quail

Optimum quail habitat is characterized by a good interspersed of open woodlands, early successional openings, and cultivated lands. The ground-level vegetation in these areas consists of herbaceous vegetation, native bunch grasses, scattered shrubs, and brambles. Bobwhite quail prefer open woodlands with a basal area of approximately 20 to 30 square feet/acre.

In order to reverse the decline in quail over the past half-century, Fort Gordon will follow RCW management guidelines for timber harvest and prescribed fire. These actions should prove to be very beneficial for quail on Fort Gordon. Research suggests that RCW management that favors the lower end of the basal area recommendation (40 square feet/acre) will provide the most benefit for quail and the best chance for population growth. In order to achieve midstory vegetation control and comply with endangered species and ecosystem management guidelines, Fort Gordon completes approximately 25 percent of its prescribed burning during the growing season, most of which is in current or potential quail habitat. Growing season burns do not appear to have detrimental

effects on bobwhites according to recent research and literature reviews. Growing season fire may destroy some nests and chicks, but the net benefit will be positive due to the overall improvement of the habitat. Mosaic or checkerboard-style prescribed burning of smaller blocks (200 acres or less) will be used when feasible. This ensures that patches of habitat are available throughout the entire year, unlike the practice of burning large blocks at one time, which forces quail and other small animals to travel greater distances to find suitable habitat. Frequent burning favors the growth of annuals and results in a more open condition at ground level, which quail prefer. To provide optimum habitat, especially in larger wildlife clearings and forested stands, select areas such as around the dove fields in TAs 23 and 30 will be burned on a 2-year rotation.

Other techniques to be used for quail habitat management that are not part of RCW management include the maintenance of early successional openings and food plots, as well as winter strip disking (both in open areas and open canopy timber stands). Maintenance of wildlife clearings should be accomplished by frequent prescribed burning, harrowing, mowing, and/or herbicide application. Food plots expected to benefit quail will be planted with sorghum, millet, partridge pea, wheat, sunflower (*Helianthus* spp.), or native warm season grasses. Strip disking, when accomplished in the winter months, will be used to set back biological succession and provide quail with access to areas of dense herbaceous growth during brood-rearing season.

The quail population will be monitored annually through harvest data, and both the spring whistle count and fall covey call count surveys which are discussed in Section 4.4.7.8

Mourning Doves

The mourning dove is a highly mobile migratory species, and local habitat conditions may not have much effect on the total population. However, providing good habitat year round can increase local populations and provide hunting opportunities. Doves prefer agricultural fields, open forest stands, and recent forestry clear cuts for feeding with nearby trees for roosting



Dove hunting on Fort Gordon

and nesting. Areas with bare ground for a source of grit and open water are most preferred. Dove fields will be established annually using brown top millet, corn, sunflower, Egyptian wheat (*Triticum aestivum*), sorghum (*Sorghum bicolor*), and other plantings. Fields in training areas 23 (located in and around Preston Drop Zone) and 30 will serve as the primary dove hunting fields. Additional fields managed for dove hunting are located in TA 28. The NRB and DPTMS (Range Control) will coordinate and adjust areas within the Preston Drop Zone that will be maintained as wildlife clearings large enough to support dove hunting (at least 85 acres).

Waterfowl

Fort Gordon provides a variety of habitats for waterfowl to use throughout the year. Nearly all bottomland and riparian stands on Fort Gordon contain several oak species for mast production, which is an important food for some duck species, especially wood ducks. Many of the controlled lakes provide open water for daytime resting and feeding for several species such as Canada geese (*Branta canadensis*), ring-necked duck (*Aythya collaris*), and bufflehead (*Bucephala albeola*). In addition dozens of beaver ponds across the installation serve as roosting, nesting, and feeding areas, especially for wood ducks.

One of the factors limiting waterfowl on the installation is the high rate of disturbance, especially around the controlled lakes. The source of disturbance is primarily from vehicle traffic around the controlled lakes, but is also from fishing and waterfowl hunting. Training Areas 30 and 34 have been designated as a waterfowl refuge, closed to all waterfowl hunting, with the exception of youth hunting during that respective season which may be authorized on an annual basis by an NRB biologist. This includes Union Mill Lake, the large beaver pond north of Union Mill and all other streams, wetlands, and beaver ponds within these two TAs. Thomas, Lower Leitner, and Union Mill lakes are managed primarily for waterfowl and Rachel lakes 1 through 4 are managed for waterfowl secondary to fishing. These lakes will be periodically drawn down to 25 to 50 percent of full pool in the summer to allow vegetation to grow around the edges. Japanese millet (*Echinochloa esculenta*) or rice (*Oryza* sp.) may be planted on the edges of these ponds during drawdown to provide supplemental food in the fall of the year. In the fall and early winter the lakes will gradually be brought back to full pool to allow access to this food and cover by waterfowl. The drawdowns should occur on a rotational basis so that all lakes are not drawn down every year. A recommended rotation would be to drawdown each lake 2 out of every 3 years.

Wood duck nest boxes are a useful management tool that have been historically used on Fort Gordon and are discussed in detail in the monitoring and nest box sections (Sections 4.4.7.8 and 4.4.7.9, respectively) of this INRMP.

Waterfowl populations are monitored on Fort Gordon by a wintering waterfowl survey and a wood duck nest box survey. Both of these are discussed in Section 4.4.7.8.

Eastern Cottontail (Rabbit)

Cottontails thrive in openings where shrubs, grasses, and forbs dominate and in woodlands with open canopies (less than 50 percent crown closure). This level of canopy closure allows sufficient sunlight to reach the forest floor to produce desirable grasses and forbs. A major limiting factor for rabbit populations on Fort Gordon is the high degree of pine crown closures (greater than 75 percent are common) in many of the forested areas. Prescribed fire, which improves nutrition and palatability of food plants, is of little benefit where crown closure prevents the growth of food.

Habitat management techniques, such as mowing, harrowing, planting, thinning of pine plantations, and prescribed fire benefit cottontail rabbits. The Preston Drop Zone, ranges, wildlife openings, and artillery firing points that are dominated by shrubs, grasses and forbs provide good habitat. Pine woodlands of fully stocked pole and sawtimber stands shade the forest floor, inhibiting the growth of adequate succulent forage. On Fort Gordon cottontail habitat will be created and maintained concurrently with northern bobwhite habitat since the habitat requirements of these two species are virtually synonymous. In addition, RCW habitat management in forested stands will also benefit this species.

Cottontail populations on Fort Gordon are monitored through hunter harvest data.

Eastern Gray Squirrel

Productive gray squirrel habitat contains a wide variety of mast-bearing hardwood trees; fruit producing trees and shrubs; flowers, buds, and cones in addition to adequate den cavities for escape, shelter, and raising young. The majority of heavy seeded mast producers are red oaks, white oaks, and hickory. Many of these trees are too young for optimum mast production, since this is achieved at 50 to 125 years of age (14 to 30-inch dbh).

To aid in the management of the eastern gray squirrel and other species that require hardwood mast, habitat management and ecosystem restoration should closely follow the Pre-European Vegetation Map (see Figure 1-4). In doing so, an adequate amount of mast producing hardwoods will be present over a wide area on Fort Gordon in bottomlands, drainages, and mixed pine-hardwood stands. While conducting timber management operations in these areas, a diversity of hardwood species should be maximized with oaks, hickories, dogwood, maple (*Acer* spp), yellow-poplar, magnolia, black gum, and persimmon being favored for mast production. In addition to live mast trees, a sufficient number of hardwood snags greater than 40 years old must be preserved throughout the habitat for den sites, since litters raised in den cavities experience a much higher survival rate than those raised in leaf nests. Prescribed fire will have limited effect on gray squirrels since most of its habitat would be contained in bottomlands and drainages, where fire intensity tends to be less and has very little effect on species composition. In addition, mast bearing hardwoods found in mixed pine-hardwood stands are often pyrophytic species such as mockernut hickory (*Carya tomentosa*), post oak, and southern red oak (*Quercus falcata*).

Squirrel populations on Fort Gordon are monitored through hunter harvest data.

Eastern Fox Squirrel

In contrast to the gray squirrel, fox squirrels (*Sciurus niger*) prefer open park-like woods with sparse vegetation. Since the fox squirrel is adapted to ground movement, it uses widely scattered hardwoods in pine uplands and hardwoods on the margins of uplands and drainages. While mast trees of optimum age (50 to 125 years) and optimum dbh (14 to 30 inches) for maximum mast production may be limited, fox squirrels also utilize pine mast throughout the year.

Management strategy for fox squirrels favors stands of mature pine preferably longleaf, with scattered hardwoods, which are essential for dens and food diversity throughout the year. Management practices following the RCW guidelines are expected to produce acceptable habitat that will sustain and possibly increase fox squirrel populations as RCW management progresses on Fort Gordon.

Predator Management

Major predator species on Fort Gordon consists of bobcat, fox, opossum, raccoon, and coyote. These species prey on a wide variety of wildlife, both game and nongame. These species are monitored through the white-tailed deer camera survey which is conducted annually. At the current time, the NRB has determined that predator control measures such as trapping are not necessary other than for nuisance situations. Fort Gordon does allow hunting opportunities for these species during the appropriate seasons. The NRB is working to improve habitat for both game and nongame species which will provide these animals with more suitable cover with which to escape predators. This is accomplished through prescribed fire, timber thinning, midstory control, etc.

4.4.7.8 Monitoring

Key information needed to successfully manage a population of wildlife is to estimate/know population size, sex ratio, mortality, natality, and age distribution. To help accomplish this task the following population census and/or sampling methods will be used. Standard Operating Procedures for monitoring are provided in Appendix N.

Monitoring affected species is vital to adaptive management.

White-tailed Deer Camera Survey

White-tailed deer camera surveys are used to accurately gather population dynamic data from current deer herds occupying an area of land (Jacobsen et al. 1997). Surveys are conducted during the time of year when all sex and age groups exhibit the most similar feeding patterns and movements (August through October). Sex ratio, fawn recruitment, and population per square mile are estimated from data gathered during the survey. Such estimates provide crucial insight necessary for making management decisions and setting harvest regulations.

Deer Harvest Data Collection

White-tailed deer are a well-studied game species and thus many inferences can be made through the collection of biological measurements. Such biological measurements are collected from white-tailed deer harvested through hunting, deer-vehicle casualties, or any deer found by other means. These measurements may include but are not limited to tooth replacement/wear (age), sex, weight, kidney fat index, lactation, fetus count/length, antler size/appearance, and any readily collectable measurement pertinent to deer herd management. To ensure adequate sample size, the NRB requires submission of basic biological data such as weight,

sex, and age (jawbone) on all harvested deer. Additional information may be collected at check stations manned by NRB staff on traditionally high harvest days.

Hunter/fisher opinion survey

It is important to provide preferable outdoor recreational experiences to active duty, wounded warriors, retirees, and selected public individuals to ensure added return from the land occupied by Fort Gordon. It is crucial to have direct insight into the opinions of those who are actively engaged in hunting, fishing, and outdoor recreational opportunities on Fort Gordon. Their opinions on important topics relevant to today's management are explored through a series of standardized questions. Survey results are analyzed annually and considered when decisions relative to sensitive topics must be made. Currently, no opinion surveys are being conducted, but they may be utilized in the future as part of the iSportsman system.

Northern bobwhite whistle counts and covey call counts

Northern bobwhite populations can be sensitive when it comes to habitat changes across the landscape. Northern bobwhites are a non-migratory bird highly dependent on ground cover for nesting, foraging, and breeding. Their responses to management actions can indicate how other populations of interest endemic to early successional habitat such as the longleaf wiregrass ecosystem will respond.

- Whistle Counts: The whistle count method is a way to quickly cover a larger landscape in a relatively short period of time. The "bob-white" whistle made by males during the breeding season months was found to peak in May and June on Fort Gordon, thus the number of whistling males is counted according to location. Results are analyzed in comparison to specific habitat metrics within the survey area. Trend analyses of these results provide a quantifiable measurement of management action successes or shortfalls.
- Covey Call Counts: Northern bobwhites gather into family groups or coveys following the breeding season during the months of October and November and do not typically disperse until the breeding season begins in the late spring. Coveys of bobwhites (hereafter coveys) often call to one another just before sunrise in areas where there are suitable populations. These calls are counted by observers on Fort Gordon during the time of peak calling (typically 15 October

through 1 November) and are analyzed to estimate a number of coveys in the surveyed areas. Observers attempt to flush any coveys detected in order to quickly count the number of individual bobwhites within each covey. The numbers of bobwhites in a covey, or “flush counts” are essential in estimating the overall population of northern bobwhites on Fort Gordon standardized by a number of bobwhites per acre of land area. The northern bobwhite population estimate specific to Fort Gordon is important to management.

Wild turkey gobble counts

Wild turkeys are the second most sought after game species on Fort Gordon, making it imperative that biologists have expedient data relevant to the local population. These data are best obtained currently through the use of gobble count surveys conducted during the month of March just prior to the hunting season. An analysis of the results yields an index that can be monitored annually across the landscape. These data collected can provide valuable insight into long-term population trends and management for this species.

Wild turkey poult survey

Recruitment in populations influence future population levels. Monitoring of recruitment within populations can be valuable to determine productivity and long-term success of a species as well as assist in setting hunting regulations for the species. Wild turkey populations play a big part in the attraction and success of hunting on Fort Gordon. Wild turkey hens and poults are counted annually by observers on Fort Gordon during the months of June and July. The observations are analyzed and the results yield recruitment estimates that are monitored annually over time.

Wintering waterfowl survey

Fort Gordon has a variety of water bodies across the landscape that can provide essential foraging, loafing, and breeding opportunities to thousands of wintering waterfowl every year. Immediately following hunting season, waterfowl are counted annually from a set of subjectively placed points to estimate the abundance of waterfowl utilizing aquatic areas across the installation. These data serve as an index to compare waterfowl populations from year to year.

Wood duck nest box survey

Artificial nesting boxes provide an opportunity for the once “threatened to near extinction” wood duck to reproduce more readily. Wood duck boxes are monitored annually during the months of January and February. Each box is inspected and examined for nest success or failure then maintained for future nesting availability. These data when analyzed, can provide knowledge about current and future resident wood duck populations.

Feral hog surveys

Feral hogs are invasive species that pose a threat to native communities on Fort Gordon. Organized surveys such as camera surveys and transect presence surveys, as well as random observations/reports, are utilized to monitor feral hog populations. All feral hog sign and observations are verified and followed by management actions, which may include trapping.

Bat surveys

Of the small mammal populations occupying the landscape on Fort Gordon, bats are among the more readily sampled and surveyed. Using sophisticated software, sonograms of bat echolocation calls recorded on site are analyzed to classify species and record a yearly index of species found at different locations on Fort Gordon. Echolocation surveys are complemented and sometimes verified through use of mist nets to safely capture live individuals. Mist netting is often performed over or around water sources during various times of the year. These surveys are completed periodically as funding becomes available.

Kestrel nest box and banding

American kestrels are a threatened species monitored on Fort Gordon through use of nesting boxes and the banding of live nestlings. Band data returned allow biologists to gain knowledge of kestrel behaviors post-fledging along with juvenile dispersal from Fort Gordon. Nest boxes are cleaned and repaired annually in February prior to nesting season and checked monthly until August or as needed to ensure no chicks go unbanded prior to fledging the nest.

Gopher tortoise monitoring

One of the top species of interest and concern, as well as a candidate species for the federal endangered species list, the gopher tortoise is closely monitored on Fort Gordon. A variety of monitoring

techniques are combined to record observations of this species' status relevant to current and past management actions and implementation. Line transect surveys are conducted every 2-5 years to identify active, inactive, or abandoned burrows and estimate the population's density and abundance. Tortoises are opportunistically captured and marked for future identification. Data from captured, marked tortoises can yield information about survival, longevity, movements/dispersal, etc. Random select samples of adult gopher tortoises can be tagged using radio telemetry transmitters for observing specific habitat selection and home range characteristics on Fort Gordon. Also, adult tortoises relocated because of the military mission become prime candidates for receiving a transmitter for close observation. For more information see Appendix X.

Red-cockaded woodpecker

See Section 4.1.15 of this INRMP for information on monitoring for RCW.

Other Species

Several other species of animals may be surveyed at various times. Survey methods will vary depending on the species, and the most appropriate method to obtain the most accurate data will be used to accomplish these surveys. These may include mist net sampling for bats or birds; time area counts for birds; drift fence trapping for reptiles and amphibians; live trapping for small mammals, and scent station surveys for predatory mammals.

4.4.7.9 Nest Boxes

Nest boxes provided for several species on the installation will continue to be maintained and monitored. The American kestrel nest box program has been very successful at providing supplementary nesting sites for kestrels as well as easy access to their nestlings for the banding program. The current boxes will be cleaned and maintained each spring prior to breeding season (see Figure 4-7). New boxes may be installed where recent habitat improvements have been made. The wood duck box program provides nesting sites for these ducks where there may be a limited number of natural cavities. These boxes also provide a means of conducting monitoring for the wood duck population on Fort Gordon. The NRB will continue to monitor and maintain existing boxes in mid to late winter prior to wood duck nesting season. New boxes will be added to replace old ones that are in disrepair as well as to add to the current inventory

any time suitable areas are discovered or improved where no boxes exist.

4.4.7.10 Control of Nuisance Wildlife

Several species of wildlife cause nuisance problems from time to time and will be managed using integrated pest management (IPM). Beavers have in the past dammed low water crossings and culvert pipes causing roadways to become impassable and damaged trees at places like the Gordon Lakes Golf Course and Leitner Lake Campground. Beavers are typically controlled by use of the conibear trap. Alternatives such as pipes under beaver dams (*Clemson Beaver Pond Leveler*) may be used but have limited effectiveness and will not negate the need to trap some animals. Beaver trapping will be done in accordance with the beaver IPM outline No. 26 found in Fort Gordon's Integrated Pest Management Plan (IPMP, Appendix P).

Other animals such as skunks are trapped with live traps (e.g. Hav-a-Hart trap) and can be relocated to another area or euthanized. Canada geese complaints at the golf course and Boardman Lake area have necessitated trapping this species in the recent past. Nuisance geese will be trapped during their molting period and relocated to an area of the installation away from their capture site or released at locations off-post which will be coordinated through GADNR.

Feral dog and feral cat complaints are handled through the Pest Control Office. For more information regarding feral dogs and cats see Section 4.9.6.6 of this INRMP as well as Appendix P.

4.4.7.11 Bats and White Nose Syndrome

Fort Gordon is home to nearly a dozen species of bats. Depending on the species, they roost, feed, hibernate, and raise young in a variety of habitat types to include, hardwood riparian forests, open pine forests, mixed pine-hardwood forests, and suburban areas. Management for bats on Fort Gordon is integrated into the ecosystem management philosophy. Bats will undoubtedly benefit from the current management practices of restoring upland longleaf pine and protecting wetlands and riparian areas.

A major concern for bats throughout the US, especially in the eastern half of the country is White-nose Syndrome (WNS). It is a deadly disease of cave- or mine-hibernating bats that is caused by the fungus *Pseudogymnoascus destructans*. WNS has killed an estimated 6 million bats since its discovery in 2006. The fungus

harms bats by causing them to arouse more often during hibernation and use critical fat reserves. In some hibernacula the hibernating population of bats has been reduced by as much as 90-100%. The fungus that causes WNS is spread by bat to bat contact or when bats contact the fungus in their environment. The spread is thought to also occur when people enter caves, mines, and other structures where the fungus exists and becomes attached to their clothing or gear. The fungus is then spread to other areas by people wearing this contaminated clothing and gear.

Fort Gordon does not have any caves or mines where large concentrations of bats are known to roost or hibernate. Bats on Fort Gordon primarily use tree hollows, loose tree bark, tree foliage, culverts, bridges and abandoned structures for roosting. Nonetheless, given the quick spread of WNS, this disease is a credible threat to bat populations on Fort Gordon. While WNS has not been observed on bats recently caught at Fort Gordon (2012, 2013, and 2015), it has been positively identified at several locations less than 120 miles to the north and northwest. Fort Gordon will continue to monitor for WNS when it conducts periodic sampling of the bat population. Individuals capturing bats on Fort Gordon for monitoring and/or research or individuals entering structures likely to be used by bats for roosting should follow the USFWS Disinfection Protocol for Bat Field Research/Monitoring. In addition, Fort Gordon will cooperate with GA DNR to the greatest extent possible on all issues relating to WNS monitoring and management as outlined in the Georgia White-nose Syndrome (WNS) Response Plan (Appendix U).

4.4.7.12 Pollinator Management

Concern for the management of pollinator species has recently come to the forefront due to measured declines in many species. A decline in pollinator species is a concern due to their importance in the food production system as well as the valuable ecosystem functions they perform. While the reasons for their decline are varied and numerous, overuse of pesticides is thought to be one of the major culprits.

All pesticide use on Fort Gordon is conducted under IPM principles as outlined in section 4.9 and Appendix P. As such, pesticide application in the forested landscape of Fort Gordon (predominately herbicides) will only be used when other potentially less harmful techniques (prescribed fire or mechanical treatments) have been attempted and found to be ineffective or inefficient.

As described in section 1.8 Fort Gordon manages the forested landscape at the ecosystem level. Species of pollinators and the plants that are important to them which are known to occur in Fort Gordon's ecosystem will benefit from the management and restoration techniques being used. In some limited cases the NRB may utilize special plantings or management techniques to help boost populations of plants known to be important to pollinator species, however, on a landscape scale techniques such as prescribed fire, forest thinning, and mechanical disturbance which are important parts of ecosystem restoration and management will ultimately be the greatest benefit to pollinator species.

4.4.8 Personnel Responsibilities

U.S. Army Garrison, Fort Gordon, is directly responsible for the implementation and enforcement of this Fish and Wildlife Management Plan through DPW, ED, and NRB.

4.4.9 Outside Assistance

The planning and management of natural resources on Fort Gordon is a collaborative effort that requires assistance from federal and state agencies, educational institutions, contractors, and other interested parties. The responsibilities of external stakeholders (i.e., USFWS and GADNR) are discussed in detail in Section 1.4.2 and beneficial partnerships are discussed in detail in Section 3.4.

4.5 FOREST MANAGEMENT

4.5.1 Mission Statement

To manage the installation's forests to support the military mission while supporting the management of endangered species, ensuring the protection of the environment and providing a sustainable income from the sales of forest products to support the program.

4.5.2 Plan Objective

The Fort Gordon Forest Management Plan is intended for use by forest resource managers and other responsible parties as a planning tool and guidance for conducting sound forest management practices on Fort Gordon. This management plan covers the period from FY 2021 through FY 2025. The forest management program is administered by the Forestry Section, NRB, Env Div, of the DPW. Plan implementation and oversight will be coordinated by the Forestry Section using available personnel, contracts, interagency agreements, and local installation expertise as available. Forest product markets, labor availability, funding constraints, other natural

resources needs and training requirements will most certainly influence the intensity and timing of management activities. In order to be practical and functional, this plan is intended to provide flexibility to accommodate these conditions, while ensuring that it meets, supports, and enhances the installation's mission.

The activities described herein provide a framework for the orderly and scientific management of the installation's forest ecosystems. The primary objective and goal is to provide a viable and healthy forest ecosystem that supports and enhances military training while providing for a sustained yield of quality forest products, the protection of real property, and the enhancement and protection of other natural resources associated with forest ecosystems.

All actions and activities covered by this plan will be carried out in accordance with all applicable Fort Gordon, U.S. Army, DoD, federal, state, and local laws and regulations.

4.5.3 General Information Inherent to the Forest Management Plan

4.5.3.1 Definitions

Definitions of technical terms used in this plan are included in this section. Although many of the definitions have been taken directly from *The Dictionary of Forestry* (Helms 1998), a number of the definitions have been constructed to define the term's actual intent as used in the Fort Gordon Forest Management Program.

Backfire – A fire intentionally set to move against the wind and "back" into an area to subdue a wildfire or for management purposes.

Basal Area – The cross-sectional area of all stems of a species or all stems in a stand measured at breast height and expressed per unit of land area, usually per acre.

BMPs – A practice, or combination of practices, that is determined after problem assessment and examination of alternatives, to be the most effective, practical means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality.

Biodiversity – The variety and abundance of life forms, processes, functions, and structures of plants, animals, and other living organisms, including the relative complexity of species, communities, gene pools, and ecosystems at spatial scales that range from local through regional to global.

Board Foot – A lumber measurement defined as being a piece of sawn wood measuring 1-inch by 1-foot by 1-foot. The term is also used as a measure when estimating the amount of lumber in trees, sawlogs, and veneer logs.

Chain – A unit of measure equal to 66 feet commonly used by foresters. A square chain (66 feet by 66 feet) is equal to 1/10 acre.

Chip – A small piece of wood used to make pulp or wood composites (made either from wood waste in sawmill or pulpwood operations or from pulpwood specifically cut for this purpose) or fuel (made either from sawmill waste or from chipping trees in the woods).

Chip-n-saw – Generally, pine trees larger than pulpwood size, but smaller than sawtimber trees (often between 9 inches – 12 inches dbh). A process whereby small logs are converted into cants (partially sawn log with at least one flat side) by chipping the outer portion of the log, and then the cants are sawn into lumber as part of the same operation.

Clearcut – A silvicultural practice in which all-merchantable trees are harvested over a specified area in one operation.

Commercial Forestland – Forestland, which is capable of producing timber for industrial use. Areas qualifying as commercial timberland have the capability of producing in excess of 20 cubic feet ($\frac{1}{3}$ to $\frac{1}{2}$ cord) per acre per year of wood.

Competition – The struggle among individual trees and between trees and other vegetation for growth requirements such as sunlight, nutrients, water, and growing space. Competition goes on among both the roots and crowns of trees in the same stand.

Conservation – The protection, improvement, and wise use of natural resources to provide the greatest social, economic, and environmental value for the present and future.

Controlled Burning – Any burning that has been started intentionally by a forest manager to accomplish some particular purpose, and over which he/she exercises some surveillance or control.

Cord – A volume measure of wood. A standard when cut and stacked is 4 feet by 4 feet by 8 feet, or 128 cubic feet of space. Cord volume in standing trees averages 70 to 90 cubic feet, because only the tree volume is measured - not the tree volume plus the empty spaces that form when the wood is stacked. Pulpwood volume is typically measured in cords. A face cord or short cord is 4 feet by 8

feet of any length wood less than 4 feet and is often the measurement used for firewood.

Dbh – Abbreviation for tree diameter at breast height (4½ feet above the ground). Dbh is usually measured in inches.

Diameter Inside Bark (DIB) – Abbreviation for tree diameter inside bark. DIB is usually measured in inches.

Ecosystem – A spatially explicit, relatively homogeneous unit of the earth that includes all interacting organisms and components of the biotic environment within its boundaries – note an ecosystem can be of any size, e.g. a log, pond, field, forest, or the earth's biosphere.

Even-aged Forest – A forest containing trees that are about the same age (usually within 10 years). Pine plantations are even-aged forests that result from clearcut harvesting and reforestation with seedlings.

Final Harvest – The last harvest of trees from an area in preparation for regeneration of the area.

Forester – A professionally trained individual who supervises the development, care, and management of forest resources to include timber, soil, water, wildlife, and recreation.

Forest Management – The science, the art, and the practice of managing the natural resources that occur on or in association with forestlands. The practice of forest management on Fort Gordon will support the achievement of installation and Army goals.

Forest Products – All plant materials in wooded areas that have commercial value.

Fusiform Rust – A fungus infection that causes cankers, or swellings on the stems and limbs of pine trees. Although sometimes fatal to the infected tree, it often slows growth, provides an entry site for insects, and reduces the value of the infected tree.

Group Selection – A modification of the single tree selection method whereby trees are removed in groups or patches ranging ¼ to 2 acres in size and distributed throughout the stand.

Hardwood – A loose term generally including all species of trees that lose their leaves in winter. Some hardwoods, such as magnolia, retain leaves throughout the year. Soft hardwoods are soft-textured hardwoods, such as maple, hackberry (*Celtis lacvigata*), sweetgum,

yellow-poplar, magnolia, blackgum, and sycamore (*Platanus accidentalis*). Hard hardwoods are hard-textured hardwoods, such as hickory and oak.

Harvest – Removing trees on an area to (1) obtain income from the wood products, (2) develop the environment necessary to regenerate the forest.

Headfire – A fire moving with the wind. Head fires can be dangerous in a wildfire situation.

Heartwood – The wood extending from the pith to the sapwood, the cells of which no longer participate in the life processes of the tree. Heartwood may contain phenolic compounds, gums, resins, and other materials that usually make it darker and more decay resistant than sapwood.

Herbicide – Any substance or mixture of substances intended to prevent the growth of or destroy unwanted trees, bushes, weeds, algae, and other aquatic weeds.

Improvement Cut – A type of intermediate harvest that improves the residual stand by removing low quality, diseased, and/or damaged trees. Improvement cuts remove small, undesirable trees and other vegetation that could harm the stand as it grows. This type of cut may or may not provide a marketable wood product.

Landing – A concentration area close to a main road where logs are brought during harvesting operations. Trees are skidded to the landing and then delimbed, bucked, and loaded onto trucks for transport to the mill. Also called a deck.

Line-plot Survey – A sampling procedure employing lines of sample plots generally laid out at regular intervals along survey lines.

Logging Slash – Unwanted and generally unmarketable wood such as large limbs, tops, cull logs, and stumps, that remain in the forest after timber harvesting.

Log Rule – A table providing estimates for the amount of lumber that can be sawn from logs of a given length and diameter. There are three common log rules used in the U.S. they are the Doyle Rule, International Rule, and Scribner Rule. The Scribner Log Rule is used on Fort Gordon.

Lump Sum Sale – A sale where a specified volume of a forest product is sold for a fixed price before harvesting begins. With a lump sum

sale, a fixed price will be paid regardless of the volume of forest product actually removed from the tract.

Thousand Board Feet (MBF) – Abbreviation for a thousand board feet.

Merchantable Height – Refers to the height (length) of a merchantable tree from a point 6 inches above the ground line to a point on the trunk where the diameter becomes too small to obtain a particular product. The product being cut from the timber determines the merchantable height. For example, if the minimum usable diameter of pulpwood is 4 inches, the merchantable height of a pulpwood tree would be its height up to a stem diameter of 4 inches.

Merchantable Timber – A stand of timber of sufficient size and volume per acre to be harvested profitably.

Midstory – Small trees growing under a forest canopy.

Mortality – Death or destruction of forest trees because of competition, disease, insects, wind, fire, or other factors.

Multiple Use Forest – A forest that is managed for a multiple of objectives, such as military training, timber production, endangered species, wildlife habitat, recreation, and aesthetics.

Natural Regeneration – Allowing the crop trees to regenerate an area. The two methods used to naturally regenerate pines on Fort Gordon are seed trees and shelterwood.

Natural Stand – A stand of trees resulting from natural seed fall or sprouting.

Needle Cast – (1) A disease of needle bearing conifers. The first indication of the disease is a discoloration and browning of the needles. Trees are seldom killed from this disease. (2) Also refers to the loss of needles on pine during periods of drought. This condition is common in longleaf pine and happens frequently in areas of soil compaction such as lawns and road shoulders.

Non-Commercial Species – Tree species of poor form, or inferior quality which normally do not develop into trees suitable for wood products.

Non-Commercial Thinning – Also referred to as precommercial thinning. A thinning that produces no marketable timber usually

because the trees have not reached a merchantable size, and costs managers in time and/or money to conduct.

Overstocking – Refers to a forest that contains too many trees per acre as determined by a tree's size and physical needs to remain healthy. Overstocking reduces growth, causes more trees to die, and makes the stand more susceptible to disease and insects.

Pesticides – Chemicals used to control forest pests. These include herbicides and insecticides, which are used to kill pests such as weeds, insects, and unwanted trees.

Pine – A descriptive name given to a particular group of needle bearing trees. In the southeastern states, they are known for their valuable lumber and pulp qualities. Pine species that occur naturally on Fort Gordon are longleaf, loblolly, shortleaf, and pond pines. While not native on Fort Gordon stands of slash, sand, and Virginia pines (*Pinus virginiana*) are growing on the installation.

Plantation – A forest stand established by planting. It is usually made up of a single species.

Planting Machine – A mechanical device used to plant trees. Planters are usually pulled by tractors, skidders, or dozers on well-cleared sites.

Pole – Term used to designate trees that can be used as power poles. To be a pole a tree must be of above average straightness and quality and have three times (in feet) its dbh (in inches) in clear, straight stem. That is a 12-inch dbh tree must have at least 36 feet of clear, straight stem to be considered a pole. Poles may be expected to bring a 20 to 25 percent premium if they occur in enough quantity and frequency to be worth sorting.

Precommercial – When referring to a tree it means that the tree has not reached a minimum dbh and height at which it is commercially harvestable. The current minimum dbh is 5 inches and the height is 20 feet to a minimum top DIB of 3 inches. The minimum dbh occasionally fluctuates with market conditions.

Prescribed Burning – The controlled use of fire to achieve forest management objectives. Prescribed fire can be used to reduce hazardous fuel levels, to control unwanted vegetation, improve visibility, improve wildlife habitat, and prepare soils for seed fall in natural regeneration.

Pulpwood – Wood cut or prepared primarily to make wood pulp, paper, fiberboard, or other products. Trees over 5 inches dbh that are unsuitable for sawtimber because of size, crook, or other defect are sold as pulpwood.

Reforestation – Re-establishing a forest by planting, seeding, or natural regeneration methods on a harvested tract of land.

Regeneration – (1) To re-establish a stand of timber, and (2) The seedlings that have been reestablished on a harvested site.

Regulated Forest – A forest being managed technically by controlling composition, stocking, harvests, growth, and yields to meet management objectives.

Reimbursable – Refers to those operations or activities that can be financed with reimbursable forestry funds.

Reimbursable Forestry Funds – Those funds that are derived from the proceeds from the sale of forest products. Only those expenses that are directly related to the management of the forest ecosystems on commercial forestland and can reasonably be expected to produce forest revenues may be reimbursed from sale receipts and include: timber management, reforestation, timber stand improvement, inventories, fire protection, construction and maintenance of timber area access roads, purchase of forestry equipment and supplies, disease and insect control, planning, timber marking, inspections, sales preparation, training of forestry personnel, and timber sales.

Rotation – The period of time between the establishment of a stand and final harvest.

Salvage Cut or Harvest – Harvesting dead trees or those in danger of being killed (by fire, insects, disease, flooding, etc.) to save their economic value.

Sanitation Cut or Harvest – Harvesting of trees infected or highly susceptible to insects or diseases to protect the rest of the forest stand.

Saplings – Live trees of commercial species that are 1 inch to 5 inches in dbh and of good form and vigor.

Sawtimber – Trees or logs cut from trees with minimum diameter and length and with stem quality suitable for conversion to lumber.

Scrub oak – Small or stunted oak tree species, normally found in poor, dry sandy soils and generally of non-merchantable size and quality.

Seedling – A young tree less than 1 inch in diameter at dbh. Seedlings are usually less than 3 years of age.

Seed Tree Cut or Harvest – A type of regeneration harvest where between five and 10 trees are left per acre to provide a seed source on the harvested tract. Trees left for seed should be of superior quality, healthy, and vigorous seed producers. In most cases, the old stand is partially removed in a single harvest cut that leaves only the seed trees standing. These remaining trees are left for 3 to 7 years until the stand of seedlings becomes established from seed. After the new stand is established, the seed trees are harvested, leaving the young seedlings to produce a new even-aged stand of timber.

Shelterwood Cut or Harvest – Similar to the seed tree harvest, the shelterwood cut leaves between 30 and 40 trees per acre on a tract to act as a seed source. The greater number of trees reduces the chance of loss or damage through wind-throw and insures better seed dispersal. In addition, when the timber is harvested the landowner can expect to receive more money because of the greater volume available for harvest.

Silviculture – The art and science of controlling the establishment, growth, composition, health, and quality of forest and woodlands to meet the diverse needs and values of landowners and society on a sustainable basis.

Singletree Selection – Individual trees of any or all size classes are removed at a conservative rate in a manner that promotes growth of remaining trees and forest sustainability. Only those trees that need to be removed to improve the development of the stand toward a continuous or perpetual forest are marked for harvest. From a regeneration standpoint, in most cases, tree removal will be used to release established regeneration rather than to create openings for regeneration to become established.

Site Index – A species-specific measure of actual or potential forest productivity (site quality), expressed in terms of the average height of trees included in a specified stand component at a specified index or base age.

Site Preparation – Hand or mechanized manipulation of a site, designed to enhance the success of regeneration – note treatments may include burning, chemical spraying, chopping, disking, and scarifying and are designed to modify the soil, litter, or vegetation and to create microclimate conditions conducive to the establishment and growth of desired species.

Softwoods – A tree belonging to the order *Coniferales*, usually evergreen, cone bearing, and with needles or scale-like leaves such as pine, spruces, firs and cedars; often called "softwoods." Bald Cypress is a deciduous conifer.

Stocking – The number of trees in a forest stand. Often, stocking level is compared to the desirable number of trees for best growth and management, such as partially stocked, well stocked, or overstocked.

Succession – The replacement of one plant community by another until ecological stability (climax forest) is achieved. For example, an abandoned farm, if left to nature, would gradually go through different states of vegetative cover and finally reach the climax forest stage after 100 or more years.

Stand – An aggregation of trees or other growth occupying a specific area and sufficiently uniform in composition (species), age arrangement and condition to be distinguishable from the forest or other growth on adjoining areas.

Stand Density – A measure of the amount of timber growing on a site expressed in number of trees, basal area, or volume.

Stand Structure – The horizontal and vertical distribution of components of a forest stand including the height, diameter, crown layers, and stems of trees, shrubs, and herbaceous understory, snags and down woody debris.

Sustainable – The ability of a resource to continuously maintain itself in perpetuity without substantial loss.

Sustained Yield – The production of renewable resources a land area can maintain in perpetuity at a given intensity of management without impairment of the resource.

Tally – Counting trees, logs, or other products to use later in determining harvestable volume and products.

Thinning – Removing some of the trees from a stand to encourage growth among the remaining timber. Commercial thinnings provide some financial return, while noncommercial thinnings do not. Methods used for thinning timber include row thinning where every third or fifth row of trees is harvested, selection thinning where only selected trees are harvested, and combination thinning where both row and selection methods are used.

Timber Cruise – To inventory a stand of timber to determine the harvestable products and volume.

Timber Marking – Selecting and indicating, usually by a paint spot, trees to be cut or left in a harvesting operation.

Timber Stand Improvement – Improving the quality of a forest stand by removing cull trees and brush, leaving a stand of good quality trees. Cull trees may be removed by chemicals, fire, girdling, cutting, mechanical means, or a combination of these methods.

Tree Length – An entire tree, with the exception of the stump, unmerchantable top and branches, and foliage. Also relates to a logging (harvesting) system whereby the entire stem to a minimum diameter at the top-end is cut and hauled to the receiving mill.

Understory – Small trees and shrubby plants growing under a forest canopy.

Uneven-aged Management System – A planned sequence of silvicultural treatments designed to maintain a continuous forest of multiple age classes, while considering values other than just timber production.

Uneven-aged – Applied to a stand in which there are considerable differences in the age of the trees, usually more than 10 years, and in which three or more age classes are represented.

Veneer – A thin layer or sheet of wood. There are three common types of veneer. These are rotary cut, sawed cut, and sliced cut veneer. Pine veneer is made into plywood, while hardwood veneer is often used for furniture and cabinets.

Volume Table – A table that provides estimates of the average volume in cords (for pulpwood) or board feet (for sawtimber) in a single tree of a certain diameter and height. Volume tables are used with timber cruise information to develop a timber inventory report.

Water Bar – A hump or small dam-type surface drainage structure used in closing abandoned roads, skid trails, and firebreaks.

Water Turnout – The extension of an access road's drainage ditch into a vegetated area to provide for the dispersion and filtration of storm water runoff.

Whole-tree Chipping – A harvesting process of converting whole trees into chips for use as pulp material or fuel for energy. This system can result in substantially lower reforestation costs than conventional harvest systems.

Wildfire – Fire burning out of control, regardless of how or why they started. See prescribed burning.

Wildland Fire – Wildland fire commonly refers to any nonstructural fire, except prescribed fire, occurring in wildland. For the purposes of this plan and fire management on this installation wildland fire will refer to any nonstructural fire, to include wildfire and prescribed fire, occurring in wildland.

Windrow – Logging debris and unmerchantable woody vegetation, which has been piled in rows to decompose or be burned; or the act of constructing these piles.

4.5.3.2 Forest and Fire Management History

Forest Management before Army Acquisition

A detailed description of the pre-Army history of the Fort Gordon area is provided in Section 2.1.3.1 of this INRMP.

Timber Harvesting since Army Acquisition

According to incomplete records, the first timber harvesting after acquisition was done in FY 1946, when 1,000 MBF (presumably pine) was cut and an income of \$10,000 shown. Apparently, this was a procurement cut, as is shown for FY 1948, when 1,200 MBF was harvested and an income of \$21,000 was shown. The first USACE timber harvest contracts were documented in FY 1952 and FY 1954, with annual sales commencing in FY 1956.

Fire Management before Army Acquisition

There is very little recorded fire history of the area before Army ownership. Some researchers believe that lightning-caused fires played a significant role in the development and renewal of fire dependent ecosystems such as the longleaf pine ecosystems found

in this area. Archaeologists believe that prehistoric Native Americans indigenous to this area used fire to maintain open areas for crop production and to open forested areas to ease wild game harvests. This use of fire by Native Americans also helped to sustain fire dependent ecosystems. In the late 1800s and early 1900s, fire was a tool used in agriculture to keep fields clear and woodlands open for livestock grazing in many parts of the southeast. There was little or no organized forest fire protection in the area.

Fire Management since Army Acquisition

The fire history of the installation is incomplete, as there was no organized forest fire protection before 1952. Through late 1956, most forest fires were reported to the Post Fire Department for action. The Fire Department did not maintain any written record of these fires, which were apparently quite frequent. In 1952 a Forestry Section was organized; however, communications between the lookout tower and personnel were practically nonexistent, and as Post Forester turnover was rapid, the entire effort was disorganized and relatively ineffective until 1956. There are indications and recollections that several fires in the past exceeded 10,000 acres in size. One of note in March 1950 burned over 15,000 acres, with an estimated damage of more than \$300,000. This fire was set by the Fire Department, under direct orders of the Post Commander, to burn off an area on the south boundary along U.S. Highway 1. Soon after ignition, winds up to 28 miles per hour from the south-southwest were experienced. The fire raged out of control and reached the main cantonment area, 12 miles away, the first afternoon. A wind shift to the north-northwest the next day drove the fire across U.S. Highway 1 onto private property. The fire continued to burn virtually uncontrolled for one week, until soaked by rains. This fire is significant from a historical standpoint, as an example of what can happen without constant, planned wildland fire prevention and protection, such as exists today. In 1956, an organized forest management program was initiated with responsibilities for both protection and management of the installation's forest resources. A summary of wildland fire management is presented in Section 2.8.

Military Use

The past military history and present mission of the post are described in Section 2.1.3 and Section 2.1.4 of this document, respectively. Wildfires have been the greatest single impact of military land use on the installation's forest resource. The posting of the AIA removed some timberland from the management base. The AIA, which had been cutover or put into crop production before military occupation, occupies some of the poorest soils on the

installation and has changed little since its establishment in 1941. The only major change was an addition in the early 1980s of several hundred acres along its northern border. This was done to accommodate a larger safety zone required by the U.S. Air Force for aerial firing. The present configuration of small arms ranges in the SAIA has changed little since its establishment during WWII. In addition to the frequent fire history, metal contamination of standing timber occurred. This practice continued through the Korean and Vietnam actions, with occasional removal of contaminated timber permitted during fluctuations in range use. In the early 1970s, timber harvesting removed a large portion of the metal contaminated timber from the SAIA. The construction of earthen berms downrange of the most actively used ranges took place in the late 1970s. These berms have effectively minimized metal contamination outside of the range itself. Areas not protected in this manner are of the poorest site quality, and berm construction is not cost-effective. Past military use of the installation's woodlands has not had a particularly adverse impact on the resource, although occasionally conflicts between harvesting and training use have occurred. The present installation mission is very compatible with forest management. Signal Corps field training is quite site-specific, permitting virtually unrestricted forest management activities throughout the installation.

Reforestation

The first attempts at reforestation were made in the early 1950s, using offenders from the U.S. Military Police disciplinary barracks under civilian supervision. The results of these hand plantings varied from poor to excellent and consisted of reforestation of old fields and other open areas. During the 1950s and 1960s, many federal and state forestry agencies were advocating the use of slash pine as the species of choice for southern reforestation efforts. Consequently, many of the plantations established on the installation during this period were slash pine. The use of slash pine continued until the early 1970s when the use of loblolly pine began. Direct seeding of longleaf pine was tried in FY 1959. It proved to be unreliable in the establishment of new stands and all efforts in direct seeding ceased. Direct seeding was tried on some 3,300 acres with little to no success. Because of their massive root system, the planting of bare-root longleaf pine seedlings was difficult and very unreliable. Therefore, little time or effort was spent on planting longleaf until recently. Recent interest in reestablishing native species and subsequent developments in pine nursery operations has renewed the interest in planting longleaf. Installation efforts within the last few years have proven fruitful in reestablishing longleaf on sites where it no longer existed or where it was understocked. Reforestation by the means of seedtree cuts has been tried on several thousand acres

during the past with little or no success. Reforestation by means of planting has proven to be the most reliable and effective way to establish pine seedlings on the dry sandy soils found on the installation.

4.5.3.3 Forest Products Market

The Augusta area has historically had a strong local demand for wood fiber, chip-n-saw, and sawtimber. The future market forecast for pine pulpwood in the area is unclear at this time, while demand for hardwood pulpwood, pine chip-n-saw, and pine saw logs is expected to remain strong. The demand in the local area for pine pulpwood has steadily declined since the conversion by the local paperboard mill to the use of approximately 80 percent hardwood pulpwood and 20 percent pine. International Paper Company (International) is one of the largest paperboard mills in the country. The mill is located in Richmond County, about 12 miles from the installation. This mill was built in the early 1960s, and has been the primary outlet for pulpwood from Fort Gordon ever since. International also has a chipping head rig and sawmill, enabling them to provide a multiple product outlet for area forest products. All sawmills in this area have facilities for chipping slabs and edgings into pulpwood, and all area pulp mills accept direct chip input. International operates several chipping mills in the area for processing hardwood chips. Pine pulpwood operations in the area have changed over the last 15 to 20 years from short wood to tree length operations. Such utilization changes have influenced the market in this area. Short wood is being replaced by tree length wood that is used for chipping and saw wood. In addition, low grade hardwoods, which were previously non-merchantable, are increasing in demand for pulpwood operations. The loss of harvesting by short wood methods has severely reduced the feasibility of selectively thinning pulpwood stands.

Pinestraw is a forest product that began to gain significant economic value about 20 years ago. Although the demand for pinestraw is expected to remain strong, prices received for pinestraw sales vary significantly from year to year because of outside market conditions. The USACE, Savannah District, maintains a mailing list of potential bidders for each sale, which includes user mills and their dealers, as well as independent producers.

4.5.3.4 Total Estimated Timber Volumes

The total estimated timber volumes on Fort Gordon are presented in Table 4-14. These estimates are based on the 2011 forest inventory. The total volumes in Table 4-14 are a summation of the computed

volumes by stand and as such do not have a sound statistical basis. The recent implementation and use of the RCW Matrix has resulted in the need for forest stand data than has not been collected in previous inventories. A decision was made in 2011 to proceed with the next 10-year forest stand inventory after all data requirements were identified and once an adequate data collection and processing software package was obtained. In 2006, the Environmental Programs Office, Assistant Chief of Staff for Installation Management issued the U.S. Army Forest Inventory Guidance. The use of this guidance for forest inventories is not mandatory but is intended as a guide only. As such, Forestry Staff will use it as it was intended as they prepare and conduct forest stand and tree data inventories on the installation.

Table 4-14. Estimated Timber Volumes on Fort Gordon Based on the 2011 Forest Inventory

Timber Type	Volume
Pine Sawtimber	342,386 MBF
Hardwood Sawtimber	34,695 MBF
Pine Pulpwood	337,660 cords
Hardwood Pulpwood	206,215 cords

MBF= Thousand Board Feet

4.5.3.5 Annual Harvest by Product

Standing timber

An annual harvest of 1 million board feet of pine sawtimber and between 1,000 and 2,000 cords of pine pulpwood should be sustainable. There will be an increase in pulpwood as planted stands become of a merchantable size. There will be an increase in volume of small sawlogs produced, and a decline in large sawlogs as older under-stocked or off-site stands are liquidated and replaced with new stands, mostly by planting. The volume of hardwood pulpwood to be harvested should continue to increase slightly. Most of the hardwood pulpwood harvested will come from areas where the pine stands are being liquidated, and from pine stands being improved for RCW foraging habitat. Due to the reduced size and quality of hardwoods in the Brier Creek drainage from beaver damage over the years, increased restrictions on mechanical harvesting in wetland, and concerns regarding water quality, no harvesting can be sustained there for the foreseeable future.

Pinestraw

No attempt has been made to determine the volume of pinestraw harvested in any year; rather, pinestraw is sold on an area basis. Therefore, no projected annual harvest by volume can be made.

4.5.3.6 Harvest Cycles

Standing timber

Current and future timber harvest will be timed based on several factors which include, but are not limited to, stocking levels, growth rates, military training needs, construction, and to meet the requirements of other plan objectives, such as threatened and endangered species requirements and invasive species management. At the completion of the stand prescriptions, each unit will be reviewed for harvest requirements at least once every 10 years. A projected schedule of timber harvest areas is presented in Appendix K. This schedule shows those areas planned for harvest because of current known requirements such as RCW habitat improvement needs and military construction projects. The areas shown are subject to rescheduling if the requirements change in the future. In addition, other areas will be added to the schedule as new requirements or needs become known.

Pinestraw

If any commercial pinestraw harvesting occurs on the installation it will not be scheduled in any one management unit more than twice during any 6-year period. Straw markets and installation access by contractors, as well as other activities such as prescribed burning, timber harvest, and military training, have an impact on the harvesting of pinestraw, so scheduling is tentative at best.

4.5.3.7 Estimated Operating Cost by Fiscal Years 2020 through 2025

Estimated operating costs for the plan period are presented in Appendix K. The estimated costs are presented by forest management activity and total for the appropriate FY.

4.5.3.8 Estimated Value of Harvested Products FYs 2020 through 2025

The estimated value of forest products harvested on Fort Gordon is presented in Appendix K.

4.5.4 Description of Forest Types and Forestland Classification

4.5.4.1 Description of Forest Types and Tree Species

Most of the tree and shrub species common to the Fort Gordon installation may be grouped into eight major forest types adaptable

to the existing forest conditions and management requirements: natural pine, pine plantation, pine-scrub oak, pine-hardwood, scrub oak, upland hardwood, bottomland hardwood, and hardwood-pine (Figure 4-11).

Natural Pine

Longleaf pine and loblolly pine make up this type. Shortleaf pine and pond pine occur naturally on the installation, usually in conjunction with loblolly pine stands, and do not exist in pure stands of any consequence. This forest type includes all natural pine stands, regardless of species, in which less than 20 percent of the overstory BA is hardwood or less than 20 percent of the overall stand BA is dominated by scrub oak. A further breakdown into sub-types can be made according to pine species and mixtures, which normally vary with the topography and soil on the installation. Longleaf pine historically was the predominant species that grew naturally on the dry, deep, sandy soils of the Sand Hills region. It occurs in pure stands on the sand ridges and upper slopes, becoming mixed with loblolly pine on the lower slopes and wetland margins. Loblolly pine grows naturally on the clay type soils of the piedmont region and on wet soils associated with wetlands. It occurs in pure stands on the installation on the upper and lower slopes where clayey soils exist and on wetland soils associated with drainages becoming mixed with longleaf on the drier slopes and ridges in the absence of fire. Loblolly pine exists in pure stands on sites that historically would have been longleaf sites because of past human activities both before and after U.S. Army ownership.

Pine Plantation

This type is made up mostly of planted loblolly pine and slash pine. The slash pine is not native to Fort Gordon. Some planted longleaf pine and direct-seeded longleaf pine are scattered throughout the installation. The area of longleaf pine plantations will increase as areas are restored to longleaf pine from non-native slash pine and off-site loblolly pine. There are also several small plantations of sand pine (*Pinus clausa*) and Virginia pine on the installation. Neither of these species is native to the installation.

Pine-Scrub Oak

This type is made up of pine with a scrub oak understory that may revert to scrub oak without proper management. Longleaf pine is typically the pine species associated with this type but other pine species may also be present. The area must have greater than 30 percent pine BA but less than 60 percent pine BA. This type is

usually located on sand ridges and upper slopes where sandy soil is relatively deep.

Pine-Hardwood

The hardwoods in this type must constitute 21 percent to 49 percent of the overstory BA, the remainder of the overstory being pine of any species. This type can be divided into two sub-types according to site. Longleaf, loblolly, and shortleaf pine are commonly found mixed with upland hardwoods on the upper and lower slopes, and loblolly and pond pine are commonly found mixed with bottomland hardwoods on the lower slopes and bottomland sites.

Scrub Oak

A minimum of 51 percent of the BA must be dominated by scrub oak to be classed as this type; the remaining BA is usually composed of scattered longleaf pine of less than 30 square feet/acre BA. Scrub oak species include turkey oak, laurel oak (*Quercus hemisphaerica*), blackjack oak, sand post oak (*Quercus stellata* var *margaretta*), and bluejack oak. Small black gum, persimmon, sand hickory (*Carya pallida*), pignut hickory (*Carya glabra*), and mockernut hickory are often mixed with the above species on the sand ridges and upper slopes.

Upland Hardwood

At least 80 percent of the BA of the overstory trees in this type must be upland hardwoods. The remaining percent may be pine of any species. Upland hardwood species include southern red oak (*Quercus falcata*), water oak, northern red oak (*Quercus rubra*), willow oak, white oak, sweetgum, and post oak. Also, found in association with upland hardwoods are persimmon, pignut hickory, and mockernut hickory of better quality than those found in association with scrub oaks. Upland hardwoods are usually located on lower slopes and around old home sites.

Bottomland Hardwood

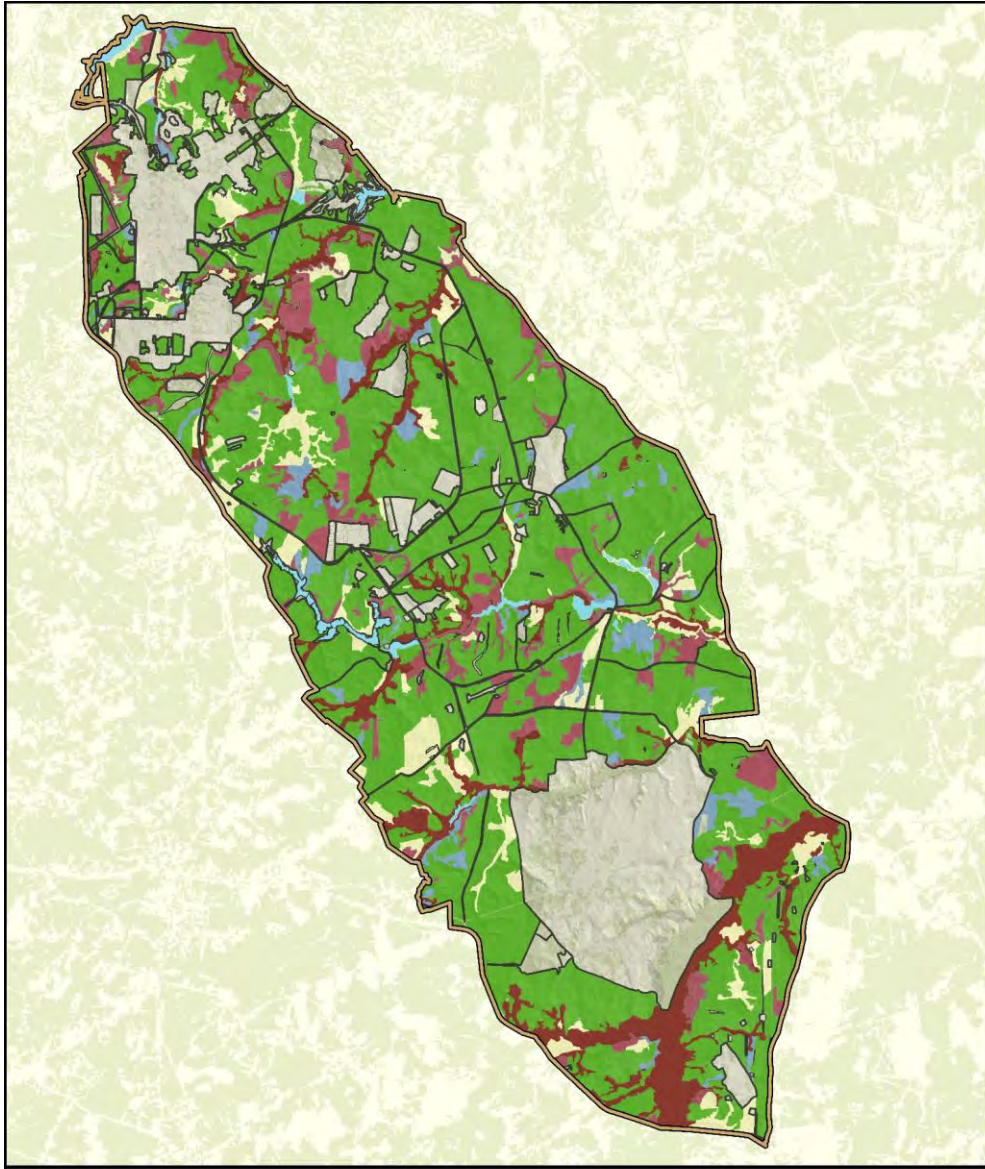
This type requires a minimum of 80 percent of the BA of overstory trees to be bottomland hardwoods; the remainder can be pine of any species. Bottomland hardwoods consist primarily of black gum and red maple, with scattered sweetgum, water oak, sycamore, and yellow-poplar, located in branch heads, swamps and poorly drained soils bordering streams.










Hardwood-Pine

The hardwoods in this type must constitute greater than 50 percent of the BA but less than 80 percent of the BA, the remainder being pine of any species. The main difference between this type and upland hardwood is the presence of an adequate number of seed-producing pine trees for the regeneration of the area to pine.

Other Species

Some of the other species commonly found in mixture with the above types are swamp bay (*Persea pubescens*), flowering dogwood, black cherry, American holly (*Ilex opaca*), river birch, black willow, hackberry, American beech, swamp chestnut oak, eastern red cedar (*Juniperus virginicus*), and ironwood (*Ostrya virginiana*).



-  Installation Boundary
-  Other Types
-  Open Areas
-  Hardwood / Pine
-  Bottomland Hardwood
-  Upland Hardwood
-  Pine (Natural and Planted)
-  Pine / Hardwood
-  Water

This map was produced by the Fort Gordon Natural Resources Branch

World Geodetic System of 1984

UTM Zone 17 North

Units: Meters

1:135,000



0 1 2 Kilometers

0 0.5 1 Miles

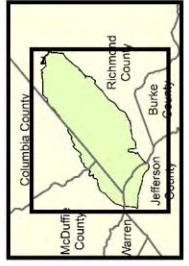


Figure 4-11. Forest Types on Fort Gordon.

4.5.4.2 Forestland Classification

U.S. Army regulations currently specify two forestland classifications: reimbursable (commercial) and non-reimbursable (noncommercial) forestland. Reimbursable forestland (RFL) is described as land that is capable of economically producing crops of industrial wood in excess of 20 cubic feet/acre/year under management and is not programmed for another use that would preclude future forest development. The direct bullet impact area of all small arms ranges, the AIA, and the known dud areas in TA 20, on North Carter Road, and in TA 49 have been withdrawn from the RFL category in the current inventory, and are included under the non-reimbursable forest land (NRFL) acreage (Figure 4-12). Earthen berms have been constructed downrange of selected small arms ranges. Essentially all of the area known as the SAIA is located within the safety fans of one or more ranges and access is restricted while small arms range firing is in progress.

The acreage of Fort Gordon lands by Forestland Classification are presented in Table 4-15. All RFL is presently available for management with minimum restrictions. The amount of acreage with stringent restrictions on the types of forest management activities carried out on it is subject to significant increases during the period covered by this plan. These restrictions could result from increased emphasis on such things as ground cover; endangered species; community tier levels; federal and state laws and regulations; and DoD and U.S. Army regulations and guidance.

Table 4-15. Acreage of Fort Gordon Lands by Forestland Classification

Forestland Classification	Area (acres)
Reimbursable	42,858.7
Non-reimbursable	5,605.2
Non-forested land	7,019.1
Total Installation Forestland	55,483.0

Source: Fort Gordon 2011

Current federal law and DoD/U.S. Army policy prohibit the use of reimbursable forestry funds for activities that cannot reasonably be expected to produce forest revenues or in areas that are classed as NRFL. An increase in NRFL acres will increase the need for other funds to cover forest ecosystem management and protection activities, which historically have been paid for with reimbursable forestry funds. An increase in the availability of current NRFL for forest management is not foreseeable at this time.

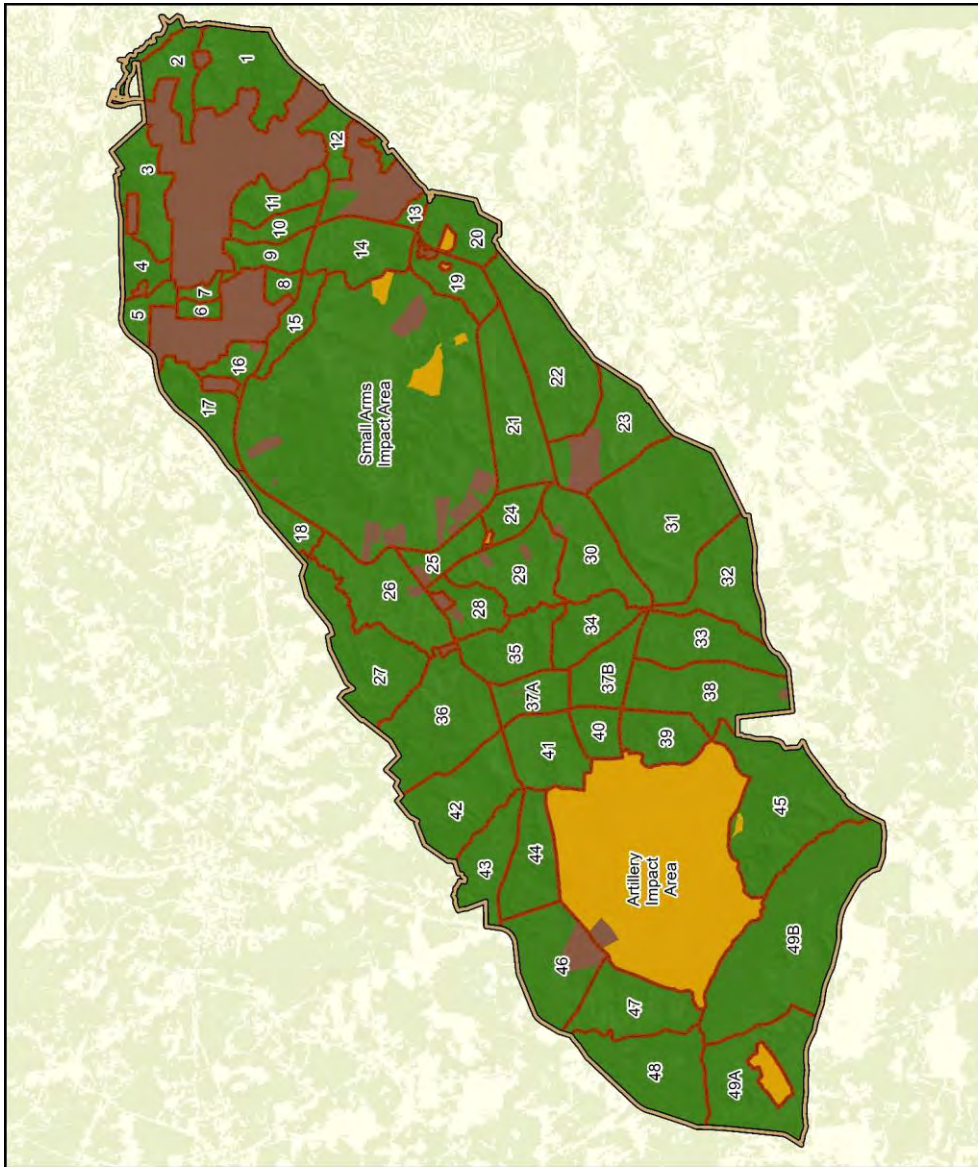


Figure 4-12. Reimbursable Forestland and Non-reimbursable Forestland (NRFL) on Fort Gordon.

4.5.5 Management

4.5.5.1 General

An intensive forest management program is currently being conducted on the installation. It is the intention of the forestry program to maintain, restore, and manage the installation's forestlands on an ecosystem basis. The harvesting of forest products is allowed and encouraged when conducted consistent with protecting and maintaining a viable, self-sustaining forest ecosystem. All forestry prescriptions will restore, maintain, and improve the ecological functions and values of the particular forest unit being managed. Foresters will work with military trainers through the ITAM program to ensure that future forest conditions are compatible with military training. Timber management in the RCW HMU will be done under the silvicultural guidelines of the revised 2003 RCW Recovery Plan, the 2007 Management Guidelines for managing RCW on U.S. Army installations, the Fort Gordon RCW ESMC, and 4-3 of AR 200-1. Where not otherwise restricted, soil types and capabilities will determine which tree species will be grown. The primary products will be pine sawtimber, chip-n-saw, and pulpwood. Pine veneer and poles are functions of quality, and occurrence is not such that pole or veneer log sales can be anticipated or scheduled. The presence of these products in a given sale area enhances the stumpage price, as producers segregate and merchandise these products separately. Hardwood sawtimber and pulpwood will be managed in appropriate areas. The majority of reimbursable hardwoods growing on Fort Gordon are bottomland species, with some occurring in appropriate microenvironments along lower slopes and in small stream hydric zones. As a general policy, plans are to grow each species in its naturally appropriate area, such as pine on pine sites and hardwoods on hardwood sites. Normally, manageable reimbursable species growing in appropriate areas will not be eliminated and converted to other cover types. Longleaf pine stands where feasible will be managed for pinestraw production.

4.5.5.2 Primary Forest Tree Species for Management

Longleaf and loblolly pines, which are both native to the installation, will be the primary forest tree species that will be emphasized in management since the majority of the forestland soils support one or both of these two species. Other native forest communities, such as bottomland hardwood, will be grown and managed in areas to which they are adapted. During the 1950s and early 1960s, the majority of pines planted were slash pine because of this species' rapid growth and its ready availability from state nurseries. Fort Gordon is located outside of the natural range of slash pine, in addition to poor growth

on the dry sandy soils that occur on the installation, individuals planted here are susceptible to severe ice damage and a high incidence of fusiform canker. Plans are to eliminate them by attrition and replace them with either longleaf or loblolly pine. Longleaf and loblolly pine will be the two preferred pine species for forest management. Soil types and site conditions will determine which of the two preferred species will be used.

4.5.5.3 Rotation Ages

The rotation ages set forth below are minimums. No absolute rotation is established. Variables involving the military mission, endangered species, and other considerations may preclude absolute projection of final harvest.

- Longleaf Pine - The minimum rotation for this species is 120 years. Longer rotations for longleaf pine are preferable for RCW management. Older longleaf pine is more susceptible to red heart disease which is preferable to the RCW for cavity excavation.
- Loblolly and Other Native Pine - The rotation age for these species is 100 years with the following exceptions: off-site stands that are to be converted, poorly stocked stands, or stands heavily infested with insects or disease.
- Slash Pine and Other Non-native Pine - No rotation age has been set for slash, sand, and Virginia pines. These species are not native to the installation. Slash, sand, and Virginia pine stands will be harvested and the sites converted to native species as feasible.
- Hardwoods - No rotation age is set for the hardwood as these stands are being primarily managed for long-term wildlife management, wetland benefits, erosion control, aesthetics, and vegetation diversity.
- RCW Cluster Stands - Pines in active RCW clusters and recruitment clusters will have no rotation age set in accordance with the Guidelines.

4.5.5.4 Cutting Cycle

Because of extreme variations in site condition and productivity at this installation, no firm cutting cycle is established. Following the first reimbursable thinning of a pine pulpwood stand at age 15 to 30 years, the stand will be examined approximately 5 years later and a second cut scheduled if indicated. Following this second cut, a 10-year interval can be anticipated before any further cutting is considered. No cycle is established for bottomland hardwood.

Beaver population buildup in most stream systems imposes an unknown variable on future regulation of bottomland hardwood cutting. Beaver control measures where viable will be coordinated with the DPW wildlife biologist and done in accordance with the beaver control SOPs (see Section 4.9). Major harvesting of bottomland hardwood was accomplished in Brier and Headstall Creeks in 1967, as an improvement cut. Surveys during FY 81 revealed an inordinate amount of beaver damage to residual high-quality, large-diameter stems. The decision was made to market as much as possible within 2 years to preclude loss of this resource. Harvesting in these drainages was completed in 1983. No cycle is established for upland hardwood, due to limited stand integrity. Desirable upland hardwoods generally will be retained to biological maturity as wildlife habitat, rather than being cultured solely for timber resources.

4.5.5.5 Management Units and Stands

Rather than arbitrarily harvesting in a specific compartment according to a particular year, which has proven unworkable in the past, all future management will be tied to a stand management concept. The reimbursable forest area of the installation has been divided into 54 management units, which match the areas used for training and other natural resources management (see Figure 2-2). Two areas that are not numbered have been assigned numbers as follows: the entire SAIA has been designated as Units 51 through 54 and the AIA has been designated as Unit 50. These management units are an administrative expediency for record management, facilitation of stand locations, fire control, and related woodland activities. Within this framework, management will relate to the individual stands, which comprise the forest. Each stand within a management unit is assigned a stand number when inventoried. At this time, there are approximately 1,900 individual stands included in management records and planning. This system is described further in ensuing paragraphs.

Management Units

The timber management units match TAs to facilitate scheduling and work assignments between all activities involved in natural resources management and military training activities. The boundaries of the management units are as shown on the March 2007 edition of the Fort Gordon Special Map (installation map) produced by the Fort Gordon ITAM/Range Control GIS Department (see Figure 2-2).

Stands

The stand is the basic and governing management entity, since it is the stands that comprise the forest resource under management. Stands are subject to change in size, classification, and composition, due to changing military land use, fire, insect, storm depredation, or management decisions. This concept of stands within management units provides the manager with resources and records control that are positively identifiable, but flexible enough to permit changes over time.

Management Unit and Stand Numbers

Stands will be identified within each management unit, and will be designated "Stand 1" through "Stand n," commencing with Stand 1 in each unit. All management references will be by Management Unit and Stand Number, for location purposes (for example: Management Unit 22, Stand 3 or 22003).

4.5.5.6 Forest Management Information System (FMIS)

Information on each stand will be maintained in an electronic database such as Microsoft Access or some similar type software program. This database will be used to enter, store, manipulate, retrieve, and generate reports on all data pertaining to stand management. This is in effect a sequential filing system. All forest stands were inventoried in the 2012 forest stand inventories were updated in 2015 or 2018 forest stand inventories and the data will be stored in this file. This database will be used to assist in stand prescriptions, harvest planning, and other forest management activities and will be maintained in such a manner so that it can be geo-referenced by stand from within the GIS. This database will be linked through a unique, primary key to Spatial Data Standard for Facilities, Infrastructure, and Environment (SDSFIE)-compliant forest stands feature class.

4.5.5.7 Stand Prescriptions

Stand prescriptions will be written for each stand prior to marking for harvest. These prescriptions will lay out the future management objective of each stand and the silvicultural treatments required to reach that objective. A schedule of silvicultural treatments required during the next 5 to 10 years will be included. All stand prescriptions will be made considering military training requirements and all aspects of the INRMP and the goals and objectives thereof. Stand prescriptions for each management unit will be given to other natural resources personnel and range control for review and comments. All valid comments and recommendations will be addressed and

changes will be made as necessary before any treatment action begins. Stand prescriptions will be entered into a stand prescription database which will be linked to GIS. The prescription database will be maintained electronically. The objective is to complete these prescriptions on 4,000 to 5,000 acres per year as time, personnel, and funding allow. If this objective is reached each year then all areas would have prescriptions completed by 2028.

4.5.6 Silvicultural Practices

The forest resource at Fort Gordon is evolving from a patchwork of residual stands and scattered stems to a resemblance of a regulated forest. Changes have occurred over time because of military land use and opportunistic silvicultural practices. No regulated annual harvest or smooth cash flow has been attained. Intensive fire protection has been emphasized since 1957 and pine density levels have increased greatly since U.S. Army acquisition of the property. Current and future management emphasis will be on establishing and maintaining native pine ecosystems on sites where those pines would have naturally occurred. Hardwoods will be maintained and managed as needed on sites where they would have naturally occurred such as in drainages and associated margins. All silvicultural practices in the RCW HMU will be carried out in accordance with the revised 2003 RCW Recovery Plan silvicultural guidelines. A priority will be given to bringing stands in the RCW HMU to within the revised 2003 RCW Recovery Plan guidelines (Appendix J). With the goal being to establish and manage as many acres as is reasonably possible of healthy forested ecosystems that support the military mission, endangered and threatened species, and a regulated annual harvest on a sustained yield basis.

4.5.6.1 General Silvicultural Practices

A combination of even-aged and uneven-aged management systems will be used. The even-aged system provides the most cost-effective means of management; the only viable method to restore longleaf pine to many of its original sites; and is compatible with military training; and other military land uses. However, the long-term goal is to *establish and sustain a balanced age class distribution throughout the forest* (e.g., an uneven-aged forest.) Bottomland hardwood management will be dictated by the extent and spread rate of beaver encroachment. Previous bottomland management goals had been to grow the trees to a large size and approximately 60 years of age, maintaining only the highest-quality stems in a mixed age forest. It now appears that as beavers spread, management will focus on conducting salvage harvest to minimize loss of the resource. During the course of bottomland timber disposal, all merchantable pines growing in the bottomland

hardwood environment will be removed, and any hardwood encroaching upon good pine sites will be harvested. Upland hardwood management is virtually nonexistent. Upland hardwoods of good quality and merchantable size occur primarily as scattered individual stems, and for the most part are valuable sources of wildlife food. Where coherent stands of good upland hardwood exist, these will be encouraged and protected for both wildlife value and vegetation diversity.

4.5.6.2 Intermediate Cuttings

Stand management will attempt to retain optimum stocking per acre for maximum benefit over the life of the stand. This is a function of site quality, initial stocking, and stand condition. The forest stand prescriptions will provide information upon which to make management decisions for each of the stands. The major guideline is to selectively mark stands to a BA of 50 to 60 square feet/acre, removing unhealthy trees and trees of inferior quality on a 10 year cutting cycle. In the RCW HMU the thinning guideline for stands will be to leave a BA of 40 square feet/acre of pines with at least a 10-inch dbh and return for additional thinning when the basal area increases to greater than 70 square feet/acre.

4.5.6.3 Final Harvest Cut

The final harvest cut of fully stocked stands may be scheduled when stands reach rotation age. Longleaf pine stands in the RCW HMU have no rotation age. Stands of non-native or off-site species and those stands which are under stocked, poorly formed, or excessively diseased, will be scheduled for final harvest as soon as feasible.

4.5.6.4 Silvicultural System

A silvicultural system is a comprehensive, planned program of treatments and methods applied throughout the life of a forest stand. Fort Gordon forest managers presently use two systems with three variations.

Even-Aged Silvicultural Systems

- *Even-aged stand.* An even-aged stand is one in which relatively small age differences exist between individual trees. The maximum difference in age permitted in an even-aged stand is usually no more than 10 years. Although the stand will not be harvested until it is 100 to 200 years old, larger differences up to 20 percent of the rotation age may be allowed. An even canopy marks even-aged stands. The smallest trees of the stand are normally those of the same age class, which have been suppressed by their contemporaries.

The majority of stems are in a diameter class, which represents the stand average, and there are fewer trees in classes above and below the average.

- *Natural even-aged silvicultural system.* This is a system widely used on U.S. Army lands in the southeastern U.S. and is most useful in blending military training with sustained yield of multiple resources. The system may be described as forest management composed of even-aged stands originating from a seed source, thinned at periodic intervals for stand improvement, maintained by fire, and regenerated from the residual stand at rotation age. Advantages are that establishment and maintenance are relatively cheap, undesirable trees are removed at a profit, and regeneration is from a known source of high-quality trees. Mature forests with an open understory are highly conducive to many kinds of military training.
- *Artificial even-aged silvicultural system.* The system is simple and is not labor intensive. Stands are clear-cut, intensively site-prepared, planted with seedlings, periodically thinned, grown to rotation age, harvested, and regenerated. Productivity and economic return are at an optimum balance. The system does have several disadvantages, such as extreme military damage to the plantation can occur very rapidly, no seed source to regenerate openings; there is a high cost of establishment; and plantations may lack biodiversity. Plant and animal species dependent upon old-growth trees normally do not do well in such an intensive, short-rotation silvicultural system. This system has application on sites where conversion from nonnative or off-site species is required and an inadequate seed source is present. Where type conversion is necessary, this silvicultural system is the most logical solution. Once the stand has been established, plantation management will be phased into the natural even-aged or uneven-aged silvicultural systems.
- *Pine plantation.* A pine plantation is a stand that has been planted with seedlings obtained from a nursery, rather than originating from seed sources on the site.

Uneven-aged Silvicultural Systems

Uneven-aged stand. Uneven-aged stands are those in which there are considerable differences in age of trees and in which three or more age classes are represented. The canopy is normally broken and uneven. Uneven-aged stands have a larger percentage of

stems in the smallest diameter class, with stem numbers decreasing somewhat regularly as diameter size increases.

- *Uneven-aged silvicultural system.* Uneven-aged management is a system, which attempts to produce a forest of uneven-aged stands. The advantages of the system are that periodic and flexible income is provided without interruption for stand regulation; the stand is upgraded if fast-growing, high-quality trees are left to regenerate the stand; the stand is not as vulnerable to destruction by fire, biotic, climatic, or military agents; the stand is more aesthetically pleasing and provides more varied habitat for wildlife. The disadvantages of the system are that more management skill and time is needed than with other reproduction methods; some management practices such as prescribed fire and chemical treatments are difficult to apply; more care is required to prevent damage to the stand during logging; and higher road maintenance costs are necessary because of frequent harvests required to provide openings for regeneration. Uneven-aged management is difficult to apply to Fort Gordon forests because of the shade intolerance of slash and longleaf pines, the history of relatively infrequent prescribed burning and the resulting vegetative competition. Frequently, regeneration has not come in because harvests have not sufficiently opened the residual canopies.

4.5.6.5 Intermediate Harvests

Harvesting or cutting of timber within silvicultural systems is called intermediate cutting. Intermediate cuts are made between stand establishment and rotation age when the stand is liquidated. Intermediate harvests are of three types: thinning, improvement cut, and salvage-sanitation cut.

Thinning

A thinning is a harvest to reduce competition and accelerate growth of the residual stems. Commercial thinning is made in stands where revenue is derived from the sale of the thinned trees. Hand crews, prescribed fire, chemicals, or mechanical means are methods used to accomplish thinning in precommercial stands.

Improvement Cuts

This is a harvest method in mixed stands of desirable and undesirable trees. Undesirable trees are removed to improve quality, to remove vulnerable trees before disease and insect infestation, to improve wildlife habitat or aesthetics, and to open up

stands to increase military maneuverability. Improvement cutting is the major type of harvest used at Fort Gordon.

Salvage/Sanitation Cuts

This harvest salvages timber damaged by fire, military training, insects, storms, or other catastrophic forces. Minimization of economic loss, utilization of damaged timber, and aesthetic improvement are the objectives, rather than the generation of income.

4.5.6.6 Regeneration

Regeneration of forest stands is the most difficult phase of silviculture. Species, site capability, weather, competing vegetation, and availability of an acceptable seed source are some of the variables that must be considered when the forest manager plans to regenerate a stand. In natural management, the forest manager often has little control over these variables, but must exert subtle influences through intermediate silvicultural treatments over many years to bring a stand to the point where satisfactory natural regeneration will be possible.

Even-Aged Regeneration Harvests

These are harvests planned specifically to bring about regeneration and not to improve the stand or generate income. Characteristics of individual species such as shade tolerance, susceptibility to wind-throw, soil and moisture requirements, and seed dispersal ability are factors that determine the type of regeneration harvest to be applied within a silvicultural system. Even-aged regeneration harvests may be one of the following: clear-cut, seed tree, or shelterwood.

- *Clear-cut.* Clear-cutting is the harvesting of all merchantable trees in a stand in one operation. Generally, clear-cut areas will not exceed an average of 80 acres in any one block. Clear-cuts within 1 mile of active or recruitment RCW clusters will not exceed 40 acres in size. Regeneration will be accomplished either naturally or artificially. Hardwood stands, which have been clear-cut, generally reproduce from stump and root sprouts or seeds stored in the forest floor. Pine stands are most often regenerated artificially by planting. Site preparation may be necessary in the form of drum chopping, raking, windrowing/piling, burning, disking, bedding, chemical application, or a combination of these treatments.
- *Seed tree.* This method selects high-quality, prolific seeding trees to be retained to provide a seed source following harvest

of the rest of the stand. Ten to 15 evenly spaced dominant or co-dominant loblolly pines per acre are left as a seed source. They are marked at breast high and marking will be visible from 360 degrees. Butt marks will be placed at ground line on the stump with liberal amounts of paint. After a stand of young trees is established, seed trees will be removed. The method is well suited to loblolly pine, but does not provide enough seed to be used with longleaf pine. Seedbed preparation such as chopping or burning is usually sufficient to expose adequate mineral soil. Disking or chemicals may be necessary on sites having heavy hardwood understory or a deep root mat.

- *Shelterwood.* This method is used on heavy seeded species such as longleaf pine, oaks, and hickories where seed dispersal from seed trees is not sufficient to provide for complete coverage of the stand. A series of preparation cuts may be necessary to remove unhealthy and defective trees and undesirable species, and to prepare the seedbed and encourage seed production. Over a period of years, shelterwood cuts will improve the vigor and productivity of remaining trees. The regeneration cut leaves 30 to 40, evenly spaced trees per acre, of the best dominant and co-dominant trees in the stand. As with the seedtree method, as soon as an adequate seedling crop is established, the overstory should be harvested.

Uneven-aged Regeneration Harvests

Uneven-aged regeneration harvests (sometimes referred to as modified shelterwood harvests) are usually done at intervals of 5 to 10 years, and every harvest has an objective to provide an opening for regeneration and to maintain an uneven-aged stand. Trees are designated for removal by the selection method either as single trees, small groups, or a combination of both. The selection method involves periodic cutting of selected trees from all merchantable classes. In stands having 60 to 70 or more square feet/acre of merchantable BA and two-thirds to three-fourths of the BA in sawtimber, harvest-cut volumes can approximate growth for the cutting period. Trees selected for harvest can be single isolated trees or groups of trees. If possible, the slow-growing and poor-quality trees are cut and the best trees are left so that stand quality and growth will be improved. Pine regeneration will come from seed produced by the best-growing and best-quality trees.

- *Modified Shelterwood.* This method is the same as the shelterwood system except not all overstory trees are

removed after seedling establishment. Approximately one-third to one-half of overstory trees are marked for harvest using group selection of trees in patches, ranging approximately 0.25 to 2 acres in size distributed throughout the stand. Created openings will take advantage of existing openings with adequate reproduction by enlarging them if necessary. This method is particularly well suited for regenerating longleaf stands within the RCW HMU and for establishment of uneven-aged stands.

4.5.6.7 Conversion of Non-native and Off-Site Stands

Fort Gordon will convert sites with non-native or off-site species to native species or species more suitable for a specific site. Slash, Virginia, and sand pine are the only non-native pines of any consequence growing on the installation. Of these slash pine is by far the most abundant, as there is no more than 100 acres of Virginia and sand pine stands on the installation.

Loblolly pine stands make up the majority of the off-site pine stands that are growing on the installation. Some of these stands are plantations on sandy soils that may have historically had longleaf growing on them. Also, there are some naturally seeded off-site loblolly stands that have become established as loblolly spread from stream margins and Piedmont soils into surrounding areas that may have historically been longleaf. There also exists the possibility that there are some off-site longleaf stands growing on loblolly sites.

The area converted annually will be limited by several factors. Some of these limiting factors are the availability of funds and personnel, the number of acres needing conversion, the speed at which harvest contracts can be completed, and various other constraints. As prescriptions are prepared for each management unit, stands that require conversion will be designated as such so that they can be prioritized for conversion. These prioritizations for conversion will include all non-native and off-site stands within each compartment. Non-native and off-site stands that are required to meet minimum RCW habitat requirements will be designated as such, and will be maintained until such time as they are no longer required for RCW habitat. The stands that come under the "required for RCW habitat" designation will be managed in accordance with the revised 2003 RCW Recovery Plan silvicultural guidelines. In stands that are designated to be converted within the RCW HMU, all longleaf trees greater than 4 inches dbh will be left standing unless they need to be removed to maintain required BA levels, they are disease or insect infested, or they are of extremely poor quality. Several different silvicultural methods or combinations as listed above will be used in

converting non-native or off-site stands to native species. One method will be to perform a final harvest on all or part of the stand and regenerate it to native species artificially. A second method will be to cut the stand back to a residual stocking of between 45 to 60 square feet/acre basal area leaving the best trees and scheduling a final harvest some 5 to 10 years later. During this 5- to 10-year period, at least two prescribed burns will be scheduled or a chemical treatment will be applied to help control undesirable understory vegetation before the final harvest. The third method would be to conduct a normal thinning and harvest schedule and schedule a final harvest in the third cutting cycle.

4.5.6.8 Forest Product Harvest Operations

Annual Cut

An annual harvest is sustainable and anticipated. Until the forest stand inventory and stand prescriptions are completed and analyzed, a prescription of annual harvest volumes is speculative. Based upon inventory volumes, informed estimates, and past performance, it appears that an annual harvest of 750,000 to 1 million board feet and 1,000 to 2,500 cords of pulpwood can be sustained.

Order of Cutting

The order of cutting will be determined by the USACE Project Forester (Sales Officer). Normally, in combined product sales, pockets of pulpwood are identified and isolated at time of marking. These may be advertised and sold as a separate item on a larger combined sale, or advertised as a separate sale. The forest stand inventory and prescriptions will identify these stands before marking, which will facilitate sales planning. Sawtimber areas are normally harvested first in mixed sales, with scattered pulpwood and top wood harvested afterward for maximum utilization of the resource. Where the contract calls for an "All Pine Trees" option, tree length harvesting, skidding, and hauling are accomplished, with product merchandising done at the consumer mill yard.

Optimum Volumes

No optimum volume per sale is prescribed. In combined product sales, the cords of pulpwood per 1 MBF of sawtimber ratio should not exceed one-to-one. This provides for maximum stumpage return.

4.5.6.9 Forest Product Sales Planning

Inoperable Conditions

Areas that do not contain a minimum of 2 cords per acre or equivalent total will not be offered as harvest areas. All areas known to contain or which might contain military or other types of metal contamination, such as shrapnel or armor-piercing bullets, will be declared as known contaminated or possibly contaminated timber. Such areas will be identified on maps or aerial photographs and ground-checked with the USACE Project Office before sales advertising. Determination of excessive contamination may be made as harvesting progresses and stumpage price negotiated downward as needed. In extreme cases, portions of sale areas may be declared inoperable and deleted. Under no conditions will there be any attempt to hide possible or known contaminated areas by including them unidentified with clean timber.

Range and Training Area Coordination

All proposed forest product sales in or in proximity to any firing range or training area will be closely coordinated with the DPTMS, Range Control Section during the planning, solicitation, sale, and harvest phases of the operation. Military use has priority over timber harvesting; however, experience over the past 51 years has proven that with proper advanced coordination, both activities can proceed with minimum restrictions. Range firing may be shifted to other ranges, provisions may be made for alternate harvest areas during range firing, or, if necessary, weekend harvesting can be scheduled. Except for site-specific TAs, there is normally no conflict between field training and timber harvesting. Occasionally, large-scale FTX may take place. In such cases, it may be necessary to suspend harvesting in specific areas or modify contractor ingress and egress for the duration of the FTX. The large area that is being closed during use of the convoy live fire range and that will be closed during the use of the Multipurpose Machine Gun Range currently being built in TA 46 has the potential to severely impact timber harvest along with other natural resources activities.

Endangered Species

All areas of proposed timber sales will be surveyed for endangered species and any proposed timber sales within or in proximity to any endangered species habitat will be closely coordinated with the installation wildlife biologist and the USFWS. These surveys will be conducted in accordance with procedures set forth for project surveys in the ESMC (see Section 4.1). All applicable endangered species-specific management guidelines and endangered species

management components will be followed. The RCW Matrix will be used to ensure that required RCW habitat is maintained in all active and recruitment RCW partitions. All harvesting activities will cease if any previously unknown endangered species is discovered in a harvest area after harvesting has commenced. No management activity to include timber harvesting will knowingly be allowed to have a negative impact on endangered species or their habitat.

Cultural Resources

Phase I cultural resources surveys have been completed in almost all of the installation's unrestricted woodlands. Sites that have not had a Phase I cultural resources survey completed will not be harvested until a Phase I cultural resources survey is completed. In those sites that have been surveyed and determined to be eligible or potentially eligible for the National Register of Historic Places will be avoided and no mechanical harvesting activities will 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 National Register 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 National Register of Historic Places.

BMPs

All timber harvesting and timber management activities will be planned and carried out in accordance with Georgia's BMPs for Forestry (GAFC 2009).

Other Harvesting Activities

Harvesting in recreation areas will be closely coordinated with the DFMWR, and will be done in such a way that will enhance the outdoor recreation environment. Contractors cannot be required to remove limbs and tops; however, flat lopping is specified in these areas, as is the cutting of extra low stumps. Occasionally harvesting may be done in the cantonment area and will be coordinated with the appropriate activities. There, as in recreation areas, flat lopping and low stumps will be required.

4.5.6.10 Timber Marking

All timber marking will be based upon analysis and prescriptions obtained from the FMIS when it is completed. Once stands are

selected in the office for possible harvest they will be revisited and a final determination will be made.

Training

All personnel engaged in timber marking at Fort Gordon at a minimum must meet the qualifications established by the Office of Personnel Management for Forestry Technician (General Service 462-05). Additional training will be given as to local requirements and procedures. This training will be under actual field conditions in a productive capacity.

Field procedure

Forestry technicians or foresters will do the actual marking. Each marker will keep an individual tally records for each stand in which they mark.

- *Marking.* Normally trees to be harvested will be marked with yellow or blue tree marking paint. In a given stand, all trees will be marked on essentially the same side to maintain control of area coverage and to facilitate showing of sale, logging, and inspection. Trees tallied as pulpwood will receive one spot at or above dbh and another at the junction of the bole and the ground. Trees tallied as sawtimber will receive two spots at or above dbh and one at the ground line. In clear-cut areas where the individual trees will not be marked, a boundary will be painted around the outside of the area, preferably on trees outside of the cutting area, with a vertical paint stripe and one at ground line. Marks will be made so that they may be seen from within the harvest area. When trees such as seed trees or leave trees are to be marked to prevent cutting, marks will be made around the bole at or above dbh so as to be visible from 360 degrees and at the ground line. Seed or leave trees will be marked with a color distinguishable from all other colors used in the sale.
- *Tree tally.* Tree tally by species or species groups, products, dbh, and height class will be maintained for each stand. Specifications for forest products commonly harvested on Fort Gordon are provided in Table 4-16. Trees normally will be tallied as follows:

Table 4-16. Forest Product Specifications

Product	Minimum dbh (inches)	Maximum dbh (inches)	Minimum Log Length (feet)	Minimum Top DIB (inches)
Pulpwood – Pine	5	40	20	3
Pulpwood – Hardwood	6	40	20	4
Chip-n-Saw – Pine	9	13	24	6
Sawtimber – Pine	13	40	16	8
Sawtimber – Hardwood	12	40	16	10
Pre-harvestable – Pine	3	5	16	0
Cull – Pine	5	40	16	0

- Diameter classes. Diameters of trees tallied will be measured at dbh and placed in dbh classes by product in accordance with the specifications listed below. Dbh is taken at 4.5 feet above the ground line. Trees on extreme slopes will have dbh measured from the average ground line. Trees with forked boles above dbh will be counted as one tree. Trees with forked boles below dbh will be counted as two trees and dbh will be measured at 4.5 feet from the juncture of the fork. Tree with cankers or other abnormalities at dbh will be measured at the first unaffected point above and below dbh and the average of these two measurements will be used as the dbh.
- Product classes. Tally procedures for each product class follow. These procedures will be followed when marking stands for harvest.
 - *Pine pulpwood.* Pine pulpwood trees, 100 percent stem count, by 2-inch dbh class, starting with the 6-inch dbh class, will have every 10th tree recorded by dbh class and height class (short, medium, or tall). Minimum height is two 5.56-foot logs with a minimum top DIB of 4 inches. All pulpwood trees larger than a 20-inch class will be recorded in the 20-inch dbh class.
 - *Pine Chip-N-Saw.* Pine chip-n-saw trees in 10-inch and 12-inch dbh classes will have every 10th tree in each dbh class recorded by dbh class and height class (medium or tall). This gives a 100 percent stem count by dbh class and a 10 percent height sample by dbh class.
 - *Pine sawtimber.* Pine sawtimber trees by 2-inch class, starting with 14-inch dbh class, will have every 10th tree in

each dbh class recorded by dbh class and log height. This gives a 100 percent stem count by dbh class and a 10 percent height sample by dbh class. All trees in the 18-inch dbh class and above will be 100 percent tallied by dbh class and height. Log heights will be recorded by whole and half log lengths. Minimum height is one 16-foot log with a top DIB of 9 inches.

- *Hardwood pulpwood.* Hardwood pulpwood tally starts with 6-inch dbh class and proceeds as for pine pulpwood.
- *Hardwood sawtimber.* Hardwood sawtimber tally starts with 12-inch dbh class and proceeds as for pine sawtimber, with all trees 20-inch dbh class and above 100 percent tallied.
 - *Volume calculation.* All timber volumes will be calculated using appropriate computer software. A hardcopy of volume and stock/stand tables will be included with the timber availability and a copy will be retained in forestry office files. Stand data records will also be updated with the volumes as marked and sold.

4.5.7 Timber Cruising

Timber volume sampling, or cruising, will be used to determine volumes to be harvested from large clear-cut areas, such as areas to be cleared for ranges or construction projects. Area boundaries will be paint-marked, and cruise lines will be laid out on a map or aerial photograph to run perpendicular to any drainage.

4.5.7.1 Variable Plot Radius Cruise (or Point Sampling)

This is the most efficient means of cruising timber in the relatively level areas of this region. On Fort Gordon, a 10 factor corrected prism will be used to determine the in trees for tally. Both dbh class and merchantable height will be recorded. The number of points to be taken will be derived from the formula: $\{(Area\ of\ the\ tract\ in\ acres\ \times\ percent\ of\ cruise) / (BA\ of\ average\ tree)\} \times basal\ area\ factor\ of\ the\ prism = number\ of\ points\ needed$. Normally, cruising will be based upon a 10 percent sample intensity. Point sampling does not lend itself well to sparse stands.

4.5.7.2 Fixed Radius Plot Sampling

If the fixed radius plot method is used, plots will either be 0.2 acre, with a radius of 52 feet, 7.9 inches; or 0.1 acre, with a radius of 37 feet, 2.8 inches. The number of plots and spacing between plots and lines will be determined by cruise intensity, which is normally 10 percent and the number of acres to be cruised.

4.5.7.3 Cruise Volume Calculations

The appropriate automatic data processing software will be used to calculate cruise volumes.

4.5.8 Pinestraw Management

Longleaf pine needles, baled and sold as pinestraw for mulch, are a valuable product. A well-stocked stand harvested every third year can produce 50 to 150 bales of pinestraw per acre. The quality of the pinestraw available for harvest is dependent upon the percentage of longleaf pine in the stand, the amount of vegetative debris mixed in the litter, and current market conditions. Besides producing an income, the raking of pinestraw reduces the fire hazard. High-quality pinestraw stands are usually free of undesirable hardwoods, which also makes them desirable as RCW habitat. Sufficient pinestraw will be left in the RCW HMU to allow for effective burning and to maintain soils and herbaceous vegetation.

Pinestraw sales are timed to coincide with the periods when the pinestraw market is good. The best period is mid-January through May. The next-best period is from the end of August through October. A number of factors are considered in scheduling areas for pinestraw harvest. Stands requiring thinning or prescribed burning should be scheduled to allow for pinestraw harvest before being cut or burned. Pinestraw harvesting in TAs and areas adjoining ranges will be coordinated with DPTMS, Range Control Branch and Directorate of Public Safety, Game Warden Section to accommodate military training, hunting, and pinestraw harvesting.

Pinestraw will not be raked more than once every 3 years. Machine raking is not authorized. Pinestraw may be baled by mechanical baler or a hand-operated baling box.

Forest product sales contracts will advise contractors of the following additional conditions and restrictions within the RCW HMU:

- Raking or baling will not be permitted within active clusters during the RCW nesting season, occurring from 1 April to 31 July. Harvesting will be permitted in inactive cluster sites year-round. Inactive cluster sites will be determined by the NRB RCW biologist before sale.
- Parking equipment or vehicular traffic to harvest pinestraw in active RCW clusters will not be permitted. The only exception will be brief, infrequent trips into an active cluster outside the nesting season to collect piled straw or bales. These trips will only be permitted from 2 hours after sunrise until 2 hours

before sunset. Vehicular traffic will be minimized in inactive cluster sites.

- Require harvest operations to move as quickly as possible through cluster sites.
- No pinestraw, including bales, will be piled or stacked against cavity trees.
- Cutting down or intentionally damaging pine trees is prohibited unless prior permission is obtained from the installation or USACE forester. Damage to seedlings will be minimized.

4.5.9 Reimbursable Forest Products Harvesting

Currently, the only reimbursable forest products harvested on the installation consist of standing timber and pinestraw.

4.5.9.1 Reports of Availability

The annual installation General Declaration of Availability for timber to be harvested during the next FY is submitted in memorandum form to the USACE, Savannah District, by 1 May of the current FY. The memorandum will include the total anticipated volumes to be made available for harvest in the upcoming FY. As specific areas or volume increments are marked for harvest, they will be made available individually to the USACE, Savannah District Office. Individual declarations of availabilities will include the following:

- Volumes by product class
- Location by TA
- Size in acres
- Marking color scheme
- Method by which volumes were obtained
- Metal contamination declaration
- Known endangered species and/or protected cultural resources sites in or adjacent to harvest areas
- Requirement that Georgia's BMPs for Forestry be followed
- Hazardous materials/waste control and spill requirements
- Any other harvest area specific requirements

4.5.9.2 Inspection of Ongoing Harvesting Operations

All ongoing harvesting operations will be inspected by both installation and USACE Savannah District forestry personnel. Frequency of inspection will be governed by location of sale, type of cut, and knowledge of the producer's past performance and integrity. More inspections will be done on new producers than on those with a good record of performance. For each inspection made, an inspection report form will be completed (original and one copy), with the copy sent to the USACE Project Forester, and the original retained in the Forestry contract file. All deficiencies will be noted. In cases of major deficiencies noted, the installation's forester may request immediate corrective action be taken by the producer, rather than waiting for the USACE Project Forester. Such action must be reported to the USACE Project Forester to avoid conflict or confusion. In the event that critical violations are found, such as extensive cutting of unmarked trees, cutting outside of sale area, environmental violations, or similar serious problems, the installation's forester reserves the right to order all harvesting stopped. The installation's forester may order the violator to leave the installation until the problem is resolved with the contractor. This action must be applied with extreme discretion. It must be reported the same day to the USACE Project Forester, the USACE District Forester in Savannah, and the office of the contractor or timber dealer, stating circumstances and reason for the cease and evict action. A joint survey of the violation will be made, with appropriate penalty applied by the USACE Sales Officer.

4.5.9.3 Contract Clearance

Upon completion of all harvesting, the District Engineer Project Forester will request a final inspection and clearance in writing. The installation's Forester will take appropriate action and respond in writing as in the appended sample. Effective management of sales inspections dictates that they should be kept up to date, so that when the District Engineer personnel notify installation personnel just before completion, final inspection becomes a routine matter. This precludes a contractor leaving post before correction of any deficiencies, and materially expedites performance bond release.

4.5.9.4 Harvesting and Income Reports

The Savannah District sends a monthly printout to the installation's Forester. This report shows income for the most recent month and the total to date for the FY, as well as volumes harvested by product for each contract item. A summary report is issued at the end of each FY.

4.5.9.5 Pinestraw Harvesting

The same procedures set forth in Section 4.5.6.9 above for standing timber harvests plus the additional requirements in Section 4.5.8 will be followed for pinestraw harvests. It is currently more economical to handle these sales as lump sum sales instead of unit price sales.

4.5.9.6 Firewood and Pinestraw Harvest for Personal Use

Sale of firewood and pinestraw to individuals is accomplished in accordance with USASCoE&FG Regulation 420-3.

4.5.9.7 Timber Harvested for Installation Use

Fort Gordon is in a zone of intensive termite activity and accelerated rot of untreated wood. Therefore, there is virtually no demand for local use timber. Occasionally, minor use is made of standing trees for demolition training by units attached to the installation, visiting units and reserve components. Such planned use should be coordinated in advance with the NRB, and insofar as possible is confined to impact area fringes and areas of accessible known metal-contaminated timber. A standing tree felled by demolitions is seldom usable for any further purpose.

4.5.9.8 Other Forest Products

Within the last few years some timber harvesters in the area have begun harvesting woody biomass for use as fuel chips in wood-fired boilers for the production of electrical and steam power. This harvesting has provided additional outlets and value for scrub species, precommercial stems, and logging slash that in the past had no commercial value and when left on-site increased the installation's cost for their removal during site preparation and habitat improvement operations. Although still somewhat limited due to minimal outlets and producers, the value of these products is expected to possibly increase as interest and use of woody biomass increases. Efforts will continue to be made in conjunction with the USACE Forester to explore more potential markets for other forest products such as fence posts and wood pellets to increase the economic value of the installation's forest resources.

4.5.10 Other Silvicultural Treatments

4.5.10.1 Prescribed Fire

Prescribed fire is one of the most important silvicultural tools available for use by forest managers in the management of the installation's woodlands. The IWFMP in Section 4.15 contains detailed management information and requirements for the use of prescribed fire and wildfire suppression on the installation. If used carefully under the proper weather conditions, prescribed fire can accomplish several silvicultural objectives. Prescribed fire can control undesirable hardwood brush, reducing competition for desirable trees, and improving habitat for the RCW. Fire-dependent ecosystems such as the longleaf pine/wiregrass ecosystem and many of the plants and vertebrates associated with them require the regular occurrence of fire in the system to thrive. The prudent use of fire under prescribed conditions can simulate natural fire without detrimentally harming the resource. Forest plant diseases such as brown spot disease, which retards the growth of longleaf pine reproduction, can be controlled by burning the outer needles of young diseased trees. Compact needle growth and pubescence around the terminal bud makes this a very fire-resistant species, which in the seedling stage, easily recovers from prescribed burning. Other silvicultural benefits include seedbed preparation for natural regeneration, the reduction of heavy fuel accumulation that could result in severe damage by wildfires, and the clearing of debris and undesirable vegetation from reforestation sites.



Prescribed fire used for RCW habitat management

4.5.10.2 Species Conversions

This paragraph deals with the conversion of sites from hardwood species to pine species and from pine species to hardwood species. The conversion or restoration of non-native or off-site pine stands to native pine stands is covered elsewhere in the plan. Due to the high cost of site preparation and tree planting, it is not a sound investment to convert low-yield natural scrub oak areas to pine for no other reason than the appearance of doing something. This is obvious in certain stands, which were planted on poor sites in the 1970s. These trees are 25 to 30 years old, and many of them are less than 4 inches at dbh and 25 feet in total height. It is quite possible that these stands

will never reach merchantable size. At the other end of the spectrum are stands planted on better sites which received their first thinning at age 13, have received a second pulpwood thinning, and are now producing small sawtimber size stems over the entire stand. Sites for conversion, as such, are virtually non-existent, with the exception that bottomland sites supporting good species of hardwood will be “converted” by removal of all merchantable pine stems. Where hardwoods are encroaching upon the mesic environmental zones along fertile stream terraces, these terraces will be cleared and native pine will be allowed to regenerate normally by natural seeding. This is not conversion in the truest sense, but rather a truncation of natural plant succession. The planting phase is covered in Section 4.11.1.

4.5.10.3 Removal of Undesirable Vegetation

Undesirable vegetation includes any herbaceous or woody vegetation such as scrub oaks, broadleaf weeds, bahia grass, off-site/non-native pines, and hardwood, which may or is having harmful or detrimental effect on desirable vegetation. A fully IPM approach using mechanical, prescribe fire, chemical treatment, or various combinations of these methods will be used to control undesirable



vegetation. Chemical control of vegetation is covered in the IPMP (Section 4.9). All pesticides used will be applied in accordance with the label specifications by certified pesticide applicators and in accordance with all applicable DoD, federal, and State of Georgia laws and regulations.

4.5.11 Planting

Vegetation Control Using Herbicide

Until the forest stand inventory and prescriptions data collection and report analysis is further advanced, it is not possible to forecast with any certainty the amount of planting to be done over the next 5 years. As described elsewhere, a considerable portion of funding spent for planting in the past has gone for naught. The current ongoing forest stand inventory and prescriptions will go a long way toward precluding a repeat of past errors.

4.5.11.1 Species to Be Planted

Longleaf pine will be planted in areas of natural longleaf occurrence. Longleaf pine is the species best suited to grow in the xeric soils of the installation. Loblolly pine will be the species primarily planted on

loblolly sites. Slash pine will no longer be used for forest regeneration on this installation.

4.5.11.2 Direct Seeding

Direct seeding is not currently a viable method for regenerating pines in this area. Although a small amount of success was indicated several years ago, more failure than success has been experienced at this installation. If new methods are developed that ensure acceptable success with direct seeding, consideration will be given to this method.

4.5.11.3 Age of Planting Stock

All seedlings currently used are 1/0 stock.

4.5.11.4 Time of Year and Type of Planting

Currently, all planting of bare root seedlings is done from 15 December to 15 March. Planting with in-house personnel can handle up to approximately 100 acres. When the area requiring planting exceeds in-house capabilities in any one-season, planting should be accomplished by contract. Planting contracts will specify machine planting, as this is the most cost-effective means of getting the job done. Hand planting may be used on areas that do not lend themselves to machine planting. Normally the site preparation and planting are included in one contract to provide an extra cost advantage, as contract administration is much more efficient this way. The contractor doing the preparation knows that he will also be doing the planting, and therefore is prone to do a better job, and becomes familiar with the area. Hand planting of containerized seedlings may begin as early as 1 November under the proper weather conditions.

4.5.11.5 Spacing

In the last few years, seedling spacing of 6 feet by 10 feet has been used in planting. The initial stocking of seedlings per acre using this spacing is 605 trees per acre. As needs and requirements dictate, spacing of seedlings may change, but the initial planting of seedlings will not exceed an average of 605 seedlings per acre.

4.5.11.6 Sources of Planting Stock

Normally bare-root planting stock will be obtained from the GAFC. In the past, contractors have been required to arrange for seedling purchase and pickup as part of their obligation. Consideration is also given to the government obtaining the tree seedlings and providing them to the contractor to plant. Containerized longleaf seedlings are

currently obtained from private nurseries. Containerized pine seedlings with 6-inch root plugs will be used on Fort Gordon. On Fort Gordon, these seedlings have been found to provide higher survival rates over those with shorter root plugs during periods of drought on the installation's deep sandy soils. Seedlings produced from local seed sources are preferable.

4.5.11.7 Advantages of Planting

Over many years, attempts have been made to reestablish pine through natural seeding by leaving seed trees at time of the final harvest. In nearly all cases this has failed, or at best left a very spotty stand. This is most likely due to the poor quality and excessively dry soils prevalent on the installation. These areas are now largely grown up in brush and other undesirable vegetation. The use of prescribed fire as a means of preparing a seedbed is not a certainty. Mechanical seedbed preparation using rolling drum chopper or disk harrow has also been tried and failed. Because the planting of seedlings has been the only reliable method of reestablishment of pine stands, it will continue to be the prevailing method of reforestation, especially in stands to be restored to native pines.

4.5.12 Correlation of Silviculture, Wildlife Management, and Outdoor Recreation

Paragraphs 4-3.d.(7) & (8)(a) of AR 200-1 state the following: *Practice responsible stewardship of forested lands to support the mission. Conduct programs that are compatible with mission operations and that support conservation compliance, sustainability, and natural resources stewardship.* In keeping with the above, forest management on this installation will be accomplished under a multiple-use concept; no one resource will be treated as being mutually exclusive. Since forest management practices can be very beneficial to wildlife habitat management, and conversely, very detrimental, this impact will be considered before any action. The forest stand inventory and prescriptions in coordination with installation's wildlife biologists is set up to identify critical wildlife habitat, including that specifically for endangered species. Such features as old home sites supporting good mast-producing oaks and hedgerows will be retained by deleting them from site preparation and other areas of adverse alteration. Generally, clear-cut and plant areas will not exceed an average of 75 acres in any one block. Large undifferentiated areas will be broken up by leaving one to two chain strips of unprepared land to create an edge effect. This will be specifically designed where possible to create travel lanes, link existing wildlife habitat or water sources, rather than creating an isolated feature. Any activity which will adversely alter the appearance and utility of outdoor recreation areas will be

carefully planned to provide ultimate benefits, and will be discussed with the DFMWR and other pertinent staff elements prior to implementation. Where it is desirable, buffer strips will be left along highly visible areas and main thoroughfares to screen heavy logging and land clearing operations until stands are reestablished.

4.5.13 Management Records

4.5.13.1 Annual Work Plan and Annual Work Record

An Annual Work Plan for forest management activities will be completed and submitted into RPTS in accordance with Army Environmental Command (AEC) guidance. This is normally submitted for the ensuing FY by 15 June of the current year to establish the budget requirement. An Annual Work Record for the FY will be completed following the close of the FY and submitted into RPTS by 31 December following the close of the FY. The annual work record will show work performed with associated costs and then will be maintained on permanent file at the DPW Forestry Office. In addition, detailed management actions and prescriptions can be seen in the Annual Work Plan for forest management and will be included in Appendix K.

4.5.13.2 Timber Availabilities

An Annual Report of Availability of Timber for Harvest will be provided to the USACE, Savannah District each year prior to 30 May for the following FY. Individual timber availabilities for the current FY made under that FY's Availability of Timber for Harvest will be provided to the USACE, Savannah District, as required or needed. All timber availabilities for the current FY will be maintained on file. At the end of the current FY, they will be moved to storage with other current FY reports as described in the following sections.

4.5.13.3 Timber Sales Contracts

An active and inactive file will be maintained of all timber harvesting as permanent records. Once a harvesting contract is completed, the bid sheet, harvest map, and volume data will be removed from the body of the contract and filed along with the final clearance letter. Inactive files will be filed in a chronological file by FY and kept on file at the DPW Forestry Office. Harvest and income volumes and other pertinent data will be entered into automated data processing format for future generation of reports. All other inspections and the rest of the body of the contract can be discarded. All information pertaining to any contract that may be disputed, require legal actions, banning producers from future harvest, or other such action shall be kept in their entirety until deemed no longer required.

4.5.13.4 Contract Inspection and Clearance Letters

These documents are to be maintained with the contract in the active file until completion of contract and then filed as described in Section 4.5.13.3.

4.5.13.5 Income and Cost Summaries

All forest management program costs and incomes will be maintained on a FY basis. This information will be entered into this management plan during the annual updates.

4.5.13.6 District Engineer Monthly Harvest Income Reports

District Engineer monthly reports will be kept for the current FY, with the final reports filed chronologically by FY for future reference.

4.5.13.7 Purchase Requests and International Merchant Purchase Authorization Card Files

All data pertaining to purchase of supplies, equipment and/or services will be maintained for the current FY and retained in files for 3 years. All data pertaining to 60-month maintenance contracts or other such long-term contracts will be kept current and maintained for 3 years after contract completion. Files for International Merchant Purchase Authorization Card purchases will be maintained in accordance with DoD, U.S. Army, and Directorate of Contracting regulations and instructions. It is recommended that all purchase data significant in nature be retained for future reference as to stock number, or other critical data to facilitate future purchases of like or same items.

4.5.13.8 Personnel Records

All personnel records will be maintained in accordance with all Office of Personnel Management, DoD, U.S. Army, and Fort Gordon regulations. No portion of these records will be maintained in computer storage as may be prohibited by the privacy act of 1974. Most of the information contained in personnel records is private in nature, and will be maintained in a secure, confidential manner, and released only as may be prescribed by the Civilian Personnel Office. A copy of the current job description and employee performance standards for each employee will be maintained at the DPW, Forestry Office.

4.5.13.9 Stand Management Information Records

All stand records will be maintained and updated at the DPW, Forestry Office. These are permanent in nature and govern all forest management activities; therefore, they will be secured against

damage or loss, including disk backup and one hard copy of each record.

4.5.14 Forest Management Personnel

The forest management organizational strength and requirements at Fort Gordon as of 1 October 2013 are presented in Section 5.5 of the Implementation Section of this INRMP.

4.5.15 Protection from Insects and Diseases

4.5.15.1 Protection from Insects

General

To date the only forest insect which poses a potential serious threat, is the southern pine beetle, a bark beetle pest that attacks pines throughout the south. Although serious outbreaks of southern pine beetles have occurred in northern Columbia and McDuffie Counties in recent years, Fort Gordon has not experienced any major outbreaks. Spot infestations of ips engraver beetles (*Ips* spp.) and black turpentine beetles (*Dendroctonus terebrans*) have and continue to occur on the installation. Ips and black turpentine beetles usually start in trees damaged by fire, lightning, or vehicles and these infestations are small and isolated. Normally in these cases, salvage harvesting is not practical and the trees are either left standing for snags to be used by wildlife or cut and piled if there is danger of further infestation of healthy trees.

Prevention and Detection

Maintenance of a healthy forest through proper management appears to be the best preventive measure. Observation of stand conditions is a routine procedure practiced by forest management personnel, with any symptoms of infestation or stand deterioration being investigated immediately as to cause and any indicated corrective action taken promptly.

Corrective Action

Salvage control is the most practical and economic control tactic for southern pine beetles, and will continue to be used at Fort Gordon. In merchantable stands, this consists of harvesting of all trees within the active spot, plus all trees within a 100-foot buffer strip around the active spot, with all trees to be felled inward into or toward the infested area. Smaller unmerchantable stems in this zone will be felled and lopped, and the cut area burned as soon as possible. Infestation in unmerchantable stands will be controlled by felling and lopping all infested stems plus a 40- to 50-foot buffer zone, followed by burning.

4.5.15.2 Protection to Diseases

There are no diseases of epidemic proportion currently affecting the timber species at this installation or in this region.

4.5.16 Protection Against Timber Trespass

4.5.16.1 Harvest Security

Timber sale areas are always clearly defined before sale and are shown on the ground to contractors. Load ticket system and log truck registry by the USACE Project Office insures proper product accountability. DPW, Forestry Section and USACE personnel jointly spot check log trucks for compliance. Any discovered instances of timber trespass by current harvesting contractors or others is reported to the USACE Office immediately for corrective action to be taken or restitution to be made.

4.5.16.2 Reservation Boundary Integrity

A perimeter firebreak and access road built and maintained by the DPW, Forestry Section as a fire protection measure serves also as a Military Police patrol road. This boundary road is accessible via 16 locked gates at established ingress and egress points. The issue of keys for these locks is controlled by the Forestry Section in accordance with principles outlined in AR 190-51 and procedures established for physical security for the installation. The boundary is posted with standard posted signs, replaced as needed by forestry or game warden personnel in conjunction with other activities. Military Police Game Wardens and forestry personnel make opportunistic observations concerning trespass along the boundary road. Joint inspections may be made by the Provost Marshal Office Physical Security Section and DPW, Forestry Section. Any deficiencies, such as breaches, are corrected during normal maintenance by motor grader or bulldozer or are repaired by the base support contractor under service order.

4.5.17 Firebreak and Road System

4.5.17.1 Maps

The location of all roads, permanent firebreaks, and trails is maintained on maps in the natural resources GIS database. This database is updated as new firebreaks are built or existing ones are altered or abandoned. A set of aerial photographs covering the installation and adjacent areas is maintained on file and is updated, as new flights are available.

4.5.17.2 Maintenance

Due to limitations, not all permanent firebreaks and woodland access roads are worked annually. Those worked are concentrated in areas of intensive military training and range use. These include firebreaks in heavily used TAs, around the artillery impact area, and around high hazard ranges. Others, including 69 miles of reservation boundary firebreak, are reworked as needed or management activities occur in those areas. Approximately 400 miles of the total of approximately 610 miles are reworked annually. Firebreaks and woodland access roads are maintained and constructed following Georgia's BMPs for Forestry activities.

4.5.17.3 Accessibility

All roads, trails, and firebreaks throughout the reservation are passable to forestry vehicles during most of the year; occasionally excessive periods of wet weather may make a few locations impassable. A total of 67 miles of improved graded roads are maintained by the Roads and Grounds Section. Culvert crossings are installed on firebreaks and woodland roads as required to facilitate travel.

4.5.17.4 Firebreak and Road Network Reduction

During the period covered by this plan, firebreaks and forest access roads will continue to be evaluated for their continued need. Those that are deemed unnecessary will be closed. Those that are closed will have erosion prevention measures installed. Due to high costs of complete road restoration, most closed roads will be allowed to restore naturally. If funds become available, roads to be closed in sensitive areas may be artificially restored.

4.6 VEGETATIVE MANAGEMENT

Vegetative management on Fort Gordon is accomplished through the Forest Management Plan (Section 4.5) and Land Management (Section 4.11).

4.7 MIGRATORY BIRD MANAGEMENT

The MBTA of 1918, as amended and EO 13186 of 10 January 2001, Responsibilities of Federal Agencies to Protect Migratory Birds, specifically protects migratory birds. The MBTA makes it illegal to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products, except as allowed by the implementing regulations. Executive Order 13186 requires that federal agencies

avoid or minimize the impacts of their activities on migratory birds and make efforts to protect birds and their habitat. Implementation of the INRMP will not adversely affect migratory birds at Fort Gordon. The INRMP implementation benefits migratory bird species through the implementation of projects, including preservation of wetlands, upland ecosystem restoration, and migratory bird surveys. A detailed discussion on Fort Gordon's migratory bird management strategy is provided in Appendix O.

Migratory birds face serious challenges, including habitat loss, collisions with artificial structures, and environmental contaminants, resulting in species decline. Because migratory birds cross the boundaries of nations, watersheds, and ecosystems, protecting them requires a coordinated effort involving multiple jurisdictions and interests. However, the 2003 National Defense Authorization Act authorizes the incidental taking of migratory birds by the Armed Forces during military readiness activities, provided the DoD proponent and the USFWS consider ways to minimize, mitigate, and monitor the take of migratory birds during these military readiness activities. Military readiness activities include all training and operations of the Armed Forces that relate to combat and the adequate testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Potential impacts to all migratory birds from both readiness and non-readiness activities should be addressed in NEPA analyses using information from the INRMP and the best scientific data available.

Many of the more than 130 bird species found on Fort Gordon are protected under the MBTA including all five of the birds listed on Fort Gordon's target species list (Table 2-3). These are Bachman's sparrow, southeastern American kestrel, bald eagle, wood stork, and red-cockaded woodpecker. In addition, another 27 species of birds found on Fort Gordon are considered Birds of Conservation Concern by the USFWS (USFWS 2008) and/or priority species by one or more of the following sources: North American Waterbird Conservation Plan, United States Shorebird Conservation Plan, North American Waterfowl Management Plan, Partners in Flight Bird Conservation Plan for the South Atlantic Coastal Plain, or DoD Partners in Flight Mission Sensitive Priority Bird Species List (Kushlan 2002, Brown 2001, NAWMP 2012, Hunter 2001, DoD 2015, respectively). These are species of migratory birds that are thought to be likely to become candidates for listing under the ESA without additional conservation actions or are species that are experiencing sustained long-term population declines. Each of these species should receive priority consideration when planning projects, evaluating military training activities, and implementing INRMP actions that may adversely

affect migratory birds. Table 4-17 lists the migratory bird species of concern for Fort Gordon.

4.7.1 Management Strategies

Implementation of the following management measures will minimize, mitigate, and monitor the take of migratory birds from military readiness activities at Fort Gordon.

- Continue the nest box program on Fort Gordon as discussed in Section 4.4.7.9 of the Fish and Wildlife Section.
- Implement the requirements of the MOU between USFWS and DOD to promote the conservation of migratory birds (Appendix O).
- Implement the program-wide goals and objectives of the DoD Partners In Flight program (Appendix O, www.dodpfi.org).
- Implement habitat enhancement for migratory bird species.
- Where possible, Fort Gordon will enter into conservation partnerships with federal, state and local agencies and non-governmental organizations to improve habitat and allow for bird research on the installation.
- Utilize the IPMP to reduce pesticide use on Fort Gordon.
- Control invasive species that compete with migratory bird species and their habitats.
- Where possible, site military readiness activities in ways to avoid or minimize impacts on migratory birds. If Fort Gordon notes clear evidence of bird take as a result of military readiness activities, Fort Gordon will document the take, evaluate these activities and where practicable, reduce or eliminate the take of migratory birds. If the take cannot be eliminated, the amount of take will be documented and, where practicable, mitigated for by other management.
- For non-military readiness activities, compliance with the MBTA is mandatory.

Table 4-17. Migratory Bird Species of Concern on Fort Gordon

Species	Status/Priority	Habitat Requirements
Red-cockaded Woodpecker	FE, SE, PIF	Mature, low density pine/pine savannah
Wood Stork	FE, ST, PIF, NAWC	Open and forested freshwater wetlands, marshes, swamps
Southeastern American Kestrel	SR, DoDPIF, PIF, FWSCC	Pine savannahs, shrub/scrub, grasslands, agricultural fields
Bachman's Sparrow	SR, DoDPIF, PIF, FWSCC	Low density pine/pine savannah, grasslands
Bald Eagle	ST, DoDPIF, PIF, FWSCC	Forested acres in proximity to large ponds, lakes, and rivers
Prairie Warbler	DoDPIF, PIF, FWSCC	Early successional forest, shrub/scrub in spring/summer
Wood Thrush	PIF, FWSCC	Mature deciduous and mixed forests in spring/summer
Brown-headed Nuthatch	DoDPIF, PIF, FWSCC	Open mature pine and mixed forests
Solitary Sandpiper	PIF, FWSCC, USSC	Edges of streams, swamps, lakes, and ponds during migration
Whip-poor-will	DoDPIF, PIF, FWSCC	Forested acres with open understory adjacent to open areas in spring/summer
Loggerhead Shrike	DoDPIF, PIF, FWSCC	Open forests, shrub/scrub, grasslands, agricultural fields
Chuck-will's-widow	DoDPIF, PIF, FWSCC	Open pine and mixed forests in spring/summer
Common Ground Dove	PIF, FWSCC	Open forests, forest edges, early successional, shrub/scrub
Red-headed Woodpecker	DoDPIF, PIF, FWSCC	Open mixed or pine forests with snags
Kentucky Warbler	DoDPIF, PIF, FWSCC	Deciduous forests, bottomlands, wooded swamps in spring/summer
Prothonotary Warbler	PIF, FWSCC	Wooded steams, swamps, bottomlands in spring/summer
American Woodcock	PIF, GBBDC, USSC	Mesic deciduous and mixed forests, early successional
Wood Duck	PIF, GBBDC	Open and wooded streams, ponds and swamps, beaver ponds
Mallard	PIF, GBBDC	Lakes, ponds, swamps, and other wetlands in winter
Lesser Scaup	PIF, GBBDC	Lakes, ponds, and marshes in winter
Ring-necked Duck	PIF, GBBDC	Lakes, ponds, and large rivers in winter
Common Nighthawk	DoDPIF	Open forests, pine savannah, fields, urban areas in spring/summer
Black-throated Blue Warbler	PIF	Mature deciduous and mixed forests during migration
Yellow-throated Warbler	PIF	Open pine forests and riparian forests in spring/summer
White Ibis	PIF, NAWC	Forested wetlands, swamps, and shallow lakes during migration
Northern Parula	PIF	Deciduous and mixed riparian forests in spring/summer
Field Sparrow	PIF	Old fields, early successional forests, field-forest edges, shrub/scrub

Table 4-17, continued

Species	Status/Priority	Habitat Requirements
Hooded Warbler	PIF	Dense deciduous riparian forests in spring/summer
Little Blue Heron	PIF, NAWC	Forested wetlands, shallow lakes and ponds in spring/summer
Anhinga	NAWC	Forested wetlands, swamps, lakes in spring/summer
Killdeer	USSC	Fields, shorelines, athletic fields, lawns, rooftops, parking lots
Wilson's Snipe	USSC	Swamps, shorelines, forested wetlands in winter

Status/Priority: FE=Federally Endangered, SE=State Endangered, ST=State Threatened, SR=State Rare, DoDPIF=DoD Partners in Flight Mission Sensitive Priority, PIF=Partners in Flight (South Atlantic Coastal Plain) Plan Priority, FWSCC=US Fish and Wildlife Service Conservation Concern, GBBDC= US Fish and Wildlife Service Game Bird Below Desired Condition, NAWC=North American Waterbird Conservation Plan Priority, USSC=United States Shorebird Conservation Plan Priority

4.8 INVASIVE SPECIES MANAGEMENT

Guidelines for control and eradication of nonnative, noxious weeds on public and U.S. Army lands are established in the Federal Noxious Weed Act of 1974 and EO 13112. Kudzu, bamboo, and Chinese privet are the most common pest plant species at Fort Gordon. The tropical soda apple (*Solanum viarum* [TSA]) is also believed to occur on Fort Gordon. Cogongrass has been found in several locations on Fort Gordon. It was first observed on the installation in July 2011 and treated in August 2011. Timely identification of infested areas and control of invasive plants can prevent ballooning control costs from exponential growth of these noxious plants.

Invasive fauna are also present at Fort Gordon. Pigeons, house sparrows, starling, feral hogs, and fire ants are the most common invasive fauna recorded at Fort Gordon. Invasive species management is included as part of the IPMP (Section 4.9.6.5).

4.9 PEST MANAGEMENT

4.9.1 Site

Discussions on the location, mission, and general physical environment of Fort Gordon are provided in Sections 2.1 and 2.2 of this INRMP.

4.9.2 Applicable Personnel

The IPMP applies to all activities and individuals working, residing, or otherwise doing business on Fort Gordon. At no time may pest management operations be performed in a manner that will cause harm to personnel or the environment. Non-chemical control efforts will be used to the maximum extent possible before pesticides are used. All herbicide\pesticide used in areas covered by the INRMP will be coordinated, monitored and approved by the Installation Pest Management Coordinator. The IPMP will be a working document and will be continually updated to reflect actual pest management practices. The Fort Gordon IPMP is provided as Appendix P.

4.9.3 Overview of Integrated Pest Management Plan

The IPMP for Fort Gordon describes the pest management requirements and outlines the resources necessary for surveillance and control of pests. It also describes the administrative, safety, and environmental requirements of the program. The program requires DoD and Georgia certified pesticide applicators, staffs of the DPW Environmental Office, the Preventive Medicine Services and the

Veterinary Activity, building occupants, and facility managers to monitor and control pests. Pests included in the plan are weeds and other unwanted vegetation; termites; ticks, mosquitoes, and other biting insects; vertebrate pests, such as birds, rodents, and snakes; flying and crawling insects; and spiders. These pests can interfere with the military mission, damage real property, increase maintenance costs, lower morale and expose personnel to diseases unless properly controlled. Actual pest management procedures are found in Appendices A and B of the IPMP (Appendix P).

4.9.4 Introduction

4.9.4.1 Purpose

This IPMP is the framework through which the pest management program is defined and accomplished on Fort Gordon. The plan identifies elements of the program to include health and environmental safety, pest identification, and pest management, as well as pesticide storage, transportation, use, and disposal. This plan is to be used as a tool to reduce the reliance on pesticide usage, to enhance environmental protection, and to maximize the use of IPM techniques.

4.9.4.2 Authority

1. DoD Instruction 4150.07, DoD Pest Management Program, 28 May 2008.
2. AR 200-1, Environmental Protection and Enhancement, 28 August 2007.
3. AR 200-5, Pest Management, 29 October 1999.

4.9.4.3 Program Objective

This plan provides guidance and requirements for operating and maintaining an effective pest management program. Integrated Pest Management principles are stressed in the plan. Adherence to the plan will help maintain compliance with pertinent laws and regulations. The IPM strategies found in Appendices A and B of the IPMP (Appendix P) will be maximized in order to comply with pesticide reduction on the installation in accordance with DoD Instruction 4150.07, DoD Pest Management Program, 28 May 2008.

4.9.4.4 Integrated Pest Management

Integrated Pest Management is the judicious use of both chemical and non-chemical control techniques to prevent pests from exceeding an acceptable population level or damage threshold. Emphasis is placed on minimizing environmental disruption that is

caused by sole reliance on pesticide applications. Integrated Pest Management depends on surveillance to establish the need for control and to monitor the effectiveness of management efforts. Examples of minimum threshold limits for the application of pesticides are provided as Appendix C in the IPMP (Appendix P).

IPM Principles

The four basic principles described below are the heart of IPM and are descriptive of the philosophy used on Fort Gordon to manage pests. Specific IPM methods can be found in Appendices A and B of the IPMP (Appendix P). Additional methods can be found in Armed Forces Pest Management Board, Technical Information Memorandum No. 29, "Integrated Pest Management." While any one of these methods may solve a specific pest problem, often several methods are used concurrently, particularly if long-term control is the goal.

- *Mechanical/Physical Control.* This method involves the use of barriers, devices or manual labor to control pests. Examples of this type of control include caulking or filling voids to eliminate harborage; mechanical traps or glue boards; installation of screens or other barriers to prevent pest entry into buildings; the application of heat or cold; hoeing to control weeds; and the manual removal of pests by vacuum or by hand. Many pest problems encountered on Fort Gordon can be prevented or solved by using mechanical control techniques.
- *Cultural Control.* Strategies in this method involve manipulating environmental conditions to suppress or eliminate pests. Examples of cultural control include crop rotation; water management; destruction of alternate host plants; sanitation; and altering irrigation times. Elimination of food and water for pests through good sanitary practices is the most important cultural control method employed under this plan. General cleanliness in buildings, dining facilities, break rooms, storage areas, etc., may prevent pest populations from becoming established or from increasing in size.
- *Biological Control.* This control strategy uses predators, parasites, or disease organisms to control pest populations. In some cases sterile adult insects may be released into the breeding population to lower reproductivity. Biological control may be effective in and of itself, but is often used in conjunction with other types of control. This type of control is by nature very pest specific, environmentally sensitive and

may not be practical or available for a given pest problem. Pesticide formulations of bacteria are readily available biological control agents for management of caterpillars on plants and immature mosquitoes in aquatic breeding sites.

- *Chemical Control.* Chemical Control is the reduction of pest populations or prevention of pest injury by using materials (pesticides) to poison them, attract them to other devices or repel them from specific areas. The use of pesticides (insecticides, herbicides, fungicides and rodenticides) is often the most simple and effective method of control available. However, pest resistance has reduced the effectiveness of many once commonly used compounds. In recent years, the trend has been to use pesticides that are pest or site specific with little or only limited residual activity. In general, pesticides should be used only after other methods of control have been attempted or considered. Chemical control is most effective when used in combination with other methods such as mechanical or cultural controls.

IPM Outlines

IPM Outlines for pest surveillance and control are found in Appendices A and B of the IPMP (Appendix P). Each major pest or category of pests is addressed in separate outlines. New outlines are to be added if additional pests at specific sites are encountered which require surveillance and/or control. Added outlines or changes in pesticide usage will be sent to the AEC Pest Management Consultant for review and approval. Appendix D of the IPMP provides required information for approval request of new pesticides to be included in the IPM programs (Appendix P). CAUTION: These outlines do not identify all the precautions and directions identified on product pesticide labels. Pesticide applicators must be familiar with and follow all precautions and directions on the pesticide label of the pesticide being used. The label is the law!

4.9.4.5 Plan Maintenance

The Fort Gordon Installation Pest Management Coordinator (IPMC) maintains this plan. Pen and ink changes are made to the plan throughout the FY. It is reviewed and updated annually to reflect all the changes made in the pest management program during the FY. Annually by 1 October, updates of this plan will be sent to the AEC Pest Management Consultant (PMC) per Chapter 5, AR 200-1 for professional review and concurrence.

4.9.5 Responsibilities

Responsibilities for implementing the IPMP on Fort Gordon are provided in the IPMP in Appendix P.

4.9.6 Priority of Pest Management

Priorities of pest control operations will be in the order shown below.

4.9.6.1 Disease Vectors and Public Health Pests

These are insects or other animals that are capable of transmitting organisms that cause disease, or that may themselves cause injury to people or their animals.

Mosquitoes

- Mosquitoes occur in large numbers at Fort Gordon from March to October. Mosquitoes not only can reduce personnel efficiency due to the annoyance of their biting but also may serve as the source for diseases such as various types of encephalitis. Special emphasis is necessary for the potential threat of West Nile virus found in most of Georgia.
- Mosquito breeding sites (e.g., artificial containers, small temporary pools of water, wetland areas) are located both on Fort Gordon as well as the surrounding adjacent properties. Mosquito control mainly consists of fogging, larvacide applications, and personal protection (e.g., repellents). Mosquito control is extremely difficult due to the long flight range of many of the mosquito species found in this area.

Ticks

- Ticks may transmit disease organisms on Fort Gordon. Tick-borne diseases include Lyme disease, Rocky Mountain spotted fever, human ehrlichiosis, tularemia and southern tick associated rash illness. Rocky Mountain spotted fever is the most important tick-borne disease that occurs in Georgia. Tick paralysis can occur from bites but its occurrence is rare.

Spiders

- Brown recluse spiders (*Loxosceles reclusa*) are found in Georgia. The spiders are generally active at night. During the day they rest in undisturbed, dark, sheltered areas such as under rocks, woodpiles and bark. They are frequently found in corners and crevices of buildings. The brown recluse normally bites when pressure is applied to it. Painful bites can

cause restlessness and fevers. The healing of bites may take several weeks to months.

- Black widow spiders (*Latrodectus* spp.) are known to occur in Georgia and frequent undisturbed places in warehouses, storage areas, fixed firing positions, and range and recreational structures. These spiders may produce painful bites and toxic reactions that can become severe.

Ants, Bees, Wasps, and Scorpions

- Fire ants are common on Fort Gordon. Their venomous sting may cause an allergic reaction in hypersensitive individuals or lead to secondary infections. Fire ants may also have a detrimental impact on endangered or threatened species.
- Envenomization from stings of bees, hornets (*Vespa* spp.), yellow jackets (*Vespula* sp. or *Dolichovespula* sp.), and wasps may produce allergic reactions in some individuals.
- Scorpions (*Centruroides*) may be found in and around buildings, particularly in those parts of the installation that tend to remain dry. Like the black widow spider, they are usually encountered in undisturbed areas. They are venomous, but stings cause few serious consequences.

Mammals

- Skunks, raccoons, bats, foxes, stray cats and dogs not only can become a nuisance but they may be infected with rabies. Since these animals may be found in or under buildings, the disease potential should be recognized.

Snakes

- The copperhead (*Agkistrodon contortrix*), cottonmouth or water moccasin (*Agkistrodon piscivores*), coral snake (*Micrurus fulvius*), eastern diamondback (*Crotalus adamanteus*), and timber or canebrake rattlesnake (*Crotalus horridus*) are venomous snakes found in Georgia. Although rarely encountered, these snakes are capable of causing serious illness or death. A variety of non-venomous snakes are also found in the state; although non-venomous, their bites may be painful and could lead to secondary infection. Removal and relocation of snakes found in areas where they are unwanted (e.g., under buildings) is occasionally required. Snakes located in areas are captured alive and relocated to other areas away from ongoing activities.

4.9.6.2 Quarantine Pests

No quarantine pests are known to occur on Fort Gordon. If any quarantine pest is suspected, the IPMC should be notified. The IPMC should inform the AEC PMC and ultimately the USDA should be notified.

4.9.6.3 Pests of Real Property

- Subterranean (*Reticulitermes* sp.) and Formosan subterranean termites (*Coptotermes formosanus*) - Both termites are found in Georgia and may cause substantial damage. Structures made of materials, that contain cellulose will be inspected annually or at a minimum of every other year for termites or termite damage.
- Ants - Carpenter ants (*Camponotus* sp.) and other wood-destroying insects may infest and damage wooden structures. In areas with high moisture, wood-destroying fungi are a potential problem.
- Birds and Bats - Birds and bats roost in warehouses, maintenance and other buildings and may damage equipment and supplies with their droppings. Birds requiring control may include the starling (*Pastor roseus*), house sparrow (*Passer domesticus*), barn swallow (*Hirundo rustica*), and pigeon.
- Squirrels - Squirrels, rats, and mice are also capable of infesting and damaging structures.

4.9.6.4 Stored Food Product Pests

Food items located in dining facilities, kitchens, or in food storage facilities may become infested by stored food product pests. Most susceptible items are rotated, moved and consumed before infestations occur. The installation Veterinary Food Inspection personnel should be contacted whenever suspect food items are discovered in warehouse or distribution facilities. Infested food at the consumer level should be considered for disposal. The most common stored food product pests include beetles, moths, and rodents.

4.9.6.5 Invasive Plants and Noxious Weeds

EO 13112

Invasive plants are introduced species that have few, if any, natural controls and spread out of control. Presidential EO 13112 signed 3 February 99, requires that each federal agency shall "prevent the introduction of invasive species", "detect and respond rapidly to and

control populations of such species in a cost-effective and environmentally sound manner", and "provide for restoration of native species and habitat conditions in ecosystems that have been invaded." It also requires agencies to "conduct research on invasive species and to develop technologies to prevent introduction and to provide for environmentally sound control of invasive species" and to "not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the U.S. or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions." The following criteria are necessary to meet and maintain these requirements:

- Comprehensive survey of the occurrence of incipient populations of alien invasive species at U.S. Army installations to be targeted for immediate eradication.
- Comprehensive survey of the occurrence of alien invasive species at U.S. Army installations with training, environmental and prevention control implications to facilitate an effective cost/benefit analysis for Army planners.
- Identify transportation and other pathways by which alien invasive species enter and exit an installation.
- Research impacts on alien invasive species of Army training site ecosystem management, to include prescribed burning and re-vegetation with native species that supports or is compatible with the U.S. Army military mission.
- Research extent of direct impact of alien invasive species such as musk thistle (*Carduus nutans*) or kudzu on military training mission and readiness and soldier health and safety.
- Development and demonstration of targeted application of pesticides such as glyphosate to alien invasive species to avoid non-target organisms and comply with both EO 13112 requiring alien invasive species control and EO 12856 reporting 50 percent reduction in pesticide usage.
- Convert information on management techniques, distribution, life histories, invasive characteristics, public education, and human health impacts of alien invasive species from the Federal Native Plant Conservation Initiative fact sheets and other sources, to the standard pest management outlines

designed by U.S. Army Public Health Command and used in this plan.

Invasive Species on Fort Gordon

Over 7 million acres of land throughout the southeast are infested with invasive kudzu. On Fort Gordon, if left unmanaged kudzu will take over endangered species habitat and limit access and maneuverability of military field training. Refer to Appendix U of the IPMP (Appendix P), which provides recommendations for controlling kudzu on Fort Gordon.

Tropical soda apple (TSA) is a perennial shrub that is native to Brazil and Argentina, but has become widespread in Florida and in some other parts of the southeast. In 1998, TSA was found and reported at 21 sites in Georgia. The primary means of dispersal is by the interstate movement of livestock that have recently fed on the TSA. However, contaminated equipment, hay, seeds, composted manure, and sod may also serve as a means of dispersal. Appendix M of the IPMP contains "Chapter 40-4-22: Tropical Soda Apple Rules" which was recently drafted by the Georgia Department of Agriculture (Appendix P). All control of the TSA should be performed in accordance with Chapter 40-4-22. Mature plants of the TSA are 3 to 6 feet tall and are armed on the leaves, stems, pedicles, petioles, and calyxes with broad-based white to yellowish thorn-like prickles up to 0.75 inch long. Leaves and stems are pubescent; flowers are white with five recurved petals and white to cream-colored stamens that surround the single pistil. The TSA spreads rapidly and there is reason to believe that the plant can be found on Fort Gordon property. Contact the USDA – Animal and Plant Health Inspection Service (APHIS) for questions concerning the presence of this invasive plant on Fort Gordon. There are other invasive plants found in Georgia, but their distribution is very limited in Georgia and not a high priority.

Cogongrass was discovered on the installation in July 2011 at two locations, one inside the SAIA and one adjacent to the Gordon Terrace housing area. Cogongrass is considered the seventh worst weed in the world and is listed as a federal noxious weed by the USDA-APHIS. The most recognizable feature of cogongrass is the fluffy white seed heads that are produced in the spring (March through June) immediately following grass green-up. The areas were treated in partnership with GADNR and are now monitored by the NRB.

Bamboo is a tall woody plant of the grass family that forms dense monocultural thickets. The species will shade out any other

groundcover species and make the area unusable for training and many wildlife species. On Fort Gordon it is found in several areas that are most likely old home sites. The most effective control for this species is a combination of mechanical and chemical treatment. Fire may control above ground parts of the plant, but below ground parts survive to resprout soon after the fire.

Chinese privet is an invasive exotic shrub species that forms dense thickets and shades out most other plant species. On Fort Gordon privet is mostly seen in drainages and around the moist edges of fields and openings. While privet does provide some wildlife benefit in the form of food and cover, it excludes other more beneficial native plant species. In most cases, the scant, damp understory in privet thickets precludes the use of fire as a control mechanism. Control of this species is best accomplished using a combination of chemical and mechanical treatments.

Georgia Exotic Pest Plant Council (GEPPC)

USDA-APHIS in Georgia formed a council with representatives from various organizations within the state of Georgia such as the Department of Agriculture, Georgia Natural Heritage Program, the University of Georgia Cooperative Extension Service, and the Department of Transportation. The purpose was to bring together organizations within the state of Georgia to initiate awareness and strategy in combating invasive and exotic pest plants. The GEPPC developed and maintains an invasive plant list that identifies and categorizes plants that pose threats to natural areas in Georgia. Contact USDA-APHIS, at (770) 922-9894 for questions concerning invasive plant management policies or for possible representation on the committee.

Georgia Invasive Species Advisory Committee

The Georgia Invasive Species Advisory Committee coordinated by GADNR, developed the Georgia Invasive Species Strategy (Strategy) in 2009 (GADNR 2009). The Strategy describes the nature and extent of the state's invasive species problems and proposes specific management actions to minimize negative impacts.

Noxious Weeds

The list of federally regulated noxious weeds can be found in Appendix N of the IPMP (Appendix P). The Federal Noxious Weed Act prohibits the interstate movement of the identified noxious weeds. The threat of introducing foreign vegetation (i.e., vegetative

plant parts or seeds) from foreign soil via retrograde cargo, such as tactical equipment returning from a foreign country, is minimized by having all retrograde cargo cleared by the USDA-APHIS prior to arriving at Fort Gordon.

Ecosystem Management

The Office of the Under Secretary of Defense issued a memorandum requiring the implementation of Ecosystem management in the DoD (Memorandum, DUSD, and (ES/EQ-C), 8 August 1994, subject: Implementation of Ecosystem Management in the DoD. Ecosystem management is elaborated in DoD Instruction 4715.3, and the DoD Commander's Guide to Biodiversity and Handbook for Natural Resources Managers. Special attention should be paid to prescribed burns to mimic natural burn patterns that restore the indigenous ecosystem and control noxious weeds.

Other Undesirable Vegetation

Undesirable vegetation on firing ranges, around targets, along fence lines, on road shoulders and, paved surfaces require control using appropriate herbicides. Herbicides should be applied directly to undesirable vegetation protect desirable vegetation and reduce contamination of natural resources. Some control of unwanted plants is done mechanically (mowing, string trimmers) or by using mulch materials around ornamental plants. Selective vegetation control may be required for pine planting site preparation or for pine release programs of forested areas. Prescribed burns should mimic natural mosaic pattern, intensity, periodicity, and re-vegetation with native species that helps to control undesirable vegetation. Executive Memorandum (26 April 1994, Clinton) directs federal executive departments and agencies to use regionally native plants for landscaping of federal grounds and federally funded projects. The use of native plants protects natural heritage and provides wildlife habitat. Native plant restoration may reduce the need for fertilizer, pesticides, and irrigation requirements because native plants are best suited to the local ecosystem.

4.9.6.6 Vertebrate Animal Pests

Periodically, vertebrate animal pests require control or management to protect personnel and/or real property on Fort Gordon. Depending on the pest species and its location, responsibility for controlling these pests rests on the DPW Base Operations contractor, NRB Fish and Wildlife section, DES Military Police or Conservation Law Enforcement, or the Base Housing Contractor. A Vertebrate Pest Control Responsibility Matrix can be found in Appendix Z.

Rodents

Mice and rats occasionally invade buildings. Primary management techniques for controlling these rodents are exclusion and sanitation. Snap traps and glue boards are the main method used for controlling rodent infestations indoors. Rodenticides may be used provided they are deployed in tamper/child proof bait stations.

Forest Animals

Beaver, skunk, otter, raccoon, armadillo, feral hogs, coyote, squirrels and deer have periodically required control. Control efforts for regulated wildlife species such as beaver, otter, squirrels, and deer will be coordinated with the installation's Natural Resource personnel, Conservation Law Enforcement office, and GADNR. Additional assistance may be obtained if necessary from the USDA APHIS, Wildlife Services. The local USFWS will be contacted to coordinate efforts to control federally protected species.

Fort Gordon's NRB will maintain a Georgia Nuisance Animal Control Permit and will keep it on file in Building 403 as well as an up-to-date list of animals trapped. A report will be filed with the Georgia Special Permit Office each January, recording the previous year's trapping results.

Georgia Nuisance Animal Control Permit must be kept on file at NRB.

The NRB has various types of traps available for control of forest animals. The conibear trap is the most effective, efficient, and humanely lethal way of removing beavers and otters. Other nuisance mammals may be trapped using live "have-a-heart" type box traps. Any kill-type traps will be set away from high traffic areas and the area marked with signs ("Danger Beaver Trap") and flagging tape placed on each side of the trap to identify specific sets. Traps will be checked every day, preferably first thing in the morning, to remove trapped animals for disposal. Traps will not be set on or during weekends or holidays unless approved by Chief of the NRB. Traps will remain set until nuisance animals have been removed or population control has been achieved.



Beaver Trap Site

Dogs and Cats

Stray dogs and cats occasionally need to be captured on Fort Gordon. Pest Control personnel from the Base Operations Support Contractor and DES personnel (if dangerous or aggressive) are responsible for the control of stray pets. Refer to Armed Forces Management Board Technical Information Manual (TIM) 37, Guidelines for Reducing Feral Cat Populations for additional guidance.

4.9.6.7 Ornamental Plant and Turf Pests

Various insect pests causing damage to plants can infest trees and shrubs. Examples of these pests include the southern pine beetle, white grubs (*Phyllophaga* sp. or larvae of the family Scarabaeidae), webworms (*Hyphantria cunea*), and tent caterpillars (*Malacosoma* spp.). These pests will be treated on a case by case basis by Pest Control personnel from the Base Operations Support Contractor. Any ornamental plant and turf pests needing control on Gordon Lakes Golf Course will be addressed by the appropriate certified pest controllers employed by the golf course.

4.9.6.8 Other Pest Management Requirements

Pest management technicians, maintenance personnel, and the military police are responsible for carcass removal. In addition, the pest management technicians may provide services for odor control in buildings and other structures. Odors may arise from dead animals, decaying vegetation, molds, fungi, or from other sources. In the event a deer is found dead as a result of deer-vehicle collision or other reason NRB personnel should be contacted for data collection and carcass removal.

4.9.7 Conservation Practices for Endangered Species

4.9.7.1 Endangered Species Act

The ESA requires USEPA to regulate pesticides in such a way as to protect endangered species. Table 2-3 provides a list of federal and state candidate, endangered, or threatened species that occur on Fort Gordon. Detailed information pertaining to endangered species on Fort Gordon can also be found in chapters 2.3 and 4.1. Refer to particular pest management outlines in Appendices A and B of the IPMP for special environmental considerations (Appendix P).

4.9.7.2 Environmental Protection Agency

USEPA's endangered species pesticide program requires pesticide applicators to be aware of information not on pesticide labels about

endangered species requirements. Special considerations must be taken when using pest control tactics in areas where endangered species are found.

4.9.7.3 Army Regulations

AR 200-1 requires personnel to deal with endangered and threatened species, and candidate, proposed, and state-protected species as though they were endangered.

4.9.8 Health and Safety Considerations

Health and safety concerns are discussed in detail in the IPMP (Appendix P).

4.9.9 Environmental Considerations

4.9.9.1 Protection of the Public

Only certified pesticide applicators (DoD certified for General Schedule [GS] and Georgia certified for pest control contractor[s]) are permitted to apply pesticides on the installation. Precautions are taken during pesticide applications to protect the public on and off the installation. Pesticides will not be applied outdoors when the wind speed exceeds 10 miles per hour or less if restricted by the label. Pesticide applicators shall have a means to monitor the wind speed during outdoor pesticide applications. Whenever pesticides are applied outdoors, care is taken to make sure that any spray drift is kept away from individuals, including the applicator. Residual sprays, dusts, etc. will not be applied in the immediate area of building interiors while occupied by personnel other than pesticide applicators or other personnel wearing appropriate personal protective equipment. Building occupants are instructed not to re-enter a treated building until pesticide has dried and odors have dissipated, usually 2 hours, less if permitted by the pesticide label. Application of non-intrusive pesticides, such as baits, is permitted in occupied buildings.

4.9.9.2 Sensitive Areas

Special consideration must be given prior to conducting pest control operations in sensitive areas that are identified on pesticide labels. No pesticides are applied directly to wetlands or water areas (ponds, lakes, streams, rivers, drainage into fish habitat, etc.) unless its use is specifically approved on the label and the proposed application is approved by the DPW, ED. In addition to aquatic habitats, sensitive areas also include critical habitat to endangered, threatened, or rare flora or fauna species, and unique geological and other natural features. Other sensitive areas include medical

treatment facilities, child-development centers, playgrounds, and schools.

4.9.9.3 Endangered and Protected Species

All migratory birds (except starlings, pigeons and house sparrows) that occur on Fort Gordon property cannot be controlled without a permit. The IPMC will periodically evaluate ongoing pest control operations and will evaluate all new pest management operations to ensure compliance with the ESA and MBTA. No pest management operations are conducted that are likely to have a negative impact on endangered or protected species or their habitats without prior approval from the AEC PMC. Table 2-3 provides a list of Fort Gordon plant and animal species that are considered to be endangered, threatened, or rare.

No pest management operations are conducted in habitats that are likely to have a negative impact on endangered, threatened, or protected species or their habitats without prior AEC PMC.

4.9.9.4 Pesticide Spills and Remediation

Spill cleanup materials are maintained on the installation as part of the Emergency Response Program. Whenever a pesticide is spilled, the Fire Department is notified for First Responder Level II and III support. All pesticide storage buildings and pest control vehicles are equipped with spill kits. General information relating to pesticide spills is found in Armed Forces Management Board TIM 15, Pesticide Spill Prevention Management, June 1992. Specific guidance is found on the product's Material Safety Data Sheet and its label. All spilled pesticides are managed under the installation's Hazardous Waste Management Program and are reported to the Environmental Office, the IPMC and the installation's Hazardous Waste Coordinator.

4.9.9.5 Pollution Prevention (P2)

This pest management program will comply, whenever possible, with EO 12856 of 3 August 1993, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements. Controlling pests with pesticides are considered only after non-chemical control methods have been exhausted. IPM strategies that stress nonchemical control form the basic framework of this installation's pest management program. See Appendix Q, for Pollution Prevention Guide for Pest Management Operations.

4.9.9.6 Prohibited Activities

1. Non-certified Pesticide Applicators are prohibited from applying pesticides.
2. At no time will a pesticide be used in any manner that is inconsistent with its label. The site of application must be identified on the pesticide label. Pesticides shall not be applied at rates higher than those specified on the label.
3. The rate of pesticide application for termite control shall not be less than those specified on the label.
4. Only those pesticides that have been approved by AEC PMC (Appendix P) shall be procured for application on the installation. No cancelled-use pesticides shall be procured.

4.9.9.7 Pesticide Approval

Only those pesticides that have been approved by the AEC PMC shall be procured for application on the installation. Prior to seeking approval of any new pesticide or technology, its usage must be evaluated in relationship to other pesticides used on the installation and to ensure that adequate safety equipment is on-hand prior to receipt of the product. Procedures for obtaining approval of new pesticides are described in the IPMP (Appendix P).

4.9.9.8 Pesticide Application Equipment Calibration

The calibration for all pesticide application equipment shall be maintained current. Details concerning the calibration of pesticide application equipment are provided in Appendix P.

4.9.9.9 Disposal of Pesticide Waste Materials

The disposal of pesticide waste material is discussed in detail in the IPMP (Appendix P).

4.9.10 Pest Management Operations with Special Environmental Considerations

All pest control operations having special environmental considerations must be approved by the AEC PMC.

4.9.10.1 Use of Restricted-Use Pesticides

Restricted-use pesticides, as well as general-use pesticides, shall only be applied by certified pesticide applicators.

4.9.10.2 Potential for Contamination of Surface and Groundwater

Programmed pest control operations are not planned where the pesticide could contaminate surface and ground water via movement

of pesticides off-target. The major potential for movement of pesticides off-target is via an accident involving pesticide application equipment having large capacity tanks or hoppers. The installation has the potential to treat aquatic areas for weed and algae growth using herbicides that have been USEPA-approved for direct application in and around aquatic sites. Also aquatic, mosquito-breeding sites may be treated with USEPA-approved pesticides and application techniques. The soil around and under buildings is treated for termite control using USEPA-approved pesticides and control techniques.

In February 2012, Fort Gordon filed a Notice of Intent for coverage under the State of Georgia NPDES Pesticide General Permit Number GAG820000. The permit is required due to potential annual treatment of weeds or algae on greater than 200 acres and forest canopy or other area-wide pest control activities on greater than 8,960 total acres.

The permit requires an implementation plan for installation activities, an inspection plan, and emergency response plan services under the Georgia Water Quality Control Act 391-3-6. The implementation plan monitoring, and reporting results are kept on file in the Compliance Branch of Fort Gordon's DPW, ED.

4.9.10.3 Treatment of More Than 640 Acres

Any pest control procedures that are programmed for areas over 640 contiguous acres in one operation must have approval by the AEC PMC.

4.9.10.4 Site(s) with Endangered and Protected Species

Migratory birds, except starlings, pigeons and sparrows, are protected species. Any bird management program involving protected migratory birds will be coordinated with the USFWS and the AEC PMC. A migratory bird depredation permit must be obtained prior to conducting any bird management program involving migratory birds. Fur-bearing and game animals are protected by GADNR laws and regulations. Management of these animals is discussed in Appendix A of the IPMP (Appendix P).

A depredation permit must be obtained for migratory birds.

4.9.10.5 Aerial Application of Pesticides

In 2017 Fort Gordon DPW ED completed an Environmental Assessment for the aerial application of herbicides. In the event that an aerial application of herbicides is considered, the IPMC shall complete an Aerial Validation Plan and submit it to the AEC PMC by

way of the Garrison Commander for approval prior to implementing aerial spray operations. If approved, all aerial application of pesticides will be done in accordance with DoD policy, Fort Gordon's IPMP (Appendix P), and pesticide labelling.

4.9.10.6 Control of Undesirable Vegetation

Management of undesirable vegetation on Fort Gordon has been discussed in Section 4.9.6.5.

4.9.10.7 Operations Involving Experimental-Use Permits

No pest management operations are anticipated that would involve use of experimental-use pesticides.

4.10 SOIL EROSION AND SEDIMENT CONTROL

4.10.1 General

Soils are the key element in the safe and sustainable management of Fort Gordon. Continued management of these soils will prevent erosion and sedimentation that could impact training, construction, and human health and safety. Erosion impacts the nutrient-rich topsoil that is needed for sustainable natural resources, increases the operating budget due to impacts on training areas, roads and grounds, water impoundments, and can create gullies that pose a hazard to troops and equipment. This INRMP component is a resource for installation personnel to identify existing and potential erosion areas and apply the appropriate measures to mitigate the impacts on Fort Gordon's mission.

Fort Gordon currently operates under a number of plans, permits and programs which in conjunction form the Soil Erosion and Sediment Control Component (SESCC). Data from the following plans comprise the majority of the SESCO: Phase II Municipal Stormwater Management Plan, Industrial Stormwater Pollution Prevention Plan (SWPPP), Stormwater Construction Plan, Stormwater Capital Improvement Plan, and the Soil Erosion and Sediment Control Plan (SESCP).

The SESCO of the INRMP is required by AR 200-1, and will be used for planning and management of soil resources in the unimproved grounds portion of the installation (e.g., not including the cantonment). The cantonment, referred to in the INRMP as "improved grounds" or "semi-improved grounds" is handled under a separate program. Therefore, the SESCO excludes the analysis of the soil loss in the cantonment area.

4.10.2 Relevant Laws, Regulations, and Policies

The SESCO addresses policy found in AR 200-1, paragraph 4-3d (1) (s) and 3d (3). Also, the SESCO lists and identifies (below) all federal, state, and local laws, regulations, and policies relative to soil erosion and water quality:

- The Sikes Act and Army Regulation 200-1
- Georgia's BMPs for Forestry
- Section 319 of the CWA
- Nonpoint Source Management Plan for Georgia
- State of Georgia 305(b)/ 303(d) List of Waters
- Georgia Water Quality Control Act 391-3-6
- Georgia Sediment and Erosion Control Act
- Georgia House Bill 285
- Augusta-Richmond County Soil Erosion/Sediment Control Ordinance

The above federal, state, and local laws and regulations are further defined in Appendix Q.

4.10.3 Soil Erosion and Deposition GIS and Web Soil Survey (WSS) Modeling

4.10.3.1 GIS

Fort Gordon conducted an SESCO Soil Erosion and Deposition GIS Modeling in May 2012 (Michael Baker Jr., Inc. 2012).

Two GIS models, Revised Universal Soil Loss Equation and Unit Stream Power Erosion and Deposition were used within Fort Gordon's SESCO (Appendix R).

The modeling results of this survey identified potential erosion and deposition "hotspots" on Fort Gordon's non-developed lands (Figure 4-13).

A field reconnaissance of the modeled results determined that the data were not a true representation of the existing conditions. The model's datasets were too coarse and the model-identified "hotspots" were not experiencing erosion control problems.

Staff interviews and additional site investigations were conducted in October and November 2010 to better understand areas of known erosion control problems at Fort Gordon. The results of this survey

and additional field reconnaissance were used to create a GIS Database of all confirmed areas of erosion on Fort Gordon. Additionally, the Revised Universal Soil Loss Equation modeling calculation was performed at each identified site within the database to rank the prioritization of the sites. The diagram at Figure 4-14, shows the resulting data.

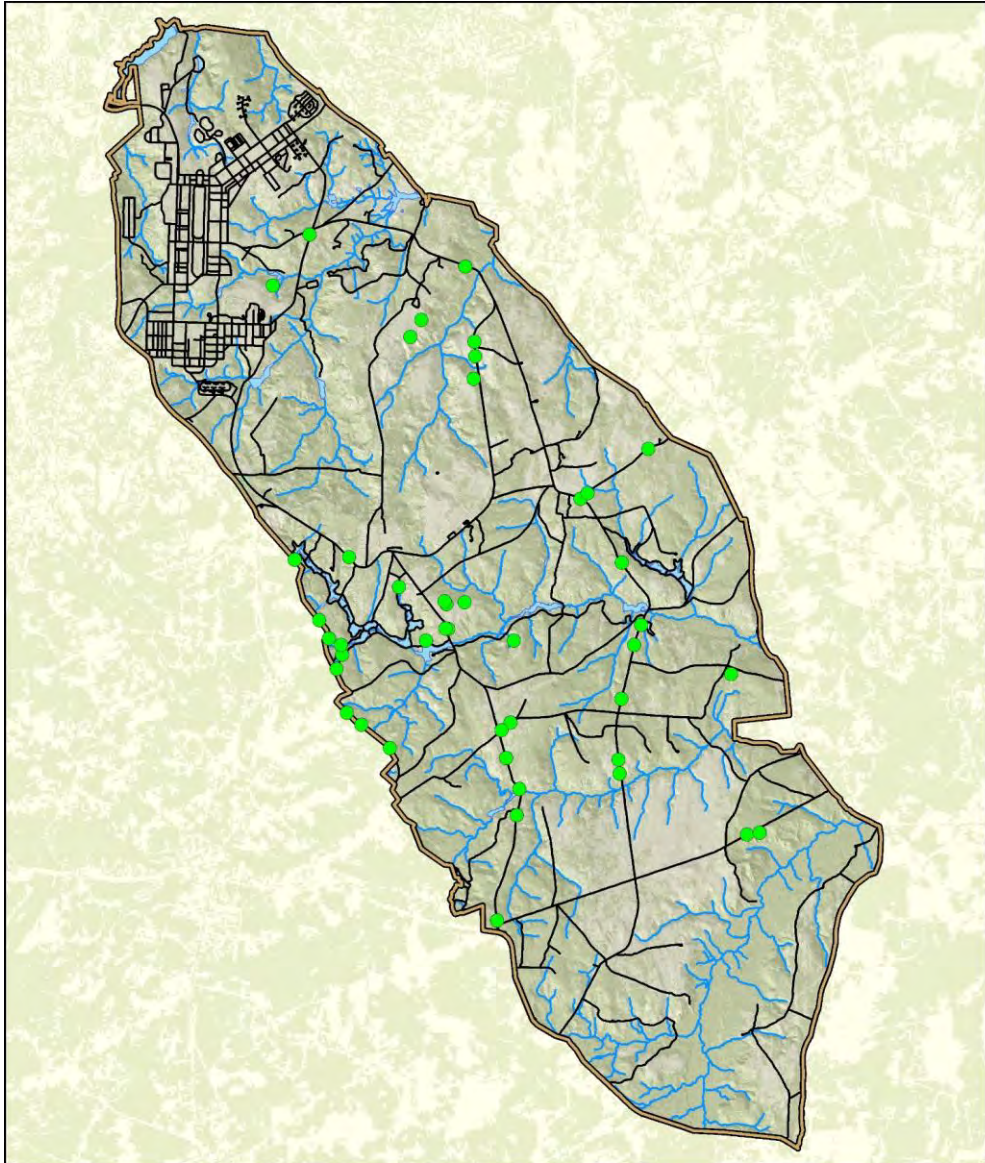
Fort Gordon plans to use the GIS database as a tool to track on-site erosion, perform restoration, and maintain BMPs.

4.10.3.2 WSS

Additionally, the USDA, NRCS provides a Web Soil Survey (WSS) online database and mapping tool (<http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>). As an online application, it does not require GIS software. The WSS can generate reports using Fort Gordon as an area of interest or for specific areas of interest in the Fort Gordon area up to 10,000 acres in size. The WSS online application is easy to use and will quickly develop reports that include:

- Bivouac areas
- Excavation for fighting positions
- Helicopter landing zones
- Potential for damage by fire
- Suitability for roads
- Water erosion potential
- Wind erosion potential

This system is a practical method for quickly identifying potential erosion areas on Fort Gordon. The WSS reports can be used in the pre-planning process to locate high erosion areas before a training exercise or management activity occurs.



-  Erosion Sites
-  Streams
-  Lakes
-  Roads
-  Installation Boundary

This map was produced by the Fort Gordon Natural Resources Branch

World Geodetic System of 1984
UTM Zone 17 North
Units: Meters



1:135,000

0 1 2 Kilometers

0 0.5 1 Miles

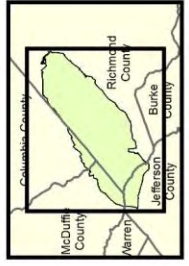


Figure 4-13. Identified Erosion Sites on Fort Gordon.

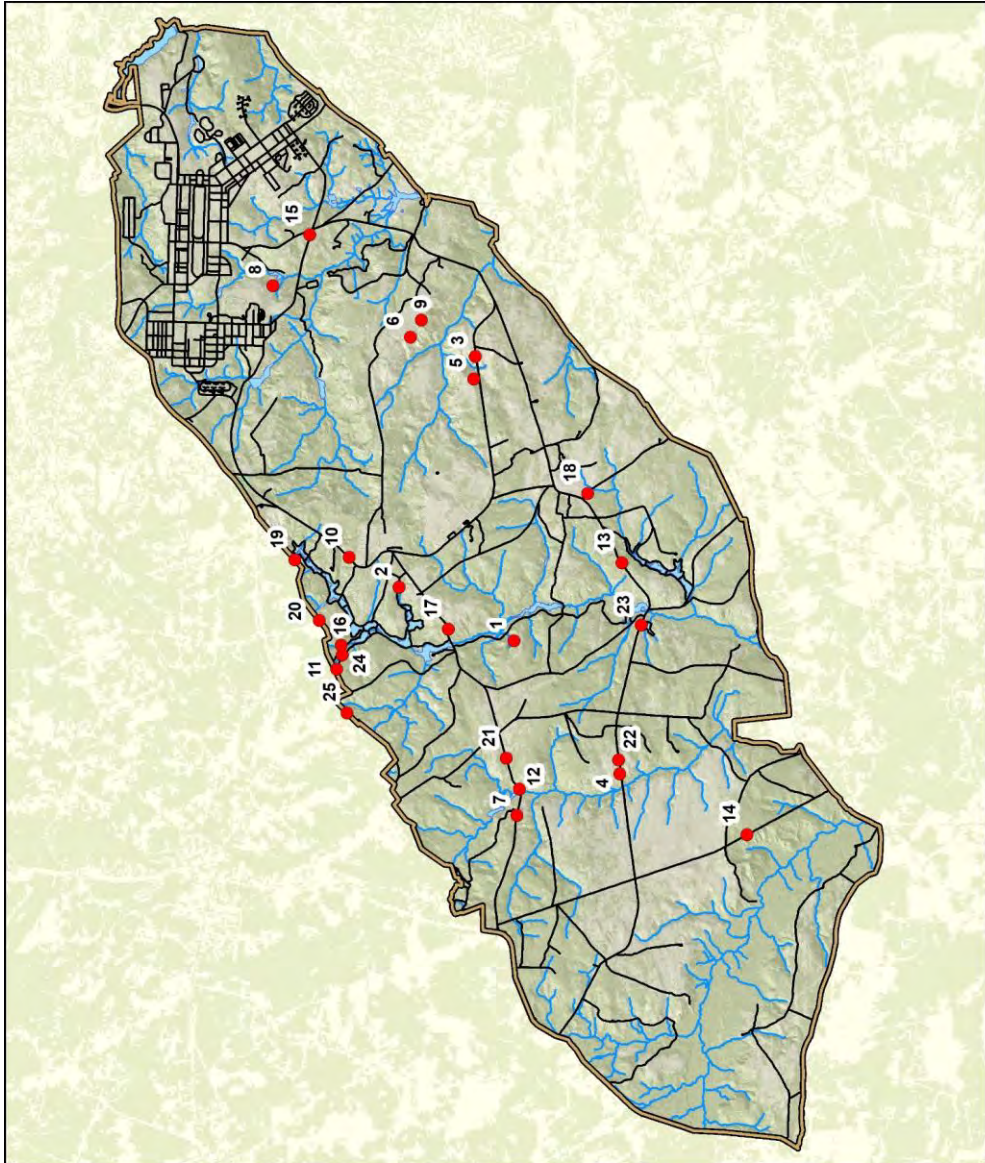


Figure 4-14. Top 25 Prioritized Erosion Sites on Fort Gordon.

4.10.4 Partnering for Erosion Control

The DPTMS via its Range Control Division is a vital component in the implementation of erosion control on the installation. The Fort Gordon DPW cooperates with the DPTMS through the ITAM program to ensure the sustainability of land use for the military mission and protection of the environment.

DPTMS and ITAM personnel can aid in locating highly eroded areas in the course of their mission and report this information back to ED for erosion rehabilitation and mitigation. Further coordination between DPTMS, ITAM, and ED can properly locate military training and real property activities on the least erodible soils. Soil erosion can also be reduced by using climatic and seasonal changes as a factor in scheduling intensive mission operations and real property management activities to the greatest extent practical. Further, identifying areas of high soil erosion in the Real Property Master Plan and scheduling the necessary BMPs can also help reduce the overall impact of erosion on Fort Gordon.

The Fort Gordon DPW, ED will conduct a semi-annual review of the SESCC with the DPTMS, personnel from the ITAM program, and Real Property points of contact. Information gained in these semi-annual meetings will be appended to the SESCC and used as an information source for the INRMP 5-year formal review.

4.10.4.1 External Partnerships

The USFWS, GAFC, and Georgia Environmental Protection Division are important external stakeholders with Fort Gordon. As the regulators of the CWA and several other laws and regulations dealing with the SESCC (Appendix Q), they are integral to the management of erosion on Fort Gordon. Furthermore, USFWS and GADNR participate in the formal 5-year revision of the Fort Gordon INRMP. A Cooperative Agreement between Fort Gordon, and USFWS and GADNR is provided in Appendix C. The USDA, NRCS is a potential partner for information on soils occurring on Fort Gordon and their management.

The City of Augusta-Richmond County's Soil Erosion and Sedimentation Control Ordinance provides erosion guidelines for property development and utility practices. The City of Augusta-Richmond County is already a partner with Fort Gordon for drinking water and other utility services. Columbia County, Georgia is also a local partner with Fort Gordon.

Fort Gordon has a history of developing relationships with the public and other agencies. The installation maintains partnerships with several universities and other agencies, such as TNC. Public outreach informs the public of the military mission and provides an avenue to avoid conflict between the military mission and the public's needs outside of the installation. For a full list of potential soil erosion partners and stakeholders; see Sections 3.4 and 5.3, and Appendix Q.

4.10.4.2 Manpower and Equipment Resources

Fort Gordon has equipment and manpower resources to implement portions of the SESCC. The DPW, NRB Branch utilizes bulldozers, tractors, and other heavy equipment to support the military mission. This equipment can be used to rehabilitate and mitigate soil erosion. Other resources exist within the DPW that, on occasion, can be used to support the mitigation of soil erosion.

However, due to the continual use of this equipment in their day to day use, available time for their use in soil erosion activities is limited. The same is true for the available manpower available to the Fort Gordon DPW. On occasion, support from U.S. Army DPW and U.S. Army Reserve Engineer Companies could be sought for erosion control. This activity would support the soldiers training mission as well as aid in mitigating the erosion on Fort Gordon.

Even with this additional support, Fort Gordon will require the help of external contracts to fully control the erosion on the installation.

4.10.4.3 BMP Technical Reference Library

All environmental activities on Fort Gordon are based upon scientific information; the control of erosion is no exception. Quick and accurate erosion control saves funds that can be utilized in other mission critical areas. The ED will create a BMP technical reference library to improve the success of erosion control measures on the installation.

Starting with the BMPs listed in the Fort Gordon SESCP, the ED will research and procure information on each erosion control management technique. If at all possible, the ED will keep this BMP technical reference library in an all-digital format, allowing a wider dissemination of the materials contained in the library.

4.10.5 Erosion and Sedimentation Controls and BMPs

The control of erosion is obtained by decreasing the velocity of water and by dissipating the water's energy. There are many ways to

accomplish erosion control and Fort Gordon's land managers incorporate them into BMPs.

The Georgia Erosion and Sediment Control Manual, 5th Edition, ("The Georgia Green Book") provides technical guidance on approved BMPs for both the Land Disturbance Activity permits issued under the Erosion and Sedimentation Act of 1975 and the NPDES Permit Number GAR 1000000, Storm Water Discharges Associated with Construction Activity. Silvicultural activities are managed using Georgia's BMPs for Forestry. The sections below address the following BMP types selected as most appropriate for the sediment and erosion control issues of construction projects identified at Fort Gordon:

- Vegetative BMPs
- Non-vegetative BMPs
- Low-Impact Development BMPs
- Non-structural BMPs

4.10.5.1 Vegetative BMPs

Military training can remove vegetative cover and cause erosion. One of the simplest, least expensive, and most sustainable BMPs for erosion control is hydroseeding of locally adapted native species. However, when constructing a vegetative barrier or mat such as a filter strip, it may be necessary to include species more suited to that process, such as a rhizomatous grass. Bermuda grass (*Cynodon dactylon*), for example, is a highly effective filter stripping and grassed waterway species. In cases where the rehabilitation site is either small or needs quick establishment, it may be more cost-effective and environmentally effective to use sod or live plants. Vegetative BMPs at Fort Gordon's disposal include the following:

- Vegetated Buffer Zones - The two types of buffer zones are: general buffers and vegetated stream buffers. A general buffer zone is a strip of undisturbed, original land surrounding a disturbed site. Buffers bordering streams are critical due to the invaluable protection of streams from sedimentation.
- Disturbed Area Stabilization (With Permanent Vegetation) - The planting of permanent perennial vegetation, such as trees, shrubs, vines, grasses or legumes, on exposed areas for final, permanent stabilization is another BMP that will be implemented at Fort Gordon.

- Disturbed Area Stabilization (With Temporary Seeding) - This BMP provides for the establishment of temporary vegetative cover with fast-growing seedlings for seasonal protection on disturbed or denuded areas.
- Dust Control on Disturbed Areas - The purpose of dust control is to prevent surface and air movement of dust from exposed soil surfaces and to reduce the presence of airborne substances that may be harmful or injurious to human health, welfare, or safety, or to animals or plant life.
- Erosion Control Matting and Blankets - This BMP utilizes a protective covering (blanket) or soil stabilization mat to establish permanent vegetation on steep slopes, channels, or shorelines.
- Streambank Stabilization (Using Permanent Vegetation) - Streambank stabilization utilizes readily available native plant materials to maintain and enhance the erosion control qualities of a streambanks, or to repair small streambank erosion problems.
- Tackifiers and Binders - Tackifiers and binders are substances used to anchor straw or hay mulch by causing the organic material to bind together. The purpose of this BMP is to prevent the movement of mulching material from a desired location.

4.10.5.2 Non-vegetative Structural BMPs

Fort Gordon's SESP recommends that structural BMPs be used primarily along the roads and maneuver trails. There are approximately 610 miles of roads on Fort Gordon. Although the primary purpose for the roads is for military training missions, the roads are also necessary for forestry and natural resources management, wildfire suppression and prevention, and recreation access. Silvicultural operations are managed under Georgia's BMPs for Forestry, which fulfill permitting requirements. Some of the most critical erosion issues on Fort Gordon are the roads. As such, structural BMPs can be implemented for these non-silvicultural applications. Non-vegetative Structural BMPs at Fort Gordon's disposal are:

- Check Dams - A check dam is a small temporary barrier, grade control structure, or dam constructed across a swale, drainage ditch, or area of concentrated flow.

- Channel Stabilization - Channel stabilization is defined as improving, constructing or stabilizing an open channel for water conveyance.
- Construction Exit - A construction exit is defined as a stone stabilized pad located at any point where traffic will be leaving a construction site to a public right-of-way, street, alley, sidewalk or parking area or any other area where there is a transition from bare soil to a paved area. A construction exit is used to reduce or eliminate the transport of mud from the construction area.
- Construction Road Stabilization - The purpose of this BMP is to provide a fixed route for travel for construction traffic and reduce erosion and subsequent regrading of permanent roadbeds between time of initial grading and final stabilization.
- Diversion - A diversion is a ridge of compacted soil, constructed above, across, or below a slope to reduce the erosion of steep or otherwise highly erodible areas.
- Downdrain Structures - The purpose of temporary downdrain structures is to safely convey storm runoff from one elevation to another without causing slope erosion and allowing the establishment of vegetation on the slope. Several types of structures may also be used as a permanent downdrain; including paved flume, pipe or a prefabricated sectional conduit of half-round or third-round pipe.
- Filter Ring - A filter ring is a temporary stone barrier constructed at storm drain inlets and pond outlets that reduce flow velocities, which prevents the failure of other sediment control devices.
- Level Spreader - A level spreader is a storm flow outlet device constructed at zero grade across the slope whereby concentrated runoff may be discharged at non-erosive velocities onto undisturbed areas stabilized by existing vegetation.
- Rock Filter Dam - A rock filter dam is a permanent or temporary stone dam installed across small streams or drainage ways. This structure is installed to serve as a sediment filtering device in drainage ways.
- Sediment Barrier - Sediment barriers are temporary structures typically constructed of silt fence supported by steel or wood posts. Other types of barriers may include sandbags, straw bales, brush piles, or other filtering material.

- **Vegetated Waterway or Stormwater Conveyance Channel** - A vegetated waterway is a natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.
- **Compost/Mulch Filter Berms** - Compost/Mulch filter berms are both temporary and permanent structures that capture sediments and pollutants of mixed particle sizes and allow large volumes of clear water to pass through. Compost/Mulch filter berms that are vegetated are typically left in place as a long-term filtration of stormwater as a post-construction BMP. Unvegetated berms are used as temporary BMPs that can be broken down at the end of construction, with the compost used as a soil amendment or mulch.

4.10.5.3 Low-Impact Development (LID) BMPs

LID is a holistic approach that incorporates site-specific ecosystem and watershed-based considerations for planning and design. The goal of LID is to mimic a site's natural hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source. LID seeks to control pollutants "nature's way" through the application of plant-soil-water mechanisms that maintain and protect the ecological and biological integrity of receiving waters and wetlands.

Although LID is a relatively new concept in stormwater management, mimicry or restoration of natural systems is the basis for implementation. LID stormwater practices were pioneered as a response to the need to solve a variety of water-quality problems that were evident in increasingly urbanized and built environments.

According to the DoD publication "Unified Facilities Criteria, Design: Low Impact Development Manual", UFC 3-210-10, published on 25 October 2004 and revised on 15 November 2010, the five key elements of LID are the following:

- Conservation – Preservation of native trees, vegetation, and soils and maintaining natural drainage patterns.
- Small-scale Controls – Mimic natural hydrology and processes.
- Directing Runoff to Natural Areas – Encourages infiltration and recharge of streams, wetlands, and aquifers.
- Customized Site Design – Ensures each site helps protect the entire watershed.

- Maintenance, Pollution Prevention and Education – Reduces pollutant loads and increases efficiency and longevity, as well as educates and involves the public.

The USACE (2008) recommends several LID technologies specifically for Army TAs. Fort Gordon will utilize LID to the greatest extent possible where practical and allowed by the available budget.

4.10.5.4 Non-structural BMPs

Fort Gordon land management comprises grounds management of improved, semi-improved, and unimproved grounds. Maintenance of semi-improved grounds is limited to erosion control, weed control, renovation of damaged turf areas, mowing, and annual burns. Maintenance of unimproved grounds is limited to erosion, fire control, and fertilization/liming of managed fish ponds.

Fort Gordon has an estimated 4,110 acres of improved grounds consisting of athletic fields, parade grounds, post cemeteries, private cemeteries, housing and administrative area lawns, airfields and heliports, golf courses, and road shoulders. The improved grounds require significantly more maintenance than unimproved and semi-improved grounds. The categories of maintenance activities for improved grounds include the following: site preparation, seedbed preparation and seeding, vegetation replacement, soil testing, fertilizing, aeration, soil amendments and mulching, mowing, edging and trimming, pruning and clipping, irrigation, noxious weed and disease control, pest control, erosion control, recreation area maintenance, and golf course maintenance.

In addition, Fort Gordon has implemented the following measures, which can be considered non-structural BMPs:

- Public Involvement and Education – Fort Gordon engages the public, residents and employees to create an awareness of the Army's efforts to protect the environment and be a "good neighbor."
- Illicit Discharge Detection and Elimination Plan – This BMP is used to assist with identifying, documenting, and dealing with illicit discharges.
- Construction Site and Post-Construction Runoff Control – This BMP is used to maintain a policy that addresses all construction related runoff situations.
- Good Housekeeping – Fort Gordon uses good housekeeping to guide and train all regular employees at Fort Gordon in

pollution prevention and good housekeeping techniques and complete site inspections of activities with the potential for stormwater pollution.

- Stormwater Pollution Prevention Plan – The SWPPP identifies and describes the industrial activities, identifies potential sources of stormwater pollution, and recommends appropriate BMPs or pollution control measures to reduce the discharge of pollutants in stormwater runoff. Additional measures, such as a policy for LID, have been developed at Fort Gordon.

4.10.6 Fort Gordon Erosion Areas

The purpose of this section is to identify the priority areas of erosion concern at Fort Gordon, including areas with sources of dust, runoff, silt, and erosion debris that should be controlled to prevent damage to land, water resources, equipment, and facilities. The Fort Gordon SESCO lists the top 25 sites in need of erosion control (see Figure 4-14). These sites were selected on the basis of nine factors: health and safety concerns, proximity to endangered species, sediment potential, barren acreage, proximity to impaired streams, proximity to non-impaired streams, severity of erosion, erosion expansion potential, and cost potential.

The plan also determined the top two sites in need of erosion management. Within the SESCO these two sites are designated as SAIA-01 and TA-026-01.



Erosion Site SAIA-01

Erosion Site SAIA-01 is located along the southern part of Range Road, within the SAIA. An area of severe upslope erosion exists.

The area is located approximately 10 to 50 feet from the edge of pavement and is approximately 250 linear feet in length.

In order to restore this site, the following BMPs should be implemented:

- Regrading

- Check dam (Note: Check dams should be used for slopes greater than 4 percent in order to slow the velocity of the stormwater runoff.)
- Permanent downdrain
- Erosion control matting and blankets
- Disturbed area stabilization with permanent vegetation

Erosion Site TA-026-01 is located along a secondary road located in the vicinity of the intersection of Gibson Road and Range Road. The size of the erosion area is less than 1 acre in size and a large gully cuts across the slope on the hill. Deposition occurs immediately downstream. RCW habitat is adjacent to the site.



Erosion Site TA-026-01

In order to restore this site, the following BMPs should be implemented:

- Regrading
- Matting
- Temporary downdrain structure (Note: The temporary downdrain structure should be removed after vegetation is permanently established.)
- Disturbed area stabilization with permanent vegetation

4.11 LAND AND GROUNDS MANAGEMENT

4.11.1 Land and Grounds Objective

The Land and Grounds Maintenance Plan documents existing land and grounds maintenance features and provides guidance to planners, natural resources managers, and other parties responsible for land and grounds maintenance on the military installation at Fort Gordon.

The objectives of Fort Gordon's Land and Grounds Maintenance Plan are:

- To support the military mission by maintaining healthy and attractive grounds in a manner that minimizes erosion, wastes, and pollution.
- To utilize native flora and less ornamental species in landscape plans to maintain healthy and attractive grounds in a manner that enhances ecosystem integrity, minimizes costs, and does not conflict with the requirements of Fort Gordon's mission.

The land and grounds maintenance is administered jointly by the DPW. Cooperating entities include the DFMWR and the DPTMS. Implementation and oversight of the Land and Grounds Maintenance Plan will be coordinated by DPW using available personnel, contractors, interagency agreements, and local installation expertise as available. In order to be practical and functional, this plan is intended to provide flexibility while ensuring that it meets, supports, and enhances the installation's mission.

The NRB actively works with DPW to balance grounds maintenance needs with habitat requirements.

4.11.2 Inventory of Land Use

Land and grounds can be defined as all lands not occupied by buildings, structures, roads, or pavements. This includes all land and water acreage for which an installation has responsibility, including outlying or satellite areas. There are three basic classifications of grounds: improved, semi-improved, and unimproved grounds (Figure 4-15). The acreage by land use classification on the installation is provided in Table 4-18.

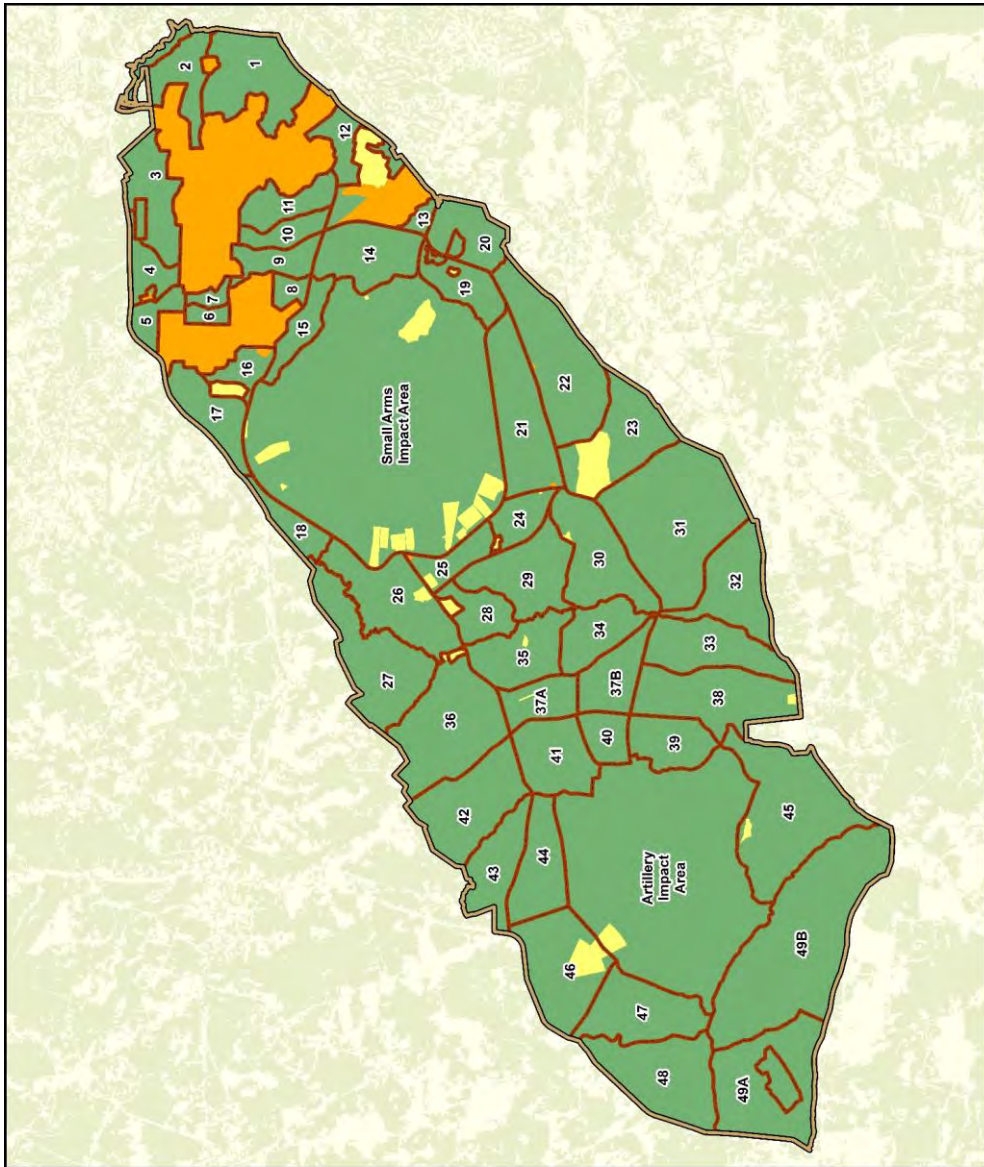


Figure 4-15. Land Classification on Fort Gordon

Table 4-18. Inventory of Installation Land Use

Land Use	Area (acres)
Improved grounds	2,763
Semi-improved grounds	1,386
Unimproved grounds	51,334
Total	55,483

Improved grounds are those where intensive development and maintenance measures are performed. These are often developed areas of an installation such as cantonment, parade grounds, drill field, athletic areas, cemeteries, housing areas, golf courses, etc.

Improved grounds typically have lawn and landscape plantings that require intensive maintenance. Semi-improved grounds are those that undergo periodic maintenance primarily for operational and aesthetic reasons (erosion and dust control, bird control, and visual clear zones). Typical semi-improved grounds include pistol and rifle ranges, ammunition storage areas, antenna facilities, picnic areas, golf course roughs, etc. Unimproved grounds are those not classified as improved or semi-improved and usually are not mowed more than once a year. Typical unimproved grounds include weapons ranges, forestlands, croplands, grazing land, lakes, ponds, and wetlands.

4.11.3 Plan Maintenance

The planning period for the Land and Grounds Maintenance Plan is the 5-year period from FY 2021 to FY 2025. All actions and activities covered by this plan will be carried out in accordance with all applicable Fort Gordon, U.S. Army, DoD, federal, state, and local laws and regulations, specifically AR 200-1.

4.11.4 Existing Land and Grounds Maintenance

Fort Gordon's grounds are maintained at intensity levels necessary to meet the designated use criteria while protecting and enhancing natural resources to ensure ecosystem integrity and biodiversity. Grounds maintenance consists of grounds management of improved, semi-improved, and unimproved grounds. Three entities are responsible for ground maintenance on Fort Gordon. Range Control under the DPTMS is responsible for range maintenance, the Detail Branch under the DPW is responsible for Cantonment Area maintenance, and the Base Operations Contractor is responsible for the maintenance on the remainder of the installation. Areas to be

mowed are determined annually and responsibilities are divided among the three responsible groups.

All grounds within Fort Gordon are delineated as one of four maintenance-level categories. The assigned maintenance level designates the performance required for the grounds maintenance practices. Maintenance Level I is specified for high-visibility improved grounds Maintenance Level II is specified for other improved grounds Maintenance Level III is specified for semi-improved grounds Maintenance Level IV is specified for less prominent semi-improved grounds.

Shoulders at Gates 1, 2, and 5 are included in this acreage and are mowed on a 10-day cycle. Maintenance of unimproved grounds is limited to erosion, fire control, and fertilization/liming of managed fish ponds. Currently, surface erosion on unimproved grounds is not a problem. However, areas with intense relief (such as hydrologic corridors) should be maintained with soil-adhering vegetation. The Forestry Section emphasizes use of Streamside Management Zones in forest management. Short periods of drought during the summer months between June and September are common. Desiccated areas of brush and woodland unimproved grounds should be inspected closely during these drought periods to avoid wildfires. Forest fire management and control on installation lands is performed by the Forestry Section and is discussed in detail in Section 4.5 (Forest Management), and Section 4.15 (Wildland Fire Management) of this document. Lake and pond management are discussed in detail in Section 4.1 (Fish and Wildlife Management) of this document.

4.11.4.1 Unimproved Grounds

Fort Gordon has an estimated 51,334 acres of unimproved grounds comprising 8,475 acres of general unimproved grounds and 42,859 acres of commercial forestland. General unimproved grounds at Fort Gordon consist of ammunition storage areas, agricultural leases (cropland), pavements, buildings and structures, NRFL, ponds, lakes, and streams. The classification and management of Fort Gordon's forestlands are described in detail in Section 4.5 (Forestry Management) of this document. The Fort Gordon Land and Ground Maintenance Plan addresses maintenance of all other unimproved grounds.

4.11.4.2 Semi-Improved Grounds

Fort Gordon has an estimated 1,386 acres of semi-improved grounds consisting of heliports, ammunition storage, antenna fields, drop zones, small arms ranges, picnic areas, and wildlife food

plots/strips. Maintenance of these grounds is limited to erosion control, weed control, renovation of damaged turf areas, mowing, and annual burns.

Mowing of semi-improved grounds should occur twice monthly between April and October. Surface erosion on non-airfield portions of semi-improved areas is limited and poses no significant problem. Areas with more intense relief (such as hydrologic corridors) should be maintained with soil-adhering vegetation. Aeration is not needed on semi-improved grounds due to the lack of activities that create soil compaction. Should soil compaction in semi-improved areas become a problem, aeration efforts should be conducted on an as-needed basis.

Damaged turf areas should be graded to reflect the landscape of the surrounding land, and should be reseeded within 2 days of the initial report. The damaged areas should be reseeded with suitable cover with preference towards native species such as common Bermuda grass in prepared seedbeds. After seeding and initial irrigation, wheat straw or similar mulch should be applied to promote water retention. Mulch should be added to cover 75 percent of the seeded area to a depth that does not inhibit seedling emergence. Jute netting or emulsified asphalt spray should be used to anchor mulch.

There are no established landscape beds on semi-improved grounds that require maintenance. In addition, there are no shrubs, hedges, or trees on installation semi-improved grounds that require regular maintenance. However, should broken limbs present safety hazards or operational problems, branches should be pruned as necessary.

4.11.4.3 Improved Grounds

Fort Gordon has an estimated 2,763 acres of improved grounds consisting of athletic fields, parade grounds, Post cemeteries, private cemeteries, housing and administrative area lawns, airfields and heliports, golf courses, and road shoulders. Approximately 70 percent of all maintained grounds at Fort Gordon are improved grounds that require significantly more attention than unimproved and semi-improved grounds. The following sections discuss typical maintenance performed on improved grounds.

Site Preparation

Site preparation and planting activities should occur during the early portion of the growing season between 15 March and 15 May; however, planting between 1 March and 15 June is acceptable. Sites should be accessible by conventional equipment where possible,

and graded to accomplish this goal where needed. Sites should be maintained for proper drainage and erosion control. Areas where erosion has impeded seeding or other planting activities should be replenished with topsoil as necessary.

Seedbed Preparation and Seeding

Three dominant grasses are managed on Fort Gordon grounds: centipede grass (*Eremochloa ophiuroides*), Bermuda grass, and bahia grass (*Paspalum notatum*). Bermuda grass is the dominant species and should be used for seeding in all areas except in low-lying wetland areas adjacent to creeks and tributaries. Minimum seed specifications for hulled Bermuda grass are as follows: 48 percent pure, 0.25 percent crop, 51.7 percent inert matter, 0.05 percent weed with 85 percent germination. Although hearty, Bermuda grass requires more fertilizing than either centipede or bahia grass, but will establish itself more quickly and weather traffic and other damaging actions better than both centipede and bahia grass.

All three grasses are warm season perennials and die during the winter months. Annual ryegrass (*Lolium multiflorum*) is a winter perennial that can be seeded in the winter to add green color to landscapes. Minimum seed specifications for ryegrass are as follows: 97 percent pure, 2 percent crop, 0.33 percent inert matter, 0.06 percent weed with 90 percent germination. Lime and fertilizer should be incorporated into the soil to a depth of 3 to 4 inches with a conventional tiller or disk. Fertilizer and lime application are described in Part I (General), Section 4.6 (Requirements Performed by Contract) of this document. Preparation by hand may be necessary where slope of the land precludes mechanical tilling or disking. Debris should be removed and anomalous contours should be graded as needed.

The NRB provides input to grounds maintenance and landscaping programs to encourage the use of native plant species at Fort Gordon.

Common Bermuda grass seed should be used for all reseeding activities except those in wetland areas. In wetland areas, a more moisture-tolerant species such as maidencane (*Panicum hemitomon*) should be used. Seeds should be cast on smooth seedbeds and disked into seedbed one to two inches deep. After casting, seedbed should be firmed with a cultipacker or similar tool. If reseeding or broadcasting is not desired, Bermuda grass stolons can be set and covered with 1 to 2 inches of soil in shallow furrows (2 to 2.5 feet apart). Any activities within wetland areas should be reviewed by ED. At that time, it would be determined if a Department

of the Army permit to perform work within jurisdictional wetlands would be required.

Vegetation Replacement

Trees, shrubs, hedges, plants, and grasses on improved grounds would be replaced upon occurrence of death, irreparable damage or unsightly appearance of existing vegetation. Identical species and like numbers would be used to replace existing vegetation.

Soil Testing

Soil testing should be done before fertilizer or lime application. Soils should be analyzed for nitrogen content and pH. If soil tests are not conducted, lime should be applied at the rate of 1 ton per acre.

Fertilizing

Fertilizer should be applied to improved grounds once per year unless tests deem this unnecessary. A commercial 8-8-8 (8 percent nitrogen, 8 percent potash, 8 percent potassium) fertilizer should be used for turf, and an 8-8-8 plus zinc fertilizer should be used for flower beds, shrubs, vines, and trees. Application rates of 3 pounds of nitrogen per 1,000 square feet for turf and 0.75 pound of nitrogen per 1,000 square feet for landscape shrubs, vines, and trees should be used in the absence of soil test results.

Aeration

Recreation areas should be aerated as needed to mitigate soil compaction caused from heavy pedestrian traffic. Particular areas that should be aerated include athletic grounds, playgrounds, and any school playgrounds. Aeration should be accomplished in a crisscross pattern with a core-type aerator. Plugs should be crushed and distributed with soil amendments over the soil.

Soil Amendments and Mulching

Lime should be applied every 3 years at a rate of 1 ton per acre unless soil tests deem this unnecessary. Pine needles may be used as mulch around all shrubs, trees, and flowerbeds to aid in moisture retention, weed control, and aesthetics. This material should be applied and maintained at a 2- to 3-inch uniform layer over beds or around landscape plantings.

Mowing

Improved grounds should be maintained at a height of 2 inches and mowed weekly between 1 April and 30 November. In general, lawns

are mowed twice weekly and athletic fields, parade grounds, post cemeteries, road shoulders, etc. are mowed once weekly. Twice weekly mowings may be required between 1 June and 1 September on improved grounds.

Edging and Trimming

Edging and trimming should be completed on all improved grounds during the same day that corresponding plots are mowed. Areas for which edging must be completed include sidewalks, driveways, medians, and curbs. No vegetation should extend more than 1.5 inches over any noted surfaces, nor should any vegetation be cut more than 0.5 inch back from any noted surfaces.

Pruning and Clipping

Pruning of shrubs should be accomplished annually between 1 April and 30 November. Selective thinning and heading back of shrubs should be practiced to maintain original size and natural growth characteristics of the shrub. Larger trees should be pruned on a 3-year cycle during the dormant season (between 1 December and 30 May) per National Arborists Association Standards. Safety clearances of 14 feet over streets, 12 feet over driveways, 8 feet over walk areas, and 4 feet from buildings and other obstructions should be maintained.

Irrigation

Irrigation of improved grounds is necessary during the growing seasons to maintain healthy turf and other landscape plantings. Portable water tanks should be used where irrigation systems are not accessible. Care should be taken to minimize runoff and ponding in low-lying areas. In the event of drought conditions, any irrigation would follow the Fort Gordon Drought Contingency Plan (Appendix S).

Undesirable Vegetation and Disease Control

A brief description of weed control measures is given in the following paragraph. Detailed information on pest and disease control at Fort Gordon is provided in the IPMP. A copy of the IPMP is located in Appendix P.

Herbicide should be used in areas for which mowing does not adequately control weeds; however, herbicide may not be used as a substitute for edging or trimming. Primary application areas include airfields, fuel stations, fence lines, road signs, utility poles, and rights-of-ways. Secondary areas of application include other high visibility

areas such as curbs. Acceptable herbicides include Roundup™, Hyvar™, 2, 4-D™, Barricade™, and Poast®. Control of fungus on ornamentals and turf would be accomplished with Daconil™ and Benlate™. All herbicides must be applied in accordance with guidance given in the IPMP (Appendix P).

Pest Control

Although insects, rodents, and disease may not pose a grounds maintenance problem on Fort Gordon grounds, occasional treatments may be necessary. Mosquitoes and German cockroaches (*Blattella germanica*) are constant pest problems at Fort Gordon. Chemicals such as Orthene™, Catalyst™, PT565™, Maxforce™, Ficam™, Gentrol, Dursban 10CR, and Scourge are applied to commonly affected areas as needed. Other common pests are controlled with Diazinon 2D™, Dursban™ products, Brodifacoum™, Roost-No-More™, Cynoff™, Phostoxin™, Affront™, Golden Malrin™, Sevin™, PT 515™ wasp freeze, Ultraban 400™, Cygon 2E™, Carbamec™, and Amdro™.

The majority of pest control is done through contract with the BASOPS contractor. Government employees perform other pest control needs for golf courses and forestry. All of the pesticides used on Fort Gordon are biodegradable. Pesticides are not applied during periods of high winds, especially in occupied areas. All pesticides are applied per the manufacturer's requirements. In case of over-application, neutralizers will be applied if applicable.

Erosion Control

Eroded and barren areas should be mitigated with appropriate re-contouring, sloping and drainage, topsoil dressing, and reseeding or sprigging. Bare areas and all ground areas where seeding is required to prevent erosion, except improved grounds, will be properly prepared then hydro-seeded. Bare areas exceeding 0.5 square foot on improved grounds will be re-sodded with the prevalent sod. Other areas where seed will not germinate shall be sodded to establish turf. On improved grounds an annual cool season grass cover would be established and maintained during the fall and winter seasons. Cool season grasses would be replaced with perennial warm season grass at the appropriate time. Varieties of grasses to be used should be the same as the dominant surrounding warm season grass. Grassed areas damaged by vehicular traffic should be graded, seeded, or sodded and irrigated as specified in TM 5-630.

Roads and firebreaks will be evaluated for closure as a part of the INRMP. The closure of unnecessary roads and firebreaks would

reduce erosion on unimproved grounds. Road and firebreak closure are discussed in detail in Section 4.5.17.4 of the Forestry Management Section of this INRMP.

Recreation Area Maintenance

Recreation area maintenance is performed at all ball fields as well as outdoor recreation areas such as Sandy Run Nature Trail and Wildlife Viewing Area, Fort Gordon Recreation Area, Hilltop Riding Stables, Leitner Lake, Wilkerson Lake, and on the installation's golf courses. Maintenance of all ball fields should be completed on Mondays by 1200 hours. If a second mowing is required, it should be performed on Thursdays before 1200 hours. Application of fertilizer, lime, herbicide, or pesticides in recreation areas should be coordinated with DFMWR recreational staff to allow schedule adjustments and proper notification to users to avoid human contact. Golf course maintenance is not performed by DPW but independently with golf course personnel and equipment.

Golf Course Maintenance

Gordon Lakes Golf Course is an approximately 90-acre, 27-hole golf course operated by DFMWR between TAs 12 and 13. The course is situated around Gordon Lake and Mirror Lake.

Golf course greens are mowed once every 7 days and fairways are mowed three times a week. Fertilizer, pre-emergent herbicide, and post-emergent herbicides are applied twice a year on both courses. Lime is applied annually according to pH test results.

Pesticides are applied to control insects, rodents, and fungi that affect turf grasses. Specific chemicals and treatments are discussed in the IPMP (Appendix P).

4.11.5 Non-point Source Pollution

Non-point source pollution refers to water pollution from the contamination of runoff from general fertilizer, herbicide, fungicide, and pesticide application. Fort Gordon has a Pollution Prevention Plan (PPP) which is maintained at the DPW and can be reviewed. BPMs recommended in the PPP and IPMP for the application of fertilizers, herbicides, fungicides, and pesticides should be strictly adhered to. A copy of the PPP can be reviewed at the DPW. The potential for non-point pollution for waterways and drains within and adjacent to golf courses is a major concern. Fertilizer should be applied per manufacture's guidelines and care should be taken to use slow release fertilizers (e.g., Osmocote) in areas with more intense relief or that provide direct runoff (swales).

4.11.6 Grounds Debris Disposal

A Hazardous Materials and Waste Management Plan has been prepared for Fort Gordon and gives detailed information on grounds debris removal and disposal. A copy of the Hazardous Materials and Waste Management Plan can be reviewed at the ED. Non-woody debris and trash from regular policing of improved, semi-improved, and unimproved grounds, and that collected from storm events, should be disposed of at an appropriate landfill. However, enough pine straw and branches shall be retained to provide mulch for ornamental beds and trees. Chipped branches and pine straw should be stored for later use. Woody debris from grounds maintenance not kept for on-site mulch should be taken to the mulch pit at the roads and grounds complex.

4.11.7 Grounds Maintenance Safety

Pesticides, herbicides, and insecticides should be applied by Pest Control personnel from the Base Operations Support Contractor. The DPW should be contacted when treatments are needed, and application should be accomplished per the application directions for each substance. Fertilizers should be dust-free, free-flowing, and non-segregating to reduce the hazards of inhalation. Application directions should be strictly followed.

Spark arrestors must be used on motorized equipment when in operation around flammables or within 50 feet of flammable substances. Mowing in numbered training areas, ranges, cemeteries, airfields, drop zones, etc. must be scheduled and approved by Range Control 1 week in advance. Controlled burning should only be accomplished by NRB and must be coordinated with DPTMS and Fort Gordon Fire Department personnel. No burning shall be conducted within 50 feet of pump houses. Firebreaks must be constructed to control burns at all times. Wildland fire control on Fort Gordon is performed by the NRB, Forestry Section and is discussed in detail in Section 4.16 of this document.

4.12 AGRICULTURAL OUTLEASING

Fort Gordon does not maintain an agricultural outleasing program.

4.13 GIS MANAGEMENT, DATA INTEGRATION, ACCESS, AND REPORTING

4.13.1 General

GIS is a tool that is used for the mapping and modeling of spatial phenomena. Within Natural Resource management agencies, and

especially U.S. Army Natural Resources offices, GIS is integral to the operations. GIS data provide documentation for the location and attributes of resources while GIS software contains the tools necessary for the management, display, analysis, and reporting of these data.

A major goal of any GIS operation is the development of rigorous standards and accuracy specifications. These standards and specifications provide for a sound data foundation with which to run analyses. The U.S. Army has written AR 115-13 to provide policies and procedures for standardizing the management and development of GIS data. Its two main features are the SDSFIE and the Quality Assurance Plan (QAP) documents.

4.13.2 Army Installation Geospatial Information and Services

The goal of the U.S. Army Installation Geospatial Information and Services program is to provide a unified approach to geospatial system management. Its guiding regulation, AR115-13, provides policies and procedures for creating, maintaining, and managing geospatial information and services in support of the installation and environment domain. It lays out roles and responsibilities, program governance, data layer provenance, and data standards. The data schema and quality standards it sets are most directly applicable to the installation, and are defined by SDSFIE and QAP documents. SDSFIE, the schema standard for DoD GIS data, defines data layer names and geometries, attribute table structures, enumerated domains, and definitions for all GIS feature types. The QAPs take the data standard farther by providing detailed guidance on how to collect and populate each feature type.

The SDSFIE standard has been completely rewritten at version 3.0, with the goal of removing/consolidating unneeded feature types, keeping only essential attribute fields, and providing an organized structure by which users can modify schema for installation-level requirements. In 2019 the IGI&S program will begin to roll out SDSFIE 4.x. In the past the IGI&S program has provided tools to transition data from one schema to the next. These tools should be used to update all ED data to continue to be compliant with reporting guidelines/requirements. Business data are generally not stored in the SDSFIE schema. It is acquired by linking the GIS tables to Army business systems such as HQ Installation Information System and HQ Army Environmental System and local installation databases.

QAP documents take the SDSFIE standard further by providing clear guidance for populating the feature types. QAPs are updated periodically. It is important to continue to check the IGI&S AKO

webpage in order to stay compliant. The QAPs specify the items that are listed in the list below.

- Roles and responsibilities
- General policy and regulations
- Valid sources and source selection criteria
- HQ, Department of the Army source databases and relationships
- Specifications for graphic entities and attributes
- Quality assurance and quality controls
- QAP annual review
- Geospatial data layer approval process
- Geospatial data layer definition, description, and characterization
- Specific policy and regulations
- Geographic representation, positional accuracy, logical consistency, completeness, temporal representation, and spatial reference
- Feature specific valid sources and source selection criteria
- Specific HQ, Department of the Army source database references
- Version and publication date of the QAP document

4.13.3 Fort Gordon GIS Data Use and Development

The Fort Gordon ED uses GIS mapping capabilities for daily decisions, as well as long-term planning of natural resources management and its integration with the Army Mission. This work is driven by laws such as the NEPA, the ESA, and the CWA. For NEPA compliance, all impacts on federal land from a proposed project and its alternatives must be considered before the project can be implemented. These impacts are frequently on natural resources such as endangered species, water, and timber, so detailed maps are required to assess them. A list of SDSFIE data layers that the ED maintains and the SME positions responsible for that maintenance is provided at the end of this section.

The branches and offices within the ED keep GIS data of these resources including threatened and endangered plant and animal inventories, hydrography data such as streams and wetlands,

cultural resources data, and environmental compliance data. The NRB, which includes Fish and Wildlife, Forestry, and Cultural Resources, maintains numerous GIS data layers. The Fish and Wildlife section maintains data for hunting and fishing areas, food plots, and threatened and endangered species. The Forestry Section maintains data for forest management such as a forest stand inventory, fire breaks, and prescribed burning locations. The Cultural Resource Office maintains data such as archaeological sites and cemeteries. The Environmental Compliance Branch has developed GIS data for solid waste management, groundwater and soil remediation, hazardous waste management, stormwater pollution prevention, and air pollution emission sources. Along with these data the ED also stores ancillary data that can affect a project such as infrastructure, boundaries, and geodetic reference points. Data for the Army's training mission such as training area boundaries, live-fire ranges, and training impact areas are maintained by the ITAM office.

Analyses of these data range from creating maps for a visual spatial analysis, to multi-step GIS algorithms, to custom software scripts and extensions. Much of the work done with GIS results in static maps containing standard GIS layers, but at other times will require new data or custom statistics to be produced for project-specific features. The custom software extensions are usually only used to run analyses for long-term planning.

All of the aforementioned types of GIS analysis require accurate, updated datasets and the ability to share current data and communicate data updates with users. All data of record is now managed by the Real Property/Master Planning office. Any intermediate working data, analysis results, and all supporting files should be stored on a file server. Data are constantly being updated and developed. To communicate these updates with others, emails are sent out to a core group of GIS users. The data layers that are maintained by ED are provided in Table 4-19.

Table 4-19. GIS Data Layers Maintained by Fort Gordon's ED

SME Title	Common Name	GIS Layer Name
Construction Representative	WELLS & MONITORING WELLS	Well
Cultural Resources Specialist	CEMETERY	CemeteryOrBurialSite_A
Cultural Resources Specialist	GRAVE	CemeteryOrBurialSite_Headstone
Environmental Coordinator	AQUIFER AREA	AquiferRechargeArea

SME Title	Common Name	GIS Layer Name
Environmental Coordinator	AQUIFER RECHARGE AREA	AquiferRechargeArea
Environmental Coordinator	FLOODPLAIN AREAS (100 & 500 year)	Inundation
Environmental Coordinator	PRE-EUROPEAN FIRE REGIME	PrehistoricFireRegime
Environmental Coordinator	PRE-EUROPEAN VEGETATION	PrehistoricVegetationType
Environmental Protection Specialist	AIR POLLUTION SOURCE	PollutionArea
Environmental Protection Specialist	ENVIRONMENTAL RESTORATION SITE	EnvironmentalRemediationSite_A (P)
Environmental Protection Specialist	HAZARDOUS MATERIALS STORAGE AREA	HazmatStorageLocation_A
Environmental Protection Specialist	LANDFILL	Structure_SolidWasteArea_A
Environmental Protection Specialist	STORM SEWER OBSERVATION POINT	STMSWR_DISCHARGE_OBSERV_PT_NCW
Environmental Protection Specialist	STORM SEWER STILLING BASIN	StormwaterUtilityArea
Forester	FIRE MANAGEMENT AREAS	FireManagmentArea
Forester	FIREBREAKS	RoadCenterline_FireBreaks
Forester	FOREST MIDSTORY MANAGEMENT	FloraMidstoryRemoval_NCW
Forester	FORESTRY OPNS/LOGGING	ForestTimberHarvest
Forester	JURISDICTIONAL WETLANDS	Wetland
Forester	LAKES, RESERVOIRS, PONDS	WaterFeature_A
Forester	REPLANTING SITE	FloraPlanting_A
Forester	RIVERS & STREAMS (area feature)	WaterFeature_A
Forester	RIVERS, STREAMS, TRIBUTARIES (line feature)	WaterFeature_L
Forester	SOIL SURVEY AREA	
Forester	SOILS	SoilMapUnit
Forester	TIMBER STANDS	ForestStand
Forester	VEGETATION COVER (GENERAL)	VegetationClassification
Forester	PRESCRIBED FIRE	WildlandFire
Forester	WILDFIRE POINT OF IGNITION	WildfirePOI
Forester	WILDFIRES	Wildfire
GIS Analyst	CONTOURS	ElevationContour
GIS Analyst	DIGITAL ELEVATION MODEL	DTM_BND
GIS Analyst	HILLSHADE	HILL_DTM
GIS Analyst	LAND COVER	NLCD
GIS Analyst	SLOPE	SLOPE_DTM
GIS Analyst	SPOT ELEVATIONS	SpotElevation

SME Title	Common Name	GIS Layer Name
Outdoor Recreation Manager	CAMPGROUND	Campground_A
Wildlife Biologist	ANIMAL STUDY AREA	FaunaStudySite_A (P)
Wildlife Biologist	ECOLOGY HABITAT	EcologyCommunity_A
Wildlife Biologist	ECOLOGY SPECIES SITE	EcologyCommunity_P
Wildlife Biologist	ENDANGERED/RARE/ THREATENED ANIMAL SPECIES	FaunaERT_P
Wildlife Biologist	FAUNA SIGHTING	FaunaSpeciesSite_P
Wildlife Biologist	FISHING SITE	FishingLocation_A (P)
Wildlife Biologist	FOOD PLOTS	SpeciesForage
Wildlife Biologist	GOPHER TORTOISE BURROW	FaunaERT_P
Wildlife Biologist	HUNTING AREA	RecreationArea_Hunting_A
Wildlife Biologist	NEST SITE	FaunaSpeciesSite_A
Wildlife Biologist	RCW TREE POINTS	FaunaERT_P
Wildlife Biologist	RCW AREA	FaunaERT_A
Wildlife Biologist	RCW CLUSTER CENTERS	RCWCluster_P
Wildlife Biologist	SPECIAL PLANT SPECIES SITE	FloraERT_A

4.14 OUTDOOR RECREATION

4.14.1 Introduction

4.14.1.1 Program Objective

Fort Gordon supports outdoor recreation as guided by AR 200-1 and the Sikes Act. The program is compatible with national defense and security requirements and is part of multiple use management. The Commanding General, Fort Gordon, is directly responsible for operations and maintenance of Fort Gordon, including implementing and enforcement of the ORP. This involves the cooperation of many different organizations both on Fort Gordon as well as outside agencies.

The ORP is administered jointly by the ED at DPW, the DFMWR, and the DPTMS. Implementation and oversight of the ORP will be coordinated by DPW, ED and DFMWR using available personnel, contracts, interagency agreements, and local installation expertise as available. The preparation and implementation of the biological management of all species and natural resources portion of the ORP are the responsibility of the NRB. DFMWR is responsible for the movement of persons, special events, and organizational elements of outdoor recreation at Fort Gordon. ITAM will coordinate with and inform DPW of military training requirements and objectives as they relate to the implementation of short- and long-term range

development plans and upcoming training activities that may affect outdoor recreation resources.

As defined in AR 200-1, outdoor recreation is a recreation program, activity, or opportunity that is dependent on the natural environment. Examples include hunting, fishing, picnicking, bird watching, hiking, nature education, and camping. Hunting and fishing are consumptive outdoor activities that are addressed in detail in Section 4.4 (Fish and Wildlife Management) of this document. Recreation facilities normally associated with urban developments, such as playgrounds, golf courses, lodging facilities, tennis courts, and ball fields are not included in this section and are addressed in Section 4.10 (Land Management) of this document.

The objectives of the ORP at Fort Gordon are:

- to support the military mission by providing Fort Gordon personnel with recreational opportunities to enhance quality of life.
- to provide outdoor recreation opportunities that do not conflict with the requirements of Fort Gordon's mission.
- to promote conservation and wise use of renewable natural resources.
- to protect the natural environment.
- to promote a healthy awareness and understanding of the natural environment.

The ORP is administered jointly by DFMWR and DPW. The primary responsibilities of each entity are presented in Section 1.4 of this INRMP. Implementation and oversight of the ORP will be coordinated by DFMWR and DPW using available personnel, contracts, interagency agreements, and local installation expertise as available. In order to be practical and functional, this plan is intended to provide flexibility while insuring that it meets, supports, and enhances the installation's mission.

4.14.1.2 Plan Maintenance

The activities described herein provide a framework to allow for suitable natural resources areas of Fort Gordon to be managed for outdoor recreational opportunities. Conservation of outdoor recreation resources will be considered in all programs, site feasibility studies, and project planning and design. The proposed planning period for the ORP is the 5-year period from FY 2021 through FY 2025. All actions and activities covered by this plan will

be carried out in accordance with all applicable Fort Gordon, U.S. Army, DoD, federal, state, and local laws and regulations, specifically AR 200-1.

4.14.2 Existing Outdoor Recreation Resources

With over 46,000 acres of commercial woodland and unimproved grounds, Fort Gordon has an abundant outdoor recreation resource base varying from forested upland habitats to forested wetland habitats and open water resources. The following sections summarize Fort Gordon's available recreation resource supply.

4.14.2.1 Natural Resources

An important concept that Fort Gordon utilizes in management of its natural resources involves the correlation of forest management, wildlife management, and outdoor recreation. All Army natural resources management is to be accomplished under a multiple-use concept and no one resource will be treated as being mutually exclusive. Fort Gordon natural resources management relies on an ecosystem-based management philosophy. This strategy blends multiple-use needs and provides a consistent framework to managing military installations, while ensuring the integrity of the ecosystem.

Ecosystem-based management is the current management philosophy being endorsed by the DoD and other federal agencies. "Ecosystem-based conservation is a broad approach to natural resources management that involves identifying, protecting, and restoring complete ecosystems – including the structural components and the processes they undergo – while fully incorporating social, economic, and other human concerns into planning" (Leslie et al. 1996).

4.14.2.2 Water Resources

Fort Gordon's water resources are discussed in detail in Section 2.3. A description of the recreational opportunities offered by the 28 managed lakes and drainages on the installation is provided in Section 4.4 (Fish and Wildlife Management) of this document.

4.14.3 Outdoor Recreation Program

Through the ORP, Fort Gordon provides multiple-use outdoor recreation opportunities such as camping, horseback riding, picnicking, and nature education. The existing recreational opportunities utilize some of its available natural resources base. A well-developed outdoor recreation program could increase the

available opportunities and allow Fort Gordon to maximize its production of quality outdoor recreation. The following sections discuss existing outdoor recreation features/areas of Fort Gordon that provide the framework for an actively managed outdoor recreation program.

4.14.3.1 Outdoor Recreation Demand

One of the first steps of developing the existing recreation features into an outdoor recreation program is to quantify or ascertain existing and projected outdoor recreation demand. An outdoor recreation survey was conducted during the preparation of Fort Gordon's ORP to investigate and document outdoor recreation demands of the installation's residents and guests (U.S. Army 2006). Quantifying outdoor recreation demand will assist planners in determining if existing facilities/area are adequate and diverse enough to meet user demands.

4.14.3.2 Classification of Outdoor Recreation Areas

All existing and future recreation areas should be classified as either Class I, II, or III based on their potential use(s), ecosystem sustainability, and sensitivity to damage or adverse impacts from human activities. Adopting this classification system will assist installation personnel in multiple-use management and allow the ORP and NRB to identify and better plan for future facilities.

Class I recreational areas are those areas designed for intense outdoor recreational activity such as picnicking, camping, water sports, and winter sports. Class II recreational areas are those designed for less intense recreational activities such as hiking, hunting, fishing, horseback riding, mountain climbing, and rock climbing. Class III recreational areas are those of special interest, such as archaeological, botanical, ecological, geologic, historic, scenic, or zoological areas.

4.14.3.3 Existing Outdoor Recreation Areas

Fort Gordon currently has three Class I recreation areas, four Class II recreation areas and one Class III recreation area. These existing outdoor recreation areas provide opportunities for camping, picnicking, water skiing, horseback riding, swimming, hiking, boating, and fishing. No designated ORV trails or areas are located on Fort Gordon and their use is prohibited. The following sections describe Fort Gordon's existing outdoor recreation program and facilities.

PWAR (Class I Recreation Area)

PWAR is located 31 miles from the installation adjacent to Lake Thurmond Reservoir near Leah, Georgia. The USACE Savannah District provides access to the land as a military recreation and fish and wildlife management area. Fort Gordon's DFMWR Recreation Division operates PWAR at Thurmond Lake.

PWAR offers several types of recreational accommodations. PWAR has six rustic three-bedroom cabins and two 2-bedroom cabins. Also, they have five 2-bedroom, two-bath cottages located on Lake Thurmond. Additionally, PWAR also has 12 motel suites and 10 hard stand campers for rent. PWAR offers nine camping areas with approximately 25 sites in each area. Four areas are strictly primitive sites with only grills and picnic tables provided, two areas have electrical hookups only, and three areas are complete with water, electrical, and sewage hookups.

PWAR also has several recreational activities available at the site. Over 200 picnic tables are available on a first-come, first-served basis. Swimming is permitted during the summer when the PWAR Beach is open and lifeguards are on duty. Playgrounds are located throughout the area. Jon boats, pedal boats and canoes are available for rent at PWAR. A total of 76 boat sheds and 110 covered and uncovered boat slips are available for nominal user fees on a monthly basis. The boat sheds are provided with lockable doors and are covered for protection against weather. Camping equipment is available for daily rental. The Bartram Trail system offers several miles of trails in the area.

Tactical Advantage Sportsman's Complex (Class I Recreation Area)

Tactical Advantage Sportsman's Complex (TASC) is located on Carter Road, which intersects Range Road. The complex includes a lodge, 800-meter range, two trap and skeet stations, a sporting clays course, and a known distance and 3-D archery range. A metal pavilion with picnic tables is located near the 800-meter range. Individuals wishing to bring a firearm onto the installation to shoot at the TASC range must have an approved FG Form 9243.

The TASC lodge can be enjoyed by the public. Food warming facilities, tables, chairs, restrooms, and a big-screen television are located in the main room for functions. There is also a pro shop with firearms, ammunition, and shooting supplies available for sale to authorized users. Hunting, fishing, and outdoor recreation permits

can no longer be purchased at the TASC and must be obtained through iSportsman.

Hilltop Riding Stables (Class II Recreation Area)

Fort Gordon's Hilltop Riding Stables complex consists of a lodge building, 44-horse barn, large rodeo arena, large quarantine barn, hay storage barn, 10 miles of riding trails on-site, and 35 acres of pastures in TA 8. Currently, there are no other TAs available for riding privately-owned horses on the installation. Organized trail rides for groups are offered, as well as hay rides and pony rides. The facility provides spring and summer youth horse camps, birthday parties, family fun days, riding lessons, lakeside ride-outs, hourly riding fees, horseback adventures, boarding of private horses, the rancho program, and education classes.

Leitner Lake (Class II Recreation Area)

Leitner Lake is a 28.5-acre recreational lake. A recreation area is situated adjacent to this impoundment and consists of multiple campsites with water, sewage, and electrical hook ups, and shower and bathroom facilities. Several primitive campsites are available on the east side of the lake. Amenities at the Leitner Lake Campground include picnic areas, covered pavilion, and a boat ramp. A large conference center is located on-site for conferences, weddings, and special events. The covered pavilion may be rented for \$50.00 per half day. There are RV campers for rent.

Wilkerson Lake (Class II Recreation Area)

Wilkerson Lake is a 4.3-acre lake that provides year-round fishing. It is heavily utilized and receives a lot of fishing pressure as it is close to the cantonment area. The lake has a handicapped-accessible dock and fishing pier. Picnic and playground areas are located next to this lake.

Sandy Run Nature Trail and Wildlife Viewing Area (Class III Recreation Area)

The Sandy Run Nature Trail and Wildlife Viewing Area includes a 0.5-mile handicapped-accessible trail and two-story viewing platform located along a natural beaver pond. This area is excellent for family outings and provides opportunity for wildlife/nature viewing and environmental education. The trail's location, ranging from a wetland to an adjacent upland Sand Hills region of the installation, provides a vivid ecological display of the variety of habitats present of Fort Gordon. Visitors may encounter river otter (*Lontra Canadensis*), beaver, raccoon, wood duck, great blue heron (*Ardea herodias*),

white-tailed deer, and Eastern wild turkey, as well as many species of reptiles and amphibians. The trail and viewing platform are open to visitors from sunrise to sunset daily.

Specific Outdoor Recreation Programs and Events

The Fort Gordon Outdoor Recreation Manager plans and coordinates the following programs of the Fort Gordon Tactical Advantage Sportsman's Complex (TASC) and outdoor recreation events:

- The FGSC sponsors a variety of activities and events for Fort Gordon and holds monthly club meetings at the TASC.
- The FGSC operates an 800-meter shooting range, open every Wednesday through Friday from 10:00 a.m. to 6:00 p.m. and on select Saturdays and Sundays. The range is open for recreational shooting for pistols, rifles, black powder firearms, and zeroing weapons.
- A known distance and 3-D range is open for archery shooting. The FGSC hosts several archery tournaments at the TASC (Range 14) each year.
- Skeet and trap fields are open Wednesday through Friday from 10:00 a.m. to 6:00 p.m., on Saturdays from 9:00 a.m. to 5:00 p.m., and on Sundays from 1:00 p.m. to 5:00 p.m. for skeet and trap and sporting clays shooting.
- The FGSC coordinates skeet/trap/sporting clays tournaments and rifle matches at the TASC.
- The FGSC conducts monthly bass and crappie tournaments at Butler Reservoir. They coordinate free kid's fishing derbies and youth shooting activities for National Hunting and Fishing Day each year.

Planned Outdoor Recreation Maintenance and New Facilities

In an effort to address the outdoor recreation needs at Fort Gordon, the following developments are proposed on the installation. Detailed description of these developments can be found in the ORP.

- Create accessible facilities and environments.
- Provide trail links to existing and proposed neighborhoods and recreation areas (e.g., Children and Youth Services Sports Complex, Main Street Recreation Area, and Freedom Park).

- Develop distinctive signage (e.g., Children and Youth Services Sports Complex and Main Street Recreation Area).
- Realign sports fields for optimum usage.
- Increase additional playgrounds, picnic area, and pavilions
- Build restroom facilities.
- Expand the utility networks.
- Provide cottages at Mirror Lake.
- Provide a central rental facility that will store and rent all recreation equipment.
- Construct 12 more RV camper sites at the Leitner Lake Campground.

4.14.4 Administration

4.14.4.1 Regulations and Policy

As mandated by AR 200-1, whenever practical, U.S. Army lands with suitable natural resources are to be managed to allow for outdoor recreation opportunities. The following laws and regulations address outdoor recreation on Army lands:

- Sikes Act
- Outdoor Recreation on Federal Lands (16 U.S.C. 4601)
- EO 11989, Use of ORVs on The Public Lands
- DODI 4715.3, Environmental Conservation Program, 3 May 1996
- AR 200-1, Environmental Protection and Enhancement, 28 August 2007
- TM5-635, Outdoor Recreation and Cultural Values, February 1982
- AR 215-2, Management and Operation of Army Morale, Welfare and Recreation Programs and Nonappropriated Fund Instrumentalities, 10 October 1990
- USACCoE&FG Reg 420-5, Hunting, Fishing, and Training Area Recreation Regulations, 13 June 2018
- USACCoE&FG Reg 420-7, Endangered Species Regulations, 14 June 2018

Management Responsibilities

Administrative responsibilities are discussed in detail in Section 1.4 of this INRMP.

4.14.4.2 Assistance from Other Agencies

- National Park Service - The National Park Service has a regional office located in Atlanta, Georgia, that can provide technical advice to Fort Gordon personnel for the development and management of outdoor recreation resources, particularly interpretative nature trails and hiking areas. The National Park Service has a varied and experienced staff of rangers, natural resource managers, archaeologists, historians, interpreters, landscape architects, engineers, and planners, experienced in protecting land and legacy, conducting research, and educating the public.
- USFWS - The USFWS has a field office at Athens, Georgia, that provides technical advice to Fort Gordon for the management of its natural and outdoor recreation resources, particularly endangered species. AR 200-1, Chapter 4, provides cooperative guidance to be followed by Fort Gordon with the USFWS regarding endangered species management on U.S. Army installations.
- GADNR - The State of Georgia, functioning through the Director, GADNR, provides limited technical advice and assistance if funds are available and priority warrants. GADNR provides permit and license information, a Register of Historic Places, and guides to hunting, fishing, and camping in the state.
- GADNR, State Parks and Historic Sites Division (SPHSD) - SPHSD operates state parks and historic sites on nearly 70,000 acres of state lands in Georgia. The major facilities on these sites include lodges with restaurants and conference facilities, cabins, campsites, and interpretive trails. SPHSD actively interprets natural and cultural resources to state park and historic site guests through publications, displays, exhibits and programs given by staff. SPHSD also provides technical assistance along with state and federal grants to local governments for the acquisition and development of public recreation areas.

4.14.4.3 iSportsman System

Fort Gordon is currently using the iSportsman program to administer many outdoor recreation related functions

(<https://ftgordon.isportsman.net>). The iSportsman program is an on-line system that allows users to purchase permits, check in/out for recreation, and obtain information concerning various outdoor recreation activities. The system also allows natural resource managers to monitor resource use, track hunting and fishing harvest, and disseminate outdoor recreation related information. The iSportman system should be used by anyone utilizing any training area for all outdoor recreation activities including hunting, fishing, birdwatching, hiking, bicycle riding, etc. The iSportsman system is not used for camping, horseback riding, disc golf, or cantonment area running or bicycle riding. (See USACCoE&FG Regulation 420-5 for more information).

The iSportsman system is administered by the Natural Resources Branch. The NRB works cooperatively with DPTMS and DES to ensure that all outdoor recreation activities do not conflict with the training mission and are enjoyed in a legal and safe manner. The NRB is responsible for all iSportsman system administration and website content. The iSportsman program is partially funded by the NRB wildlife section using 21x funds.

4.15 BIRD AIRCRAFT STRIKE HAZARD

Fort Gordon currently does not maintain any active runways, therefore, this section is not applicable to this INRMP. A BASH plan will be developed if future missions require it.

4.16 WILDLAND FIRE MANAGEMENT

Prescribed fires are a management tool used to reduce forest fuels that could generate a high-intensity fire and destroy natural resources. Prescribed fires are also a critical management tool used to support threatened and endangered species such as the RCW and the gopher tortoise. Frequent prescribed fires are required by the INRMP, ESMC to protect forest resources and restore and maintain the longleaf pine/wiregrass ecosystem on Fort Gordon. Growing season (spring/summer) fires are used to reduce midstory hardwood trees and encourage the reproduction and growth of herbaceous vegetation. Fuel reduction fires are generally conducted during the dormant season (winter) when temperatures are low and the weather is more predictable. Dormant season burns also minimize damage to desirable vegetation. All prescribed fires are conducted in accordance with the IWFMP provided as (Appendix T).

Fort Gordon annually burns the SAIA and the AIA to reduce the fuel load and risk of wildfire resulting from training-related usage of flares,

tracers, and explosives. The installation annually burns approximately 15,000 acres to meet natural resources and mission requirements.

4.17 TRAINING OF NATURAL RESOURCES PERSONNEL

4.17.1 Wildland Fire

The Army has recently adopted the National Wildfire Coordination Group's (NWCG) Federal Wildland Fire Policy to govern all wildland fire activities carried out by Army personnel. The Army is presently exploring the possibility of seeking membership in the NWCG. The NWCG is made up of all land managing federal agencies (except the military services) with wildland fire responsibilities and the National Association of State Foresters. The Federal Wildland Fire Policy requires all personnel involved in prescribed fire and/or wildfire activities meet certain training and physical qualifications. The Army is presently reviewing how it will implement this requirement. Some military installations have already implemented this requirement with most of them making it mandatory for new hires and positions and voluntary for current employees. Fort Gordon's requirements for personnel qualifications will be reviewed and the IWFMP will contain complete information on personnel qualifications.

4.17.2 Timber Marking

All personnel engaged in timber marking at Fort Gordon must meet, at a minimum, the qualifications established by Office of Personnel Management for Forestry Technician GS 462-05. Additional training will be given as to local requirements and procedures. This training will be under actual field conditions in a productive capacity.

4.17.3 Pesticide Application

All Fort Gordon personnel who apply pesticides shall have received and maintained DoD or state of Georgia (contractors) certification as pesticide applicators for the categories of pest control engaged. Details on specific training requirements can be found in the IPMP (Appendix P).

4.17.4 Wildlife Management

4.17.4.1 Continuing Education

Wildlife management theories and techniques may change over time as a result of improved technology or new research. It is imperative that Fort Gordon's wildlife biologists and technicians receive periodic exposure to such changes in order to manage the installation's wildlife effectively, efficiently, and with scientifically defensible

information. Continuing education for wildlife biologists and technicians could come in the form of workshops, conferences, symposiums, study groups, field trips, and formal in-class training.

4.17.4.2 Capture and Banding of Federally Protected Species

Fort Gordon is permitted by the USFWS and U.S. Geological Survey (USGS) Bird Banding Lab (BBL) to capture and band RCWs and American kestrels, which are federally protected species. Biologists or technicians banding these birds on Fort Gordon must be either a permitted master bander or a subpermittee working under a permitted master bander. Specific training requirements to be a master bander or subpermittee bander are not specified by the USFWS or the USGS BBL. However, individuals are approved to become a bander only after they have provided the USGS BBL with evidence of sufficient training and experience under a permitted master bander. The USGS BBL makes the determination as to whether the training and experience is sufficient for banding.

More specific to the RCW, the USFWS requires that individuals participating in monitoring, capture, and banding of RCWs be trained and have experience under an approved trainer. As stated in the RCW Recovery Plan the minimum amount of training should be at least:

- a) 50 cavities correctly assessed for stage and activity.
- b) 15 cavity trees climbed and cavity contents checked.
- c) 10 adult RCWs captured and banded and data taken without injury to the bird.
- d) 20 nestlings captured, aged, and banded and data taken without injury to the birds.
- e) 20 free-ranging RCWs correctly identified by color-bands.
- f) 10 sub-adults translocated without injury or mortality.
- g) 10 RCWs treated for another handling technique (such as bleeding).

4.17.4.3 Installation of RCW Cavity Inserts

The task of installing artificial RCW cavity inserts is one that is dangerous and requires a moderate level of skill. Since this work requires an individual to operate a chainsaw at heights of 20 feet or more it is important that the person be properly trained and receive adequate practice before attempting to install artificial cavity inserts.

Proper training is given only by an individual that is himself trained, experienced, and proficient in installing cavity inserts. Proper techniques, including important safety points are included in the SOPs for the installation of RCW Cavity Inserts.

Training required by USFWS for the installation of artificial cavities and restrictors as stated in the RCW Recovery Plan should include:

- a) Work under a properly trained and permitted person for at least 3 years.
- b) One should install at least 10 restrictors, 10 drilled cavities, 10 starts, or 10 inserts to be certified in each technique.
- c) Learn the proper maintenance and inspection procedures for cavities and restrictors.

4.18 COASTAL/MARINE MANAGEMENT

Coastal and marine management is not applicable to Fort Gordon.

4.19 OTHER LEASES

Fort Gordon does not currently maintain any other leases related to natural resources on the installation.

5.0 IMPLEMENTATION

Over the course of its implementation, the INRMP will:

- Enable Fort Gordon to make progress towards achieving a sustainable natural resources base and a realistic training environment, which is embodied in the diversity of the longleaf pine ecosystem.
- Establish appropriate stewardship policies that serve to protect both natural and cultural resources.
- Ensure compliance with environmental laws.
- Provide a continuity of direction and effort that can accommodate changes in personnel and leadership.
- Promote cost-effectiveness through better planning and coordination.
- Promote good public relations by demonstrating the installation's commitment to stewardship, as well as a multiple-use concept for the general public.
- Make use of innovative strategies to accomplish specific management objectives.

5.1 PLAN IMPLEMENTATION AND REVIEW

The NRB will develop annual work plans based on the requirements and funding of all program elements that comprise the INRMP. Detailed natural resources management prescriptions that drive the projects are provided in Appendix K. Many actions are tied together and will take several years to implement. For example, timber harvest in FY 2021 will support RCW recruitment cluster installation in FY 2022. Additionally, a general summary of the major actions/projects during the next 5 years and the programs they support is provided in Appendix K. The annual work plans to be developed for each FY will include a listing of projects, funding requirements, common levels of service supported, and manpower data to complete the action. The annual work plan will be used to track progress on INRMP implementation, budget expenses, request budget allotments for future months and coordinate needed manpower requirements for labor-intensive projects. Each year the core government Natural Resources managers will meet as necessary to review plan implementation and discuss any necessary adjustments. There will be a minimum of two meetings per year. The DPW group will consist of representatives from Wildlife, NEPA, GIS and Forestry. Additional representatives could include the SMS

team and from DPTMS the Range Control, and ITAM programs. This in-process review will serve to prioritize projects, resolve conflicts, coordinate implementation of specific provisions of the INRMP, identify common objectives so some projects may be completed by several partners, and identify the need for plan updates. The projects listed in the annual work plan will be assessed and revised as necessary. A list of prioritized projects will be developed at the beginning of each FY and reviewed and updated each quarter for the remainder of the year. The list of prioritized projects will include a brief description of the project, a cost estimate, a timeline for completion, designation as in-house or contract, the most likely funding mechanism, and a point of contact for each project. After prioritization, those projects for which funding and other resources are available will be started in accordance with the timeline developed. Other projects that need funding will be incorporated into appropriate funding streams. Non-recurring projects or new projects that require funding will be submitted into the IMCOM annual budget submission process. For example, projects will be submitted in spring 2021 for FY 2022 funding. Recurring projects receive funding from IMCOM and AEC based on a funding model utilizing, common levels of service, installation size, number of threatened or endangered species, number of species at risk etc. This funding model is a new budget process under IMCOM, and is likely to undergo some revision as it is implemented.

5.2 ACHIEVING NO NET LOSS

Historically, Fort Gordon has achieved a no net loss in the capability of military lands to support the mission of the installation. Implementation of the INRMP will ensure that there is no net loss in available military lands to support Fort Gordon's mission. The Fish and Wildlife Section and the Forestry Section of the NRB of DPW have the primary role and responsibility for the implementation of the INRMP. The ITAM of DPTMS also is an integral participant.

The implementation of proposed projects, as described in this section and future revisions and updates of this INRMP to reflect emerging natural resources planning needs, assists Fort Gordon in achieving no net loss to the military mission. These projects focus on maintaining RCW habitat, assessing the impacts of military readiness activities on RCW populations, controlling erosion and sedimentation in stream channels, implementing ecosystem management, managing the installation's forests, and providing for recreational opportunities.

To implement this plan and ensure minimal impacts or conflicts with military training, frequent and close coordination between the NRB and the DPTMS Range Control office will be necessary. Range Control schedules and manages training land use and needs to be aware of management actions within the TAs, especially those actions that involve contractors or workers who are not a regular part of the Fort Gordon natural resources staff. These actions will include, but are not limited to, timber harvest, pine straw raking, and plant or animal surveys. In addition, the natural resources staff needs to be aware of when and where field training is occurring so work can be adjusted around those activities when necessary. Range Control provides the NRB a list of the ranges and TAs scheduled for use on a regular basis to assist with work planning.

5.3 OUTSIDE ASSISTANCE

The magnitude and complexity of the management requirements are such that outside assistance is necessary. This assistance can vary, but usually takes the form of a partnership, which may include funding, facilities to work in, support such as GIS, or just an agreement on how two agencies will work with each other to achieve common goals. Some of the cooperators involved include the USACE, USFWS, NRCS, GADNR, the Georgia Environmental Protection Division, universities, contractors, and others.

5.4 FUNDING OPTIONS

5.4.1 Environmental Program Requirements

Funds for recurring natural and cultural resource programs, other than reimbursable fish and wildlife or forestry, are acquired from the annual Garrison Environmental Requirements Build budget process, which provides Operations and Maintenance, Environmental Compliance and Prevention Funds. The model takes into account installation size and number of personnel, number of permits, acres of wetlands, and some additional factors. Installations are then only funded to the level of the model output.

Non-recurring projects or new projects are submitted by the installation to IMCOM in the spring for review and approval of funding beginning the next fiscal year. For example, projects will be submitted in the spring of 2021 for funding beginning in FY 2022.

On average, Fort Gordon receives approximately 2 million dollars annually from non-forestry natural resources projects submissions, including but not limited to: salaries, threatened and endangered species management, soil conservation projects, GIS management,

pest management, etc. Annual, funding requested for projects and contracts is approximately 2.8 million dollars. These inadequate funding levels continue to occur while management requirements continue to increase. Budget numbers depicted in Table 5-1 reflect the estimated amount required to implement the INRMP not the amount of VENQ funding that will be provided.

**Table 5-1. Estimated VENQ Environmental Program Requirements (in dollars)
Fiscal Years 2021 through 2025**

Project	FY21 (\$)	FY22 (\$)	FY23 (\$)	FY24 (\$)	FY25 (\$)	TOTAL (\$)
Salaries Natural Resources Not Included Elsewhere	212,000	220,500	230,000	240,200	250,000	1,152,700
Implement Endangered Species Conservation Requirements	1,800,000	1,872,000	1,947,000	2,024,800	2,105,800	9,749,600
Implement Fish and Wildlife Management Plan (Sikes Act Funds)	48,000	48,000	49,000	49,000	50,000	244,000
Implement Integrated Natural Resources Management Plan	318,000	330,000	343,000	357,000	372,000	1,720,000
Review/Prepare NEPA Documents For Conservation *Includes Supplemental EA For INRMP Revision	100,000	100,000	150,000*	100,000	100,000	550,000
Conservation Supplies and Materials	35,000	35,000	40,000	40,000	40,000	190,000
Conduct Invasive Species and Pest Management	100,000	104,000	104,000	104,000	104,000	516,000
GIS Data, Supplies and Materials	18,000	18,000	19,000	20,000	20,000	95,000
Training & Certification Requirements	19,000	19,000	20,000	20,000	20,000	98,000
Total	2,650,000	2,746,500	2,902,000	2,955,000	3,061,800	14,315,300

5.4.2 Forestry Funds

Fort Gordon should on average receive \$1,000,000 annually to fund the operation of the Forest Management Program. Funds are received from three sources they are as follow: (1) Forestry Reimbursable Funds, (2) Environmental VENQ funds, and (3) the Forestry Reserve Account. The Forest reimbursable and Forest Reserve Account funds are derived from proceeds of forest product sales from all U.S. DoD installations. Fort Gordon plans on producing an average of \$500,000 per year. By law the funds from the sale of forest products can only be used for reimbursement of expenses directly related to the economic production of timber products and its harvest. Budget figure requirements for the implementation of the Forest Management Plan are provided in Table 5-2 and include all sources of funds.

Table 5-2. Forest Management Plan Budget for Fiscal Years 2021 through 2025

Items	FY21 (\$)	FY22 (\$)	FY23 (\$)	FY24 (\$)	FY25 (\$)	TOTAL (\$)
Equipment	150,000	150,000	150,000	150,000	150,000	750,000
Fire Protection	52,000	52,000	54,000	54,000	56,000	268,000
Management	410,000	415,000	420,000	425,000	430,000	2,100,000
Access Roads	22,000	22,000	24,000	24,000	26,000	118,000
Reforestation	275,000	300,000	325,000	350,000	375,000	1,625,000
Support	22,000	22,000	24,000	24,000	26,000	118,000
Total Requirement	931,000	961,000	997,000	1,027,000	1,063,000	4,979,000

5.4.3 Fish and Wildlife

Fish and Wildlife Conservation Funds are obtained from the sale of hunting and fishing permits. These funds are designated as Army account 21X5095. Fort Gordon permit fees for hunting, fishing, and other outdoor recreation are presented in Table 5-3. Approximately \$47,000 is obtained annually from the sale of these permits to be used for management of game and sport fish. These funds are used to plant wildlife openings; stock, fertilize, and lime fishing ponds; print hunting and fishing regulations; purchase and maintain tractors and other equipment; and satisfy other related requirements.

Table 5-3. Fort Gordon Hunting, Fishing, and Outdoor Recreation Permit Fees

Permit	Annual	1 Day Guest	7 Day Guest
Hunting (Small Game Only)	\$20	\$10	\$50

Hunting (Small and Big Game)	\$40	\$10	\$50
Public Access Hunting (Small Game Only)	\$15	N/A	N/A
Public Access Hunting (Small and Big Game)	\$35	N/A	N/A
Nighttime Hunting	\$10	N/A	N/A
Fishing	\$20	\$5	\$25
Public Access Fishing	\$15	N/A	N/A
Outdoor Recreation	\$5	N/A	N/A
100% Service Disabled (Hunt And Fish)	\$5	N/A	N/A
Public Access Lottery Entry Fee	\$10	N/A	N/A
Youth Hunting or Fishing (under 18)	Free	N/A	N/A

5.4.4 Other Funds

Other funds that may become available to complete projects are the DoD Forestry Reserve Account, Legacy, Agricultural Outlease, construction project mitigation funds, USDA (Pest Management Board) funds, DoD "Sustainable Forests, Protecting Our Future" funds, end of FY funds (Subject to Availability), grants, and other funding sources.

5.4.5 Summary of INRMP Implementation Costs

The average VENQ and reimbursable annual costs of fully implementing the INRMP are presented below by funding category. These total annual costs represent an estimate of the cost of implementation: however, some variability from year to year can be expected. Average annual costs are:

- Environmental (Environmental Program Requirements): \$2,467,300
- Fish and Wildlife: \$47,000
- Forestry: \$500,000

The total average annual VENQ and reimbursable funding necessary to fully implement this INRMP from FY21 through FY25 is \$2,863,060. The total cost over 5 years of fully implementing this INRMP is \$14,315,300.

5.5 STAFFING

The current NRB staffing levels are presented in Table 5-4. The NRB is made up of the Forestry, Fish and Wildlife, NEPA, and Cultural Resources sections. While the NEPA and Cultural Resources staff

supports the INRMP and its implementation, they do not directly perform natural resources management and are not included in the staffing discussion below. In 2016 the U.S. Army Manpower Analysis Agency approved the ACSIM Environmental VENQ manpower staffing model. The approved model documented a requirement of 25 total government employees to meet minimal legal compliance with 10 government employees in Conservation Branch. The data presented in the table are based on the numbers of required staff outlined in that staffing study. The grade structure reflects what is currently on-hand; however, the Installation Forester and Lead Wildlife Biologist positions need to be upgraded to reflect GS-12 level managers and to align with other installations and the IMCOM Standard Garrison Organization.

Table 5-4. DPW Environmental Division, Natural Resources Branch, Current Staffing Requirements at Fort Gordon

Natural Resources Branch	Grade	Recognized	Authorized	On-Hand
Branch Chief	GS-13*	1	1	1
Forestry Section				
Forester	GS-11	1	1	1
Forester (Forest Management)	GS-09	1	1	1
Forestry Technician	GS-09	1	1	1
Fish and Wildlife Section				
Wildlife Biologist	GS-11	2	1	1
Wildlife Biologist	GS-09	2	1	1
Fisheries Biologist	GS-09	1	0	0
Land and Grounds Management				
Fire Management Specialist/IPMC	GS-11	1	1	1
Totals		10	7	7

* GS – General Service

The Fish and Wildlife Section has a requirement of six government employees and multiple contract positions addressing seven program areas: RCW; threatened and endangered species; environmental awareness; soil conservation; range and training area compliance; wetlands management; and fish and wildlife management. Currently the Fish and Wildlife Section consists of two GS wildlife biologists. The Forestry Section has a requirement of four government personnel addressing three program areas: Timber Management; Fire Management; and Land Management Support. The current GS Forestry staff of three includes the installation's forester, one management forester, and one forestry technician. In addition, there is multiple forestry support positions that is currently filled through a support contract.

The approved authorizations on the TDA only allow for 7 government Natural Resources staff. Due to the shortage in authorizations, Fort Gordon will find it necessary to hire additional sources of temporary labor to assist in the completion of some monitoring and management projects. These temporary hires could include onsite support contractors, seasonal employees, university hires (interns), ORISE hires, and Student Conservation Association interns. However, the core government Natural Resources Branch management professionals currently in-house provide the foundation of the program by accomplishing planning, overseeing and approving all operations that effect natural resources as required by the Sikes Act, and fulfill the supervisory roles necessary to continue the successful natural resources program at Fort Gordon.