DEPARTMENT OF THE AIR FORCE
78TH AIR BASE WING
ROBINS AIR FORCE BASE GEORGIA

SEP 19 2017

MEMORANDUM FOR 78 CEG/CL

FROM: 78 ABW/CC

SUBJECT: Authority to Approve Revisions and Certification for Annual Review of the Integrated Natural Resources Management Plan (INRMP)

1. Per Section 2.7.1 of AFI 32-7064, *Integrated Natural Resource Management*, 18 Nov 14, the Installation Commander shall approve the INRMP by signature on all revised INRMPs. The Installation Commander may re-delegate signature authority to a lower level provided that the signatory has control over all aspects and management objectives addressed within the subject INRMP.

2. Per Section 2.7.2 of AFI 32-7064, *Integrated Natural Resource Management*, 18 Nov 14, the Installation Commander shall certify the annual review of the INRMP as valid and current; or delegates the certification of the annual INRMP review authority to no lower than the Civil Engineer Squadron Commander.

3. IAW Section 2.7.1 and 2.7.2 of AFI 32-7064, *Integrated Natural Resource Management*, 18 Nov 14, I hereby delegate authority to approve revisions and certify the annual review of the INRMP to the Director, 78th Civil Engineer Group (78 GEG/CL). This authority shall not be re-delegated, and only the 78 CEG/CL is authorized to exercise the authority under this delegation.

4. Our point of contact is Mr. Jacob Tuttle, 78 CEG/CEIEC, DSN: 497-9273.

Lyle K. Drew

LYLE K. DREW, Colonel, USAF
Commander

U. S. AIR FORCE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Robins Air Force Base

FY17-FY22

(See INRMP signature pages for plan approval date)

ABOUT THIS PLAN

This installation-specific Environmental Management Plan (EMP) is based on the U.S. Air Force's (AF) standardized Integrated Natural Resources Management Plan (INRMP) template. This INRMP has been developed in cooperation with applicable stakeholders, which may include Sikes Act cooperating agencies and/or local equivalents, to document how natural resources will be managed. Non-U.S. territories will comply with applicable Final Governing Standards (FGS). Where applicable, external resources, including Air Force Instructions (AFIs); AF Playbooks; federal, state, local, FGS, biological opinion and permit requirements, are referenced.

Certain sections of this INRMP begin with standardized, AF-wide "common text" language that address AF and Department of Defense (DoD) policy and federal requirements. This common text language is restricted from editing to ensure that it remains standard throughout all plans. Immediately following the AF-wide common text sections are installation sections. The installation sections contain installation-specific content to address local and/or installation-specific requirements. Installation sections are unrestricted and are maintained and updated by AF environmental Installation Support Teams (ISTs) and/or installation personnel.

NOTE: The terms 'Natural Resources Manager', 'NRM' and 'NRM/POC' are used throughout this document to refer to the installation person responsible for the natural resources program, regardless of whether this person meets the qualifications within the definition of a natural resources management professional in DODI 4715.03.

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DOCUMENT CONTROL

Record of Review – The INRMP is updated not less than annually, or as changes to natural resource management and conservation practices occur, including those driven by changes in applicable regulations. In accordance with (IAW) the Sikes Act and AFI 32-7064, *Natural Resources Management*, the INRMP is required to be reviewed for operation and effect not less than every five years. Annual reviews and updates are accomplished by the base Natural Resources Manager (NRM), and/or an Installation Support Team Natural Resources Media Manager. The installation shall establish and maintain regular communications with the appropriate federal and state agencies. At a minimum, the installation NRM (with assistance as appropriate from the NR Media Manager) conducts an annual review of the INRMP in coordination with internal stakeholders and local representatives of the United States Fish and Wildlife Service (USFWS), state fish and wildlife agency, and National Oceanic and Atmospheric Administration (NOAA) Fisheries, where applicable, and accomplishes pertinent updates. Installations will document the findings of the annual review in an Annual INRMP Review Summary.

INRMP APPROVAL/SIGNATURE PAGES

The current INRMP for Robins AFB has been updated and is considered current for August 2017-August 2022. This version only consists of minor edits that provide updated information and adjusts implementation timelines from the 2012 document that has been reviewed and signed by GADNR and the USFWS. There have been no changes to management goals and objectives that are substantively different than those previously agreed to by the cooperating agencies, or that would result in environmental consequences different from those in the existing INRMP. Per mutual agreement by our cooperating agencies (GADNR and USFWS), the INRMP will remain current and be documented by signature, as required by Air Force Instruction 32-7064 (*Integrated Natural Resources Management*).

PLAN APPROVAL

Gary Schneider, Director
78th Civil Engineer Group
Robins Air Force Base

20 Sep 17.
Date

AGENCY COORDINATION

Cindy Dohner, Director
Southeast Region
U.S. Fish and Wildlife Service

for
8-21-2017
Date

Rusty Garrison, Director
Wildlife Resources Division
Georgia Department of Natural Resources

8-18-2017
Date

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EXECUTIVE SUMMARY

Introduction

This is an updated INRMP, consisting of limited revisions. Under the AF Environmental Impact Assessment Process (EIAP), it qualifies for a NEPA Categorical Exclusion per Title 32, Code of Federal Regulations (CFR), Part 989, described in Appendix F, and, as such, does not require additional NEPA analysis. The public comment requirements under the SAIA are satisfied under the INRMP NEPA process in 2001, and the INRMP updates have not resulted, nor are they expected to result for this update, in biophysical consequences materially different from those evaluated previously. The INRMP Environmental Assessment in 2001 resulted in a Finding of No Significant Impact."

Purpose and Scope of Plan

The purpose of this Integrated Natural Resources Management Plan (INRMP) is to guide the implementation of the natural resources program management at Robins Air Force Base (AFB) and to comply with Department of Defense (DoD) and Air Force (AF) directives, policies, and guidelines, and federal and state laws and regulations for the protection and conservation of natural resources under the control of Robins AFB. This INRMP implements Department of Defense Instruction (DoDI) 4715.03 and AF Policy Directive (AFPD) 32-70 and adheres to guidelines set forth in Air Force Instruction (AFI) 32-7064. The INRMP complies with the requirements set forth in the Sikes Act Improvement Act (SAIA) of 1997 for the conservation and rehabilitation of natural resources on lands used for military mission activities. This plan updates the 2012 INRMP and integrates the various component plans that determine how the natural resource management goals and objectives are to be attained.

The scope of the INRMP encompasses the conservation and management of the plants, fish and wildlife, threatened and endangered species and habitats, surface water and wetlands, and other relevant physical environment attributes within the boundaries of Robins AFB. The plan sets forth goals, practices, and guidelines for the management of natural resources and the enforcement of associated laws and regulations. This INRMP provides an interdisciplinary approach for the conservation and ecosystem-based management of natural resources on Robins AFB. The plan describes the condition of the physical and biotic environments on the Base, discusses potential mission impacts on natural resources and program management, states goals and objectives for attaining and sustaining a desired land condition that is consistent with federal mandates for land stewardship, and provides a work plan for the implementation of natural resources management objectives and actions for the five- year planning period. The INRMP applies to all organizations on Robins AFB that are involved with the management or use of natural resources on the Base.

Support of the Military Mission

The INRMP supports the AF and Robins AFB military mission by providing the framework and tools to assist the installation commander with the conservation and rehabilitation of natural resources consistent with the use of the installation to ensure military readiness. The plan serves as the commander's plan of action for the Base's natural resources program so that the Base remains in compliance, thereby supporting the mission. The plan guides both short-term and long-range resource use decisions and planning activities that integrate both military mission requirements and the Base comprehensive planning process. Implementation of the INRMP will assist in maintaining compliance with natural

resource laws and regulations and provide sustainable landscapes to meet future training and outdoor recreation needs.

Plan Implementation and Benefits

The overarching goal for this INRMP is to maintain or enhance the existing diversity of fish, wildlife, and plant species found at Robins AFB by maintaining or enhancing the habitats necessary for these species to thrive. The management focus is on the conservation of game species and common non-game species; protection of rare species, significant natural communities, and wetlands; and improvement in biodiversity as practicable. Resource conservation and management are carried out using an ecosystems management approach. Specific management goals express Robins AFB's vision of the desired condition for natural resources in the foreseeable future, in this case, the five-year planning period covered by this INRMP. Specific goals for this INRMP are:

Goal 1: Manage forests to maintain or enhance the existing level of native plant species diversity and forest structure and improve urban forest recruitment and vertical stratification to achieve long-term sustainability in concert with competitive uses and management emphasis area (MEA) focus.

Goal 2: Apply sound ecosystem management principles and the best available science to achieve and maintain healthy population levels, ecologically balanced composition, and sustainable productivity of game and non-game fish and wildlife species in aquatic and upland habitats and control nuisance wildlife.

Goal 3: Protect individuals and sustain or increase existing population levels of federal and state native threatened and endangered plant and animal species and habitats, conserve other special status species and habitats, and promote population growth through active management.

Goal 4: Protect jurisdictional wetlands and Waters of the U.S. to sustain "no net loss" and prevent degradation of existing quality, function and value of wetland, surface water, and floodplain resources.

Goal 5: Maintain grounds using practices that conserve existing ecosystem integrity, optimize wildlife value, enhance biodiversity at community and landscape levels, and that support bird/wildlife aircraft strike hazard (BASH) reduction, force readiness and mission effectiveness.

Goal 6: Provide high quality natural resource-related outdoor recreation facilities and opportunities that promote the mental, physical, and social well-being of Base personnel, and others subject to availability, consistent with the military mission and security policies and with minimal impact on sensitive natural resources.

Goal 7: Encourage better utilization and conservation of Base natural resources through effective management and communication that is responsive to customer needs and consistent with the Air Force mission.

Goal 8: Use the geographic information system and coordinated planning to facilitate informed and effective natural resources management and decision-making, and to promote natural resource education.

Implementation of the plan consistent with the military mission and security policies will support force readiness, mission effectiveness, and safety by conserving or improving existing ecosystem quality, protecting and sustaining sensitive species and habitats, and integrating Base programs through the ecosystem management approach. Plan implementation will further ensure no net loss in the capability of the Base to support the military mission.

The goals represent a continuation of the vision stated in the 2012 INRMP and do not represent a significant change in management direction for the installation. It reflects that the INRMP planning analysis and guidance, although it does not actually take action, fosters separate consonant actions. This INRMP represents a limited update of the 2012 document and proposed management actions are not expected to result in biophysical consequences materially different from those actions evaluated previously.

The principal changes in this INRMP are:

- Update of the condition and management status of natural resources since the 2012 INRMP was approved; and
- Update of management goals, objectives, and actions to reflect management accomplishments made since implementation of the 2012 INRMP

1.0 OVERVIEW AND SCOPE

This INRMP was developed to provide for effective management and protection of natural resources. It summarizes the natural resources present on the installation and outlines strategies to adequately manage those resources. Natural resources are valuable assets of the United States Air Force. They provide the natural infrastructure needed for testing weapons and technology, as well as for training military personnel for deployment. Sound management of natural resources increases the effectiveness of Air Force adaptability in all environments. The Air Force has stewardship responsibility over the physical lands on which installations are located to ensure all natural resources are properly conserved, protected, and used in sustainable ways. The primary objective of the Air Force natural resources program is to sustain, restore and modernize natural infrastructure to ensure operational capability and no net loss in the capability of AF lands to support the military mission of the installation. The plan outlines and assigns responsibilities for the management of natural resources, discusses related concerns, and provides program management elements that will help to maintain or improve the natural resources within the context of the installation's mission. The INRMP is intended for use by all installation personnel. The Sikes Act is the legal driver for the INRMP.

1.1 Purpose and Scope

The INRMP provides the framework for documenting and maintaining natural resources program management for compliance with federal, state and local environmental standards and regulations. It is both a comprehensive guide for natural resource management on Robins AFB and a "living document," subject to modification in response to adaptive management decisions and new information or policies. The INRMP describes an interdisciplinary approach for the conservation and ecosystem- based management of natural resources on Robins AFB by setting goals for attaining and sustaining a desired land condition that is consistent with federal mandates for land stewardship. The INRMP supports installation management by assisting the installation commander with the conservation and rehabilitation of natural resources consistent with the use of the installation to ensure military readiness. The INRMP applies to those organizations that are involved with the management or use of natural resources on Robins AFB. INRMP goals and objectives are integrated into project and mission planning activities through consultations and formal review processes.

This INRMP is the primary plan for the management of natural resources and the compliance with and enforcement of federal laws and regulations, DoD and AF policies, directives, and instructions, and state laws. This plan updates the 2012 INRMP (Robins AFB, 2012), builds on the 2001 INRMP (Robins AFB, 2001), 1995 Integrated Natural Resource Management Plan (Robins AFB, 1995a) and the 1989 Natural Resources Plan (USDA, 1989), and integrates the various component plans that determine how the natural resource management goals and objectives are to be achieved. Component plans provide the implementation details for the various natural resource management initiatives. Key plans and studies are archived in an annex to the INRMP (Robins AFB, 2018).

The scope of the INRMP encompasses the conservation and management of the plants, fish and wildlife, threatened and endangered species and habitats, surface water and wetlands, and other relevant physical environment attributes within the boundaries of Robins AFB. The plan is site-specific in cases where management actions occur in specific areas and sets forth overarching management goals, practices, and guidelines that address similar areas basewide. This INRMP presents an overview of the installation and describes the physical and biotic environments in the Installation Profile Section. Mission impacts on natural

resources and natural resource program management are described in the Mission Impacts on Natural Resources Section. The Natural Resources Program Management Section describes natural resources program management. The Management Goals and Objectives Section presents management goals and objectives and management plan implementation is described in the INRMP Implementation, Update, and Revision Process Section. Text references and related documents are listed in the References and Associated Plans Section. Appendices include pertinent supporting information and attachments.

1.2 Management Philosophy

The INRMP supports the military mission by protecting and enhancing land condition for training, providing outdoor recreation opportunities that promote the mental, physical, and social well-being of personnel to enhance force readiness and mission effectiveness, and managing habitats to reduce the risk to personnel and aircraft from birds and wildlife.

The management philosophy of 78 CEG/CEIE is to plan and carry out natural resource tasks using scientifically sound management techniques in applying the AF principles for ecosystem management.

A key element of this philosophy is the use of adaptive management, a process that links monitoring the progress toward meeting INRMP goals and objectives with the evolution of current management actions, so that future management needs can be identified and appropriate adjustments can be made.

The INRMP serves as a tool to guide both short-term and long-range resource management decisions and planning activities that integrate both military mission requirements and the Base comprehensive planning process. The INRMP was developed using interdisciplinary input and is used as a resource for planning activities that depend upon or may affect natural resources at Robins AFB.

The INRMP is intended to be used with the comprehensive Robins AFB geographic information system (GIS) resource maps. Current resource maps are provided on the GIS and their use during planning enhances the INRMP's effectiveness in protecting sensitive resources and integrating with other programs. The INRMP and GIS system serve as decision-making tools for commanders and are key components of the Base comprehensive planning process.

The INRMP implements the AF principles for ecosystem management by setting goals, defining objectives, and developing strategies for maintaining native ecosystem types and processes, restoring habitats and ecological processes as needed, conserving biodiversity, and controlling exotic and invasive plants.

1.3 Authority

INRMPs are mandated under the Sikes Act as amended by the Sikes Act Improvement Act (SAIA) of 1997. The Sikes Act requires the Secretary of Defense to carry out a program to provide for the conservation and rehabilitation of natural resources on lands used for military mission activities. INRMPs are used to implement this program. DoDI 4715.03, Natural Resources Conservation Program, implements policy, assigns responsibilities, and prescribes procedures for the integrated management of natural and cultural resources on property under DoD control.

This INRMP adheres to the guidelines set forth in AFI 32-7064, Integrated Natural Resources Management. AFI 32-7064 explains how to manage natural resources on AF property for compliance with federal, state, and local standards and implements DoDI and AFPD 32-70, Environmental Quality. Robins Air Force Base Instruction (RAFBI) 32-7064, Integrated Natural Resources Management, aligns with AFPD 32-70 and

implements AFI 32-7064 at Robins AFB. Applicable laws, regulations and other policies and directives that guide integrated natural resources management (INRM) at Robins AFB are listed in the Annotated Summary of Key Legislation Related to Design and Implementation of the INRMP Appendix.

1.4 Integration with Other Plans

Key Component Plans and Studies

Plan / Study	Date	Resource Area
A Critical Review of the Pesticide Reduction Program at Robins AFB, GA	January 1997	Integrated Pest Management
Upland Forest Survey	March 1998	Forest Management
Invasive Plants Management Plan	September 1999	Invasive Plant Management
Rare Plant Survey and Management Plan	April 1999	Rare Plants
Threatened and Endangered Animal Species Survey	March 2000	T/E Species
Final Floodplain Survey Report	June 2002	Floodplain Protection
Loblolly Pine Plantations 10-Year Forest Management Plan	January 2003	Timber Management
Avian Radar Survey at Robins Air Force Base	March 2003	Birds
Final Summary Report, Native Ecosystem Restoration Longleaf Pine Reforestation Site	May 2003	Forest Restoration
Baseline Natural Resources Inventory, Reptile and Amphibian Survey	October 2003	Reptiles and Amphibians
Final Outdoor Recreation Management Plan	July 2004	Outdoor Recreation
FY 2004 Final Report for Scout Lake Fisheries Habitat Restoration, Robins Air Force Base, Houston County, GA	November 2004	Fishery Management
Robins Air Force Base Botanical Report	January 2005	Plants
Floodplain Map Update	January 2005	Floodplain Protection
Baseline Natural Resources Inventory Terrestrial Arthropod Study	January 2005	Insects
Natural Resources Wetland Protection Plan	January 2006	Wetland Protection
Rare, Threatened, And Endangered Species Inventory	May 2008	T/E Species, Birds
Scout Lake Fishery Management Report	May 2008	Fishery Management
Invasive Plants Management Plan	May 2008	Invasive Plant Management
Baseline Natural Resources Inventory Fish Survey	May 2008	Fish
Native Ecosystem Management Final Tree Planting Plan FY08	December 2008	Ecosystem Management
Summary Letter for Native Ecosystem Management	April 2009	Ecosystem Management
Wetland Inventory Report	April 2009	Wetland Protection
Rare Plant Monitoring and Management Plan	May 2009	Rare Plants
Invasive Plant Species Control Summary Report	May 2010	Invasive Plant Management
Threatened and Endangered Animal Species Survey	July 2010	T/E Species
Robins AFB Bird/Wildlife Aircraft Strike Hazard [BASH] Plan 91-212 (RAFB BASH Plan)	December 2010	BASH Management
Final Integrated Cultural Resources Management Plan, Robins Air Force Base, Houston County, GA	November 2011	Cultural Resources
Wildland and Prescribed Fire Management Plan	December 2010	Fire Management
Longleaf Pine Summary Letter	January 2011	Forest Management
Best Practices for Landscaping at Robins Air Force Base	March 2011	Grounds Maintenance

2.0 INSTALLATION PROFILE

Office of Primary Responsibility	Environmental Management Branch (78 CEG/CEIE) has overall responsibility for implementing the Natural Resources Management program and is the lead organization for monitoring compliance with applicable federal, state and local regulations
Natural Resources Manager/POC	Name: Add Phone: Add Email: Add
State and/or local regulatory POCs (For US-bases, include agency name for Sikes Act cooperating agencies)	Click here to enter text.
Total acreage managed by installation	6,733 acres
Total acreage of wetlands	2,250 acres
Total acreage of forested land	Click here to enter text.
Does installation have any Biological Opinions? (If yes, list title and date, and identify where they are maintained)	Click here to enter text.
NR Program Applicability (Place a checkmark next to each program that must be implemented at the installation. Document applicability and current management practices in Section 7.0)	☑Threatened and endangered species ☑ Invasive species ☑ Wetlands Protection Program ☑ Grounds Maintenance Contract/SOW ☑ Forest Management Program ☑ Wildland Fire Management Program ☐ Agricultural Outleasing Program ☑ Integrated Pest Management Program ☑ Bird/Wildlife Aircraft Strike Hazard (BASH) Program ☐ Coastal Zones/Marine Resources Management Program ☑ Cultural Resources Management Program

2.1 Installation Overview

2.1.1 Location and Area

Robins AFB is located in central Georgia, approximately 18 miles south of Macon, Georgia, and adjacent to the eastern city limits of the City of Warner Robins in Houston County. Its western boundary runs parallel and adjacent to Georgia State Road 247. The Base encompasses approximately 6,733 acres. Additional land is controlled, but not owned by Robins AFB. This land is principally comprised of clear zone for the runway. There are no agricultural outleases on the installation.

Robins Air Force Base Location

Installation/GSU Location and Area Descriptions

Base/GSU Name	Main Use/Mission	Acreage	Addressed in INRMP?	Describe NR Implications
Robins AFB		6,733 acres	*Include where addressed, Cat II, etc. (e.g., INRMP coverage)*	
[GSU 1]				
[GSU 2]				

2.1.2 Installation History

Prior to acquisition of the land on which Robins AFB is situated, the upland areas of the landscape were altered by agricultural activities between the 1830s and early 1900s. The forerunner of Robins AFB was the Wellston Air Depot, which was activated at the small town of Wellston, population 50. Early in 1941, Macon civic leaders, with the help of Congressman Carl Vinson, persuaded the Army Air Corps to establish a maintenance and supply depot in adjoining Houston County 18 miles south of Macon. The City of Macon and Bibb County purchased 3,000 acres with $100,000 from bonds, and donated the land to the federal government. In 1941 the area around the original tract of 3,108.5 acres established for the Army Air Corps Depot was primarily undeveloped. The Base was established on land that had few agricultural attributes, much of which was covered by wetlands. All of the upland soils were disturbed, and portions of the

wetlands were filled to establish a level land area to construct the buildings and runways needed to conduct the mission of the Army Air Corps.

During the construction phase, Wellston Air Depot was renamed Robins Field in January 1942. Industrial production at the air depot was begun in October of 1942 and, at this time, the name was changed again to Warner Robins Army Air Depot (hereafter referred to by the name established in 1948, Robins Air Force Base). Immediately, a town adjacent to the air depot began to expand and was incorporated as the City of Warner Robins in March 1943 (Hickson, 1976). Through its history the Base and its Commands have had a series of names, all reflecting its logistical mission: Wellston Army Air Depot, Warner Robins Air Depot Control Air Command, Warner Robins Air Technical Service Command, and Warner Robins Air Material Area. On April 1, 1974, the Base was named Warner Robins Air Logistics Center (WR-ALC).

The four decades following World War II were years of challenge and tremendous growth for Robins Air Force Base. The world had entered an era of uneasy peace broken by conflicts that required more and more logistics support. The changing requirements of a jet age AF added a new dimension to the challenge, leading to the growth of the Commands and the Base. In 1958, more growth occurred as Robins AFB was given responsibility for the C-130 aircraft and as preparations were made for adding a bomber wing of the Strategic Air Command (Hickson 1976). During the course of the Vietnam war, Robins AFB was given responsibility for numerous aircraft including the B- 57 Canberra; the AC-119C, AC-119K, and AC-130 Gunships; and the C-130, C-141, C- 123, and C-124 cargo planes (Head, et al., 1996). Since then, Robins AFB has also assumed the responsibilities for other aircraft like the F-15 Eagle, the C-5 Galaxy, Special Forces gunships, the U-2 aircraft, numerous helicopters, and key missile, avionics, and aircraft systems (Head, et al., 1996), and more recently, the C-17 Globemaster.

Today WR-ALC and Robins AFB is one of the south's largest AF bases and Georgia's largest industrial complex, employing over 25,584 military, civilian, and contractor personnel. WR-ALC hosts more than 60 tenant units at Robins AFB. Associate organizations include the 94th Aerial Port Squadron (94 APS), 116th Air Control Wing (116 ACW), 339th Flight Test Squadron (339 FLTS) "Rogues", 638th Supply Chain Maintenance Group (638 SCMG), 689th Combat Communications Wing (689 CCW), Detachment A, Marine Aircraft Group-49 (MAG-49), Georgia Army National Guard - Company H, 171st Aviation Regiment (171 AVN REGT), Headquarters Air Force Reserve Command (HQ AFRC), and other units.

2.1.3 Military Missions

The basic mission of WR-ALC has not changed since its beginnings in 1941. WR-ALC supports the goals and objectives of Air Force Materiel Command (AFMC) and other related AF and DoD activities by providing affordable combat capabilities, readiness, and sustainability to its customer, the warfighter. The methods used in meeting the primary responsibility of the Center, to maintain aircraft and their components, have changed only in the equipment itself and the complexity of the workload. WR-ALC provides combat capabilities for DoD by maintaining and sustaining more than 200 weapon systems and deploying combat-ready forces. The 689 CCW provides communications, air traffic control and weather systems that deploy in support of U.S. military operations anywhere in the world. The 94 APS delivers worldwide combat communications for joint and coalition war fighters supporting combat operations and Humanitarian Relief Operations. The 116 ACW provides long-range, air-to-ground surveillance to detect and track troop ground movements. 339 FLTS provides functional test check flight missions of depot aircraft and oversees and conducts Test and Evaluation programs. MAG-49, Detachment A manages unit facilities and oversees

operations of Marine Light Attack Helicopter Squadron-773 (HMLA-773). Company H 171 AVN REGT transports time- sensitive, mission-critical staff and cargo supporting military units and disaster relief.

Further discussion regarding the Base, major units, and associate unit's missions may be integrated from the Robins website (www.robins.af.mil).

Listing of Tenants and NR Responsibility

Tenant Organization	NR Responsibility
94th Aerial Port Squadron (94 APS)	*Identify which host/tenant organization is responsible for managing tenant's impact to/by natural resources*
116th Air Control Wing (116 ACW)	
339th Flight Test Squadron (339 FLTS) "Rogues"	
638th Supply Chain Maintenance Group (638 SCMG)	
689th Combat Communications Wing (689 CCW), Detachment A	
Marine Aircraft Group-49 (MAG-49)	
Georgia Army National Guard - Company H	
71st Aviation Regiment (171 AVN REGT),	
Headquarters Air Force Reserve Command (HQ AFRC)	

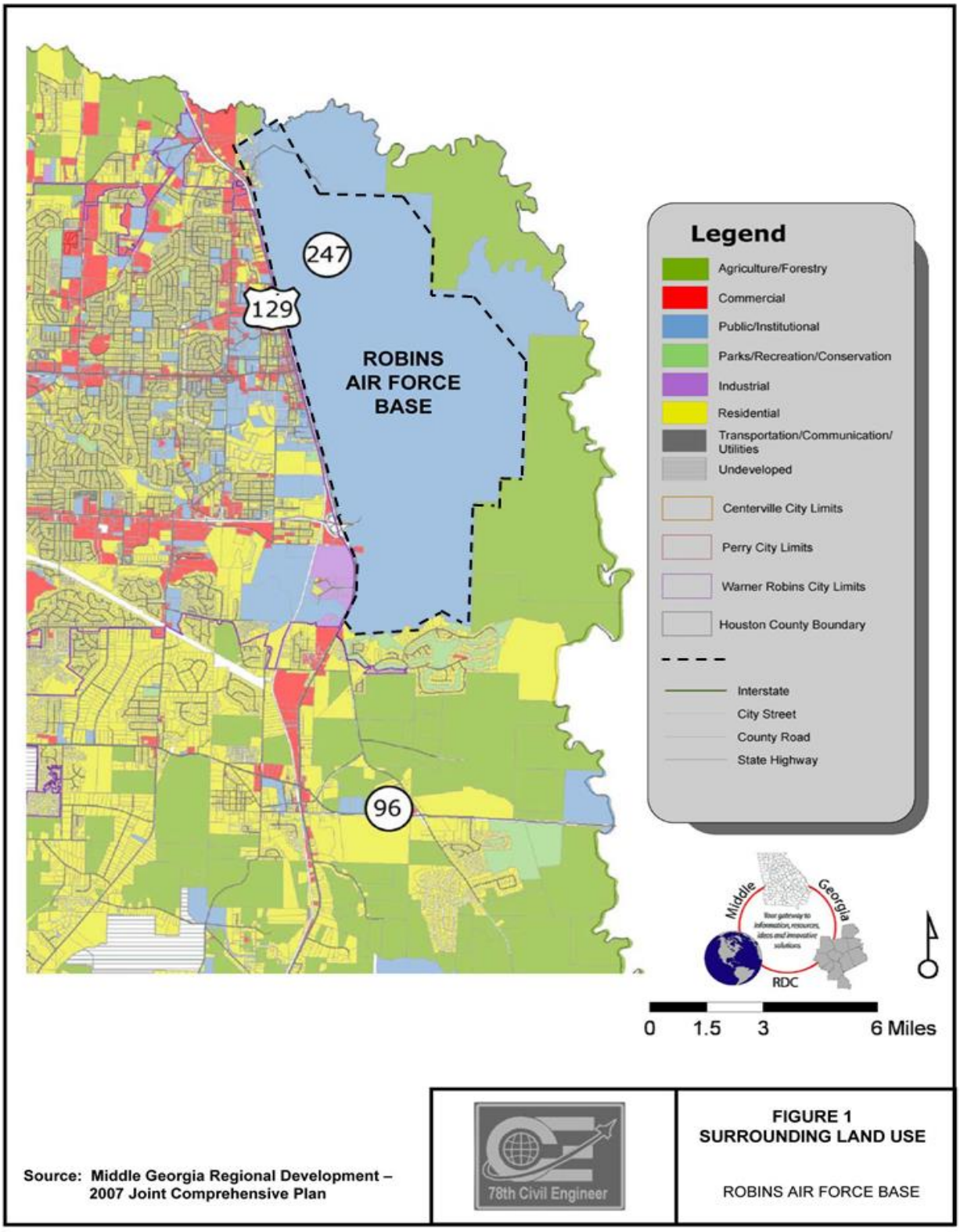
2.1.4 Surrounding Communities

Robins AFB, located in Middle Georgia approximately 100 miles southeast of Atlanta, is Georgia's largest single employer and recognized as the primary economic contributor for the surrounding 26-county region. Houston, Bibb, Twiggs, Crawford, and Peach Counties and the cities of Warner Robins, Centerville, and Byron are closest to the Base. Robins AFB is located in Houston County and bordered on the north, east and south by unincorporated areas of the county. Houston County, with a land area of approximately 377 mi^2, has a current population of 139,900 residents (USCB, 2012). Warner Robins, with a land area of approximately 23 mi^2 and population of over 65,000 is located immediately to the west of the Base. Centerville, with a population of approximately 7,150 residents, is surrounded by Warner Robins and unincorporated portions of Houston County. Perry, the county seat of Houston County, is located approximately 15 miles south of the Centerville/Warner Robins area and has a population of approximately 13,850 residents and total land area of about 16.5 mi^2.

Land use in the general area surrounding Robins AFB is a mixture of commercial, industrial, residential, and agricultural uses (Figure: Surrounding Land Use). Recent development has occurred away from the immediate area of the Base and does not pose a risk for encroachment issues. The most concentrated area of development is in Warner Robins to the west of the Base. Land south of the Base remains largely agricultural with some residential development. Land to the east remains largely undeveloped wetlands and open space. North of the Base, land use is a mixture of low-density residential, agricultural, industrial, and commercial development. The areas immediately east and north of the Base lie within the 100-year floodplain and future development in these areas is unlikely. Cooperative efforts between the Base and

Middle Georgia local governments help ensure the prevention of urban encroachment; maintain military value and mission capability; and protect the health, safety, and welfare of the public (MGRDC, 2004a).

Surrounding Land Use

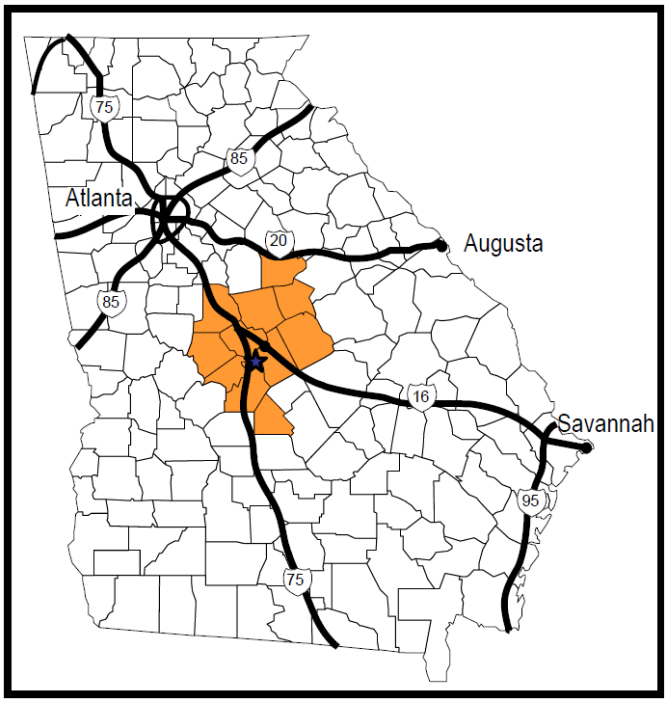


Regional Land Use

The Middle Georgia Region is located in the middle of the state and is divided north/south by the Ocmulgee River and east/west by the Fall Line (MGRDC, 2004b). These two dividing lines converge in Macon which is located approximately 18 miles north of Robins AFB. Macon and Warner Robins are two of the three largest cities in the region and represent cultural and financial centers. The region consists of urban, suburban, and rural developments. Macon and Warner Robins have substantial urbanized areas. The areas surrounding Macon and between Warner Robins and Perry have experienced rapid suburban development in recent years. The counties in the southern and southeastern portions of the region have retained their historic agrarian economic bases.

Macon's suburban areas extend south from the downtown area in neighboring areas of Bibb County. Macon's major industrial areas extend south from the downtown area to the Middle Georgia Regional Airport located just north of Robins AFB. Suburban residential development is expanding to the west and south of Warner Robins, including Centerville and the unincorporated areas of Houston County. Industrial land use is concentrated primarily at and near Robins AFB. Other small urban centers are scattered throughout the rural areas of the region. Within the metropolitan area counties, rural residential land use tends to be more prevalent than forest and agricultural uses. Rural residential land use tends to be lower in the southern portions of the region where agriculture and kaolin mining are predominant, while rural areas north of the Fall Line are characterized more by forest lands, especially near the Oconee National Forest and the Piedmont Wildlife Refuge.

Robins AFB is located in the southern portion of the Middle Georgia Region, southeast of the Fall Line and east of the Ocmulgee River. The Base lies within the Southeastern Plains Ecoregion (GADNR, 2005). Urban sprawl has increased dramatically since 1985 and natural habitats have been converted into agricultural or urban uses that have altered the natural processes of the land. These changes in land use have prohibited the restoration of natural fire regimes on a broad scale. As a result the landscape today contrasts sharply with the historic open oak woodlands, park-like longleaf pine, and other fire-dependent habitats. Residential and commercial development has resulted in the loss of habitat on the outskirts of metropolitan areas and major highways, including the Warner Robins area. The Southeastern Plains encompass approximately 16.3 million acres of which approximately 427,000 acres are in permanent or long-term conservation ownership (GADNR, 2005). Robins AFB is located in the Sand Hills portion of the Southeastern Plains where past conversion of forest and woodland to agricultural land uses outside urban and commercial use areas has resulted in the loss of much of the natural vegetation. The uplands of this region are currently used for row crops, orchards, pastures, hayfields and other agricultural uses. Dryer sites that are generally unsuitable for agricultural uses still contain intact longleaf pine-scrub oak woodlands and associated natural habitats.

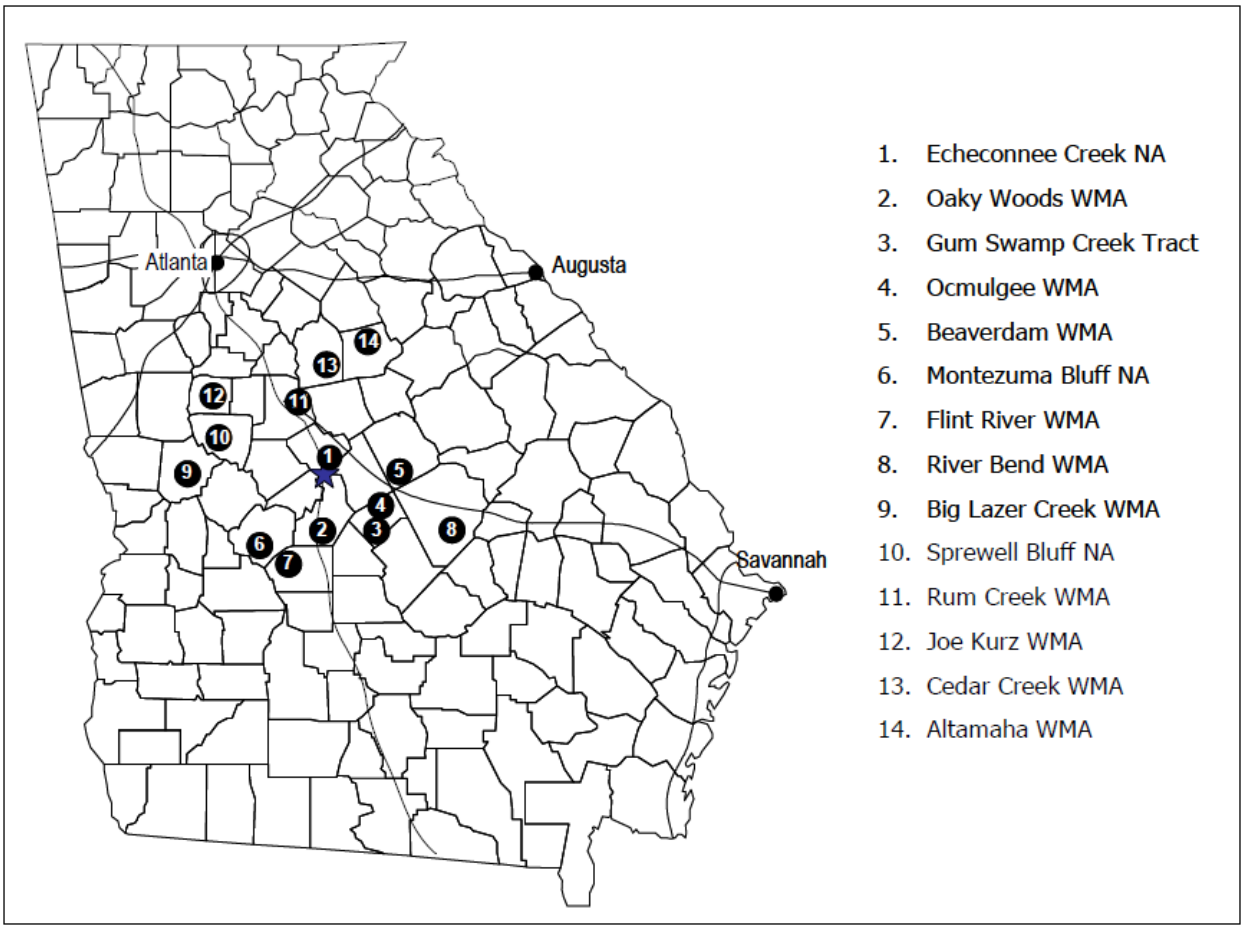


Middle Georgia Region

2.1.5 Local and Regional Natural Areas

Within a 50-mile radius of Robins AFB there are 11 state Wildlife Management Areas (WMA), three state Natural Areas (NA), Baldwin State Forest (SF), the Oconee National Forest (NF), Piedmont National Wildlife Refuge (NWR), and Bond Swamp NWR.

Bond Swamp NWR and the three state natural areas are within 5 miles of Robins AFB. Bond Swamp NWR is located approximately 3 miles north within the Ocmulgee River floodplain, The former West Tract of Oaky Woods WMA is located adjacent to the Base boundary east of the airfield and north of the Base Natural Habitat Preserve Management Emphasis Area (MEA). This area was transferred to the City of Warner Robins for future development. The northern portion of the Ocmulgee WMA is located east of the Base and the Ocmulgee River. The Echeconnee Creek NA is located on Echeconnee Creek north of the Base. There are no state parks near the Base, although there are several urban parks within the City of Warner Robins.



Local and Regional Natural Areas

2.2 Physical Environment

2.2.1 Climate

The warm, humid climate of Robins AFB is influenced by the Gulf of Mexico and the Atlantic Ocean, and by the Appalachian Mountains to the northwest. Warm moist air masses originating from the Gulf and the Atlantic Ocean cause high precipitation in the area and high humidity year-round. The weather is warm and humid during most of the summer and the short winter is characterized by mild temperatures. Precipitation typically is greatest from late November through July. On average, the driest months are September and October and the wettest month is March. Thunderstorms are common during the spring and summer months.

Temperatures of 90° F or higher can be expected on 3 out of 4 days in June, July, and August, and temperatures of 100° F or higher occur an average of 5 to 7 days each summer. The winters are generally mild; daily low temperatures of 32° F or below occur on average about 35 days each winter, in several short periods mostly from December through February. The average growing season is about 250 days. The first killing frost occurs around November 10, while the last freeze occurs around March 20. Average yearly rainfall near the Base is about 45 inches. February, March and July are normally the wettest months, averaging between 4.5 to 5 inches of rainfall. Fall is the driest part of the year, but no month has an

average rainfall of less than 2 inches. Occasionally, there are tornadoes, and some of the more severe local thunderstorms are accompanied by damaging winds. The average relative humidity ranges from 80 to 90 percent in the morning and from 43 to 63 percent early in the afternoon.

Average Temperature (F) & Precipitation (1948-2016)

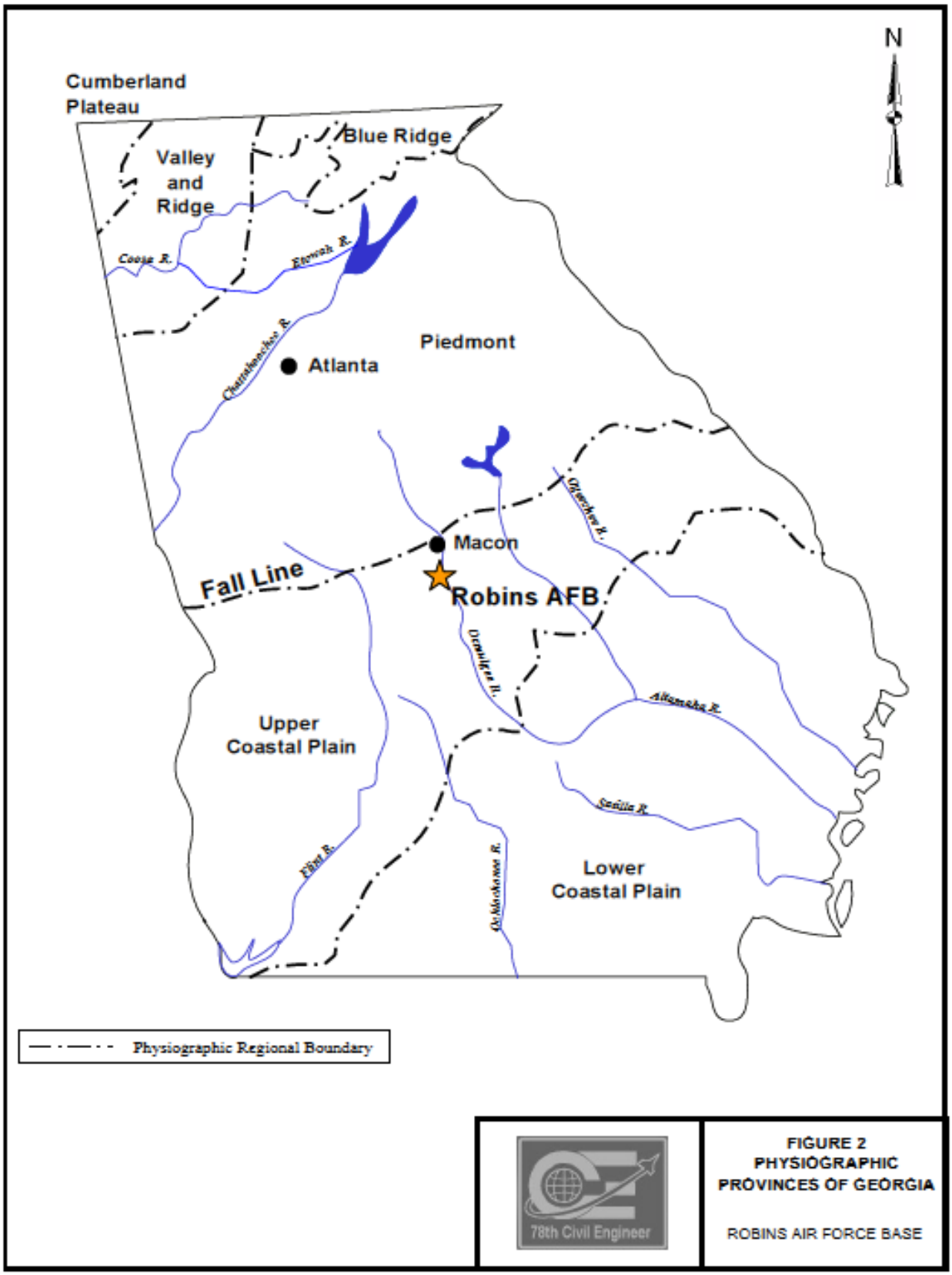
http://www.intellicast.com/Local/History.aspx?location=USGA0346

Date	Average Low	Average High	Record Low	Record High	Average Precipitation	Average Snow
January	34°	57°	-6° (1985)	84° (1949)	5"	0.6"
February	37°	61°	9° (1973)	85° (1989)	4.55"	0.8"
March	44°	69°	14° (1980)	90° (2007)	4.9"	0.1"
April	50°	76°	28° (2007)	96° (1986)	3.14"	0"
May	59°	83°	40° (1997)	99° (1967)	2.98"	0"
June	67°	90°	46° (1972)	106° (1954)	3.54"	0"
July	71°	92°	54° (1967)	108° (1980)	4.32"	0"
August	70°	91°	55° (1952)	105° (2007)	3.79"	0"
September	64°	85°	35° (1967)	102° (1980)	3.26"	0"
October	51°	77°	26° (1952)	100° (1954)	2.37"	0"
November	43°	68°	10° (1950)	88° (1961)	3.22"	0"
December	36°	59°	5° (1962)	82° (1972)	3.93"	0.1"

2.2.2 Landforms

Robins AFB lies within the Atlantic Coastal Plain physiographic province of Clark and Zisa (1976) along the upper margin of the Southeastern Plains Ecoregion of Georgia described by Griffith, et al. (2001). The Base location is about 20 miles southeast of the Fall Line, which separates the more resistant crystalline rocks of the Piedmont Ecoregion from the less resistant unconsolidated deposits of the Southeastern Plains (Figure: Physiographic Provinces of Georgia). The Southeastern Plains Ecoregion is characterized by irregular, interstream plains with a mosaic of cropland, pasture, woodland, and forest (GADNR, 2005). Natural vegetation is mostly oak-hickory-pine and Southern mixed forest. The Base is partly within the Level IV Sand Hills and Level IV Southeastern Floodplains and Low Terraces Ecoregions of the Southeastern Plains of Georgia. The Sandhills Ecoregion forms a narrow, rolling to hilly, highly dissected coastal plain belt that crosses the state from Augusta to Columbus. The Base is situated on the low alluvial terrace of the Ocmulgee River, included in the Southeastern Floodplains and Low Terraces Ecoregion.

The topography of the Base slopes generally eastward, between elevations of about 300 feet mean sea level (msl) on the west and 240 feet msl on the east. Much of the area bordering the eastern side of the Base is low-lying swampland, and parts of the Base have been constructed over filled wetlands. This geographic positioning affords a mixture of lower piedmont, upper coastal plain, sandhill, and lower coastal plain habitats.



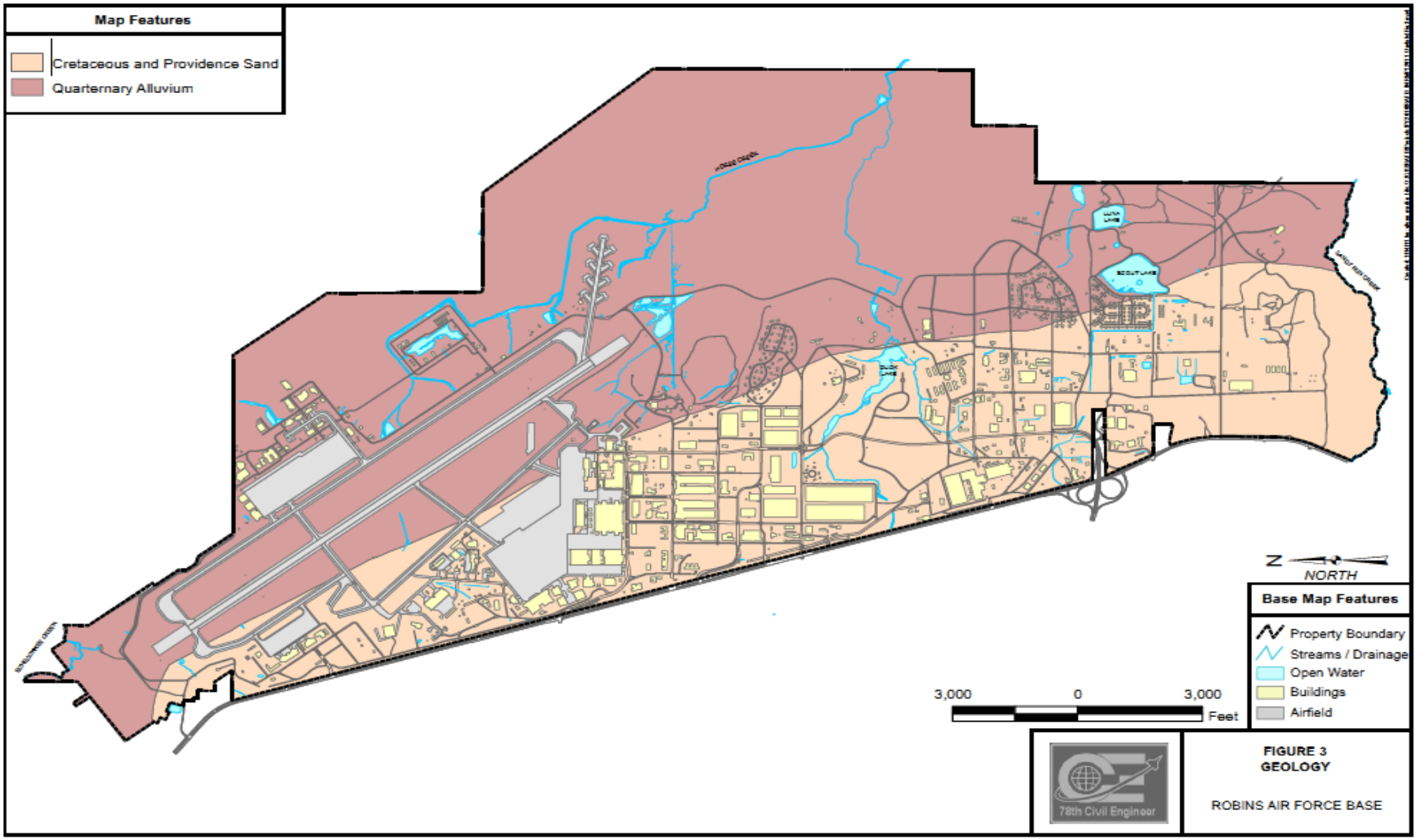
Physiographic Provinces of Georgia

2.2.3 Geology and Soils

Geologic units ranging from Cretaceous to Quaternary, typically unconsolidated, have been described in the Warner Robins area. Older Cretaceous units are encountered to depths of approximately 1,700 feet, underlain by crystalline basement rocks (Figure: Geology). Geologic units consist of Cretaceous Ripley and Providence Sand, Eocene Undifferentiated Sands, and Quaternary Alluvium. Most of the site is immediately underlain by alluvial deposits of the Ocmulgee River. The depth to consolidated deposits is presumed to be at least 1,700 feet. The western half of the Base is sandy alluvial deposits; the eastern part is underlain by peat and fine-grained organic silt deposits.

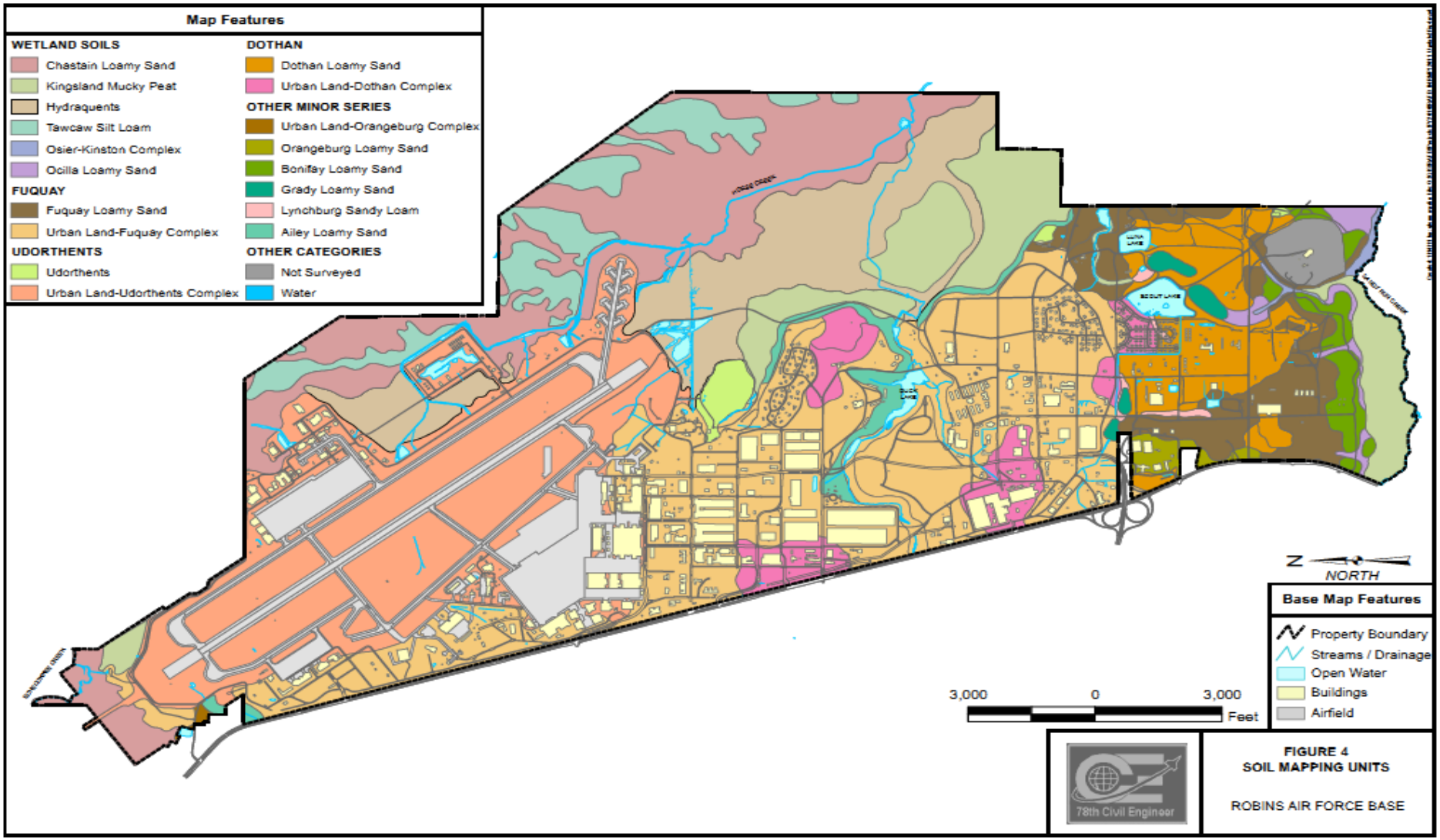
The soil survey of Houston County (USDA, 1967) mapped the most common upland soils as Lucy sand, Lakeland fine sand, and Orangeburg sandy loam. The bottomland soils were mapped as either Chastain-Leaf or Swamp soils. The soils at Robins AFB were mapped more recently in 1992 (Robins AFB, 1992). Information on specific management practices for soils mapped on the Base and limitations and potentials of each soil can be found in the NRCS Soil Survey. The 1992 soil survey produced more detail for the Base, but included some soil series not mapped in the original USDA survey. Sixteen soil units and nine complexes are mapped on Robins AFB. The upland soils are typically sandy and well-drained with low fertility, while the bottomland soils are generally moderately well- to very poorly-drained and subject to flooding. In general, all undeveloped soil types on Robins AFB, including both bottomland (wetland) and upland soils, are suitable for wildlife food plants and protective cover vegetation (Figure: Soil Mapping Units). Some of the upland soils are easily eroded.

Potential prime agricultural soils on the Base include Bonifay loamy sand, Dothan loamy sand, Fuquay loamy sand, Lynchburg sandy loam, and Orangeburg sandy loam. Chastain, Grady, Kingsland, Osier-Kinston, and Tawcaw soils are considered wetland (hydric) soils and typically are not suitable for construction.


Map Features
Cretaceous and Providence Sand
Quarternary Alluvium
N
NORTH
Base Map Features
Property Boundary
Streams / Drainage
Open Water
Buildings
Airfield
3,000
0
3,000
Feet
78th Civil Engineer
FIGURE 3
GEOLOGY
ROBINS AIR FORCE BASE

Geology

Soil Mapping Units



2.2.4 Hydrology

Robins AFB, in the drainage basin of the Ocmulgee River, known as the Altamaha Basin, is drained by four unnamed intermittent creeks flowing from west to east into Horse Creek, which flows in a southeasterly direction to the Ocmulgee River (Figure: Surface Water Features). The direction of surface flow is from west to east, into one of the intermittent creeks or the wetlands on the eastern side of the Base. The stream, pond, and wetland habitats on Robins AFB are hydraulically interconnected and dynamic systems that change seasonally with precipitation and corresponding fluctuations in surface and ground water levels.

Horse Creek and Sandy Run Creek provide most of the stream habitat at Robins AFB. Horse Creek is a small bottomland stream draining marshland in the northeastern portion of the Base. Sandy Run Creek, a significantly larger drainage, marks the southern boundary of the Base. Both creeks are tributaries of the Ocmulgee River and provide habitat for fish, reptiles, and amphibians and for many species of aquatic invertebrates. Most of the Ocmulgee River floodplain at the Base, as well as portions of the Echeconnee Creek floodplain and the Sandy Run Creek floodplain that border the Base to the north and south, respectively, are within the Federal Emergency Management Agency (FEMA) 100-year floodplain (Figure: Floodplain).

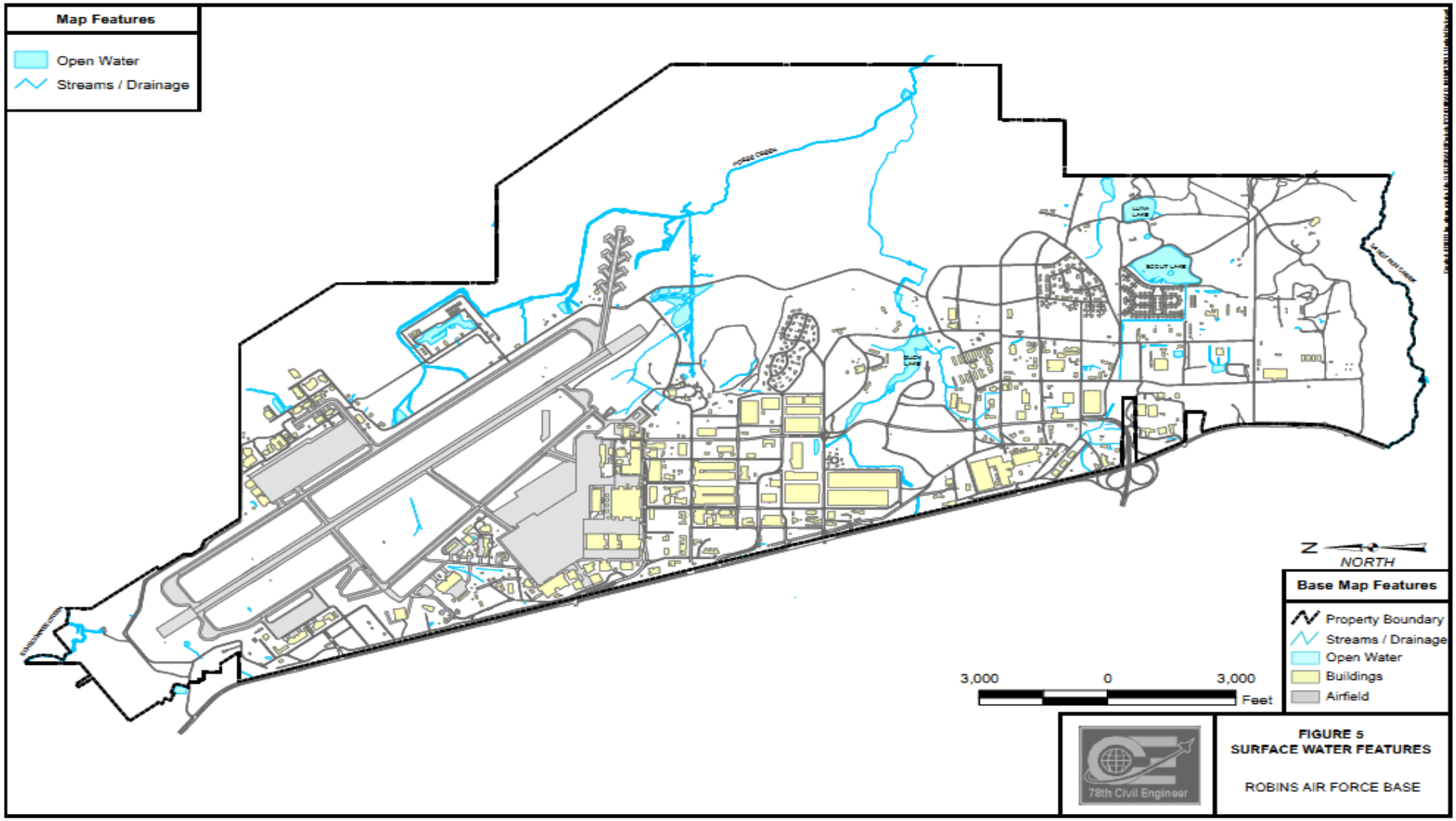
There are three constructed lakes on Robins AFB. Duck Lake (8.34 acres) is located centrally on the Base and is surrounded by a mosaic of upland forest and the trimmed grasses of residential housing along the southern shore and a golf course along the northern shore. Luna Lake (7.70 acres) is open-water habitat used primarily for recreation. Scout Lake (22.36 acres), once connected to the wetlands, has been converted to limnetic habitat. This lake now is artificial open-water habitat.

Both perennial and ephemeral pond habitats are present on Robins AFB. The ephemeral ponds created by rains and the seasonal flooding of the rivers and streams provide extensive aquatic habitat. There is a gum-cypress pond, created by the dam-building activities of beaver, located at the base of the upland hardwood bluff along Fort Valley Street. In addition to the gum-cypress pond, there are several other ephemeral ponds associated with unique plant communities. Inland wetlands are found near streams.

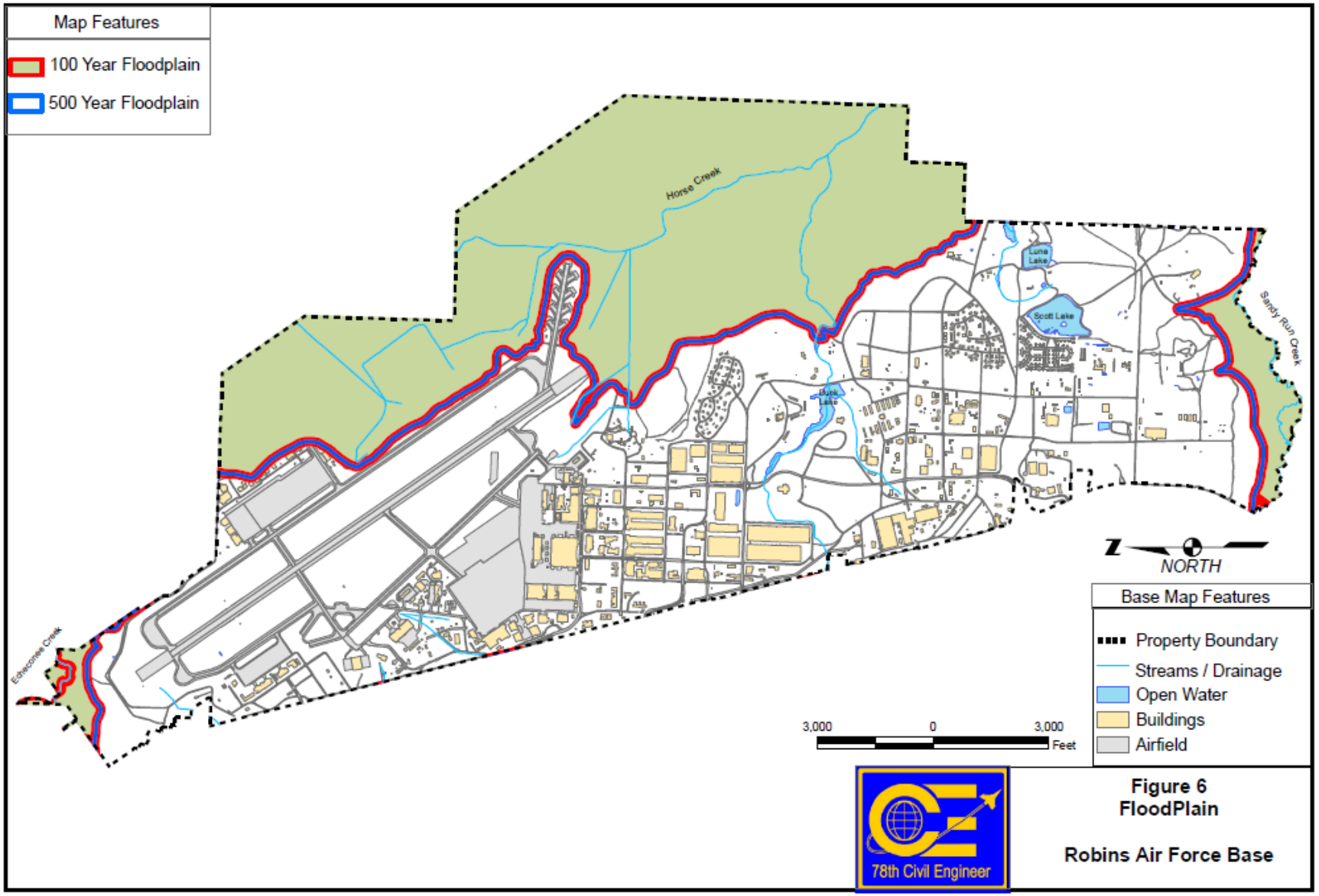
Stormwater runoff from the northern portion of the Base flows north-northeast and discharges to the Ocmulgee River. In the north central portion of the Base, stormwater discharges to Horse Creek from natural, intermittent streams and man-made drainage features. Stormwater from the south-central portion of the Base discharges to Duck Lake and ultimately to Horse Creek. Stormwater in the southern portion of the Base discharges to Scout and Luna Lakes and wetland areas.

The groundwater hydrology of the Warner Robins area has been reported by LeGrand (1962) and by the Georgia Geologic Survey (Sonderegger et al. 1978; Thomson et al. 1956). Groundwater is found beneath Robins AFB under both water table and artesian conditions. The water table is present throughout the Base at shallow depth in the upper sandy alluvial deposits. The water table discharges to the east and contributes to the development of a swampy area extending to the Ocmulgee River. There appears to be a confining bed just below the swamp deposits, which would create weak artesian conditions immediately below this upper layer. Both the land surface and the confining beds are inclined towards the southeast, but the inclination of the beds is steeper. Drinking water for Robins AFB is supplied by seven (six currently active) water wells.

Surface Water Features



Floodplain

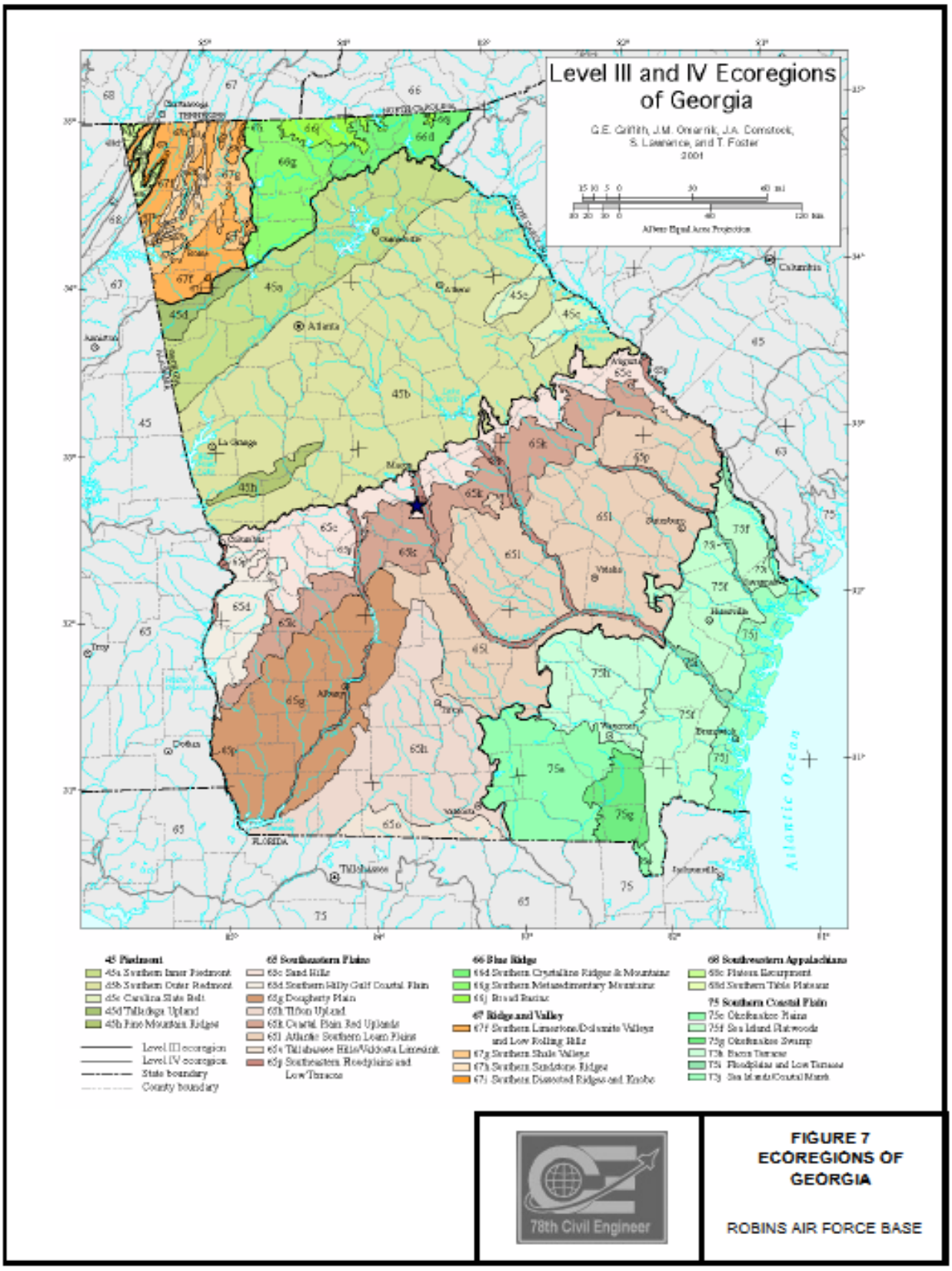

Map Features
100 Year Floodplain
500 Year Floodplain
Horse Creek
Luna Lake
Scott Lake
Duck Lake
Sandy Run Creek
Echeconee Creek
NORTH
Base Map Features
Property Boundary
Streams / Drainage
Open Water
Buildings
Airfield
3,000
0
3,000
Feet
78th Civil Engineer
Figure 6
FloodPlain
Robins Air Force Base

2.3 Ecosystems and the Biotic Environment

2.3.1 Ecosystem Classification

Robins AFB is located in the Southeastern Mixed Forest Province near the transition to the Outer Coastal Plain Mixed Province (Figure: Ecoregions of Georgia) within the Humid Temperate Domain of the Subtropical Division according to the Forest Service's National Hierarchical Framework of Ecological Units described by R.G. Bailey (1995). Overall ecosystem attributes are similar to the Middle Coastal Plains Section ecological unit (McNab and Avers, 1994) where the predominant landform consists of moderately dissected, irregular plains formed by marine deposition. Rock units formed during the Mesozoic and Cenozoic Eras with the Mesozoic strata consisting of Cretaceous sands and clays. The soils have a loamy or sandy surface layer, and a loamy or clayey subsoil. Soils are generally deep and well- to poorly-drained. Streams and rivers within this region are small to medium size with perennial, low velocity, moderate volume flow. The principal forest cover type consists of loblolly (*Pinus taeda*) and shortleaf pine (*P. echinata*) with hardwoods, including sweetgum (*Liquidambar styraciflua*), flowering dogwood (*Cornus florida*), elm (*Ulmus* spp.), redcedar (*Juniperus virginiana*), southern red oak (*Quercus falcate*), and hickories (*Carya* spp.). Southern Floodplain Forest also is present on bottomlands associated with streams and rivers. Typical fauna supported in this Section include white-tailed deer (*Odocoileus virginianus*), black bear (*Ursus americanus*), bobcat (*Felis rufus*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), gray (*Sciurus carolinensis*) and fox squirrel (*S. niger*), eastern chipmunk (*Tamias striatus*), white-footed mouse (*Peromyscus leucopus*), pine vole (*Pitymys pinetorum*), short-tailed shrew (*Blarina brevicauda*), and cotton rat (*Sigmodon hispidus*). Game birds include wild turkey (*Meleagris gallopavo*), bobwhite quail (*Colinus virginianus*), and mourning dove (*Zenaida macroura*). Songbirds include red-eyed vireo (*Vireo olivaceus*), cardinal (*Cardinalis cardinalis*), tufted titmouse (*Parus bicolor*), wood thrush (*Hulocichia mustelina*), summer tanager (*Piranga rubra*), blue-gray gnatcatcher (*Polioptila caerulea*), hooded warbler (*Wilsonia citrina*), and Carolina wren (*Thryothorus ludovicianus*). Herpetofauna includes eastern box turtle (*Terrapene carolina*), common garter snake (*Thamnophis sirtalis*), and water moccasin (*Agkistrodon piscivorus*).

Ecoregions of Georgia



78th Civil Engineer

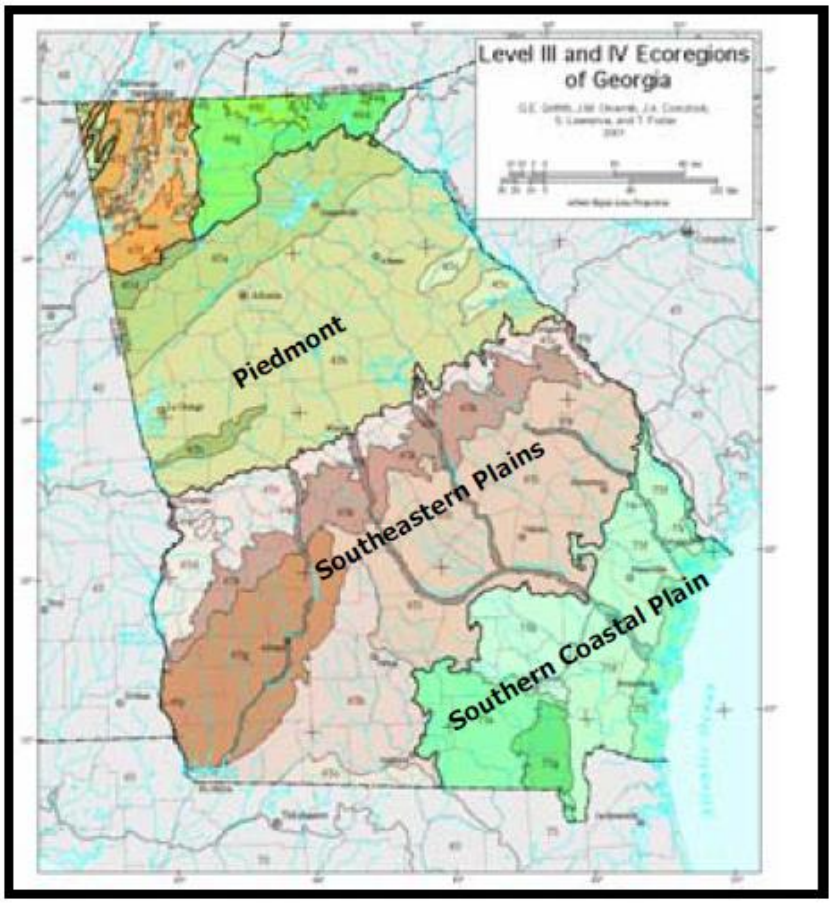
FIGURE 7
ECOREGIONS OF GEORGIA

ROBINS AIR FORCE BASE

The Base's geographic position relative to Griffith et al.'s Ecoregions of Georgia was described in the Landforms Section and generally corresponds to Bailey's hierarchical framework of ecological units as shown below. Most of the developed and undeveloped upland areas of the Base are within the Sand Hills Ecoregion. Portions of the airfield and associated facilities to the northeast and the Bottomland Hardwood Forest to the east and south of the Jeep Trail are within the Southeastern Floodplains and Low Terraces Ecoregion.

Ecosystem Classification Relative to Baily and Griffith *Et al.* Frameworks	
Bailey's Subregions	Griffith et al.'s Ecoregions
Southeastern Mixed Forest Province	Southeastern Plains Ecoregion (Level III)
Middle Coastal Plains Section	Sand Hills and Southeastern Floodplains and Low Terraces (Level IV)

Robins AFB is located partly on a terrace and partly on bottomland of the Ocmulgee River. Upland pine forest, upland hardwood forest, and alluvial wetland and bottomland forest communities define the coastal plain ecosystem near the Base.



Level III and IV Ecoregions of Georgia

2.3.2 Vegetation

GUIDANCE FROM AFI 32-7064 (REVIEW AND REPLACE WITH INSTALLATION-SPECIFIC CONTENT):
Describe the historic and current vegetation associations for the ecological units within and surrounding the installation.

2.3.2.1 Historic Vegetative Cover

The historic vegetation cover was described by Lamoreaux (1999) based on analysis of a thick peat deposit along Sandy Run Creek near the southwestern corner of the Base. Results suggest that the pre-Modern vegetation consisted of semi-arid temperate woodland or open boreal forest with the Atlantic Coastal Plain containing a mosaic of open pine-dominated forest with some spruce and prairie grassland between 22,000 and 13,000 years ago. In response to warmer and wetter climate, the area experienced a transition to a closed cool temperate forest of mixed conifers and deciduous broadleaf trees. The longleaf pine ecosystem developed as a result of native burning. By about 5,000 years ago oak (*Quercus* spp.) and gum (*Nyssa* spp., *Liquidambar* spp.) were more abundant than pine (*Pinus* spp.) and several new species, including sweetgum, yellow poplar (*Liriodendron tulipfera*), basswood (*Tilia* spp.), and magnolia (*Magnolia* spp.) began to appear. By about 3,800 years ago to the present understory trees and shrubs such as hornbeam (*Carpinus* spp.) and bayberry (*Morella* spp.) became increasingly well-represented.

2.3.2.2 Current Vegetative Cover

The plants and natural communities that occur on Robins AFB have been surveyed and reported in several past studies and reports. The consolidated plant species list contains 413 total taxa (Plant and Animal Species List Appendix, Tables E-1 and E- 2). Forbs (non-woody, seed-producing plants other than grasses) represent the most diverse group of plants recorded on the Base, while the diversity among grasses, shrubs and trees recorded on the Base is similar. Selected plant species occurrence on the Base and their wildlife value are summarized in Table: Selected Plant Species Occurrence and Wildlife Value.

The existing natural vegetation on Robins AFB may be divided into three general associations or cover types (Figure: Forest Types): (1) upland forest, (2) bottomland forest, and (3) transitional forest. The largest parcel of undeveloped land is the bottomland forest located on the Horse Creek/Ocmulgee River floodplain on the eastern side of the Base. This forest occupies a total of 2,142 acres in 10 delineated areas, mostly in the southern and eastern portions of the Base. Interspersed among this bottomland forest are tupelo sloughs, gum-cypress sloughs, and a backwater flat. The floodplain of Sandy Run Creek that flows along the southern boundary of the Base also is relatively undisturbed bottomland forest. Floodplain cover types are shown in Figure: Floodplain Cover Type. Moving upslope (to the north) from Sandy Run Creek, the creek swamp forest transitions into bay swamp forest then to oak-pine upland forest. These bottomland and transition forests provide high wildlife value.

Upland forest occupies approximately 534 acres in seven areas, primarily in the southeastern portion of the Base. The current upland pine forests are dominated by longleaf pine (*Pinus palustris*) and loblolly pine (*P. taeda*). Upland hardwood forests are characterized by dominants including various species of oaks, southern magnolia (*Magnolia grandiflora*), American beech (*Fagus grandiflora*), sweetgum, and loblolly pine.

Selected Plant Species Occurrence and Wildlife Value

Common Name	Scientific Name	Base Location[1]	Wildlife Value[2]
Allegheny monkeyflower	*Mimulus ringens*	1	X
Alligatorweed	*Alternanthera philoxeroides*	4, lakes, wetlands	X
American beautyberry	*Callicarpa americana*	8,9	F
American beech	*Fagus grandifolia*	8	F,C
American elm	*Ulmus americana*	1,8	F,C,N
American holly	*Ilex opaca*	2,5,7	F
American hornbeam	*Carpinus caroliniana*	1	F
American witchhazel	*Hamamelis virginiana*	8	F
Aquatic milkweed	*Ascelpias perennis*	1	X
Atamasco lily	*Zephyranthes atamasca*	low woods, wet meadows, roadsides	X
Awnpetal meadowbeauty (Awned meadowbeauty)	*Rhexia aristosa*	6	X
Bahia grass	*Paspalum notatum*	airfield, open ground, pastures	X
Bald cypress	*Taxodium distichum*	1,4	F,N,B
Black cherry	*Prunus serotina*	7,8	F
Black willow	*Salix nigra*	5	F
Blue waterhyssop	*Bacopa caroliniana*	6	X
Broadleaf cattail	*Typha latifolia*	ponds, lakes, streams, ditches	F,C,N
Callery pear (Bradford pear)	*Pyrus calleryana*	7	X
Camphor weed	*Pluchea camphorata*	6	X
Cardinal flower	*Lobelia cardinalis*	1	F
Carolina buckthorn	*Frangula caroliniana*	8	F
Carolina elephantsfoot	*Elephantopus carolinianus*	low, open woods, moist thickets, stream banks	F
Carolina silverbell	*Halesia carolina*	8	F
Centipede grass	*Eremochloa ophiuroides*	urban areas, sunny, dry locations	X
Cherrybark oak	*Quercus pagoda*	1,8	F
Chinaberrytree	*Melia azedarach*	7	F
Chinese privet	*Ligustrum sinense*	8	F
Cinnamon fern	*Osmunda cinnamomea*	3,4,8	F
Climbing hempvine	*Mikania scandens*	wet soils in new forest, older forest openings	X
Clustered	*Sanicula odorata*	1	X
Coastal doghobble	*Leucothoe axillaris*	1,2,3,4,8	C
Common Name	*Scientific Name*	Base Location1	Wildlife Value2
Common Bermuda	*Cynodon dactylon*	urban areas, golf course	F
Common lady fern	*Athyrium filix-femina*	2	C
Common sweetleaf	*Symplocos tinctoria*	8	F
Coral greenbrier	*Smilax walteri*	2,3,4,5	F,C,N
Crepemyrtle	*Lagerstroemia indica*	7	X
Darlington oak	*Quercus hemisphaerica*	7	F
Devil's walkingstick	*Aralia spinosa*	8	F
Dogfennel	*Eupatorium capillifolium*	open ground, disturbed areas	C
Dwarf palmetto	*Sabal minor*	1,5	F

Common Name	Scientific Name	Base Location[1]	Wildlife Value[2]
Eastern baccharis	*Baccharis halimifolia*	open woods, forest margins	N
Eastern bluestar	*Amsonia*	1	X
Eastern poison ivy	*Toxicodendron radicans*	1,8	F
Eastern redbud	*Cercis Canadensis*	7	F
Eastern redcedar	*Juniperus virginiana*	upland forest, open fields	F,C
Eastern sweetshrub	*Calycanthus floridus*	8	F
Ebony spleenwort	*Asplenium platyneuron*	8	X
Farkleberry	*Vaccinium arboreum*	5,9	F
Fetterbush lyonia	*Lyonia lucida*	2,3	F
Finger rot	*Cnidoscolus stimulosus*	open fields, disturbed areas	F
Flameleaf sumac	*Rhus copallinum*	roadsides, other disturbed	F
Flowering dogwood	*Cornus florida*	7,8,9	F
Giant cane	*Arundinaria gigantea*	1,2	C,N
Grassy arrowhead	*Sagittaria graminea*	wet ditches, lake and pond	X
Green ash	*Fraxinus pennsylvanica*	1	F
Harper's wild ginger	*Hexastylis shuttleworthii var.*	2	X
Hazel alder	*Alnus serrulata*	2	C
Inkberry	*Ilex glabra*	2	F,C
Japanese honeysuckle	*Lonicera japonica*	8	F
Japanese privet	*Ligustrum japonicum*	8	F
Jewelweed	*Impatiens capensis*	1	X
Laurel greenbrier	*Smilax laurifolia*	2,3,5	F
Laurel oak	*Quercus laurifolia*	1,2,3,5,7,8,9	F
Littleleaf sensitivebrier	*Mimosa microphylla*	open fields, disturbed areas	X
Live oak	*Quercus virginiana*	7	F,C
Lizard's-tail	*Saururus cernuus*	1,2	F
Loblolly pine	*Pinus taeda*	7,8	F,C,N
Common Name	*Scientific Name*	Base Location1	Wildlife Value2
Longleaf pine	*Pinus palustris*	7	F,N
Maidencane	*Panicum hemitomon*	6	N
Mockernut hickory	*Carya tomentosa*	8,9	F
Mountain azalea	*Rhododendron canescens*	2	X
Netted chainfern	*Woodwardia areolata*	2,3,4	F,C
Ocmulgee skullcap	*Scutellaria ocmulgee*	8	X
October ladies'-tresses (Oval	*Spiranthes ovalis*	wetland east of PAVE PAWS	X
Overcup oak	*Quercus lyrata*	1	F
Peppervine	*Ampelopsis arborea*	1,5	F
Possumhaw (Southern wild	*Viburnum nudum*	2	X
Red buckeye	*Aesculus pavia*	8	F
Red maple	*Acer rubrum*	2,3,5,7,8	F,C,N
Red mulberry	*Morus rubra*	8	F
Redbay	*Persea borbonia*	2,3,8	F
River birch	*Betula nigra*	7, bottomland and upland	F
Roundleaf greenbriar	*Smilax rotundifolia*	8	F
Royal fern	*Osmunda regalis*	2,4	X
Rue-anemone	*Thalictrum thalictroides*	upland hardwood and mixed	X
Saw greenbrier	*Smilax bona-nox*	2,5	F

Common Name	Scientific Name	Base Location[1]	Wildlife Value[2]
Shortleaf pine	*Pinus echinata*	7,9	F,N
Silktree (Mimosa)	*Albizia julibrissin*	7	X
Slash pine	*Pinus elliottii*	7	F,C,N
Smallflower pawpaw	*Asimina parviflora*	8	F
Smallspike falsenettle	*Boehmeria cylindrica*	2	X
Soft rush	*Juncus effusus*	4	F,C
Sourwood	*Oxydendrum arboreum*	upland forest areas	F,N
Southern magnolia	*Magnolia grandiflora*	7	F,C
Southern red oak	*Quercus falcate*	7,8	F,C
Spanish moss	*Tillandsia usneoides*	throughout forests	C,N
Spurred butterfly pea	*Centrosema virginianum*	open woods, clearings	F
Stiff dogwood	*Cornus foemina*	5	F
Strawberry bush	*Euonymus americana*	8	F
Sugarberry	*Celtis laevigata*	bottomland, upland forests	F
Swamp chestnut oak	*Quercus michauxii*	1	F
Stiff dogwood	*Cornusfoemina*	5	F
Swamp loosestrife	*Decodon verticillatus*	margins of streams, ponds,	F
Swamp smartweed	*Polygonum*	6	X
Swamp sunflower	*Helianthus angustifolius*	open wet areas, ditches,	F
Swamp Titi	*Cyrilla racemiflora*	4,5	F,C
Swamp tupelo	*Nyssa biflora*	1,2,3,4,5	F,N
Sweetbay	*Magnolia virginiana*	2,3,5	F
Sweetgum	*Liquidambar styraciflua*	1,2,5,7,8	F
Taiwanese photinia	*Photinia serrulata*	8	X
Tallowtree	*Sapium sebiferum*	7	F
Thorny olive	*Elaeagnus pungens*	8	F,C,N
Tuliptree	*Liriodendron tulipifera*	2,3,8	F
Virginia sweetspire	*Itea virginica*	1,2,4	F
Water hickory	*Carya aquatica*	1	F
Water oak	*Quercus nigra*	2,3,5,7	F
Water tupelo	*Nyssa aquatica*	1,4	F
White fringetree	*Chionanthus virginicus*	upland forest, stream banks	F
White oak	*Quercus alba*	8	F
Willow oak	*Quercus phellos*	7	F
Winged elm	*Ulmus alata*	7	F

Notes:

[1] Specific Base locations are identified by numbers as defined below:

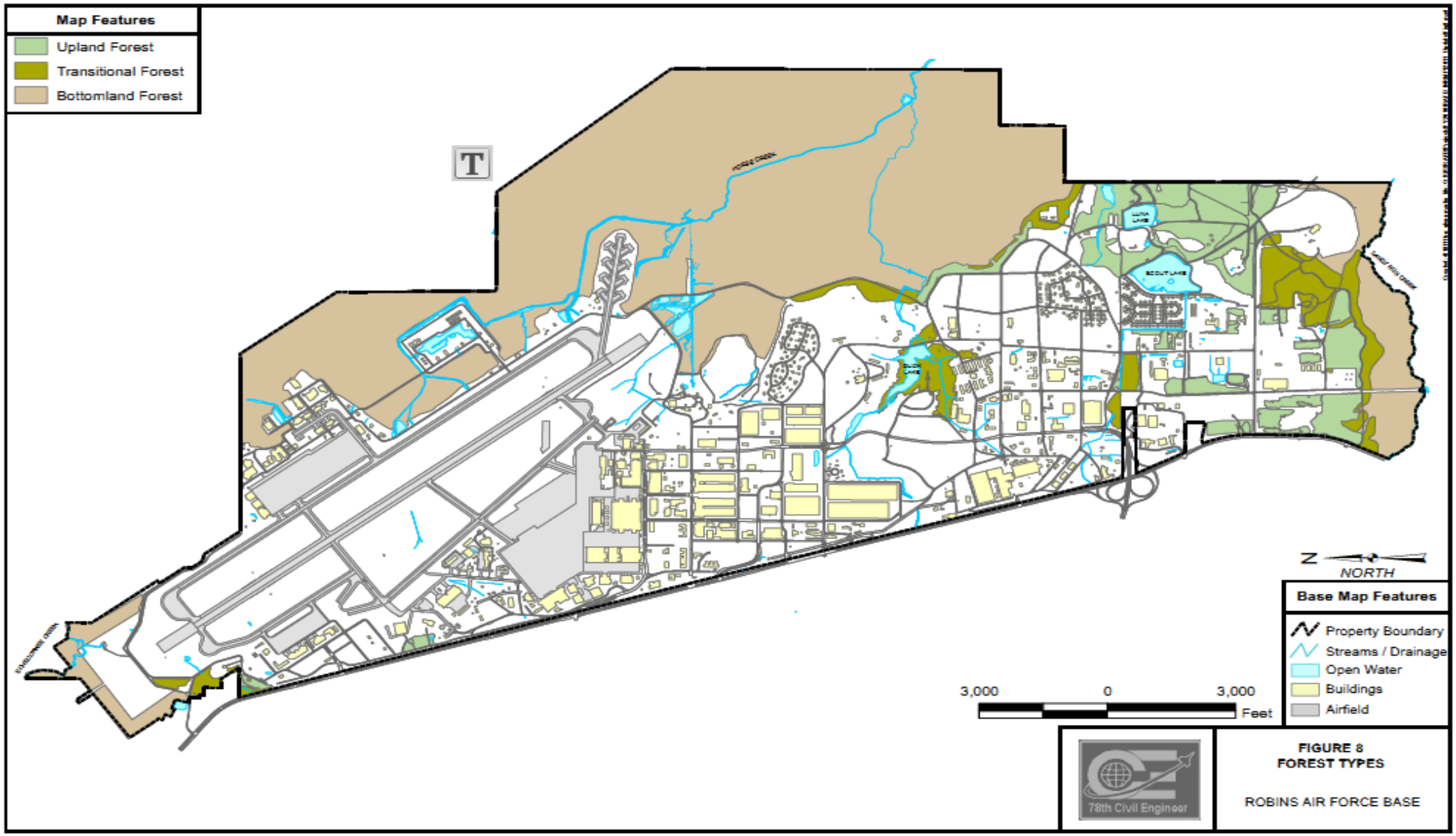
1—Bottonland Hardwood Swamp
2—Creek Swamp
3—Bay Swamp
4—Gum-Cypress Pond
5—Gum Pond
6—Grady Freshwater Meadow
7—Urban Forest
8—Upland Hardwood Bluff
9—Longleaf Pine Forest

Note that these locations are the habitats where an observer is more likely to encounter the species and may not be the only location where the species occurs on Robins AFB. General locations where the species may be present on the Base are indicated in the table.

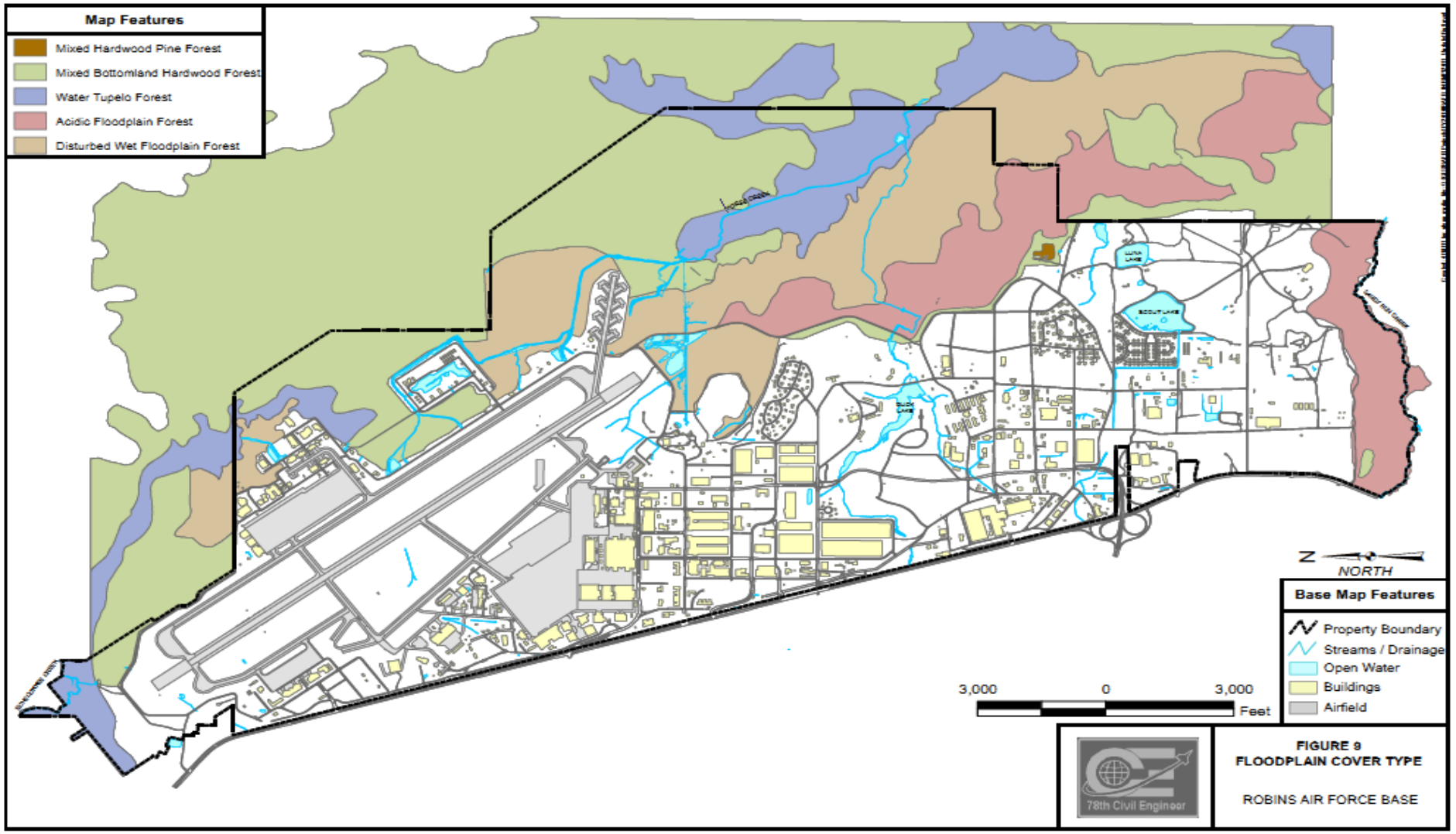
[2] Wildlife value is defined as follows:

F—food
C—cover
N—Nesting
B—Breeding sites
X—No wildlife value was reported in the references used for this report.

Forest Types



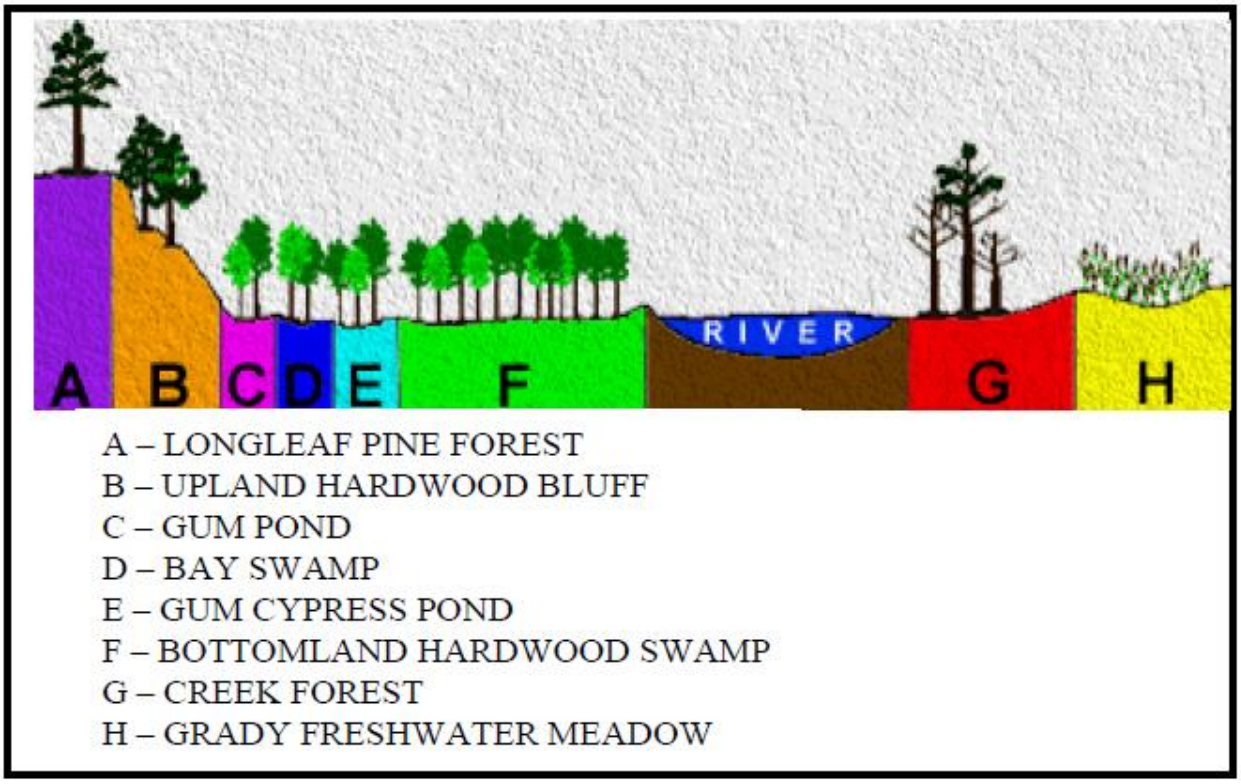
Floodplain Cover Type



Significant Natural Communities

Eight significant communities were identified by Georgia DNR, Natural Heritage Program personnel during a survey of rare species and natural communities on the Base (Heyman, 1994): (1) relict successional longleaf pine forest, (2) relict upland hardwood bluff forest, (3) gum pond, (4) bay swamp, (5) gum-cypress pond, (6) old growth bottomland hardwood swamp, (7) creek forest, and (8) Grady freshwater meadow.

These communities include five forested wetland habitats, one non-forested wetland habitat, and two upland habitats (Figure: Significant Natural Communities). Four of the eight significant community types (old-growth bottomland hardwood swamp, bay swamp, creek swamp, and gum- cypress pond) are located primarily in bottomland forest; the other four in transitional and upland forests.



Significant Natural Communities

Bottomland Hardwood Swamp—This old growth natural community, located on the Horse Creek and Ocmulgee River floodplains on the eastern portion of the Base, is comprised of a series of plant community mosaics due to differing hydrologic regimes ranging from seasonal to semi-permanent flooding. The largest portion of this community is a seasonally-flooded old growth bottomland hardwood forest, characterized by an overstory comprised of a variety of oaks and other hardwoods.

Bottomland Hardwood Swamp

Creek Forest - This natural swamp forest community type, found along the floodplain of Sandy Run Creek at the southern boundary of the Base, has a canopy dominated by sweetbay (*Magnolia virginiana*), redbay (*Persea borbonia*), blackgum (*Nyssa sylvatica*), sweetgum, red maple (*Acer rubrum*), and water oak (*Quercus nigra*).

Bay Swamp - This natural community is located at the base of the Upland Hardwood Bluff. A second, smaller Bay Swamp is located in the southern portion of the Base directly north of the Creek Swamp. These swamps contain a layer of peat at the surface that retains water, acting as a small reservoir. The canopies are dominated by sweetbay, redbay, blackgum, and yellow poplar.

Bay Swamp

Gum-Cypress Pond - This unusual community type results from ponding caused by beavers and is located at the base of the Upland Hardwood Bluff. Dominant trees include blackgum and bald cypress (*Taxodium distichum*) with some water tupelos present.

Gum Pond - Six seasonally-flooded (ephemeral) gum ponds are located on the Base. These are low areas or depressions containing Grady soils. They hold little water during most of the year, but dramatically increase in size and water depth during the late winter and early spring rains. Dominants in these ponds are blackgum and sweetgum, with abundant black willow (*Salix nigra*), sweetbay, and red maple. Three ponds are located directly north of the jeep trail that parallels

Sandy Run Creek; two ponds east and west of Macon Street, respectively; and a pond is located southeast of Scout Lake.

Gum Pond

Grady Freshwater Meadow - This unique natural community is comprised of several concentric rings, each with a particular dominant flora. Dominants in the center of the pond include the awnpetal meadow beauty [(awned meadowbeauty) *Rhexia aristosa*], Maryland meadowbeauty (*Rhexia mariana*), little floatingheart (*Nymphoides cordata*), blue waterhyssop (*Bacopa caroliniana*), globefruit primrose-willow (*Ludwigia sphaerocarpa*), Short's hedgehyssop (*Gratiola viscidula*) and sticky hedgehyssop (*Gratiola brevifolia*), coppery St. Johnswort (*Hypericum acutifolium*), brownish beakrush (*Rhynchospora capitellata*), and spikerush (*Eleocharis* sp.). A narrow strip of grassleaf rush (*Juncus marginatus*), bog rush (*Juncus biflorus*), and globefruit primrose-willow surrounds the center of the pond. Outside of this area, a strip of buttonweed (*Diodia* spp.), woolgrass (*Scirpus cyperinus*), swamp smartweed (*Polygonum hydropiperoides*), forked rush (*Juncus dichotomus*), and maidencane (*Panicum hemitomon*) occurs.

Several grasses (Panicum spp.), loblolly pine seedlings, and Chinese lespedeza (*Lespedeza cuneata*) occur throughout the freshwater meadow.

Upland Hardwood Bluff - Two 40- to 50-foot bluffs separate the floodplain and sandhill ecosystems along Hannah Drive and Fort Valley Streets on the eastern side of the Base. The larger of these upland hardwood bluff forests is located east of Crescent Drive and Fort Valley Streets. The canopy is dominated by sweetgum, red maple, yellow poplar, American beech, white oak (*Quercus alba*), laurel oak (*Quercus laurifolia*), southern red oak (*Quercus falcata*), and mockernut hickory (*Carya tomentosa*). Small clumps of Ocmulgee skullcap (*Scutellaria ocmulgee*) are scattered extensively through the area. A single specimen of needle palm (*Rhapidophyllum hystrix*) has been reported on the bluff and is considered to be a relict, sporadically-occurring species.

The second hardwood bluff forest is located east of the golf course and on the west side of Hannah Road. The canopy is dominated by American beech with water oak, cherrybark oak (*Quercus pagoda*), white oak, mockernut hickory, sand hickory (*Carya pallida*), blackgum, yellow poplar, black cherry (*Prunus serotina*), and loblolly pine also present. Ocmulgee skullcap is scattered throughout this hardwood bluff community.

Upland Hardwood Bluff

Longleaf Pine Forest - This natural community represents a regenerating native longleaf pine-wiregrass ecosystem that had reverted to upland hardwood habitat due to past fire suppression. The 22-acre site was harvested, excluding the mature longleaf pines, and replanted with longleaf pine seedlings in the winter of 1997-1998. Selected forestry herbicides were applied to control the competing understory and non-longleaf pine species and prescribed burns were conducted in March 2004, February 2009, and November 2011 to facilitate reestablishment of the original longleaf pine-wiregrass habitat.

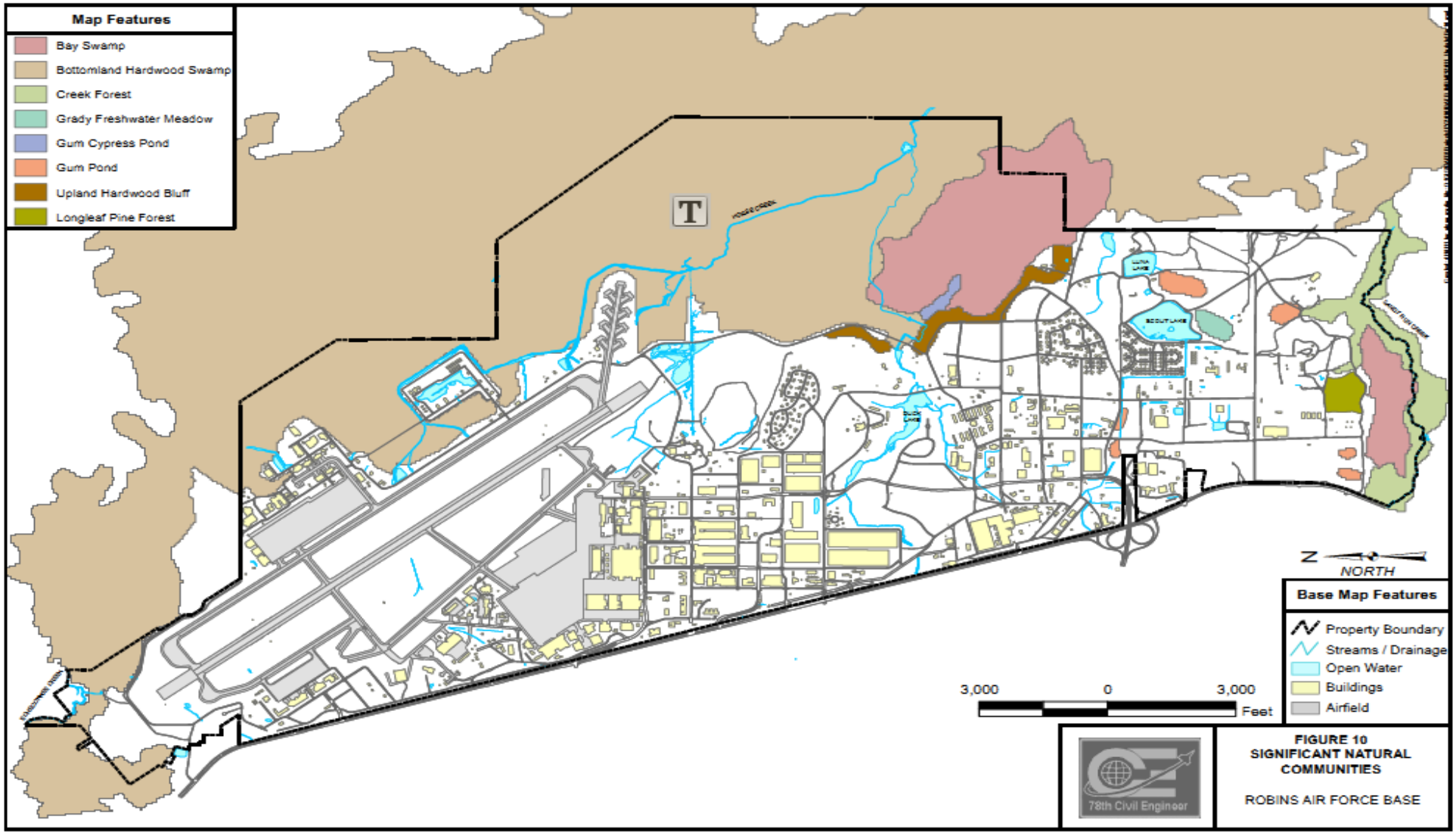
Invasive/Exotic Plants

Invasive plant species present on the Base are:

- Alligatorweed (*Alternanthera philoxeroides*)
- Asian dayflower (*Murdannia keisak*)
- Autumn olive (*Elaeagnus umbellata*)
- Bahia grass (*Paspalum notatum*)
- Bull thistle (*Cirsium vulgare*)
- Bush honeysuckle (*Lonicera maackii*)
- Chinaberrytree (*Melia azedarach*)
- Chinese/Japanese privet (*Ligustrum sinense / L. japonicum*)
- Chinese tallowtree (*Sapium sebiferum*)
- Chinese wisteria (*Wisteria sinensis*)
- English ivy (*Hedera helix*)
- Japanese honeysuckle (*Lonicera japonica*)
- Kudzu (*Pueraria montana var. lobata*)
- Multiflora rose (*Rosa multiflora*)
- *Phragmites australis*
- Sacred bamboo (*Nandina domestica*)
- Sericea lespedeza (*Lespediza cuneata*)
- Silktree (*Albizia julibrissin*)
- Taiwanese photinia (*Photinia serrulata*)
- Water hyacinth (*Eichhornia crassipes*)

- Winter creeper (*Euonymus fortunei*)

Significant Natural Communities



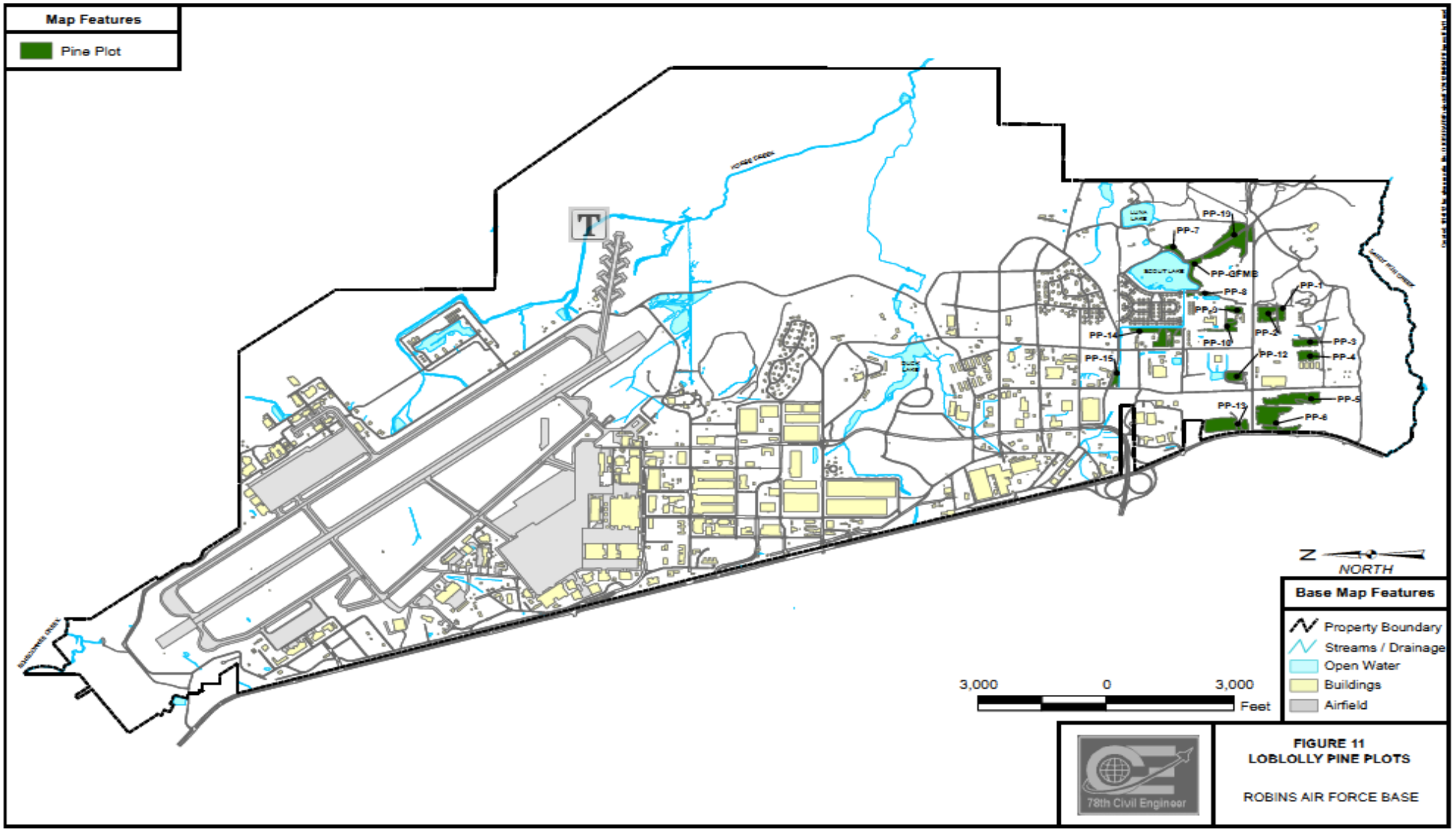
2.3.2.3 Turf and Landscaped Areas

In addition to the natural cover types, vegetation cover types of more intensely managed and developed areas have been mapped and include planted pine and timber areas, turf grass and golf course, and general field areas. Loblolly pine stands and smaller woodlots are located throughout the southern portion of the Base. Sixteen individual loblolly stands comprise about 60 acres (Figure: Loblolly Pine Plots).

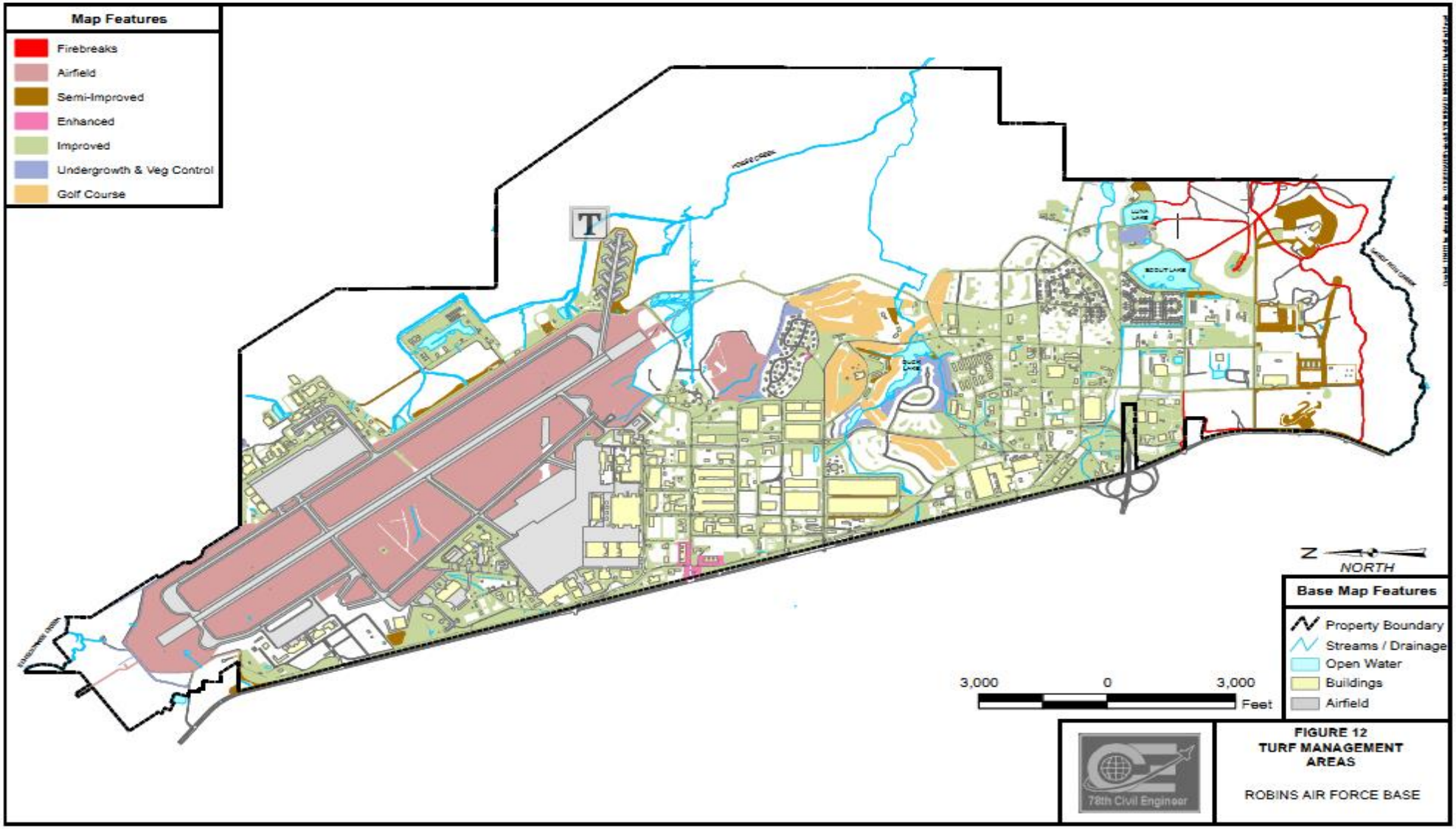
There are eight Turf Management Areas on the Base (Figure: Turf Management Areas). These areas include semi-improved, improved and enhanced areas, the golf course and airfield, firebreaks, construction and vegetation control areas. Turf types on the Base include fields (dominated by patchy undifferentiated grasses); golf course (under intensive turf management); industrial/residential (maintained turf/lawns on industrial facilities and residential areas); recreational (playing fields, trap and skeet shooting range, and picnic areas); roadside turf areas (that parallel and are directly adjacent to roads); and airfield turf areas (that surround runways, taxiways, and tarmacs).

The Urban Forest was inventoried in 1995 (Robins AFB, 1995b). A total of 15,480 trees and shrubs within the developed areas of the Base were identified, labeled with tags, and silviculture attributes were recorded Of the 15,480 trees and shrubs inventoried, the oaks (3,903 trees) and pines (4,194 trees) accounted for 52% (8,097 trees) of the total number of trees recorded. The two most common trees recorded were loblolly pine (2,738 trees) and water oak (2,173 trees) and they accounted for 32% (4,911 trees) of the total number of plants inventoried.

Loblolly Pine Plots



Turf Management Areas



2.3.3 Fish and Wildlife

Horse Creek and Sandy Run Creek, tributaries of the Ocmulgee River, provide most of the stream habitat at Robins AFB. Horse Creek is a small bottomland stream draining marshland in the northeastern portion of the Base. Sandy Run Creek, a significantly larger drainage, marks the southern boundary of the Base.

These streams provide habitat for fish, reptiles and amphibians, and for many species of aquatic invertebrates. Fishes likely to utilize stream habitat at Robins AFB include lamprey (multiple genera), minnow (multiple genera), sucker (multiple genera), catfish (*Ictalurus* spp.), madtom (*Noturus* spp.), killifish (*Fundulus* spp.), bass (*Micropterus* spp.), sunfish (*Lepomis* spp.) and darter (*Etheostoma* spp.). Horse Creek, Sandy Run Creek, and the Ocumulgee River provide valuable floodplain habitat, which when flooded, provides ideal foraging and rearing habitat for many fish species. Stream habitat at Robins AFB also is used by mammals, such as muskrat (*Ondatra zibethicus*) and beaver (*Castor canadensis*), and by birds (mostly waterfowl). Aquatic stream habitat, stream banks and margins also are used by aquatic and semi- aquatic turtles, including the common snapping turtle (*Chelydra serpentina*), eastern mud turtle (*Kinosternon subrubrum*), and yellow-bellied slider (T*rachemys scripta scipta*). Also utilizing these habitats are semi-aquatic snakes, including the eastern cottonmouth (*Agkistrodon piscivorus*) and banded water snake (*Nerodia fasciata*).

Eastern Cottonmouth

A baseline survey for reptiles and amphibians in 2003 recorded 32 reptile and amphibian species, nine of which had not been recorded previously on the Base. Turtles and frogs are the most diverse groups of reptiles and amphibians in both bottomland and upland habitats. The upland sandhills and lowland swamp forest, together with the distinctive natural communities within each, provide excellent habitat diversity for reptiles and amphibians. Temporary ponds located on the floodplain margins and in upland areas of the Base provide essential habitat for frogs, toads, and salamanders to breed and raise their young. The three lakes provide less valuable habitat than the smaller, less disturbed drainages and wetland habitats because of more human activity and higher fish predation in and around the lakes. The lowland communities, including the Bottomland Hardwood Swamp and Horse Creek, have the habitat elements to support large populations of reptiles and amphibians.

The three lakes on Base (Scout Lake—22.36 acres, Luna Lake—7.7 acres, and Duck Lake—8.34 acres) are stocked for fishing and fishing is allowed in a portion of Horse Creek. A fish survey was conducted in 2007 to determine baseline fish populations in the three lakes, and Horse Creek. A total of 25 species were recorded, and the highest species diversity (20 species) occurred in Horse Creek and the Horse Creek Ditch. The lakes are variously stocked with bass, catfish, sunfish, and grass carp (*Ctenophayngodon idella*) for vegetation control as needed.

Female American Alligator

Wildlife species recorded during surveys by the NRCS in 1989 and Georgia DNR in 1993/1994 are listed in the Plant and Animal Species List Appendix. A baseline survey for terrestrial arthropods (insects) was conducted in 2003/2004 with a focus on species of potential human health impact or that represent significant pests to people (Robins AFB, 2005b). A total of 411 terrestrial arthropod taxa in 203 families were recorded (Plant and Animal Species List Appendix, Table E-4). The most abundant arthropods on Base were beetles, midges, moths, and gnats. Spiders and crane flies were common.

Many species of Neotropical migratory birds (most songbirds and other species) reside on the Base during the spring and summer months. They are most abundant within the forested wetlands along the eastern and southern perimeters of the Base. Many other species of small, migratory birds, such as warblers, are present on the Base during spring and fall migrations. Flocks of starlings (*Sturnus vulgaris*), blackbirds (Icterid family), meadowlarks (*Sturnella ludovicianae*), mourning doves, Savannah sparrows (*Passerculus sandwichensis*), and cattle egrets (*Bibulcus ibis*) forage in grassy areas of the airfield, other open areas, and along roadsides. Red-winged blackbirds (*Agelaius phoeniceus*) and grackles (*Quiscalus quiscula*) forage and roost in the wetland areas. Chimney swifts (*Chaetura pelagica*), barn swallows (*Hirundo rustica*), common nighthawks (*Chordeiles minor*), and bats (*Myotis* spp.) are common during April through October. Red-tailed hawks (*Buteo jamaicensis*), turkey vultures (*Cathartes aura*), and black vultures (*Coragyps atratus*) also are common to the Robins area and northern harriers (*Circus cyaneus*) are present from mid-October to early April. Common wetland birds include great egrets (*Casmerodius albus*), heron species (Ardeidae family), and Canada geese (*Branta canadensis*).

The highest diversity of animals on Robins AFB occurs in the southern and eastern sections, in undeveloped bottomland and transitional forest associated with the floodplains of Sandy Run and Horse

Creeks and the Ocmulgee River. In these relatively undisturbed areas, a mosaic of many wet and temporarily-flooded communities provides over 2,000 acres of excellent wildlife habitat for mammals, birds, reptiles, amphibians, as well as invertebrates. In addition, there are approximately 300 acres of upland forest consisting of mixed hardwood-pine-forests and loblolly pine plantations that provide additional wildlife habitat. Much of the wildlife inhabiting these highly productive ecosystems lives on the Base year-round. Deer, feral hog (*Sus scrofa*), wild turkey, waterfowl, and squirrel (*Sciurus* spp.) are hunted in designated areas on the Base. A comprehensive list of plant and animal species can be found in Appendix E*, Plant and Animal Species List*.

2.3.4 Threatened and Endangered Species and Species of Concern

No threatened or endangered (TES) animal species are found on the Base. The Base does provide habitat that would be suitable for at least transient occurrence of some other listed animal species. No federally-listed plant species have been recorded on Robins AFB. The American alligator (*Alligator mississippiensis*) does occur on Base. In 1987, the Fish and Wildlife Service pronounced the American alligator fully recovered and consequently removed the animal from the list of endangered species. For this reason, the Fish and Wildlife Service continues to protect the alligator under the ESA classification as "threatened due to similarity of appearance to the American crocodile (*Crocodylus acutus*)." The Service thus regulates the harvest of alligators and legal trade in the animals, their skins, and products made from them, as part of efforts to prevent the illegal take and trafficking of endangered "look-alike" reptiles. Beyond harvest and legal trade regulations, there are no other regulatory requirements for this specie under the ESA.

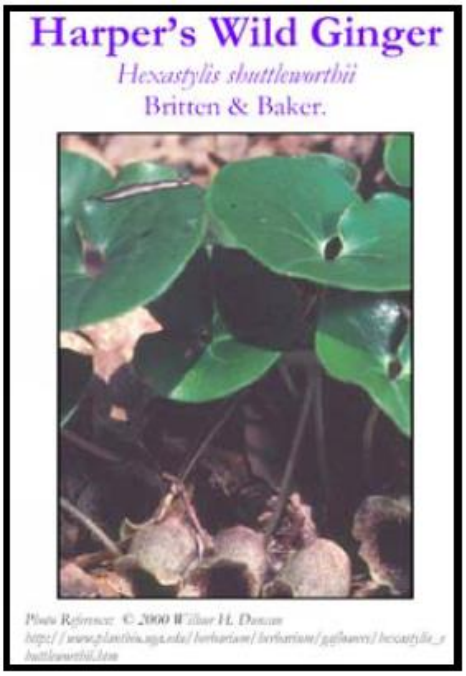
Other Sensitive Species

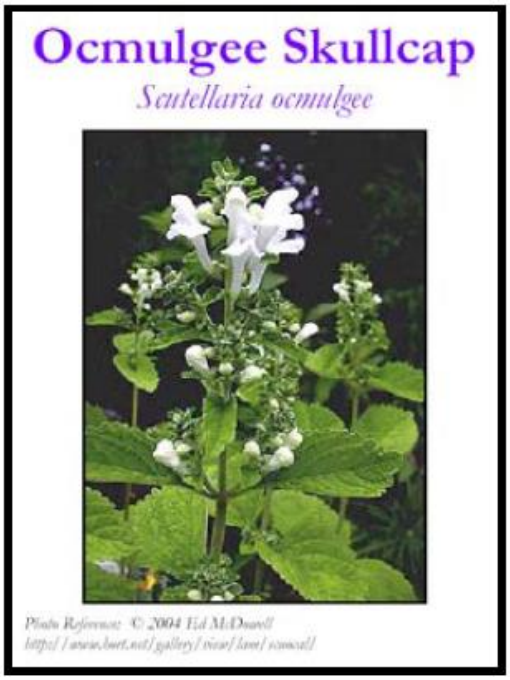
In total, 19 plant species considered to be rare in the state of Georgia have been reported to occur on the installation (Table: Protected and Special Concern Plants Occurring at Robins Air Force Base). Ocmulgee skullcap is the only state- protected plant reported to occur on the Base. Ocmulgee skullcap is listed as 'threatened' because it is likely to become an endangered species in the foreseeable future throughout all or parts of its range. Harper's wild ginger (*Hexastylis shuttleworthii* var. *Harperi*), a species previously protected, has been moved to the state Tracking List as a special concern plant species.

State special concern plants are not protected by law, but their status is monitored by the state to determine if the species should be protected. Tracking List plants are typically considered to be imperiled by the state because of rarity. Watch List plants typically are rare or uncommon species that need additional documentation before their status can be determined.

Tracking List plants that occur on the Base include Harper's Wild Ginger, Boykin's lobelia (*Lobelia boykinii*) and awnpetal meadowbeauty. The first two species are considered imperiled and vulnerable. Awnpetal meadowbeauty is considered imperiled in Georgia, and although the population on the Base appeared healthy and thriving during prior surveys, only four awnpetal meadowbeauty plants were found on the Base during a 1997-1998 survey and no plants in bloom were found in surveys from 2003- 2005.

Watch List plants on the Base include white doll's daisy (*Boltonia asteroides*), southern peat moss sedge (*Carex lonchocarpa*), black-seeded spikerush (Elocharis melanocarpa), Robbin's spikerush (*Elocharis robbinsii*), quillwort arrowhead (*Sagittaria isoetiformis*) and October ladies'-tresses (*Spiranthes ovalis*).





Protected and Special Concern Plants Occurring at Robins Air Force Base

Scientific Name	Common Name	State List (Status/Rank)
Asclepias incarnata ssp. *incarnata*	Swamp milkweed	Watch[1] (S3)
sclepias lanceolata	Lanceleaf milkweed	Watch (S3)
Boltonia asteroides	White doll's daisy	Watch (S3)
Carex lonchocarpa	Southern peat moss sedge	Watch (S3)
Carex lupuliformis	False hop sedge	Tracking[2] (S1)
Eleocharis melanocarpa	Black-seeded spikerush	Watch (S3)
Eleocharis robbinsii	Robbins spikerush	Watch (S3?)
Gratiola viscidula	Short's hedgehyssop	Watch (SNR)
Hexastylis shuttleworthii var Harperi	Harper's wild ginger	Tracking (S2S3)
Lemna perpusilla	Duckweed	Watch (SNR)
Lobelia boykinii	Boykin's lobelia	Tracking (S2S3)
Lysimachia terrestris	Bog candles	Tracking (S1)
Phacelia purshii	Miami mist	Tracking (S1)
Polygonum amphibium	Water knotweed	Watch (S1)
Quercus palustris	Pin oak	Tracking (SH)
Rhexia aristosa	Awnpetal meadowbeauty	Tracking (S2)
Sagittaria isoetiformis	Quillwort arrowhead	Watch (SU)
Scutellaria ocmulgee	Ocmulgee skullcap	Protected[3] (T)
Spiranthes ovalis	October ladies'-tresses	Watch (SNA)

Status/Rank Definitions:

T **Threatened**—A species which is likely to become an endangered species in the foreseeable future throughout all or parts of its range in Georgia.

S2 **Imperiled**—Imperiled because of rarity due to very restricted range, few populations, steep declines, or other factors making it very vulnerable to extirpation from the state.

S3 **Vulnerable**—Vulnerable in the state due to restricted range, relatively few populations, recent and widespread declines, or other factors making it vulnerable to extirpation.

SH **Possibly Extirpated—**Known from only historical records; there is evidence that the species or ecosystem may no longer be present in Georgia.

SU **Unrankable**—Due to lack of information or due to substantially conflicting information about status or trends.

SNA **Not Applicable**—The species or ecosystem is not a suitable target for conservation activities.

SNR **Unranked**—Georgia conservation status not yet assessed.

[1] **Watch List**—Typically rare or uncommon species that need additional documentation before their status can be determined; not protected by law.

[2] **Tracking List**—Typically considered to be imperiled in Georgia because of rarity; not protected by law.

[3] **Protected List**—Species protected by law in Georgia.

2.3.5 Wetlands and Floodplains

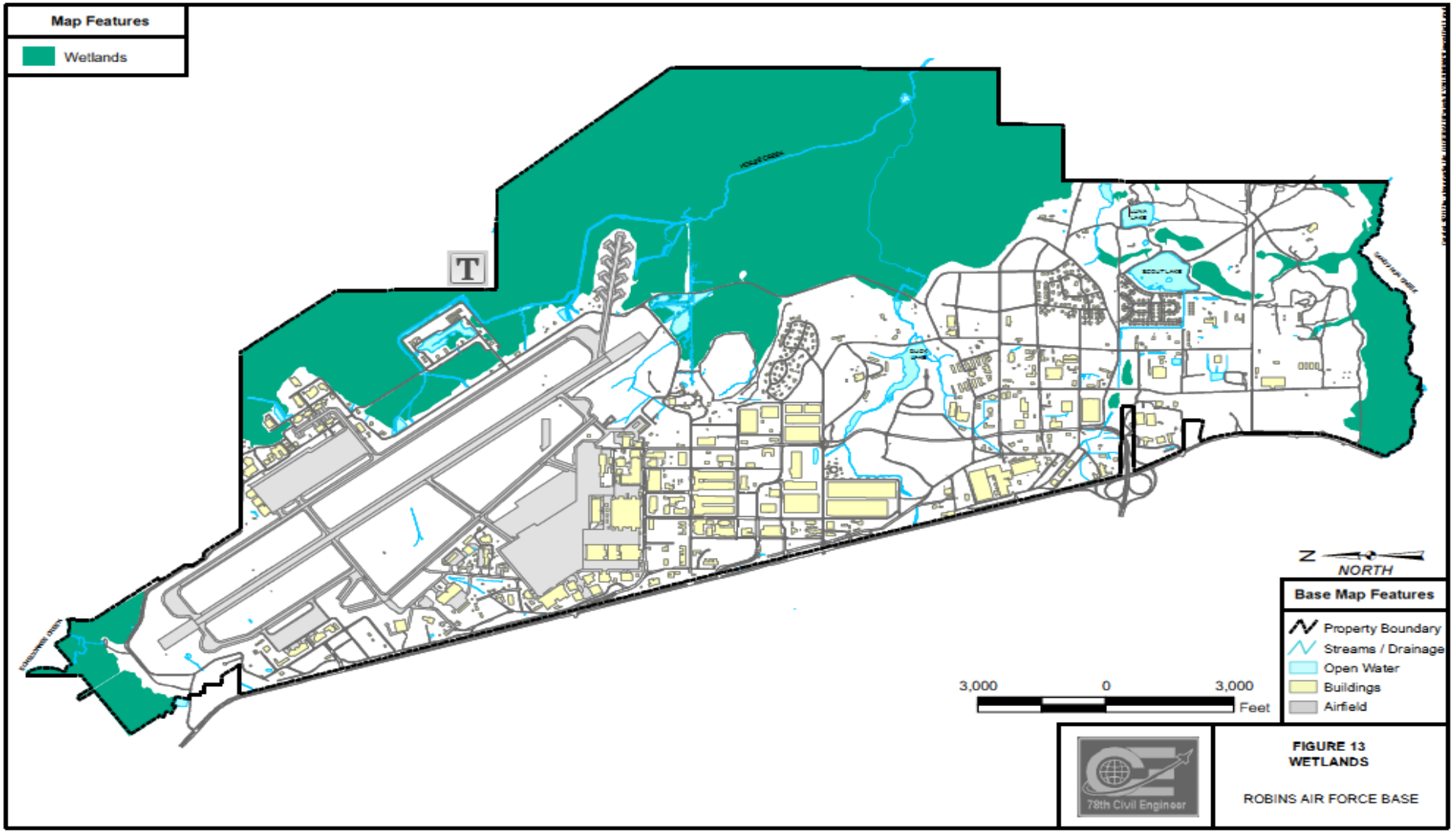
Water resources on the Base include intermittent and flowing streams, lakes, ponds (Figure: Surface Water Features), and wetlands (Figure: Wetlands). Horse Creek is the most significant stream. This small, bottomland stream is located on the northern side of the installation and flows eastward through the bottomland swamp to its confluence with the Ocmulgee River. A small reach of Echeconnee Creek enters and leaves the installation boundary in the extreme northwestern portion of the Base. Duck Lake is an 8.3-acre impoundment bordering the golf course. Luna Lake is 7.7-acres in size and is located adjacent to the Family Campground (FAMCamp) and Lodge. Scout Lake is 22.4 acres in size and located to the south of Luna Lake.

There are approximately 2,250 acres of delineated wetlands on the Base. Wetlands are classified according to the USFWS National Wetland Inventory on the basis of vegetation type, topography, and hydrologic regime. The Palustrine wetland system, one of the five major wetland systems recognized by the USFWS, is dominant at Robins AFB. Palustrine wetlands are shallow, standing-water marsh environments that include swamps and bogs.

Wetlands occur on many of the semi-improved and unimproved tracts of land on Robins AFB Wetlands (Figure: Wetlands). High quality wetlands are present throughout the undeveloped areas. Wetland features in the upland portion of the Base include six gum ponds and the Grady Freshwater Meadow. A large Bay Swamp is present in the floodplain of Sandy Run Creek at the southern boundary of the Base. An extensive Bay Swamp also occurs at the base of the Upland Hardwood Bluff and surrounds a Gum Cypress Pond. The remainder of the eastern portion of the Base is Bottomland Hardwood Swamp.

Ephemeral pools also are present after rain events.

Wetlands


Map Features
Wetlands
NORTH
Base Map Features
Property Boundary
Streams / Drainage
Open Water
Buildings
Airfield
3,000
0
3,000
Feet
78th Civil Engineer
FIGURE 13
WETLANDS
ROBINS AIR FORCE BASE

Wetland Type and Area

Wetland Type	Approximate Acreage*
Broadleaf Deciduous	>2,214
Emergent	25
Scrub/Shrub	>1
Open Water	11

* Based on:
Final Wetlands Delineation (Robins AFB, 1999b)
Final Wetland Delineation Report for Wetland Areas 22 and 25 (Robins AFB, 2006)
Wetland Inventory Report (Robins AFB, 2009b)

A study to delineate and quantify the jurisdictional wetlands located on the Base (Fin*al Wetland Delineation for Warner Robins Air Logistics Center*, Robins AFB, 1999b) was conducted in 1999 in accordance with the criteria set forth in the Technical Report Y-87- 1, Corps of Engineers, Wetlands Delineation Manual (1987 Federal Manual).

Subsequent updates to this study were conducted in 2006 (*Final Wetland Delineation Report for Wetland Areas 22 and 25,* Robins AFB, 2006) and 2009 (*Wetland Inventory Report*, Robins AFB, 2009b. These wetland reports should be consulted for further information, including detailed maps showing jurisdictional wetland boundaries. Only four CWA Section 404 permits have been issued for the Base since 2001. The first three permits were for remedial actions to correct inadvertent actions that resulted in impact to jurisdictional wetland areas. The fourth permit, issued March 1, 2010, was for filling 19.5 acres of wetland south of the runway, as part of airfield improvements.

Broadleaf Deciduous Wetland

2.3.6 Other Natural Resource Information

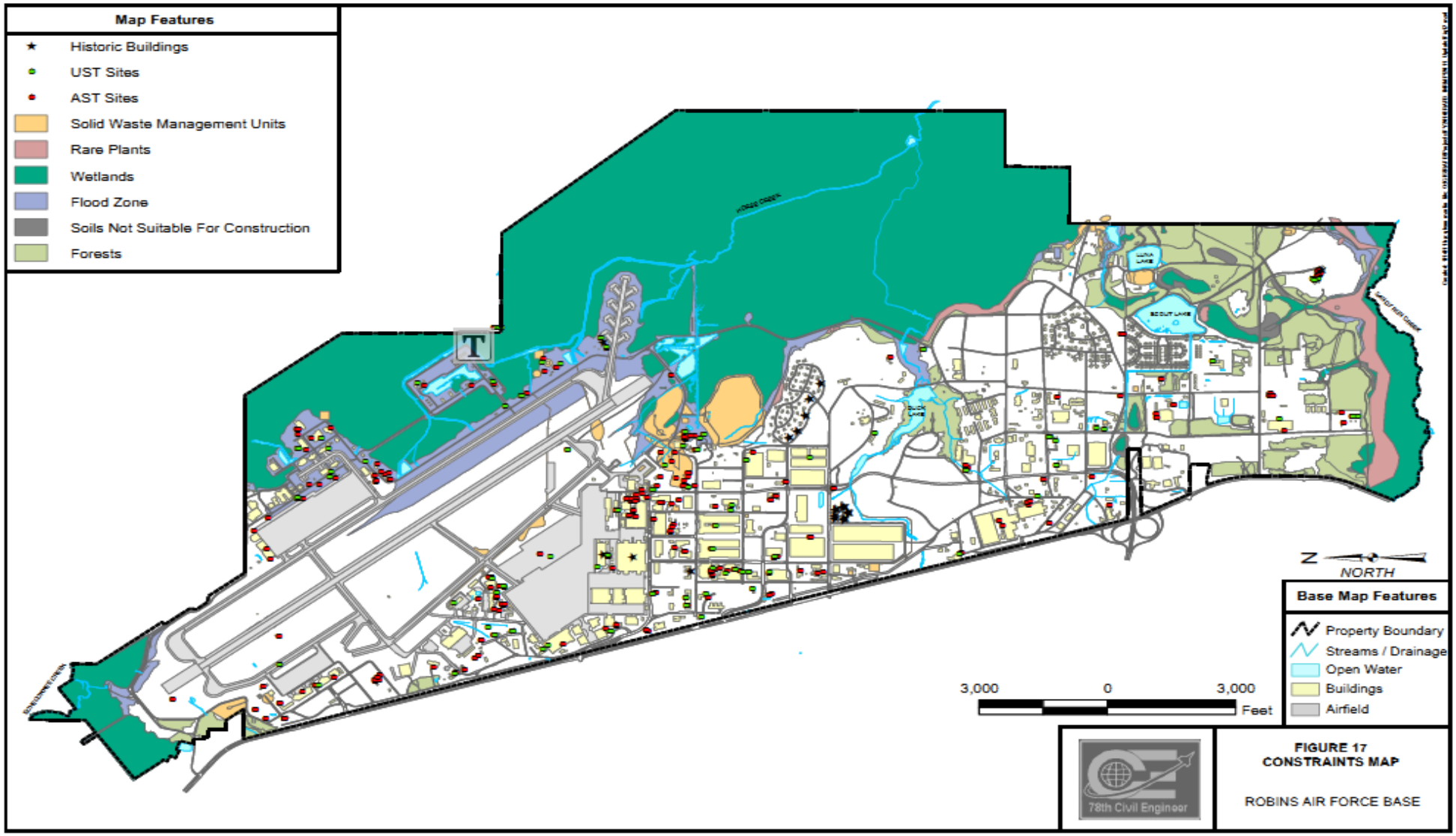
GUIDANCE FROM AFI 32-7064 (REVIEW AND REPLACE WITH INSTALLATION-SPECIFIC CONTENT):
Describe, summarize, and reference any other biological inventories and surveys conducted on the installation that provide information applicable to natural resources program management.

2.4 Mission Impacts on Natural Resources

2.4.1 Natural Resource Constraints to Mission and Mission Planning

Natural resources constrain development over much of the Robins AFB property (Figure: Constraints Map). Jurisdictional wetlands along the eastern and southern property boundaries and US Highway 129 along the western boundary of the Base are the greatest constraints to mission planning and implementation. Rare plant species are located within the Upland Hardwood Bluff forest, the Grady Freshwater Meadow, and the Creek Forest south of the Jeep Trail and east of the PAVE-PAWS facility. Floodplain occurs immediately to the north and east of the developed area of the Base and to the south along Sandy Run Creek. These constraints are also a benefit in that they provide an encroachment buffer.

Constraints Map



2.4.2 Land Use

Robins AFB is situated on 6,733 acres in Houston County, Georgia. All of this land is managed under the Base INRMP. Grounds categories define the land uses on Robins AFB. The major grounds categories for the fee-owned land (6,779 acres) are improved, semi-improved, and unimproved grounds (Figure: Existing Land Use on Base). Improved grounds (3,540 acres) support housing, administrative and industrial facilities, parks and playgrounds, athletic fields, parade grounds, and the golf course. Semi-improved grounds (406 acres) are open fields. Unimproved grounds (2,833 acres) include natural, forested, and wetland areas on the Base. At Robins AFB, the unimproved grounds are mostly wetlands. However, wetlands occur on many of the semi-improved tracts of land as well. Presently there are no agricultural outleases in effect.

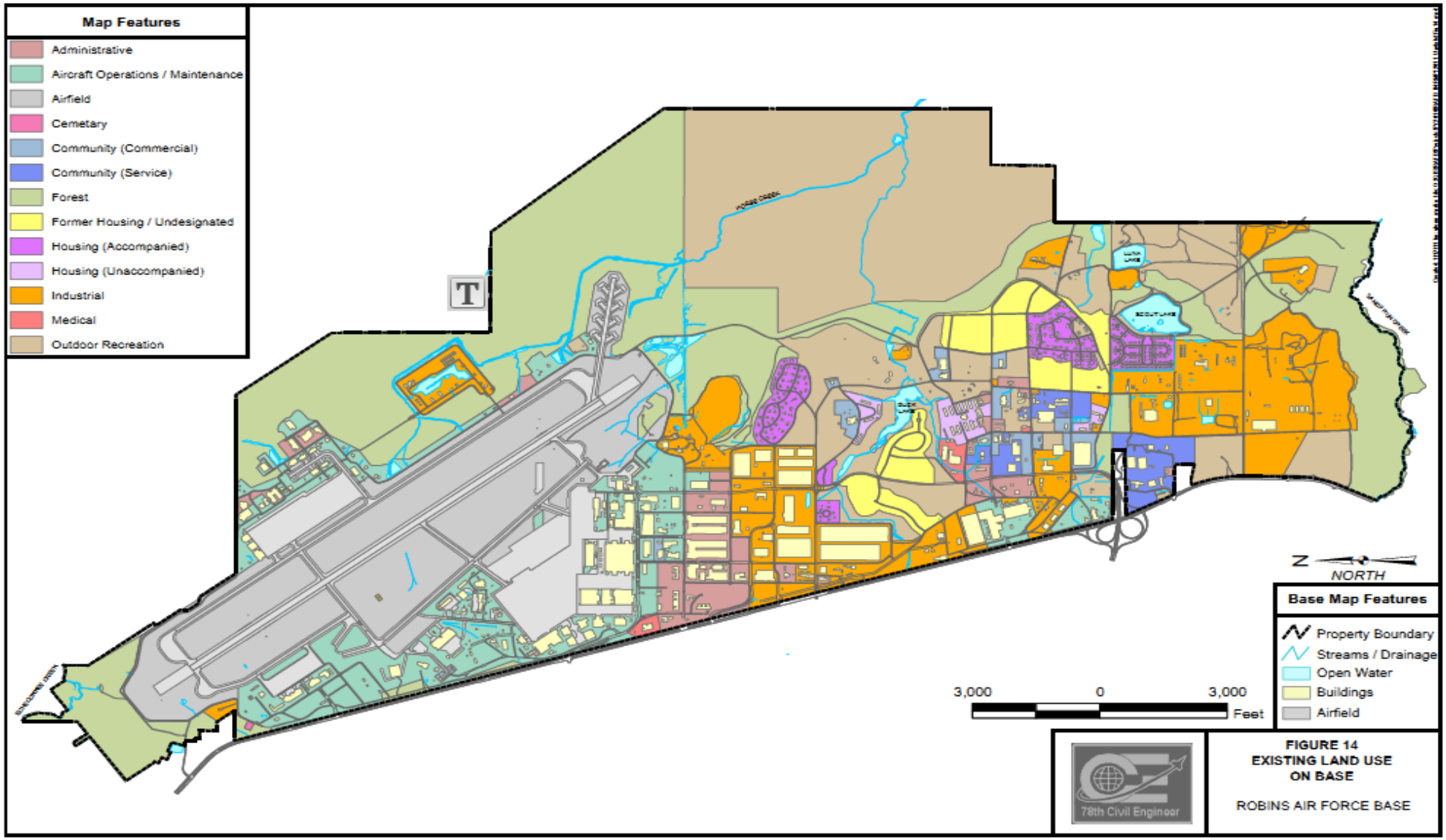
Grounds categories for the fee-owned land are further sub-divided into smaller areas for natural resource management. Eight MEAs were developed at Robins AFB based on mission-dependent development plans and natural resource management goals and objectives (Robins AFB, 1995a). These MEAs (Figure: Management Emphasis Areas) function as primary natural resource land management units based on their suitability for certain developmental activities and help determine appropriate locations for specific land uses and management practices.

Management Emphasis Areas at Robins AFB

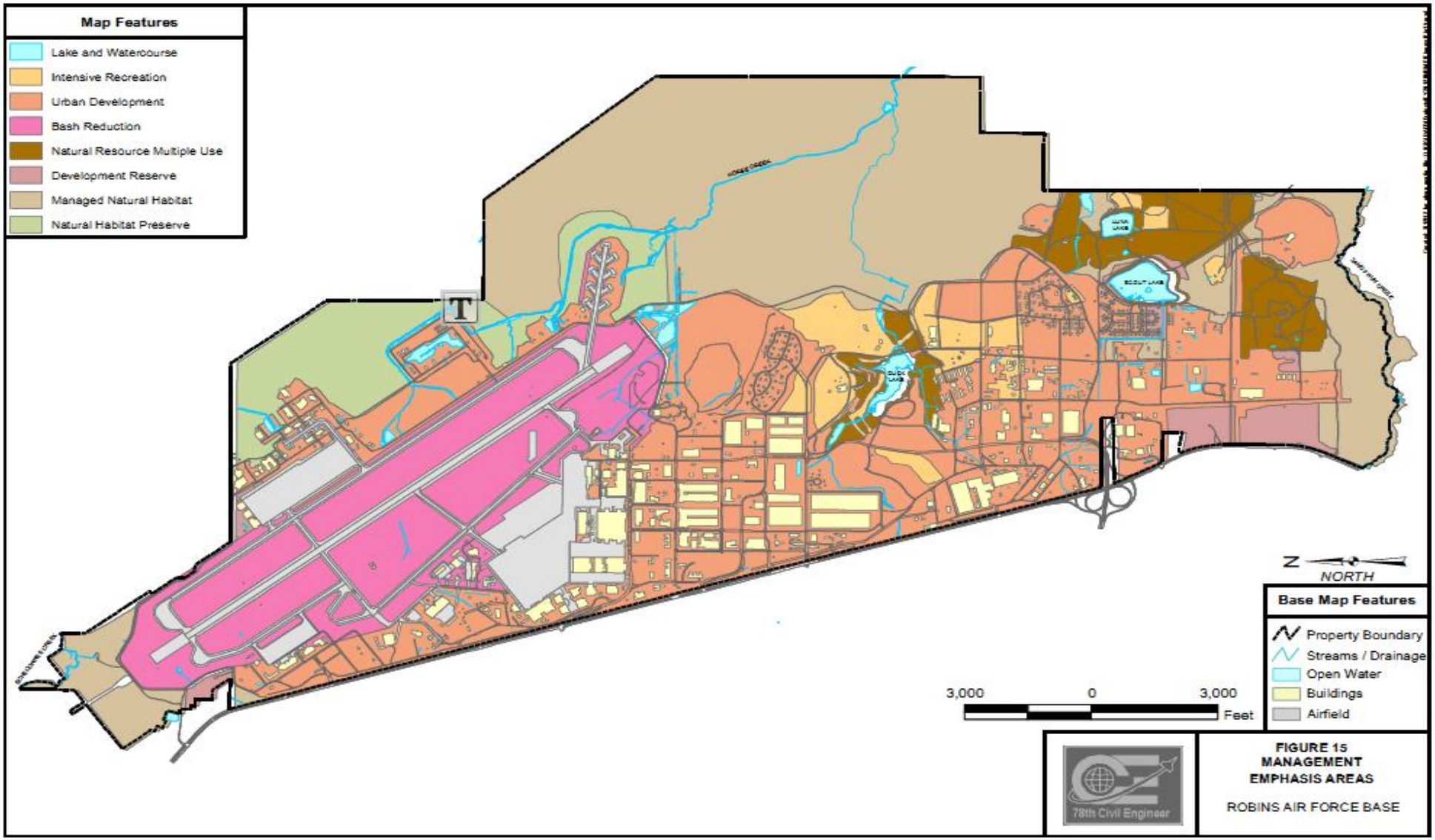
MEA Designation	Approximate Size in Acres
Natural Habitat Preserve	695
Managed Natural Habitat	1,643
Natural Resource Multiple Use	342
Development Reserve	145
Intensive Recreation	243
Lake and Watercourse	69
Urban Development	2,593
BASH Reduction	1,049

Recreational area classifications and Outdoor Recreation Facilities are shown in Figure: Outdoor Recreation Facilities.

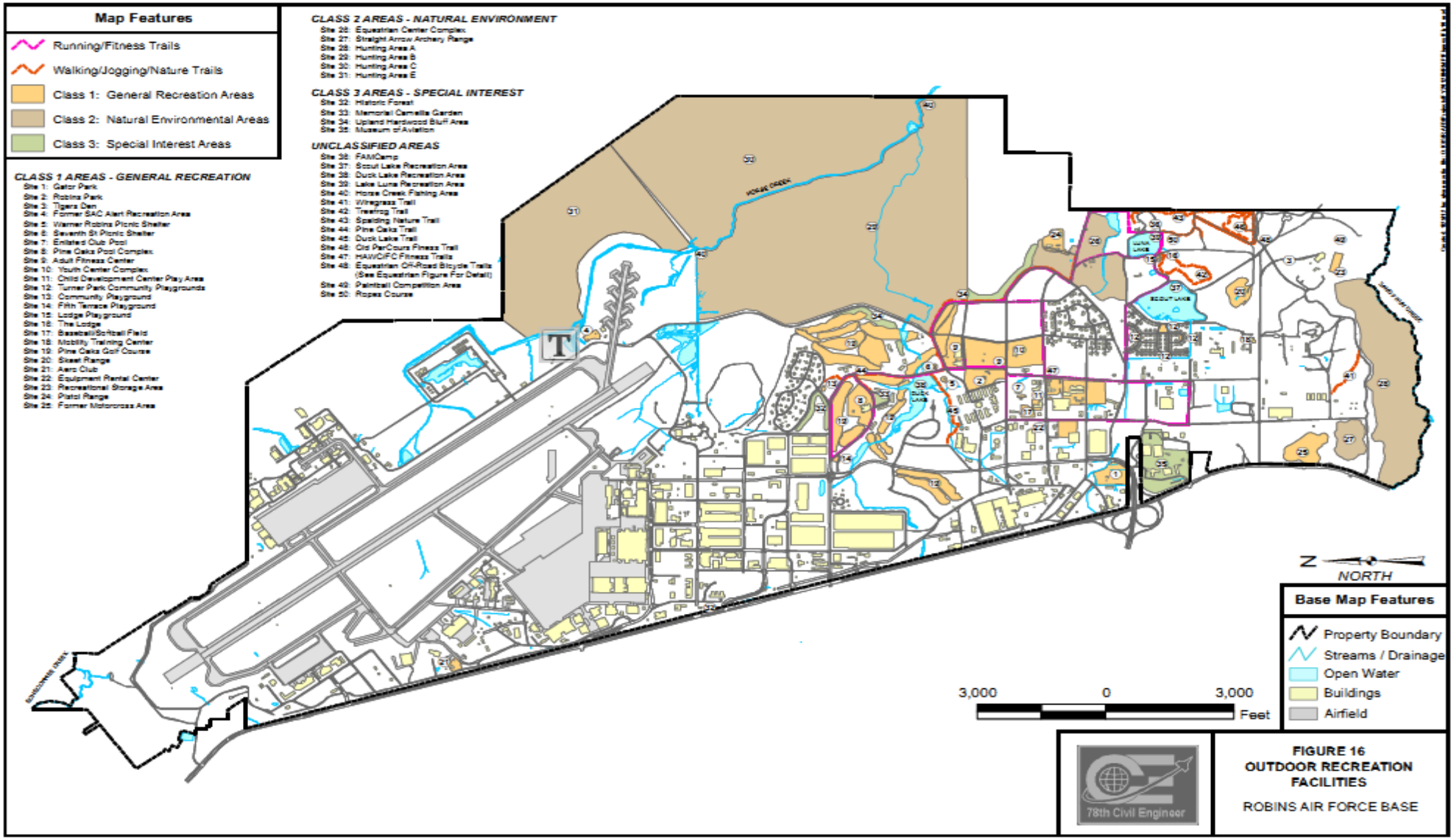
Existing Land Use on Base



Management Emphasis Areas



Outdoor Recreation Facilities



2.4.3 Current Major Impacts

The basic mission of WR-ALC, to maintain aircraft and their components and to provide supply and other logistics functions, has not changed since its beginning in 1941. The primary mission emphasis for associate organizations on Robins AFB also relates to aircraft maintenance, aircraft operations, and flight operations support. Most mission- related activities therefore are performed in the developed, industrial portion of the Base. Robins AFB operates nine wastewater discharge points around the Base that discharge to the Ocmulgee River. There are two nonpoint source stormwater permits. There are point source air emissions from about 28 buildings on the Base.

The focus for natural resources management is to support mission effectiveness and readiness by protecting, maintaining, enhancing, and preserving natural resources in both the built and natural environments on the installation. A major part of the planning for current and future mission activities involves grouping related mission functions together and separating incompatible ones.

The primary direct and indirect actions related to the military mission that may affect natural resources are those related to:

- Past land and waste management practices,
- Current training activities or operation/maintenance of grounds and facilities, and
- Construction of new facilities and infrastructure or expansion/development of new training areas to accommodate changing mission requirements.

Past solid waste and other management practices involving hazardous materials have resulted in sites that are presently undergoing study and remediation to identify and reduce potential impacts to the environment. Scattered throughout the Base are approximately 79 Solid Waste Management Units (SWMUs). Fifty-five of these sites have been addressed to the point where no further action is required.

Ground training field activities and aircraft operations (including BASH control) are the current mission activities with the greatest potential for negative effects on natural resources of the Base. There are three designated field training areas on the installation. The all-terrain vehicle (ATV) training area is in the southwestern corner of the Base. The Prime Base Engineer Emergency Force (Prime BEEF) training area is in the south- central portion of the Base. Prime BEEF teams are mobile civil engineer teams that train for immediate deployment to perform construction work during wartime or other emergencies. Their major responsibilities include force beddown, war damage-related repair, day-to-day airbase facility operations, structural fire/crash/fire rescue, and explosive ordnance disposal. The Security Police (78 SFS) and elements of the 689 CCW train in fields in the South 800 Area of the Base. The 689 CCW provides communications, air traffic control, and weather systems support that deploys worldwide in support of U.S. military operations.

Timber Harvest

The primary direct impacts of the current military mission on natural resources are field training damage and maneuver damage in the designated field training areas. Adverse effects to vegetation and soils can result from foot traffic in regularly used areas such as bivouac sites and from moving vehicles and equipment across the landscape. Wildlife can be disturbed from the physical presence of personnel in the field. Less direct adverse effects on natural resources include disturbance to wildlife from noise related to the Pistol Range, the Grenade Range, and low-flying aircraft at the airfield. Other indirect effects may result from traffic, infrastructure maintenance, and other mission support activities. The major impacts related to the current mission are limited adverse effects on soils and vegetation and temporary noise- and activity-related effects on wildlife.

Facility and infrastructure construction to support current and future mission requirements may require the development of additional land with associated effects on the natural environment. Indirect adverse effects are related to infrastructure maintenance, upgrades, and improvements. Most of this activity would be restricted to the developed portion of the Base and adverse effects would be temporary and/or limited in extent.

Positive benefits to natural resources result from the commitment to manage and conserve natural resources by protecting sensitive resources and minimizing adverse effects to provide sustainable natural resources for supporting the military mission.

2.4.4 Potential Future Impacts

The developed area or urban land use on the Base is projected to increase, while forest, open space, and outdoor recreation land use is projected to decrease. Future Military Construction (MILCON) projects to support the military mission are expected to occur in the developed areas of the Base: Flightline, Administrative, Housing, Avionics, and South Industrial planning areas. The principal impact in these areas would result from ground disturbance and necessary tree removal. Adverse impacts on natural resources from these MILCON projects should be minimal because of the current land use and urban environmental setting.

Prior to construction of new facilities or implementation of other major actions related to the military mission, the natural resources manager reviews proposed activities as appropriate under AFI 32-7061 that adopts Title 32, Code of Federal Regulations, Part 989 (32 CFR Part 989), Environm*ental Impact Analysis Process (EIAP)*. This process assures that potentially significant adverse impacts on natural resources are avoided or mitigated to minimize adverse effects.

2.4.5 Natural Resources Needed to Support the Military Mission

Natural resources needed to support the military mission include an adequate source of water and sufficient land area to meet mission requirements. Both open and vegetated natural areas are needed to simulate battlefield conditions for field training. Open areas are necessary for staging field operations and bivouac, while forested areas are necessary for concealment.

3.0 ENVIRONMENTAL MANAGEMENT SYSTEM

The AF environmental program adheres to the Environmental Management System (EMS) framework and it's Plan, Do, Check, Act cycle for ensuring mission success. Executive Order (EO) 13693, *Planning for Federal Sustainability in the Next Decade*, U.S. Department of Defense Instruction (DoDI) 4715.17, *Environmental Management Systems*, AFI 32-7001, *Environmental Management*, and international standard, ISO 14001:2004, provide guidance on how environmental programs should be established, implemented, and maintained to operate under the EMS framework.

The natural resources program employs EMS-based processes to achieve compliance with all legal obligations and current policy drivers, effectively managing associated risks, and instilling a culture of continuous improvement. The INRMP serves as an administrative operational control that defines compliance-related activities and processes.

4.0 GENERAL ROLES AND RESPONSIBILITIES

General roles and responsibilities that are necessary to implement and support the natural resources program are listed in the table below. Specific natural resources management-related roles and responsibilities are described in appropriate sections of this plan.

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	**Installation Role/Responsibility Description**
Installation Commander	The 78th Air Base Wing Commander (78 ABW/CC) is ultimately responsible for natural resources management at Robins AFB and approves the INRMP. All other commands on the installation also bear responsibility for supporting natural resources management. The INRMP serves as the Commander's plan of action for the Base's natural resources program.
AFCEC Natural Resources Media Manager/Subject Matter Expert (SME)/ Subject Matter Specialist (SMS)	
Installation Natural Resources Manager/POC	
Installation Security Forces	

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	**Installation Role/Responsibility Description**
Installation Unit Environmental Coordinators (UECs); see AFI 32-7001 for role description	
Installation Wildland Fire Program Manager	
Pest Manager	
Range Operating Agency	
Conservation Law Enforcement Officer (CLEO)	
NEPA/Environmental Impact Analysis Process (EIAP) Manager	
National Oceanic and Atmospheric Administration (NOAA)/ National Marine Fisheries Service (NMFS)	
US Forest Service	
US Fish and Wildlife Service	
78th Air Base Wing Commander (78 ABW/CC)	The 78th Air Base Wing Commander (78 ABW/CC) is ultimately responsible for natural resources management at Robins AFB and approves the INRMP
78th Civil Engineer Group (78 CEG)	The 78th Civil Engineer Group (78 CEG) has the primary responsibility for planning and development of the INRMP.
The Environmental Management Branch (78 CEG/CEIE)	The Environmental Management Branch (78 CEG/CEIE) is the office of primary responsibility for INRM. Its mission is to restore, protect, and foster respect for the environment to ensure the continued military mission of Robins AFB. The 78 CEG/CEIE provides expertise and support to the 78 ABW/CC to ensure installation compliance with restrictions set forth in the Endangered Species Act (ESA) of 1973 and Amendments, the Clean Water Act (CWA), and all other applicable AF, federal and State of Georgia laws and regulations.

5.0 TRAINING

AF installation NRMs/POCs and other natural resources support personnel require specific education, training and work experience to adequately perform their jobs. Section 107 of the Sikes Act requires that professionally trained personnel perform the tasks necessary to update and carry out certain actions required within this INRMP. Specific training and certification may be necessary to maintain a level of competence in relevant areas as installation needs change, or to fulfill a permitting requirement.

Installation Supplement – Training

GUIDANCE FROM AFI 32-7064 (REVIEW AND REPLACE WITH INSTALLATION-SPECIFIC CONTENT):

- *NRMs at Category I installations must take the course, DoD Natural Resources Compliance, endorsed by the DoD Interservice Environmental Education Review Board and offered for all DoD Components by the Naval School, Civil Engineer Corps Officers School (CECOS). See http://www.netc.navy.mil/centers/csfe/cecos/ for CECOS course schedules and registration information. Other applicable environmental management courses are offered by the Air Force Institute of Technology (http://www.afit.edu), the National Conservation Training Center managed by the USFWS (http://www.training.fws.gov), and the Bureau of Land Management Training Center (http://training.fws.gov).*
- *Natural resource management personnel shall be encouraged to attain professional registration, certification, or licensing for their related fields, and may be allowed to attend appropriate national, regional, and state conferences and training courses.*
- *All individuals who will be enforcing fish, wildlife and natural resources laws on AF lands must receive specialized, professional training on the enforcement of fish, wildlife and natural resources in compliance with the Sikes Act. This training may be obtained by successfully completing the Land Management Police Training course at the Federal Law Enforcement Training Center (http://www.fletc.gov/).*
- *Individuals participating in the capture and handling of sick, injured, or nuisance wildlife should receive appropriate training, to include training that is mandatory to attain any required permits.*
- *Personnel supporting the BASH program should receive flight line drivers training, training in identification of bird species occurring on airfields, and specialized training in the use of firearms and pyrotechnics as appropriate for their expected level of involvement.*
- *The DoD supported publication Conserving Biodiversity on Military Lands -- A Handbook for Natural Resources Managers (http://dodbiodiversity.org) provides guidance, case studies and other information regarding the management of natural resources on DoD installations.*

Example/boilerplate language (to be updated/replaced with installation-specific content):

Natural resources management training is provided to ensure that base personnel, contractors, and visitors are aware of their role in the program and the importance of their participation to its success. Training records are maintained IAW the Recordkeeping and Reporting section of this plan. Below are key NR management-related training requirements and programs:

1. Add installation-specific training

6.0 RECORDKEEPING AND REPORTING

6.1 Recordkeeping

The installation maintains required records IAW Air Force Manual 33-363, *Management of Records*, and disposes of records IAW the Air Force Records Management System (AFRIMS) records disposition schedule (RDS). Numerous types of records must be maintained to support implementation of the natural resources program. Specific records are identified in applicable sections of this plan, in the Natural Resources Playbook and in referenced documents.

Installation Supplement – Recordkeeping

Click here to enter text.

6.2 Reporting

The installation NRM is responsible for responding to natural resources-related data calls and reporting requirements. The NRM and supporting AFCEC Media Manager and Subject Matter Specialists should refer to the Environmental Reporting Playbook for guidance on execution of data gathering, quality control/quality assurance, and report development.

Installation Supplement –Reporting

Click here to enter text.

7.0 NATURAL RESOURCES PROGRAM MANAGEMENT

This section describes the current status of the installation's natural resources management program and program areas of interest. Current management practices, including common day-to-day management practices and ongoing special initiatives, are described for each applicable program area used to manage existing resources. Program elements in this outline that do not exist on the installation are identified as not applicable and include a justification, as necessary.

Installation Supplement –Natural Resources Program Management

Although the installation as a whole is responsible for implementing the INRMP, the 78 CEG/CEIE is the office of primary responsibility for implementing natural resources management. The 78 CEG/CEIE establishes the INRMP in coordination with the 78th Civil Engineering Squadron (78 CES), 78th Mission Support Group (78 MSG), and 78th Security Forces Squadron (78 SFS). All of these groups participate in various aspects of the natural resources management program implementation in consultation with 78 CEG/CEIE. The 78 CES maintains urban trees and shrubs and promotes water conservation. The 78 MSG issues hunting and fishing permits and provides information to hunters. The 78 SFS enforces hunting and fishing regulation on the Base. Individual responsibilities of these groups are described in RAFBI 32-7064 (Robins AFB Instructions Appendix). The Natural Resources Manager (78 CEG/CEIE) directs the implementation of the natural resources management program and has the principal role in meeting the goals and carrying out the objectives of the INRMP. The 78 CEG/CEIE chairs the Base INRM Integrated Process Team (INRM IPT) and the Pesticide Use Reduction Integrated Process Team (Pesticide IPT) and also is responsible for monitoring the success of management strategies and adjusting strategies as needed.

The U.S. Army Corps of Engineers (USACE), Savannah District office assists in the determination and management of jurisdictional wetlands. The regional USFWS office reviews and signs the INRMP and is consulted as needed regarding the management and conservation of fish, wildlife, and habitat. The Georgia DNR also reviews the INRMP and is consulted as appropriate regarding fisheries management and wildlife management. The Georgia Forestry Commission provides forest management support and the United States Department of Agriculture (USDA), Wildlife Resources Division, and the Georgia DNR provide assistance with nuisance plant and wildlife control. Local universities assist in component plan development through input and review of management activities and recommendations. Government contractors assist in the preparation of management plans and by conducting studies and surveys.

Natural resources program management includes integration with other AF programs, natural resources program assessments, assessing natural resources damage by other parties, and database development. The INRMP is coordinated through the Base Environmental, Safety, and Occupational Health (ESOH) Council and the Bird Hazard Working Group (BHWG) to ensure that the implementation of the INRMP is supported and not in conflict with the BASH Plan, Integrated Pest Management Plan (IPMP), or Air Installation Compatible Use Zone (AICUZ) study. National Environmental Policy Act (NEPA) documents related to natural resources management are coordinated through the Base legal office (78 ABW/JA). In the event that natural resources under AF control are damaged by another party, such as by an accidental oil or chemical release, the installation must assess and claim damages. The Base coordinates with Major Command (MAJCOM), SAF/IE (the designated AF natural resources trustee), and AFLSA/JACE (AF legal) as needed.

7.1 Fish and Wildlife Management

Applicability Statement

This section applies to all AF installations that maintain an INRMP. The installation is required to implement this element.

Program Overview/Current Management Practices

Fish and wildlife programs include conservation, hunting and fishing, and education. Sensitive fish and wildlife habitats are protected from damage caused by human activities through the use of Best Management Practices (BMPs).

Wildlife Management

Many of the program management activities for vegetation, water, and land protect and enhance habitat for fish and wildlife. Upland hardwood forests are generally left in their natural state. The principal management activity for wildlife is the control of exotic plant and animal species. The primary nuisance wildlife species on Base are feral hogs, beaver, and coyotes. The principal means of controlling these species is through the use of lethal and non-lethal trapping techniques. Control is carried out by the Base wildlife biologist or by personnel from the Base entomology shop. When necessary, the wildlife biologist will request from the USDA (i.e., the Base has a contract with the Wildlife Services Division) or Georgia DNR. Detailed control strategies are outlined in RAFB Instruction 32-7064 *Integrated Natural Resources Management*. Actions that would inadvertently attract wildlife to the airfield or to hazardous waste sites on Base are avoided.

Silviculture and wildlife management techniques in the Development Reserve MEA allow for wildlife habitat improvement. There is increased focus on allowing the passive conversion of remnant 30-year-old pine plantations to mixed hardwood stands, where possible, to improve wildlife habitat quality by increasing plant diversity and forage quality. Two-thirds of the acreage formerly managed as loblolly pine plantations has been converted to other uses, especially Base construction requirements. The remaining plantation acreage has been thinned for the third time, and has succeeded to predominantly mixed hardwood-pine habitat. Management prescriptions to promote wildlife habitat include thinning or final shelterwood harvest operations in the remaining pine forests, controlling exotic species, reducing mowing requirements where possible, establishing and protecting habitat corridors (especially along drainages),

snag creation and retention, the mechanical creation of gaps, reducing pesticide use, prescribed burning, and planting native trees and shrubs in urban areas. Weeds and fruit-bearing trees and shrubs such as blackberry, persimmon, plum, and sassafras are allowed to establish around the perimeter of pine stands and mowed fields where possible. Existing high quality habitat is passively maintained by restricting/limiting future land disturbance and moderately significant habitat is improved by planting or promoting the establishment of native plant species that would provide forage and shelter for wildlife with emphasis on the Natural Habitat Preserve and Managed Natural Habitat MEAs. Select locations may be used to develop food plots to enhance native plant wildlife value with priority given to reducing wildlife damage problems and other conflicts where humans and wildlife compete for land use, such as the golf course, airfield, and housing areas. On-going coordination with the golf course is directed toward wildlife habitat enhancement, especially by minimizing maintenance in out-of-bounds areas.

Other components of wildlife conservation involve periodic wildlife surveys, enforcement of hunting regulations, and education. Basewide wildlife and habitat surveys are conducted every 5 years, and as funding permits, to assess habitat status, quality, and management needs. Periodic surveys for game and non-game species such as breeding bird censuses, spotlight surveys (as authorized by Georgia DNR) for deer and feral hog on the airfield, wintering blackbird surveys, small mammal censuses, mid-summer black bear surveys, reptile and amphibian inventories (e.g., alligator counts), and arthropod surveys are conducted. A baseline reptile and amphibian survey was completed in 2003 (Robins AFB, 2003a) to update and supplement previous wildlife inventories. Samples were collected in each of the eight Significant Natural Communities and in Horse Creek, Sandy Run Creek, and the three lakes on Base. In 2003/2004 a baseline survey for terrestrial arthropods was conducted in various natural areas adjacent to residential and industrial areas (Robins AFB, 2005b).

Fish Management

Many of the management measures for invasive/exotic plant control, water quality improvement and watercourse/wetland protection, support fish conservation and enhance fish production. Additional management measures that serve to maintain and enhance fisheries resources are highlighted below.

Fish are monitored in all three lakes by sampling with seine nets to determine fish stocking requirements. Periodic sampling has also been performed via the use of electro-shock equipment. Scout Lake was stocked with largemouth bass (*Micropterus salmoides*) in 2001-2002, 2004, and 2006 in an effort to re-establish a healthy predator to prey fish species ratio. Catch and release requirements applied to anglers fishing for bass. Fish population checks in 2000-2001, and in 2003 and 2004 showed that the fishery in that lake was out of balance with respect to fish age and size structure due to an overabundance of stunted prey fish species, particularly bluegill (*Lepomis macrochirus*). Management recommendations for restoration of the Scout Lake fishery were developed (Robins AFB, 2004b) and implemented in early 2004. Scout and Luna Lake have been fertilized periodically to improve habitat and water quality, and Luna Lake is currently managed as a catfish pond via annual stocking (when funds are available). Monitoring and fertilization at Scout Lake occurred in 2005 and 2006, and the lake was renovated (i.e., all fish were removed with the aid of Rotenone) in October 2010. Scout Lake was stocked with sunfish in the fall of 2010, and was stocked with bass and catfish in the spring of 2011.

Duck Lake was drained in 1996 to facilitate a restoration project associated with the discovery of DDT constituents in the lake's sediments. That project was completed in 1998, at which time the basin was re-filled and the lake was restocked with catfish, sunfish, and bass. Fertilization of Duck Lake has not been necessary since the lake receives nutrient inflow from two streams.

Hunting and Fishing

The 78th Force Support Squadron (78 FSS) coordinates the hunting and fishing program with 78 CEG/CEIE. The 78 FSS sells hunting and fishing permits at the Base Equipment Rental which also serves as the game check station. This coordination ensures that hunting and fishing activities are consistent with MEA management and mission activities. The 78 CES provides construction and maintenance for outdoor recreation facilities. The 78 SFS, the Georgia Department of Natural Resources, and the Fish and Wildlife Service provide enforcement assistance to 78 CEG/CEIE concerning hunting and fishing regulations, safety rules, and other prohibitions related to outdoor recreation activities and natural resources management. A more detailed discussion of the respective roles of these organizations can be found in Robins AFB Instruction (RAFBI) 32-7064 contained in the Robins AFB Instructions Appendix, as well as the 1998 Memorandum of Agreement among the above signatories that established enforcement roles. Hunting and fishing areas are shown in Figure: Hunting and Fishing Areas.

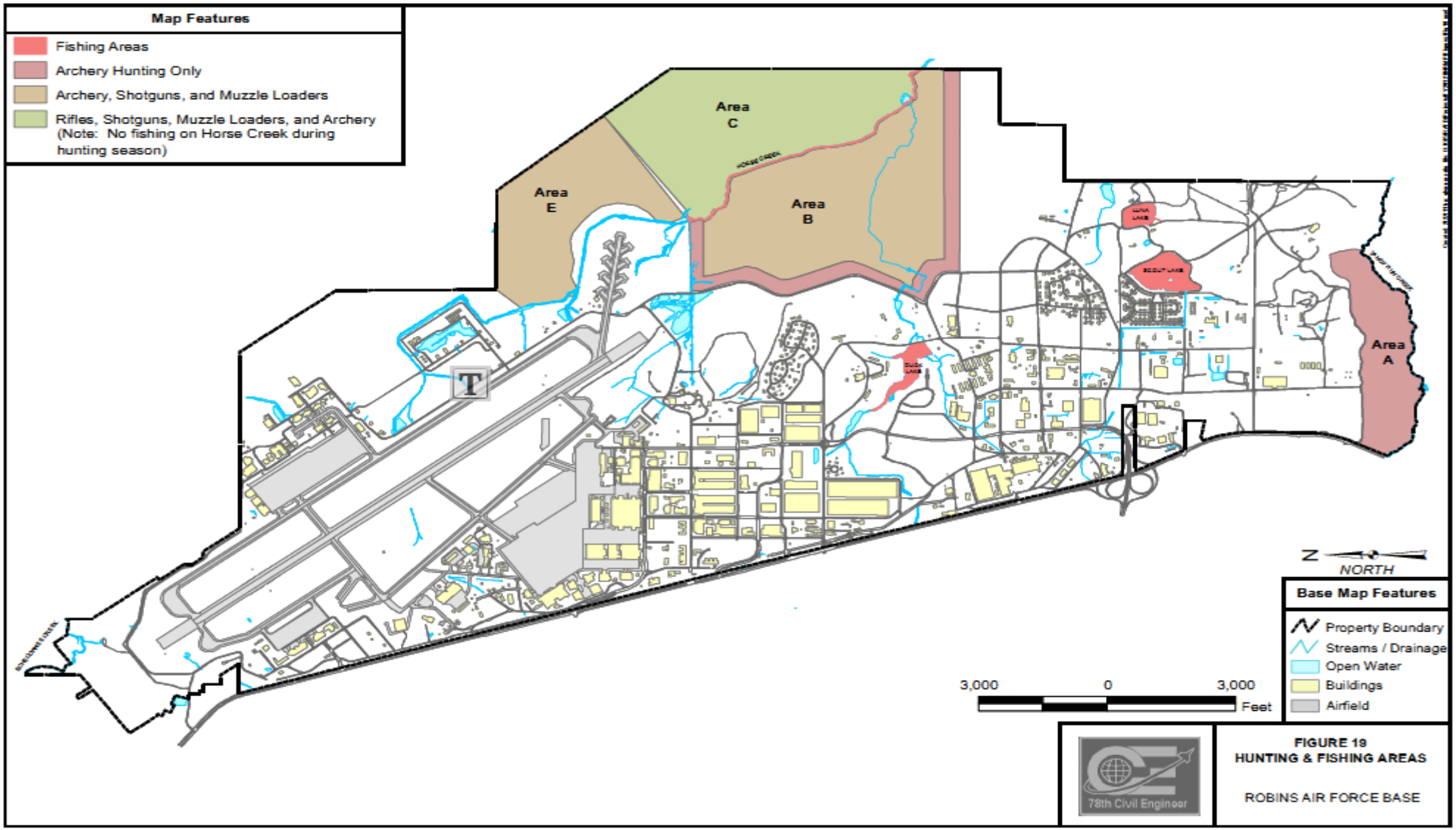
Aside from golf, hunting and fishing are the outdoor recreation activities in highest demand on the Base. The Base provides 1,317 acres of permanently designated hunting area (Areas A, B, C, and E). All hunting areas are on Base property.

Rifles, shotguns, muzzleloaders, and bows are approved for Hunting Area C. Shotguns, muzzleloaders, and bows are approved for Hunting Area B. Hunting equipment is limited to archery in Hunting Area A. A valid Georgia hunting license and a Robins AFB hunting permit are required. Base permits are purchased from the Base Equipment Rental and hunters must attend the Base hunter orientation class prior to hunting in

any of these designated areas. Deer, feral hog, turkey, waterfowl, and squirrel are the only game that may be taken in the hunting areas. All game taken must be checked at the Base Equipment Rental. ATV use is subject to Base restrictions and is prohibited in wetlands and forests. Further details regarding hunting regulations and restrictions are provided in RAFBI 32-7064 (see the Robins AFB Instructions Appendix).

The three lakes on Base (Scout, Luna, and Duck Lakes) are stocked for fishing and fishing is allowed in the portion of Horse Creek downstream from the bridge to the Base property boundary. Both Scout and Luna Lakes have fishing piers accessible by persons with disabilities. The lakes are stocked with bass, catfish, and sunfish. The portion of Horse Creek approved for fishing is located between Hunting Areas B and C. A valid Georgia fishing license and a Robins AFB fishing permit are required. Base permits may be purchased from the Base Equipment Rental. Fishing regulations for the Base are the same as those established by the Georgia DNR. Base-specific requirements may be found in RAFBI 32-7064 (Robins AFB Instructions Appendix).

Hunting and Fishing Areas



Education

The 78 CEG/CEIE promotes wildlife and natural resource education through articles in the Base newspaper, placing information on the Base website, participating in Arbor Day and Earth Week ceremonies, supporting birding, botanical, and herptile field trips, leading field trips for college and high school students, and providing talks at local schools, garden clubs, meetings of the Environmental Advisory Board, and other gatherings. Education also is provided through Base communication media and service organizations related to actions personnel and residents can take to further reduce human/wildlife conflicts such as potential contact with deer flies, ticks, mosquitoes, and snakes. Two interpretive nature trails, the Treefrog Trail and Wiregrass Trail, have stations describing the local plants, wildlife and ecology.

Issues and Concerns

There is no pier at Duck Lake and installing a fishing pier would improve fishing access as would installing a boat ramp at Scout Lake. Scouts Lake's fishery could also be improved by more consistent fertilization.

Additional fishing access could be provided by adding fishing platforms along Horse Creek, subject to funding availability. These platforms would provide better access for the disabled and better protect stream bank vegetation from trampling.

7.2 Outdoor Recreation and Public Access to Natural Resources

Applicability Statement

This section applies to all AF installations that maintain an INRMP. Robins AFB **IS** required to implement this element.

Program Overview/Current Management Practices

Open fields with some wetland areas occupy 406 acres of semi-improved grounds. Unimproved grounds consist of 2,833 acres of commercial forest, natural forest areas, stream corridors, and wetlands. Most of the unimproved lands are wetland areas. The most significant natural feature on the Base is the bluff between the upland coastal plain terrace and the bottomland hardwood swamp of the Ocmulgee River floodplain. Upland, bottomland, and transitional forest provide the most significant natural resource for active and passive recreational activities. Upland mixed hardwood forest occupies about 450 acres in the southeastern part of the Base in addition to approximately 60 acres of planted pines managed for commercial timber harvest and a 25-acre relict longleaf pine stand. The bottomland forest consists of approximately 2,142 acres of mixed hardwoods on the eastern side of the Base. An urban forest characterized by pines and oaks is present in the housing areas and throughout much of the southern half of the administrative and industrial area of the Base. The Air Force outdoor recreation program mission, vision, and goals guide the development and management of the outdoor recreation program at Robins AFB (see the Outdoor Recreation Management Plan Appendix).

Areas for Outdoor Recreation Use

The topography and varied natural vegetation communities provide diverse environmental settings for outdoor recreational activities. The classification of areas suitable for outdoor recreation is based on the degree of development and intensity of use (AFI 32-7064).

Class I areas are developed areas that are suitable for general outdoor recreation. These areas are used for intensive recreational activities such as camping, sports, physical fitness, and social gatherings. At Robins AFB these areas comprise about 243 acres and support the FAMCamp, golf course, skeet range, the Aero Club, model aircraft runway, group picnic facilities, and outdoor sports and fitness facilities.

The FAMCamp is nestled in a 10-acre wooded area by Luna Lake. There are paved sites for recreational vehicles (RVs) and space to accommodate three to four tents for primitive camping. Showers, restrooms, laundry facilities, and a picnic area and playground are available.

Class II areas are natural areas that are suitable for less intensive recreational activities. These areas can support dispersed recreational activities such as hunting, fishing, birding, hiking, sightseeing, jogging, and horseback riding. These areas occupy approximately 2,500 acres on the Base, much of which is wetlands, and support more than 20 miles of nature, hiking, horseback riding, off-road bicycle, and fitness trails, a field archery course and equestrian facilities.

The Base provides more than 1,300 acres of permanently designated hunting area (Areas A, B, C, and E). All hunting areas are on Base property. The Base lakes are stocked with sport fish each year and fishing and boating are available on all three lakes and Horse Creek. Both Luna and Scout Lakes have fishing piers that are accessible to people with disabilities. Canoes and boats and boating equipment may be rented from the Equipment Rental Center.

Three designated nature trails provide passive outdoor recreation and educational opportunities. All three trails have interpretative stations describing the plants, animals and ecology of the ecosystems in which they are located. The Treefrog Trail, established in 1997, is an unpaved 0.5-mile loop around a gum pond wetland within the pine/hardwood forest near the Lodge. The Spalding Nature Trail is a 1.3-mile trail, partially paved with recycled material. This trail circles the FAMCamp, winding through mixed hardwood/pine forest featuring the plants and animals of this upland forest ecosystem. The Wiregrass Trail is a 0.3-mile unpaved trail that bisects the longleaf pine reforestation site. This trail features the wiregrass/longleaf pine ecosystem of the coastal plain and ends in an outdoor classroom area on the South Perimeter Road (Jeep Trail).

The Pine Oaks and Duck Lake Trails traverse varied terrain from the east central part of the Base near the former Officer's Club along the golf course and Upland Hardwood Bluff to the Equestrian Center Complex near the eastern boundary of the Base. These trails are popular for walking and jogging. The Pine Oaks Trail is approximately 2 miles in length. The Duck Lake Trail, located in a wooded buffer, follows a tributary to the lake. This ½- mile trail serves as a scenic connector and joins the Pine Oaks Trail at the Warner Robins Street bridge. The old 2-mile ParCourse Fitness Trail situated in the same natural area as the Spalding Nature Trail and Treefrog Trail begins near the Lodge and is still available for walking/jogging or running.

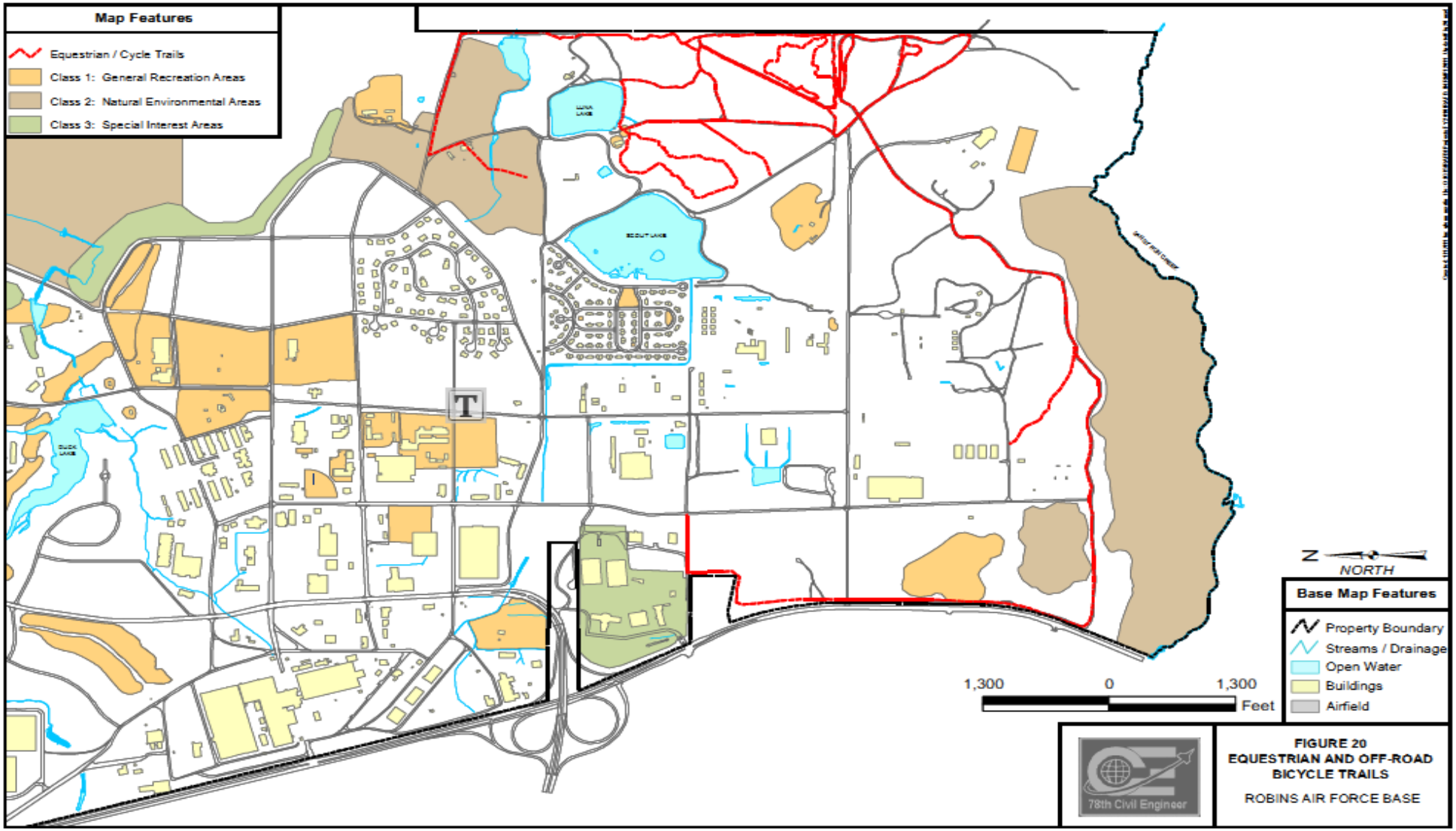
Approximately 5 miles of trails are approved for horseback riding and off-road bicycles (Figure: Equestrian and Off-Road Bicycle Trails). These trails are in the southern part of the Base and include the Equestrian Center Complex, nature trails, the old ParCourse trail, and unpaved roads in the area, including the South Perimeter Road (Jeep Trail).

The Straight Arrow Archery Range is a 14.7-acre area operated by the Straight Arrow Archery Club and is open to military and civilians who are club members. Facilities include a 14-target field course and a sighting-in area, a covered shelter and picnic tables, storage sheds, and portable toilets.

The Equestrian Center Complex is a 57.3-acre area with stables, fenced pastures, riding rings and a hunter/jumper competition arena. The facilities, operated by the outdoor recreation (OR) organization, are available for boarding horses owned by active duty and retired military members and civilian DoD employees. Robins Riding Club, considered a private organization, sponsors trail rides, clinics, and shows.

Class III areas are special interest areas. These areas contain valuable archeological, historic, botanical, zoological, ecological, or other features that require protection. These areas are comprised of unique ecological (Upland Hardwood Bluff) and archeological sites, Historic Forest, Memorial Camellia Garden, and Museum of Aviation. The Historic Forest is located around the parade ground on Fifth Street. The Historic Forest was established in 1994 and originally was located along Page Road near the former Visitor's Center. This area combines an emphasis on tree conservation with a commemoration of our nation's heritage. Trees planted here are grown from the seeds of trees associated with famous Americans. In addition to its commemorative and patriotic value, the Historic Forest exemplifies Robins AFB's steadfast commitment to preservation of the environment.

Equestrian and Off-Road Bicycle Trails



Outdoor Recreation Demand

Demand for outdoor recreation was assessed in the 2004 *Final Outdoor Recreation Management Plan* (Robins AFB, 2004c). Aside from golf, hunting and fishing are the outdoor recreation activities in highest demand on the Base. Camping facilities and park areas for outdoor social gatherings also are in high demand.

Interface with Services Division

The 78 FSS has the lead responsibility for most outdoor recreation facilities/activities on the Base. These responsibilities are carried out in coordination with 78 CEG/CEIE who has primary responsibility for natural resources management. 78 CEG/CEIE establishes hunting and fishing rules. Permits for hunting and fishing are issued at the Base Equipment Rental building. The Base Equipment Rental serves as a check point for hunters and anglers and provides use information to the 78 CEG/CEIE.

Policy and Regulations

Policy and regulations for outdoor recreation activities related to natural resource use are provided in RAFBI 32-7064 (Robins AFB Instructions Appendix). All military (active duty and retired) personnel and members of their immediate family may hunt and fish on Robins AFB. DoD employees assigned to the Base may participate on a space-available basis. Hunting and fishing rules and other limitations and prohibitions are specified in RAFBI 32-7064. Use of boats in the approved fishing areas must comply with state boating regulations and the use of boats with internal combustion engines is not allowed on the Base.

ATVs may be used for official DoD training purposes on established roads and trails in the South 800 Area/Obstacle Course near the Prime BEEF area. When mission needs dictate ATV use for training in other areas of the Base the use is approved on a case-by-case basis by the 78 CEG/CEIE. ATVs may be used by hunters during deer and feral hog hunting seasons on the natural gas pipeline road east of the bridge on Horse Creek and to transport targets on established trails at the Archery Range. ATVs or any other off-road vehicles may not be used for recreational purposes on any other part of the Base. ATVs must be transported to approved-use areas by trailer or truck.

Public Access

Outdoor recreation programs, activities, and facilities on the Base are directed toward providing enhanced Quality of Life (QOL) for active duty military, retirees, DoD civilians, and their immediate family members. The primary focus is on meeting the recreational needs of the active duty military members and their families. The public may participate as a guest of the eligible groups discussed above or as otherwise approved by the Base Commander. Program eligibility and use is determined by guidelines in AFI 34-262, *Services Programs and Use Eligibility*, and the Installation Commander.

7.3 Conservation Law Enforcement

Applicability Statement

This section applies to all AF installations that maintain an INRMP. The installation is required to implement this element.

Program Overview/Current Management Practices

Robins AFB has an established Memorandum of Understanding (MOU) with the USFWS, Georgia DNR, and the 78 SFS regarding the enforcement of hunting and fishing regulations on the Base (see the Robins AFB Instructions Appendix). The 78 SFS enforces rules concerning safety and environmental issues in Base fishing areas, including personal flotation device requirements, prohibitions on swimming, wading, improper trash disposal, and prohibitions on the use of boats with gasoline or other internal combustion engines. The 78 SFS supports the 78 CEG/CEIE natural resources manager concerning violators of fishing and hunting rules. The 78 SFS also enforces rules governing the use of ATVs on the Base. These restrictions on use of off-road vehicles are defined in RAFBI 32-7064. The USFWS investigates Service-enforced statutes, treaties, and regulations as authorized by law. The Georgia DNR enforces state and applicable federal fish and wildlife regulations within proprietary areas of the installation and applicable federal fish and wildlife regulations within exclusive areas of the installation.

7.4 Management of Threatened and Endangered Species, Species of Concern and Habitats

Applicability Statement

This section applies to AF installations that have threatened and endangered species on AF property. This section **IS** applicable to Robins AFB.

Program Overview/Current Management Practices

Three biological surveys for federal and state endangered, threatened, or rare animal species have been conducted on Robins AFB (USDA SCS, 1989; Heyman, 1994; and Robins AFB, 2000). Additional surveys were completed for birds (Robins AFB, 2008b), and fish (Robins AFB, 2008a) in 2007. A rare plant survey and management plan was completed in 1999 (Robins AFB, 1999d). A follow-up survey was completed in 2008 (Robins AFB, 2008b), and the management plan was updated in 2009 (Robins AFB, 2009a; see the Rare Plant Monitoring and Management Plan Appendix). A reptile and amphibian species survey was completed in 2003 (Robins AFB, 2003d). No federal threatened or endangered animal or plant species or habitats of concern occur on Robins AFB. Therefore, there have been no consultations under Section 7 of the ESA or biological opinions issued by the USFWS.

Program management related to federally-listed species includes on-going review of ecological studies conducted on the Base and conducting periodic basewide surveys for threatened or endangered species in suitable habitats at least once every 5 years (see the Threatened and Endangered Animal Species Monitoring and Management Plan Appendix). Survey methodology is coordinated with the USFWS and Georgia DNR through informal communications or plan reviews as appropriate. Site-specific TES surveys on any unimproved grounds are conducted as warranted prior to any land disturbing or other potentially disruptive activities. Section 7 consultation with the USFWS would be initiated if any federally-listed species were found on the Base in the future and potentially would be affected by mission-related activities.

Other Sensitive Species

Sensitive animal or plant species are those species that are of special interest because of unique characteristics, habitat requirements, rare occurrence, or listing by the state for protection or for monitoring, such as Georgia DNR Tracking List and Watch List plants. Rare plants have the potential to

become federal-listed or state-protected and are therefore of special interest for conservation management and given priority in accordance with funding availability.

Eight of the state-listed plant species occur in the Grady Freshwater Meadow. This unique habitat is protected and monitored. Management practices at this site include protecting the existing hydrologic regime from changes that would significantly alter the existing water level cycles, monitoring permanent plots for awnpetal meadowbeauty, inventory of flowering success of awnpetal meadowbeauty and Boykin's lobelia plants, periodic inventory of all plant species using transects across the freshwater meadow, and monitoring of the hydrologic conditions of this habitat. The stability of the awnpetal meadowbeauty population is used as an indicator of stability for the other rare plant species in this habitat with similar ecological and hydrological requirements. The long- term monitoring program for awnpetal meadowbeauty and the Grady meadow site includes the following:

1. Periodic sampling of permanent five-meter radius circular plots;
2. Inventory of all species utilizing a transect located across the wetland;
3. Inventory of all flowering awnpetal meadowbeauty and Boykin's lobelia plants in late June; and
4. Periodic monitoring of the hydrologic conditions of the wetland.

Grady Freshwater Meadow

The Ocmulgee skullcap occurs at two locations in the Upland Hardwood Bluff community, and at a third location between the Officer's Circle and the landfill. The Upland Hardwood Bluff community has been designated as sensitive habitat by 78 CEG/CEIE. The activities in this area are monitored to prevent adverse impact to this species. The health of Ocmulgee skullcap is monitored through sampling permanent 5- meter radius circular plots during July at the northern location within the Upland Hardwood Bluff community. Past observations have shown that the flowering and fruiting of this species depends upon control of the height of competing vegetation. Mowing to a height of 3 to 6 inches during winter months (November, December, January) or hand clearing is used as required to control competing vegetation. When mowing, care is taken to minimize soil impacts (either from compaction or scarification) to protect the roots of the skullcap from damage.

Although the Harper's wild ginger populations appear to be healthy and vigorous, permanent plots have been established in the Creek Forest to monitor the health of these populations. Periodic surveys of two five-meter circular plots during mid- to late-May are used to inventory the number of stems and flowers. Total numbers of flowers are used as an indicator of sexual reproduction, while the total number of leaves indicate asexual production. Because this species flowers so irregularly, leaf count is considered to be the best indicator for plant health.

October ladies'-tresses was observed in the past at the wetland site east of PAVE- PAWS, but has not been recorded recently. Because orchids can exist for several years in a dormant, underground state, this species may still be present in the wetland. This area is revisited periodically in early October to determine whether this species still occurs on the Base and to monitor hydrological conditions of the area. Presently, there is no active management of this site.

Sensitive species also include those plants or animals not protected under the ESA, but afforded protection under other statutes. Bald eagles (*Haliaeetus leucocephalus*) were removed from the endangered species list on June 2007, but are protected under the Eagle Act. When the bald eagle was delisted, the USFWS promulgated regulations to authorize the limited, non-purposeful take of this species when associated with otherwise lawful activities. These permits authorize disturbance, and in some cases, may authorize physical take of eagles or nests if every precaution has been taken to avoid physical take. Bald eagles are occasional visitors to Robins AFB, but there are no known nests on the installation. Management activities affecting bald eagles or other migratory bird species would be carried out in accordance with 50 CFR Parts 13 and 22 or other applicable requirements, respectively.

7.5 Water Resource Protection

Applicability Statement

This section applies to AF installations that have water resources. This section **IS** applicable to Robins AFB.

Program Overview/Current Management Practices

The major environmental stressors that impair or threaten water quality in the Ocmulgee River basin include traditional chemical stressors, such as oxygen demanding substances, metals, and bacterial contamination, as well as less traditional stressors, such as stream channel modifications and alteration of physical habitat (GADNR, 2004). Urban runoff and rural nonpoint sources are the major sources of failure to support designated uses of water bodies in the Ocmulgee Basin. The major threats to water quality within the basin are: fecal coliform bacteria, sediment loading and habitat degradation, dissolved oxygen, and fish tissue contamination. Sediment loading is of greatest concern in developing areas and major transportation corridors. The fish consumption issues are associated with mercury, primarily from air deposition, or polychlorinated biphenyls (PCBs) from legacy sources.

The focus for water resource management on Robins AFB is to protect and restore, as necessary, the watercourses, impoundments, and wetlands within the Base. Principal program areas include lake and watercourse protection, floodplain protection, wetlands protection, and water conservation.

Lake and Watercourse Protection

Watercourses refer to the creeks as well as the man-made ditches that transport stormwater runoff through the Base. The impoundments are all bodies of standing water, natural or man-made, which are intended to have permanent water retention.

The main concerns that presently exist for lake and watercourse protection are:

1. Sedimentation from erosion along the stream banks and lake shores,
2. Chemicals in nonpoint source runoff entering the water bodies, and
3. Sediment loading from watershed erosion entering the water bodies.

Program management includes multiple strategies to protect water quality and minimize impacts to streams and lakes on the Base. These strategies include lake and watercourse management zones, erosion protection, and watercourse and upland vegetation restoration, pesticide use reduction, and storm water runoff management.

Lake and Watercourse Management Zones

Lake and Watercourse Management Zones are used to protect existing shoreline vegetation and streambanks from potentially adverse disturbance. These zones identify the level of use that is allowed along the edges of the streams and lakes.

Lake and Watercourse Management Zones

Zone	Purpose	Distance	Permitted Uses
Zone I	To protect the banks of the lakes and streams. This will help to maintain the stability of the channel banks and lakeshore.	40 ft	Limit pedestrian access. Provide access by walkway where practicable. Prohibit mowing in natural areas such as the east side of Duck Lake.
Zone II	To protect the watershed area adjacent to the stream or lake. This helps to prevent erosion from entering the water body.	60 ft	Low intensity activities are allowed. Minimize permanent recreational structures (such as picnic tables, camping, barbecue pits, etc.)
Zone III	This zone delineates where higher intensive use activities are allowed.	50+ ft	High intensity recreational activities and permanent or semi-permanent structures are allowed.

There are areas of the Base where mowing occurs along streambanks and lake margins. Sod and trees around the perimeters of Luna and Scout Lakes are maintained turf. Current management emphasis is to discontinue or restrict mowing where possible and to plant low maintenance, native grasses, shrubs or trees or to allow natural growth of native plant species to revegetate the streambanks and shoreline zones in natural areas to minimize potential erosion and sedimentation problems.

Erosion Control

The Georgia Soil and Water Conservation Commission BMPs for soil erosion and sediment control are used as guidelines to minimize erosion and resultant sedimentation of waterbodies (GASWCC, 2000 and

2002). Erosion control BMPs for unpaved roads provided by the Georgia Forestry Commission (1999) also serve as management guidelines. The general guidelines direct that:

1. Stripping of vegetation, regrading, and other development activities shall be conducted in such a manner so as to minimize erosion;
2. Cut and fill operations must be reduced to a minimum;
3. Development plans must conform to topography and soil type, so as to create the lowest practicable erosion potential;
4. Whenever feasible, natural vegetation shall be retained, protected, and supplemented;
5. The disturbed area and the duration of exposure to erosive elements shall be kept to a practicable minimum;
6. Disturbed soil shall be stabilized as quickly as practicable;
7. Temporary vegetation or mulching shall be employed to protect exposed critical areas during development; and
8. Permanent vegetation and structural erosion control measures must be installed as soon as practicable.

A land-disturbing activity plan is prepared and a "Soil Erosion and Sedimentation Control Permit" is obtained from the Houston County Public Works Department for construction projects that create soil disturbance of one acre or more. The land-disturbing activity plan and detailed site plans are based on practical combinations of the following planning guidelines, as a minimum.

Typical Erosion and Sediment Deposition

Land-Disturbing Activity Planning Directives

1. Fit the activity to the topography and soils. Detailed planning should be employed to assure that roadways, buildings and other permanent features of the activity conform to the natural characteristics of the site. Large graded areas should be located on the most level portion of this site. Areas subject to flooding should be avoided. Areas of steep slopes, erodible soils and soils with severe limitations for the intended uses should not be utilized without overcoming the limitations through sound engineering practices. Erosion control, development and maintenance costs can be minimized if a site is selected for a specific activity.

2. Minimize the disturbed area and the duration of exposure to erosion elements. Clearing of natural vegetation should be limited to only those areas of the site to be developed at a given time. Natural vegetation should be retained, protected and supplemented whenever practicable with construction scheduling employed to limit the duration of soil exposure. Major land clearing and grading operations should be scheduled during seasons of low potential runoff.
3. Stabilize disturbed areas immediately. Permanent structures, temporary or permanent vegetation, and mulch, or a combination of these measures, should be employed as quickly as possible after the land is disturbed. Temporary vegetation and mulches can be most effective on areas where it is not practical to establish permanent vegetation. These temporary measures should be employed immediately after rough grading is completed if a delay is anticipated in obtaining finished grade. The finished slope of a cut or fill should be stable and ease of maintenance considered in the design. Stabilize all roadways, parking areas, and paved areas with the gravel sub-base, temporary vegetation or mulch.
4. Retain or accommodate runoff. Runoff from the development should be safely conveyed to a stable outlet using storm drains, diversions, stable waterways or similar conservation measures. Consideration should also be given to the installation of storm water retention structures to prevent flooding and damage to downstream facilities resulting from increased runoff from the site. Temporary or permanent facilities for conveyance of storm water should be designed to withstand the velocities of projected peak discharges. These facilities should be operational as soon as possible after the start of construction.
5. Retain sediment. Sediment basins, sediment barriers and related structures should be installed to filter or trap sediment on the site to be disturbed. The most effective method of controlling sediment, however, is to control erosion at its source. Sediment retention structures should be planned to retain sediment when erosion control methods are not practical, or insufficient, or in the process of being installed, or have failed due to some unforeseen factor. Plans for maintenance of sediment control structures and removal of collected sediment following construction shall be developed prior to starting construction.
6. Do not encroach upon watercourses. Permanent buildings should not be subjected to flooding, sediment damage, or erosion hazards. Earth fills should not be constructed in flood-prone areas that would adversely obstruct water flows or increase downstream velocity of water flows. When necessary to span a flood prone area or watercourse, bridge or culvert openings should be sized to permit passage of peak discharges without causing undue restrictions in water flows or without creating excessive downstream velocities. Uses of flood prone areas should be limited to activities which would not suffer excessive damage from flooding, scour, and sediment damages. Temporary bridges or culverts should be employed when construction equipment is required to cross natural or constructed channels.

Upland Vegetation Restoration

The purpose of revegetation plans for exposed ground in upland areas is to reduce erosion of exposed soil surfaces. Standard vegetation planting practices such as those from the Natural Resource Conservation Service are used where possible for all watershed surfaces where exposed soil is present. General guidelines for the revegetation of disturbed soil surfaces include:

- Plant vegetation (such as trees, shrubs, vines, grasses, or legumes) on highly erodible or critically eroding areas to stabilize soils. Applicable areas are eroded fields, disturbed streambanks,

excavation sites, road construction areas, or gullied areas where natural vegetation cannot be reestablish by usual planting methods.

- Use conventional planting methods where possible and consider using companion crops which aid in getting permanent cover established, especially when mixed plantings are done during marginal planting periods.
- Use block sod in controlling erosion adjacent to structures.
- Consider using irrigation, especially when late season plantings are done.
- Use low maintenance, native plants in most cases to ensure long- lasting erosion control.
- Include wildlife plantings in critical area plantings.

Watercourse Vegetation Restoration

The purpose of revegetation plans for watercourses is to stabilize and protect the banks of streams, lakes, wetlands, or excavated channels against scour and erosion using vegetative as the preferred restoration means. The vegetation restoration plan applies to natural or excavated channels where the stream banks are susceptible to erosion from the action of water or debris, or to damage from animals, pedestrian or vehicular traffic. Watercourse restoration plans also apply to controlling erosion on shorelines where the problem can be solved with relatively simple structural measures, revegetation, upland erosion control practices, or a combination of these where failure of structural measures would not create a hazard to life or result in serious damage to property. Since each watercourse is unique, measures for protecting streambanks and shorelines are adapted to the specific site. A partial list of general protective elements that may be used to enhance streambank protection include:

Obstruction Removal – The removal of fallen trees, stumps, debris, minor ledge outcroppings, and sand and gravel bars that might cause local current turbulence and deflection. (Note: a fisheries biologist should be consulted prior to removal of large woody debris to determine if removal of such debris would significantly degrade fisheries habitat.)

Banksloping – The reduction of the streambank slope to provide a more suitable condition for vegetative protection or for the installation of structural or vegetation bank protection, or a combination of the two.

Fencing – Artificial obstructions to protect vegetation needed for streambank protection or to protect critical areas from damage from streambank activity or vehicular traffic.

Clearing – The removal of trees and brush when necessary to facilitate the growth of more desirable bank vegetation and the removal of trees that are in immediate danger of falling into the stream.

Vegetative Protection – The lining of the streambank or shoreline with vigorously growing shrubs, grasses, or trees, or a combination of them.

For drainages that are receiving sediment from off-Base sites, the sediment is trapped by silt screens, or low flow hay bales, at a location just inside the Base, when necessary.

Pesticide Use Reduction

The amount of pesticides that could enter streams or lakes is minimized. Pesticides are typically applied to control the production of weeds and nuisance insects. Pesticides can enter the water system from

applications sprayed directly on the water surface, unintentional overspray from applications near water, or as residue from previous applications to sites within the watershed that is transported by storm water runoff. Eliminating the application of pesticides is not a viable alternative on the Base. BMPs that help reduce the amount of these nonpoint source (NPS) chemicals from entering streams and lakes include:

1. Reducing the amount of pesticide applied within the watershed to the minimum necessary,
2. Using non-chemical control methods, such as manual vegetation removal or biological pest control,
3. Review of application schedules and monitoring results to determine if less frequent applications are possible,
4. Avoiding applications immediately before rainfall events,
5. Using less toxic pesticides that biodegrade in a shorter period of time, and
6. Minimizing the amount of pesticides applied near bodies of water by restricting the application of pesticides within Zone 1 of the stream and lake management zones and limiting the application of pesticide in Zone 2 to the minimum amount and frequency needed.

Storm Water Runoff Management

The Base NPS program and BMPs are consistent with the Georgia NPS Pollution Management Program. Activities that can generate pollutants in runoff from uncovered areas, such as vehicle maintenance, chemical or waste oil storage, or loading and unloading of chemicals are carried out in covered areas to the extent practicable.

Potentially contaminated storm water runoff is retained and diverted to the sanitary sewer system in areas that cannot be covered. Any disposal of contaminants into the storm drain system is prohibited.

Floodplain Protection

Previous management measures related to upland habitat enhancement and lake and watercourse protection, enhancement, and restoration also will protect floodplain function and values. Additional measures that serve to protect natural features of floodplains and protect personnel and property from flood hazards include:

- Periodic review of 100-year floodplain data and maps to ensure that the flood zone information is current and accurate;
- Maintaining the current floodplain maps on the Base GIS for use in planning, design, siting, and environmental assessment activities;
- Reviewing proposed development plans to determine whether they will occur in the floodplain and to minimize land-disturbing development activity in the floodplain by ensuring that any development is consistent with regulatory requirements and natural resource management goals.

Water Conservation

The 78 CEG/CEIE enforces the Georgia DNR Environmental Protection Division (EPD) statewide watering restrictions and publishes informative pamphlets concerning water restrictions and water conservation measures applicable to the Base. Water conservation initiatives include recommending native, drought-resistant vegetation that can be used for landscape and area plantings, replacing less drought-tolerant vegetation when possible, and promoting and exploring opportunities for using treated wastewater for

irrigation of the Golf Course. Drought-tolerant plant species or species adapted to local conditions are recommended during review of landscape designs and development plans to minimize the need for landscape plant irrigation. Recommended drought-tolerant species are shown in Table: Durable Plants for Xeriscape-Type Landscapes in Georgia. Confining irrigation to the evening hours to minimize evaporation and maximize benefits from watering is promoted as good conservation practice. The use of treated wastewater for golf course irrigation would require approval from the US Environmental Protection Agency (USEPA) and/or the State of Georgia as well as an approved National Pollutant Discharge Elimination System (NPDES) permit.

Durable Plants for Xeriscape-Type Landscapes in Georgia

VINES							
Botanical Name	**Common Name**	**Water Zone[1]**	**Georgia Hardiness Zone[2]**	**Flower Color/ Time of Bloom**	**Growth Rate**	**Group**	**Exposure**
Akebia quinata	Fireleaf Akebia	1, 2, 3	6b to 8	Not Showy	Fast	Deciduous	Sun/Shade
Antigonon leptopus	Coral Vine	1, 2, 3	8	Reddish Pink/ Summer	Fast	Deciduous	Sun
Campsis radicans	Trumpet Vine	1, 2, 3	6b to 8	Orange/ Summer	Fast	Deciduous	Sun/Shade
*Clematis paniculata**	Autumn Clematis	1, 2	6b to 7	White/Summer	Medium	Deciduous	Sun/Semi-shade
Clematis hybrids	Flowered Clematis	1, 2	6b to 8	Purple, Pink, White/Spring	Medium	Deciduous	Sun/ Semi-shade
Fatshedera lizei	Fatshedera	1, 2	7 to 8	Not Showy	Medium Slow	Evergreen	Shade/Semi-shade
Ficus pumila	Climbing Fig	1, 2	7b to 8	Not Showy	Slow	Evergreen	Sun/Shade
*Gelsemium sempervirens**	Carolina Jessamine	1, 2, 3	6b to 8	Yellow/Spring	Medium	Evergreen	Sun/Semi-shade
Lonicera x heckrottii	Goldflame Honeysuckle	1, 2, 3	6b to 8	Pink/Spring	Fast	Evergreen	Sun/Semi-shade
*Lonicera sempervirens**	Trumpet Honeysuckle	1, 2, 3	7b to 8	Orange-Red Yellow/Spring	Fast	Evergreen	Sun/Semi-shade
Parthenocissus quinquefolia	Virginia Creeper	1, 2, 3	6b to 8	Greenish White/ Summer/Not Showy	Fast	Deciduous	Sun to Shade
Parthenocissus tricuspidata	Japanese Creeper	1, 2, 3	7b to 8	Not Showy	Fast	Deciduous	Sun/Shade
Rosa banksiae	Banks Rose	1, 2, 3	6b to 8	White/Spring	Fast	Semi-evergreen	Sun
Rosa spp.	Climbing Roses	1, 2	6b to 8	Many Colors/ Spring	Fast	Deciduous	Sun/Semi-shade
Trachelospermum jasminoides	Confederate Jasmine	1, 2, 3	7 to 8	White/Summer	Medium	Evergreen	Sun
GROUND COVER							
Botanical Name	**Common Name**	**Water Zone**	**Georgia Hardiness Zone**	**Flower Color/ Time of Bloom**	**Normal Height/ Growth**	**Group**	**Exposure**
Ajuga reptans	Carpet Bugle	1, 2	7a to 8	Purple/spring	2-4 in Medium to Fast	Evergreen	Shade/Semi-shade

Hedera canariensis	Algerian Ivy	1, 2, 3	8	None	6-8 in Medium	Evergreen	Shade/Semi-shade
Botanical Name	**Common Name**	**Water Zone**	**Georgia Hardiness Zone**	**Flower Color/ Time of Bloom**	**Normal Height/ Growth**	**Group**	**Exposure**
Hemerocallis spp.	Daylily	1, 2	6b to 8	Many colors/Spring	12 in Fast	Evergreen	Sun/Semi-shade
Hypericum calycinum	St. Johns Wort	1, 2, 3	6b to 8	Yellow/Spring	8-12 in Medium to Fast	Semi-evergreen	Sun/Semi-shade
Juniperus conferta 'Blue Pacific'	Shore Juniper	2, 3	6b to 8	None	12-24 in Fast	Evergreen	Sun
Junperus honzontalis	Creeping Juniper	2, 3	6b to 8	None	12-24 in Moderate	Evergreen	Sun
Liriope muscan	Liriope	1, 2, 3	6b to 8	Purple/summer	8-15 in Medium	Evergreen	Sun/Shade
Ophiogopon japonicus	Dwarf Lilyturf or Mondo	1, 2	6b to 8	Not Showy	5-6 in Medium	Evergreen	Shade
Phlox subulata	Moss Phlox or Thrift	1, 2	6b to 8	Pink, white, Purple/spring	3-4 in Medium	Evergreen	Sun
Thachelospermum asiaticum	Asiatic Jasmine	1, 2, 3	7b to 8	Fine	4-6 in Medium	Evergreen	Sun/Semi-shade
Vinca minor	Common Periwinkle	1, 2, 3	6b to 8	Purple/Spring	5-6 in Fast	Evergreen	Shade
Vinca major	Large Periwinkle	1, 2	7 to 8	Purple/Spring	12-24 in Moderate	Evergreen	Sun/Semi-shade
ORNAMENTAL GRASSES							
Botanical Name	**Common Name**	**Water Zone**	**Georgia Hardiness Zone**	**Texture**	**Height and Spread/**	**Panicle Length**	**Exposure**
Calamagrostis x *acutifolia* 'stricta'	Feather Reed Grass	1, 2, 3	6b to 8	Fine	5 ft/3 ft	12 in	Sun
Carex morowii	Japanese Sedge Grass	1, 2, 3	6b to 8	Fine	1 ft/1 ft	3 in	Sun/Semi-shade
*Chasmanthum latifolium**	Upland Sea Oats	1, 2, 3	6b to 8	Fine	3 ft/2 ft	8 in	Sun/Semi-shade
Cortaderia selloeana	Pampas Grass	1, 2, 3	7b to 8	Fine to Medium	8 ft/6 ft	20 in	Sun
Cortaderia sellonana 'Pumila'	Dwarf Pampas Grass	1, 2, 3	6b to 7a	Medium	3 ft/4 ft	2 ft	Sun

Elymus glaucus	Blue Wild Rye	1, 2, 3	6b to 8	Medium	5 ft/4 ft	10 in	Sun
Erianthus ravennae	Ravenna Grass	1, 2, 3	6b to 8	Medium to Coarse	9 ft/4 ft	20 in	Sun
Pennisetum alopecuroides	Australian Fountain Grass	1, 2, 3	6b to 8	Fine	3 ft/2 ft	3 in	Sun
Botanical Name	**Common Name**	**Water Zone**	**Georgia Hardiness Zone**	**Texture**	**Height and Spread/**	**Panicle Length**	**Exposure**
Pennisetum setaceum	Fountain Grass	1, 2	Use like an Annual	Fine	4 ft/4 ft	12 in	Sun
Pennisetum setaceum 'Rubrum'	Crimson Fountain Grass	1, 2	Use like an Annual	Fine	4 ft/4 ft	12 in	Sun
Pennisetum villosum	Feathertop Grass	1, 2, 3	6b to 8	Fine	3 ft/2 ft	3 in	Sun
Phalaris arundinacea 'Picta'	Ribbon Grass	1, 2, 3	6b to 8	Fine	2 ft/3 ft	6 in	Light Shade
Small Shrubs (2 to 5 feet)							
Botanical Name	**Common Name**	**Water Zone**	**Georgia Hardiness Zone**	**Texture**	**Form**	**Growth Rate**	**Height**
Abelia x grandifolia	Abelia	1, 2, 3	6b to 8	Fine	Irregular to Oval	Slow	3-4 ft
Aucuba japonica 'Nana'	Dwarf Aucuba	1, 2, 3	6b to 8	Coasrse	Oval	Slow	3-4 ft
Berberis thunbergi	Japanese Barberry	1, 2, 3	6b to 8a	Medium	Oval	Medium	3-5 ft
Buxus microphylla var. japonica	Semi-Japanese Boxwood	1, 2, 3	7a to 8	Fine	Rounded	Slow	3-4 ft
Deutzia gracilis	Slender Deytzia	1, 2, 3	6b to 8a	Fine	Mounding	Medium	2-4 ft
Gardenia radicans	Creeping Gardenia	1, 2	7a to 8	Fine	Spreading	Slow	2-4 ft
Azalea spp.	Azalea hybrids	1, 2	6b to 8	Fine	Upright Spreading	Slow to Medium	3-5 ft
Hydrangea arborescens 'Anabelle'	Smooth Hydrangea	1, 2	6b to 8	Coarse	Rounded	Fast	3-4 ft
Ilex cornuta 'Carissa'	Carissa Holly	1, 2, 3	6b to 8	Medium	Rounded	Slow	3-4 ft
Ilex cornuta 'Rotunda'	Dwarf Chinese Holly	1, 2, 3	6b to 8	Coarse	Rounded	Slow	3-4 ft
Ilex crenata 'Compacta'	Compacta Holly	1, 2	6b to 7	Fine to Medium	Rounded	Medium	3-4 ft
Ilex crenata	'Green Lustre'	1, 2, 3	6b to 8a	Fine to Medium	Rounded	Medium	3-5 ft
Ilex crenata 'Hellen'	Japanese Holly	1, 2	6b to 7	Fine	Spreading	Slow	2-3 ft
Ilex crenata 'Hetzi'	Hetz Holly	1, 2	6b to 7	Fine to Medium	Rounded	Medium	4-5 ft

Ilex vomitoria 'Nana'*	Dwarf Yaupon Holly	1, 2, 3	6b to 8	Fine	Rounded	Slow	3-4 ft
*Itea virginica**	Virginia Sweetspire	1, 2, 3	6b to 8b	Medium	Upright Branching	Medium	3-5 ft
Jasminum floridum	Showy Jasmine	1, 2, 3	8	Medium	Upright	Medium	3-5 ft
Botanical Name	**Common Name**	**Water Zone**	**Georgia Hardiness Zone**	**Texture**	**Form**	**Growth Rate**	**Height**
Jasminum nudiflorum	Winter Jasmine	1, 2, 3	6b to 8	Fine	Mounding Spreading	Fast	3-4 ft
Juniperus davurica 'Expansa'	Parsons Juniper	1, 2, 3	6b to 8	Fine	Spreading	Medium to Fast	2 ft
Juniperus horizontalis 'Plumosa'	Andorra Juniper	1, 2, 3	6b to 8	Fine	Spreading	Slow	2 ft
Kerria japonica	Japanese Kerria	1, 2, 3	6b to 8	Medium	Upright Arching	Medium	3-5 ft
Lonicera pileata	Privet Honeysuckle	1, 2, 3	6b to 8a	Medium	Oval	Medium	2-3 ft
Pittosporum tobira 'Nana'	Dwarf Pittosporum	1, 2	7b to 8	Medium	Spreading	Medium	3-4 ft
Pyrancantha koidzumii	'Santa Cruz'	1, 2, 3	7b to 8	Medium	Prostrate Spreading	Medium	2-3 ft
Raphiolepis indica	Indian Hawthorne	1, 2, 3	7 to 8	Medium	Spreading	Slow	2-4 ft
Santolina chamaecyparissus	Lavender Cotton	1, 2, 3	6b to 8	Fine	Irregular	Slow to Medium	2-4 ft
Spirea x bumalda	Bumald Spirea	1, 2, 3	6b to 8a	Fine	Mounded	Fast	2-3 ft
Spirea nipponica	'Snowmound'	1, 2, 3	6b to 8a	Fine	Mounded	Fast	3-5 ft
Spirea thunbergii	Thunberg Spirea	1, 2, 3	6b to 8	Fine	Irregular	Medium	3-4 ft
Aucuba japonica	Japanese Aucuba	1, 2	6b to 8	Coarse	Upright	Medium	6-8 ft
Berberis julinae	Wintergreen Barberry	1, 2, 3	6b to 8	Medium	Oval	Slow to Medium	5-6 ft
Buxus sempervirens		1, 2, 3	6b to 7a	Fine to Medium	Rounded	Slow to Medium	5-8 ft
Cytissus scoparius	Scotch Broom	1, 2, 3	6b to 8a	Fine	Upright Open	Medium	5-6 ft
Forsythia intermedia hybrids	Border Forsythia	1, 2	6b to 8	Medium	Irregular	Fast	5-7 ft
Hydrangea macrophylla	Bigleaf Hydrangea	1, 2	6b to 8	Coarse	Rounded	Fast	5-8 ft
Hydrangea quercifolia	Oakleaf Hydrangea	1, 2, 3	6b to 8	Coarse	Upright Irregular	Medium	6-8 ft

Ilex cornuta 'Bufordii Nana'	Dwarf Buford Holly	1, 2, 3	6b to 8	Medium to Coarse	Rounded	Slow	5-6 ft
Ilex glabra		1, 2, 3	6b to 8	Medium	Rounded	Medium	6-8 ft
Jasminum mesnyi	Primrose Jasmine	1, 2, 3	8	Medium	Mounded Trailing	Medium	5-6 ft
Botanical Name	**Common Name**	**Water Zone**	**Georgia Hardiness Zone**	**Texture**	**Form**	**Growth Rate**	**Height**
*Kalmia latifolia**	Mountain Laurel	1, 2	6b to 7	Medium	Upright	Slow to Medium	5-8 ft
Lespediza thunbergii	Thungerg Lespedeza	1, 2, 3	6b to 8a	Medium	Upright Arching	Fast	5-6 ft
Southern Indian Azalea		1, 2	7a to 8	Medium	Rounded Irregular	Medium to Fast	5-8 ft
Spirea prunifolia 'Plena'	Bridalwreath Spirea	1, 2, 3	6b to 8	Fine to Medium	Rounded	Medium to Fast	5-7 ft
Spirea vanhouttei	Vanhoutte Spirea	1, 2, 3	6b to 7b	Medium	Rounded	Medium to Fast	5-7 ft
Yucca filamentosa	Adam's Needle Yucca	1, 2, 3	6b to 8	Coarse	Upright	Fast	5-6 ft
Large Shrubs (8 feet and up)							
Botanical Name	**Common Name**	**Water Zone**	**Georgia Hardiness Zone**	**Texture**	**Form**	**Growth Rate**	**Height**
Buddleia davidii	Butterfly Bush	1, 2, 3	6b to 8	Medium	Upright Oval	Fast	10-15 ft
*Calycanthus floridus**	Sweetshrub	1, 2, 3	6b to 8	Medium	Broad Rounded	Medium	8-12 ft
Camellia japonica	Camellia	1, 2	6b to 8	Medium to Coarse	Rounded to Oval	Slow to Medium	8-10 ft
Camellia sansanqua	Sasanqua Quince	1, 2	7 to 8	Medium	Irregular to Upright	Slow to Medium	8-10 ft
Chaenomeles speciosa	Flowering Quince	1, 2, 3	6b to 8	Medium	Rounded	Medium	8-10 ft
Cupressocyparis leylandii	Leyland Cypress	1, 2, 3	6b to 8	Fine	Upright	Fast	60-70 ft
Elaeagnus x ebbingii	Elaeagnus	1, 2, 3	6b to 8	Medium	Irregular	Fast	8-10 ft
Eunymus alatus	Winged Euonymus	1, 2, 3	6b to 8	Medium	Mounded	Slow	15-20 ft

Hamamllis vernalis	Vernal Witchhazel	1, 2, 3	6b to 8a	Medium	Dense Rounded	Medium	8-12 ft
Hibiscus syriacus	Shrub Althea	1, 2, 3	6b to 8	Medium	Rounded	Medium	8-12 ft
Ilex x attenuate 'Fosteri'	Foster Holly	1, 2	6b to 8	Medium	Upright	Slow to Medium	8-10 ft
Ilex cornuta 'Bufordii'	Buford Holly	1, 2, 3	6b to 7b	Coarse	Oval to Rounded	Medium to Fast	8-12 ft
Botanical Name	**Common Name**	**Water Zone**	**Georgia Hardiness Zone**	**Texture**	**Form**	**Growth Rate**	**Height**
*Ilex vomitoria**	Yaupon Holly	1, 2, 3	6b to 8	Fine	Upright	Medium to Fast	8-12 ft
Juniperus chinensis 'Hetzi'	Hetz Juniper	2, 3	6b to 8	Fine	Upright	Fast	15 ft
Juniperus chinensis 'Pfitzeriana	Pfitzer Juniper	2, 3	6b to 8	Fine	Broad Upright	Fast	8-10 ft
*Leucothoe populifolia**	Fetterbush	1, 2	7a to 8	Medium	Upright Arching	Medium	8-12 ft
Ligustrum japonicum	Japanese Privet	1, 2, 3	7b to 8	Coarse	Dense Rounded	Medium	8-12 ft
Ligustrum x vicaryi	Vicary Golden Privet	1, 2, 3	6b to 8	Medium	Rounded	Medium	10-12 ft
Magnolia stellata	Star Magnolia	1, 2, 3	6b to 8a	Coarse	Rounded	Medium	10-15 ft
*Myrica cerifera**	Southern Waxmyrtle	1, 2, 3	7b to 8b	Medium	Upright Rounded	Medium	8-10 ft
Osmanthus fortunei	Fortunes Osmanthus	1, 2, 3	6b to 8	Medium	Rounded	Slow to Medium	8-10 ft
Philadelphis coronarius	Semi-Sweet Mockorange	1, 2, 3	6b to 8a	Medium	Rounded	Medium	10-12 ft
Pittosporum tobira	Japanese Pittosporum	1, 2	7b to 8b	Medium	Rounded	Fast	8-10 ft
Podocarpus macrophyllus var. maki	Semi-Southern Yew	1, 2	7a to 8b	Medium	Upright	Medium	8-12 ft
Pyracantha spp.	Firethorn	1, 2	6b to 8	Medium	Irregular	Fast	10-12 ft
*Rhododendron austrinum**	Florida Azalea	1, 2	6b to 7	Medium	Rounded	Medium	8-12 ft
*Rhododendron calendulaceum**	Flame Azalea	1, 2	6b to 7	Medium	Rounded	Medium	10-15 ft

*Rhododendron canascens**	Piedmont Azalea	1, 2	6b to 7	Medium	Rounded	Medium	10-15 ft
Rhus typhina	Staghorn Sumac	1, 2, 3	6b to 8	Fine	Open Spreading	Fast	15-25 ft
Temstroemia gymnanthera	Cleyera	1, 2	6b to 8	Medium	Upright	Slow to Medium	8-10 ft
Viburnum lantana	Wayfaringtree Viburnum	1, 2, 3	6b to 8a	Coarse	Rounded Spreading	Medium	10-15 ft
Botanical Name	**Common Name**	**Water Zone**	**Georgia Hardiness Zone**	**Texture**	**Form**	**Growth Rate**	**Height**
Viburnum opulus	European Cranberrybush	1, 2, 3	6b to 8a	Coarse	Upright Spreading	Medium	8-12 ft
Viburnum plicatum var. *tomentosum*	Doublefile Viburnum	1, 2, 3	6b to 8a	Coarse	Round Spreading	Medium	8-10 ft
Viburnum x pragense	Prague Viburnum	1, 2, 3	6b to 8a	Medium	Oval	Medium	10-12 ft
Small Trees (10 to 30 feet)							
Botanical Name	**Common Name**	**Water Zone**	**Georgia Hardiness Zone**	**Georgia Hardiness Zone**	**Texture**	**Form**	**Growth Rate**
Acer buergeranum	Trident Maple	1, 2, 3	7b to 8	Medium	Oval	Slow	20-25 ft
*Carpinus caroliniana**	American Hornbeam	1, 2, 3	6b to 8	Medium	Loose Rounded	Slow	20-30 ft
*Cercis canadensis**	Redbud	1, 2	6b to 8	Medium	Oval	Medium	25-30 ft
*Chionanthus viginicus**	Fringe Tree	1, 2	6b to 8	Coarse	Irregular	Slow to Medium	10-20 ft
Cotinus coggygria	Common Smoketree	1, 2, 3	6b to 8a	Medium	Upright Spreading	Medium	10-15 ft
Erlobotrya japonica	Loquat	1, 2	7b to 8	Coarse	Rounded	Medium to Fast	10-20 ft
*Halesia carolina**	Silverbell	1, 2, 3	6b to 8	Medium	Spreading	Medium	20-30 ft
Ilex attenuate 'Savannah'	Savannah Holly	1, 2, 3	6b to 8	Coarse	Pyramidal	Medium	25-30 ft
Ilex decidua	Possumhaw	1, 2, 3	6b to 8	Medium	Loose Rounded	Medium	20-30 ft
Ilex latifolia	Lusterleaf Holly	1, 2, 3	6b to 8	Coarse	Pyramidal	Medium	20-25 ft

Ilex x 'Nellie R. Stevens'	Nellie R. Stevens Holly	1, 2, 3	6b to 8	Medium	Pyramidal	Medium	15-25 ft
*Ilex opaca**	American Holly	1, 2	6b to 8	Medium to Coarse	Pyramidal	Medium	20-30 ft
Koelreuteria paniculata	Goldenraintree	1, 2, 3	6b to 8	Fine	Rounded	Medium	20-30 ft
Lagerstroemia indica	Crape Myrtle	1, 2, 3	6b to 8	Fine	Upright	Fast	20-30 ft
Maclura pomifera	Osage-Orange	1, 2, 3	6b to 8	Medium	Rounded Irregular	Fast	20-30 ft
Magnolia x soulangiana	Saucer Magnolia	1, 2, 3	6b to 8	Coarse	Rounded	Medium	20-30 ft
Malus spp.	Flowering Crab	1, 2	6b to 8	Medium	Rounded to Upright	Medium	15-30 ft
*Pinus virginiana**	Virginia Pine	1, 2, 3	6b to 8a	Fine	Conical	Slow	15-30 ft
Botanical Name	**Common Name**	**Water Zone**	**Georgia Hardiness Zone**	**Georgia Hardiness Zone**	**Texture**	**Form**	**Growth Rate**
*Prunus caroliniana**	Carolina Laurel Cherry	1, 2, 3	7 to 8	Medium	Oval	Fast	20-30 ft
Prunus serrulata	Japanese Flowering Cherry	1, 2	6b to 8a	Medium	Oval Spreading Weeping	Medium	20-30 ft
Prunus x yedoensis	Yoshino Cherry	1, 2	6b to 8a	Medium	Oval Spreading	Medium	10-15 ft
Vitex agnus-castus	Chastetree	1, 2, 3	6b to 8	Medium	Oval	Medium	15-20 ft
Large Trees (30 feet and up)							
Botanical Name	**Common Name**	**Water Zone**	**Georgia Hardiness Zone**	**Texture**	**Form**	**Growth Rate**	**Height**
*Acer floridanum**	Florida Maple	1, 2, 3	6b to 8	Medium	Oval	Medium to Fast	40-50 ft
*Acer rubrum**	Red Maple	1, 2	6b to 8	Medium	Rounded	Medium	40-50 ft
Acer saccharum	Sugar Maple	1, 2	6b to 7a	Medium	Oval	Medium to Fast	60-80 ft
*Betula nigra**	River Birch	1, 2	6b to 8	Medium	Oval	Fast	40-70 ft
Carya illoensis	Pecan	1, 2	7a to 8	Medium	Rounded	Medium	50-60 ft
Cunninghamia lanceolata	China Fir	1, 2	7 to 8	Fine	Conical	Slow	30-75 ft
Cypressocyparis leylandii	Leyland Cypress	1, 2, 3	6b to 8	Fine	Upright	Fast	60-70 ft

*Fraxinus pennsylvanica**	Green Ash	1, 2, 3	6b to 8	Medium	Upright Spreading	Medium	50-60 ft
Ginkgo biloba	Maidenhair Tree	1, 2	6b to 8	Medium	Irregular	Very Slow	50-70 ft
Liriodenfron tulipifera	Tulip Poplar	1, 2, 3	6b to 8	Coarse	Broad Rounded	Fast	70-90 ft
*Liquidambar styracuflua**	Sweetgum	1, 2, 3	6b to 8	Coarse	Broad Rounded	Fast	60-75 ft
*Magnolia grandiflora**	Southern Magnolia	1, 2	6b to 8	Coarse	Upright Pyramidal	Slow to Medium	60-80 ft
Metasequoia glyptostroboides	Dawn Redwood	1, 2	6b to 8	Fine	Conical	Fast	40-50 ft
*Oxydendrum arboreum**	Sourwood	1, 2, 3	6b, 7a	Medium to Coarse	Upright	Medium	30-40 ft
Botanical Name	**Common Name**	**Water Zone**	**Georgia Hardiness Zone**	**Texture**	**Form**	**Growth Rate**	**Height**
*Pinus elliotii**	Slash Pine	1, 2, 3	7 to 8	Medium	Horizontal Branching	Fast	80-100 ft
*Pinus strobus**	White Pine	1, 2	6b to 7a	Medium	Pyramidal	Medium	80-100 ft
*Pinus taeda**	Loblolly Pine	1, 2, 3	6b to 7	Medium	Horizontal	Fast	80-100 ft
Quercus acutissima	Sawtooth Oak	1, 2, 3	6b to 8	Medium	Broad Oval	Medium	35-45 ft
*Quercus falcata**	Southern Red Oak	1, 2	6b to 8	Coarse	Rounded	Medium	70-80 ft
*Quercus nigra**	Water Oak	1, 2, 3	6b to 8	Medium	Rounded	Medium	80-90 ft
Quercus palustris	Pin Oak	1, 2	6b to 8a	Medium	Pyramidal	Medium	70-80 ft
*Quercus phellos**	Willow Oak	1, 2	6b to 8	Fine	Rounded	Medium	80-100 ft
*Quercus shumardii**	Shumard Oak	1, 2, 3	6b to 8	Medium	Pyramidal	Medium	40-60 ft
*Quercus virginiana**	Live Oak	1, 2, 3	7b to 8	Medium	Rounded	Medium	60-80 ft
Pyrus calleryana 'Bradford'	Bradford Pear	1, 2, 3	6b to 8	Medium	Upright Rounded	Medium to Fast	34-40 ft
Sophora japonica	Japanese Pagodatree	1, 2, 3	6b to 7	Medium	Upright Spreading	Fast	50-75 ft
*Taxodium distichum**	Bald Cypress	1, 2, 3	6b to 8	Fine	Conical	Medium	50-70 ft
Ulmus parvifolia	Chinese Elm	1, 2, 3	6b to 8	Medium	Rounded	Fast	40-50 ft
Zelkova serrata	Japanese Zelkova	1, 2, 3	6b to 8a	Medium	Broad Oval	Fast	50-80 ft

* - Denotes plants that are native Georgia

1 - Water Zones: 1 = regular irrigation; 2 = moderate, occasional irrigation; 3 = low, no irrigation (natural rainfall).

2 - The Georgia Hardiness Zones are geographic areas of the State that have been established on the basis of the range of the average annual minimum temperatures: 6b = -5 to 0ºF; 7a = 0 to 5ºF; 7b = 5 to 10ºF; 8a = 10 to 15ºF; and 8b = 15 to 20ºF. The minimum temperature of a zone determines

whether a plant is physiologically capable of growing in the zone. As such, the floristic composition of the zone is determined, in part, by temperature.

Source: Wade, G.L., J.T. Midcap, K.D. Coder, G. Landry, A.W. Tyson, and N. Weatherly, Jr. 2003. *Xeriscape^{TM}: A Guide to Developing a Water-Wise Landscape*. The University of Georgia College of Agricultural & Environmental Sciences / Cooperative Extension Service. Bulletin 1073: 1-40.

7.6 Wetland Protection

Applicability Statement

This section applies to AF installations that have existing wetlands on AF property. This section **IS** applicable to Robins AFB.

Program Overview/Current Management Practices

Wetlands on Robins AFB are generally high quality, particularly those occurring in undeveloped portions of the Base. Mitigation is in place or has been completed for those wetlands affected by hazardous wastes from SWMUs. Land disturbances within 40 feet of wetlands are restricted on Base, unless authorized by permit. Recent drought conditions have affected the hydrology of some wetlands on the Base. However, the greatest threat to wetland quality on the Base is from sediment transport from erosion of unpaved roads during significant rain events.

In 1999, the 78 CEG/CEIE implemented a *Wetland Protection Plan* (Robins AFB, 1999c) to remedy the most serious threats to wetlands. The principal adverse conditions potentially affecting wetland quality identified in the 1999 *Wetland Protection Plan* were: 1) Gully, road and channel erosion; 2) Stream bank slumping; and 3) Off-Base inflows of sediment and debris. The 1999 plan was updated in 2005 (Robins AFB, 2005a) and addressed the present condition of former wetland problem areas; identified significant new problem areas; provided management recommendations for addressing problems; and the current hydrologic condition of the Grady Freshwater Meadow was assessed to identify potential problems that could impact the future survival of this unique wetland community and associated sensitive plant species (see the Wetland Protection Plan Appendix). The *Wetland Protection Plan* contains recommendations for:

- Actions to assure the success of erosion repairs,
- Actions for future erosion prevention on slopes and streambanks,
- Options for stabilizing eroded streambanks and slopes, and
- Alternative techniques for controlling erosion and protecting streambanks.

“No Net Loss” Policy

Development actions in wetlands require a Finding of No Practical Alternative (FONPA) for compliance with EO 11990 and 32 CFR Part 989. The policy of “no net loss” is achieved by following the mitigation guidelines below:

1. Avoid impacts to wetlands whenever possible by redesigning projects to stay out of wetlands.
2. When avoidance is not possible, minimize the amount and extent of impacts on wetlands.
3. Compensate for loss of wetland acreage or functional value by restoring or enhancing degraded natural wetlands. Creation of new wetlands should be considered only if restoration or enhancement alternatives are not feasible or if required by either the USACE permit or Georgia water quality certification conditions.

Monitoring and Documentation

Wetlands are periodically monitored to detect adverse conditions or trends that may affect wetland habitat value and quality. Affected areas are restored or enhanced as needed.

Current jurisdictional wetland boundaries and associated data are maintained on the Base GIS to assist Base planning in ensuring that planned developments will not adversely impact wetland areas. The wetland delineation is reviewed and updated as needed, generally every 5 years, as required by the USACE.

7.7 Grounds Maintenance

Applicability Statement

This section applies to AF installations that perform ground maintenance activities that could impact natural resources. This section **IS** applicable to Robins AFB.

Program Overview/Current Management Practices

Maintenance of improved, semi-improved, and unimproved grounds follows guidelines of the Natural Resources Conservation Service (NRCS) and existing AF standards and specifications. The I*ntegrated Pest Management Plan* (Robins AFB, 2010) directs the appropriate use and application of chemical and biological agents for disease and insect pest control. The grounds maintenance goal is to help facilitate grounds management practices that will optimize protection of existing ecosystems and contribute to biodiversity.

The acreage of grassland and undeveloped forest that is mowed has been significantly reduced in the past, and the frequency of mowing for some of these areas has also been reduced. In many cases, the timing of mowing efforts has been altered so that it now occurs in late summer or fall, thereby protecting nesting areas for quail and other ground nesting birds. Existing turf areas are monitored and evaluated to identify additional sites that could be mowed less frequently without interfering with their primary use or degrading their visual appeal (aesthetics). Certain areas within the Intensive Recreation MEA, the rough area on the golf course, for example, might be suitable areas for reduced frequency of mowing. Other areas, such as putting greens and certain athletic fields require frequent mowing to satisfy primary use requirements.

Robins AFB contains approximately 3,540 acres of improved lands, 406 acres of semi- improved lands and 2,833 acres of unimproved land. Improved grounds are converted to semi-improved or unimproved grounds where possible. Implementation methods for converting improved land to semi-improved and unimproved land include:

- Plant trees, shrubs and ground covers for permanent cover in improved areas. When native trees are desired, the preference is transplanting trees from stands located in the Development Reserve MEA that are subject to future removal. The use of more durable native species rather than non-native ornamental plant species is preferred.
- Use ground covers for large landscape areas. Ground covers include a wide range of low-growing plants that grow more slowly than grasses. However, weeds are likely to compete, especially in the first year, so ground covers are not used unless proper maintenance is planned such as providing mulch of 3-inch thickness until the plants provide adequate cover to ensure survival.
- Plant native grasses and wildflowers in desired areas. Wildflowers have been established on one of the landfills. Continuing efforts are made to return more maintained landscape acreage to its natural state. The most suitable areas for this practice are sites located in the Natural Resources

Multiple Use and Intensive Recreation, although some native wildflower planting may be appropriate for the Urban Development MEA.

- Fall planting is encouraged because the need for constant watering is reduced and plants have time to establish new roots before hot weather.

Urban Forest

The 1994 Urban Forest database in the Base GIS could not be routinely updated and the data became out-of-date. The Urban Forest inventory and management plan was updated in 2004 (Robins AFB, 2004d). Urban Forest maintenance is a top priority for environmental staff. The Urban Forest is inspected weekly to identify trees in need of maintenance or removal, to identify disease or plant pest problems, and to prevent damage to trees from construction and other human activities.

Tree pruning and the removal of broken branches continue to be the most frequent maintenance concerns. Other important maintenance issues are the need for transition trees that can replace those that are dying, lack of species diversity in the canopy, lack of sub-canopy, shrub and groundcover layers, and the lack of standardized pruning techniques.

The past use of Water Oak and Loblolly Pine as landscape trees throughout the Base appears to have been excessive. Although Water Oak grows quickly, it is short-lived, retains dead branches and produces large numbers of acorns. From a maintenance aspect, Water Oak is undesirable as a landscape tree. Moreover, because most were planted at the same time they have now reached maturity and are dying in large numbers. Loblolly Pine is moderately shade intolerant, grows quickly and if grown as a single cohort (i.e., Loblolly Pine plantation), a forest with a dense canopy is produced. Mature pine plantations rarely possess a sub-canopy or shrub layer and groundcover is often sparse. Although these are desirable qualities in the forestry industry, the planting of monospecific stands (stands composed of a single species of tree) of pines (or any species of tree for that matter) is not appropriate for the Urban Forest.

The absence of an aggressive planting strategy to provide replacements for the mature trees that have died with “transition trees” (i.e., trees that have been planted in areas where mature trees are dominant) has left previously well-treed areas with large open gaps. As previously discussed, the even-aged pine and oak forests present a potentially serious problem for the future because the trees are all of the same age. Once the trees begin to die, there will be no transition trees to replace these individuals and the character and ecology of the entire area will change drastically.

Despite plantings, many trees do not survive because of the prolonged drought. Replacement is only slightly higher than the number or trees being lost. If this pattern continues to persist, the long-term implications to the future health and stature of the urban forest could be serious. Another issue with respect to the long-term health of the forest is the damage caused to young trees/saplings by mowing and trimming, especially in the Historic Forest. Although injuries by string trimmers might appear to have little immediate effect on the trees, these seemingly minor injuries are a source of chronic stress to the plants and provide pathways for systemic bacterial and fungal infections as well as the introduction of pests.

Common tree diseases and infestations that have been identified on the Base include Fusiform Rust, Spot Anthracnose, Septoria Leafspot, and Pine Bark Beetles. Diseased and dead trees are present, but not common in the Urban Forest area. The two dominant trees in the Urban Forest are loblolly pine and water oak. The pine trees are being significantly affected by Pine Bark Beetle and Fusiform Rust infestations. Many of the water oaks are more than 70 years old and are beginning to die. However, replacement trees are subject to available funding. Also, there is a need to increase species diversity in the canopy and to create sub-canopy, shrub, and groundcover layers.

Management practices for the urban forest are embodied in *Best Practices for Landscaping* (Robins AFB, 2011b; see the Best Practices for Landscaping Apendix). These guidelines include direction on what to plant, how to plant, plant care and maintenance, pest management, and protecting plants during construction. The guidelines are based on conformance with American National Standards Institute (ANSI) landscaping practices.

Because of the overwhelming success of the Tree City USA program at Robins AFB, the Base has received Tree City USA Growth Awards. The Tree City Growth Award was designed to "recognize environmental improvement and encourage higher levels of tree care throughout America". Future attainment of the Growth Award will provide recognition of the continued success of the RAFB urban forest program as well as recognition of the Base as a leader in the Tree City USA program.

Historic Forest

Numerous historic tree seedlings from American Forest, Inc. have been planted as part of the Robins AFB Historic Forest. The Historic Forest was established in 1994 with the planting of two Historic Trees, the Betsy Ross Sycamore and the Orville and Wilbur Wright Red Cedar. The goals for establishing this forest were to encourage the planting of trees and to foster an appreciation of American heritage. During ceremonies to celebrate Arbor Day, additional trees are planted and dedicated annually. This forest was first established just west of Building 215 and was filled to capacity with 56 trees. A new site near the parade field was established in 2000 with the planting of two Lincoln White Oaks and two Franklin D. Roosevelt Southern Magnolias. The original (old) Historic Forest site was affected by the relocation of the main gate to accommodate the new Robins AFB entrance, so trees were transplanted to the new site (Parade Ground).

7.8 Forest Management

Applicability Statement

This section applies to AF installations that maintain forested land on AF property. This section **IS** applicable to Robins AFB.

Program Overview/Current Management Practices

Plant and forest resource management is carried out under multiple programs that address protection and enhancement of plant species, forest conservation, and timber and fire management. Bottomland and upland forest conservation and management emphasizes sustainability, productivity, control of exotic plants, restoration of native species and wildlife enhancement. Dead trees are typically retained and protected for the benefit of wildlife throughout forested areas where they do not present a safety hazard. Best Practices for Landscaping (Robins AFB, 2011b; see the Best Practices for Landscaping Appendix) provides landscaping guidelines for project proponents, facility managers, and contractors. Rare plant conservation and control of exotic, invasive plants are discussed in the Management of Threatened and Endangered Species, Species of Concern and Habitats Section and the Integrated Pest Management Programs Section, respectively.

Bottomland Forest

The bottomland forest and other forested wetlands are generally left in their natural state, except where mission requirements dictate otherwise, such as near the runway or for security reasons. Presently there

is no active management of the bottomland forest other than periodic monitoring of forest and hydrological conditions.

Upland Forest

The upland forest is periodically surveyed and managed as needed to maintain health and sustainability. Specific management areas within the overall upland forest include the Upland Hardwood Bluff, Longleaf Pine Forest, Urban Forest, including the Historic Forest, and timber stands. Two significant upland forested communities, the hardwood bluff and the relict longleaf pine site, are being restored. The management prescription for the Upland Hardwood Bluff forest includes identifying known locations of the Ocmulgee skullcap populations and limiting recreational and other activities near these locations that would adversely impact this species, controlling and eliminating non-native plant species with priority being given to removing competing, non-native vegetation encroaching on Ocmulgee skullcap populations, and promoting natural regeneration of the dominant native plant species in this relict hardwood bluff community.

The restoration of the Longleaf Pine Site was initiated in 1997/1998 and involved the use of mature longleaf pine seed trees for natural regeneration and a prescribed burn program. Prescribed burning is the preferred management method and the first prescribed burn was conducted in March 2004. Follow-up burns were conducted in February 2009 and November 2011, and herbicide treatments were applied in 2006, 2007, 2008, 2009, and 2010. Longleaf pine seedling survival and growth will continue to be monitored, and prescribed fire application will continue on a 2- to 3-year rotation. The status of restoration is summarized in the Longleaf Pine Management Plan Appendix.

Longleaf Pine Site

The restoration program will continue using the following management prescriptions:

- Prior to the burn, reduce excessive fuel sources by removing woody debris and clearing vegetation at the bases of existing interpretative signs on the nature trail that bisects the site, and
- The burning technique will utilize strip headfires, rather than slower- moving backfires, to reduce the risk of damaging the young pine trees.

Timber

An upland forest survey was completed in March 1998, and the loblolly pine forest management component was updated in 2003 (Robins AFB, 2003d). The total value of merchantable saw timber was estimated to be approximately $110,188 based on third quarter 2002 statistics, and the value of pulpwood was considered negligible because of low volume throughout the Base. Since the 1998 and 2003 surveys, some acreage has been clearcut, and stands have been thinned. The past management emphasis for timber stands was on creating a balance between timber production and wildlife value. Management practices included thinning to promote tree growth and wildlife enhancement, use of prescribed fire, creating small openings for wildlife use, and leaving snags for cavity nesting wildlife. Selective herbicide treatments also were used if burning to control understory vegetation was not possible or practicable. Shelterwood regeneration (natural regeneration from mature seed trees) was the preferred method for all pine stands to be commercially harvested.

The pine stands and many of the small pine woodlots were thinned in January 1999 or January 2000, respectively, and again in 2006. Management focus for the future will be on limiting fire to allow understory to develop to increase diversity and better support wildlife. The current land area available for timber management is no longer sufficient to support commercially viable timber production and harvest. Long-term plans for the remaining pine lots include thinning, shelterwood harvest, and final harvest, allowing the pine plots to succeed to mixed hardwood/pine habitat to support wildlife (see the Loblolly Pine Management Plan Appendix). Areas of natural or artificial regeneration are inspected annually for the first three years to evaluate seedling survival and management prescriptions are adjusted as necessary.

7.9 Wildland Fire Management

Applicability Statement

This section applies to AF installations with unimproved lands that present a wildfire hazard and/or installations that utilize prescribed burns as a land management tool. This section **IS** applicable to Robins AFB.

Program Overview/Current Management Practices

The Wildland and Prescribed Fire Management Plan recognizes the importance of fire as a natural ecological factor affecting native vegetation and uses fire as a tool under carefully selected conditions to achieve biodiversity and ecosystem management objectives. The program is based on active collaboration with other agencies in research and training activities designed to increase understanding of the ecological role of fire for vegetation native to Houston County; investigating the interaction between past and present fire suppression and other management activities and existing fire hazard conditions, and developing practical approaches to prescribed burning use as a vegetation management tool on Robins AFB. Although wildfires have not been a significant issue at Robins AFB, the program also encompasses elements of fire hazard mitigation and fire suppression.

Fire Management Program Directives

1. All fire management activities will comply with the Wildland and Prescribed Fire Management Plan.
2. Follow all federal, state, and local air pollution laws and regulations.

3. Follow all state prescribed burning standards and regulations.
4. Site-specific planning for all prescribed burns will be conducted by trained or certified natural resources management personnel, and approved by Base fire management staff prior to project implementation. Such planning will include: written description of the proposed burn unit; statement of management objectives; requirements for pre-burn biological surveys for special-status species; requirements for pre- and post-burn environmental monitoring; requirements for a cultural resources survey if in sensitive zone; other preparation required prior to implementation (pre-established control lines, protection of sensitive species and habitats, definition of size and locations of individual burn cells within the burn unit if safety or ecological concerns dictate that the unit cannot be burned as a whole, etc.). In addition, the planning report will also address weather parameters, fuel moisture conditions, resource coordination requirements, provision for public and worker safety, burn day notification of appropriate agencies and persons, smoke management analysis, control line placement and standards, specific firing tactics and ignition methods, and mop-up and patrol procedures.
5. Prescribed burns will be conducted with the assistance of the Georgia Forestry Commission.
6. Use prescribed burning to reduce potentially hazardous natural and activity fuel loadings in a safe, carefully controlled, and environmentally sound fashion to achieve prescribed objectives.

Fire hazard mitigation actions undertaken for public safety objectives are implemented using the following general priorities:

- Highest priority for the Urban Development MEA and in the vicinity of key Base facilities (e.g., to create a fire hazard reduction zone around the “Christmas tree” jet parking area);
- Intermediate priority for the Intensive Recreation, Development Reserve, and Natural Resource Multiple Use MEAs; and
- Lowest priority in the Natural Habitat Protection and Natural Habitat Management MEAs.

Other factors considered in developing priorities, include areas that have limited accessibility, contain hazardous or critical facilities, have limited water supplies for firefighting, require long response time, have high fuel loading conditions, or that might impact water quality.

The following tract plow line standards apply to all fire suppression actions (See the Wildland Fire and Prescribed Fire Managemnt Plan):

1. Use the minimum number of plow lines necessary to contain the fire.
2. Fire plow line depth should be no greater than the minimum required to contain the fire.
3. Fire plow lines should not be located in habitat ecotones unless required by the emergency nature of the incident. Offset plow lines well to the side of the transition zone between habitats, if possible.
4. Fire plow lines should be oriented along contours whenever possible.
5. Fire plow lines will not be located within 300 feet of special-status species locations and sensitive habitats unless the potential damage from the fire exceeds impacts from tractor plow lines.

Plow lines will not bisect or tie into waterways or riparian zones, or impact significant or potentially significant cultural resource sites, or be placed downhill at right angles to steep slopes unless required by the emergency nature of the incident. All plow lines with potential for erosion will be stabilized and rehabilitated following the emergency suppression action.

7.10 Agricultural Outleasing

Applicability Statement

This section applies to AF installations that lease eligible AF land for agricultural purposes. This section **IS NOT** applicable to Robins AFB.

Program Overview/Current Management Practices

There are no agricultural outleases on the installation.

7.11 Integrated Pest Management Program

Applicability Statement

This section applies to AF installations that perform pest management activities in support of natural resources management, e.g. invasive species, forest pests, etc. This section **IS** applicable to Robins AFB.

Program Overview/Current Management Practices

Pest management is guided by the *Integrated Pest Management Plan* (Robins AFB, 2010). Pest control programs are always planned to make use of integrated pest management (IPM) whenever possible. IPM emphasizes the use of biological, cultural, and mechanical methods for controlling pests. Managing habitat conditions, removing food sources, and exclusion from buildings help reduce the use of chemicals. Pesticide use has been reduced by over 80% since 1993. Other IPM tools include planting trees that are less susceptible to insects and disease and promoting education in pest control techniques. Use of these guidelines, standards, and specifications minimizes nonpoint source issues associated with chemical use.

Insect pests of both economic and human health concern are present on the Base. The current *Pest Management Plan* for the Base is largely effective in minimizing problems related to terrestrial arthropods. Current treatment strategies by insect group include:

Treatment Strategy

Insect Group	Traditional	Integrated Pest Management
Bagworms	Pesticides	Hand removal of pupae
Molecrickets	Pesticides	Nematodes
Roaches	Pesticides	Siege baits; traps
Ants	Pesticides	Baits
Wasps and bees	Wasp-freeze	Nests knocked down
Spiders	Foggers	Webs knocked down; egg sacs
Fire ants	Pesticides	Hot water
Termites	Pesticides	--
Carpenter ants	Pesticides	--
Mosquitoes		Mosquito dunks with BTI*
Flies	Foggers	Refuse minimization
Fleas	Pesticides	--

*BTI—*Bacillus thuringensis israelensis*

Optional pest management practices were recommended in a recent terrestrial arthropod survey report (Robins AFB, 2005b).

The invasive plant species at Robins AFB are classified by the Georgia Exotic Plant Pest Council (GA-EPPC) into problem categories (serious, moderate, minor) based on their threat to natural areas (invasive characteristics and ability to displace native plant species). Species designated a serious threat are those that have invasive characteristics. Species designated a significant threat have some invasive plant characteristics, but have less impact on native plant communities. Low threat species do not have invasive characteristics. Most of these species generally occur in disturbed areas on the Base such as open fields and clearings, margins of forests, and along roadsides. Kudzu distribution is limited, but complete eradication is a continuing problem.

Control options include chemical, mechanical, biological, or a combination of methods depending upon the particular plant species. Control methods are implemented seasonally or during certain life stages or flowering cycles depending upon the particular plant species and its susceptibility to the particular control method being applied. Control methods and implementation periods for selected invasive species are listed below by threat category.

Invasive/Nuisance Plant Control

Species	Recommended Control Method	Implementation Period
Serious Threat		
Alligatorweed *Alternanthera philoxeroides*	Biological (alligatorweed flea beetle)	Late Spring (May or June)
Asian Dayflower *Murdannia keisak*	Chemical (Glyphosate spray)	Growing season
Autumn Olive *Elaeagnus umbellate*	Mechanical (cutting)	During flowering (May-June)

Species	Recommended Control Method	Implementation Period
Chinaberrytree *Melia azedarach*	Chemical (Triclopyr via basal bark method or girdle and treat)	All year (not effective when ground is frozen)
Chinese Tallowtree *Sapium sebiferum*	Chemical (Triclopyr via basal bark method or girdle and treat)	All year (not effective when ground is frozen)
Chinese Wisteria *Wisteria sinensis*	Chemical (Triclopyr via stump cut method), Mechanical (repeated cutting)	All year (not effective when ground is frozen)
English Ivy *Hedera helix*	Mechanical (hand-pulling of small sprouts, cutting of large aerial stems)	All year
Japanese Privet *Ligustrum japonicum*	Mechanical (hand pulling) for small plants, Chemical (Glyphosphate or Triclopyr via cut stump method) for mature plants.	Growing season
Japanese Honeysuckle *Lonicera japonica*	Chemical (Glyphosate immediately following first frost)	Late Autumn (immediately following first frost)
Kudzu *Pueraria montana* v. *lobata*	Mechanical (grubbing) for the northern population Chemical root crown method for	
Multiflora Rose *Rosa multiflora*	Chemical (Triclopyr via basal bark method)	All year (not effective when ground is frozen)
Silktree *Albizia julibrissin*	Mechanical (repeated cutting, cut stump or girdle and treat with Glyphosate or Triclopyr)	During flowering (May-June)
Water Hyacinth *Eichhornia crasipes*	Mechanical or by hand.	Growing season
Moderate Threat		
Bahia Grass *Paspalum notatum*	Chemical (Embark and Oust Combination)	Start immediately following emergence
Bush Honeysuckle Lonicera maackii	Chemical (Glyphosate immediately following first frost)	Late Autumn (immediately following first frost)
Sacred Bamboo *Nandina domestica*	Mechanical (cutting)	All year
Minor Threat		
Winter Creeper *Euonymus fortunei*	Chemical (Triclopyr spray)	Growing Season
Taiwanese Photina *Photinia serrulata*	Mechanical (cutting)	All year

Alligatorweed (*Alternanthera philoxeroides*), Asian dayflower (*Murdannia keisak*), and water hyacinth (*Eichhornia crassipes*) occur in open water and along stream margins and in wetlands. The 78 CEG/CEIE has initiated a biological control program for alligatorweed using the alligatorweed flea beetle to control populations of this plant species. Bahia grass occurs in abandoned fields and pastures and is the dominant grass in the airfield area. Effort is under way to eradicate Bahia grass on the airfield.

7.12 Bird/Wildlife Aircraft Strike Hazard (BASH)

Applicability Statement

This section applies to AF installations that maintain a BASH program to prevent and reduce wildlife-related hazards to aircraft operations. This section **IS** applicable to Robins AFB.

Program Overview/Current Management Practices

Bird and other wildlife hazards in the BASH Reduction MEA are managed through implementation of the *Robins AFB BASH Plan* (78 ABW/SE, 2012). This plan is based on BASH program guidelines contained in AFI 91-202, *USAF Mishap Prevention Program* and AFPAM 91-212, *BASH Management Techniques*. Aircraft strike hazards exist at Robins AFB and vicinity due to resident and migratory bird species and resident animals. Wildlife strikes rarely occur although the presence of feral hog, white-tailed deer, and coyotes near the airfield poses a significant hazard. Most bird strikes at the Base occur below 2,000 feet above ground level (AGL). Bird strikes occur most frequently (70% of the time) during spring and fall migrations.

Existing and Potential Strike Hazards Posed by Birds and Wildlife

The most significant aircraft strike hazards posed by wildlife to aircraft at Robins are those caused by: 1) predictable movements of large flocks of blackbirds, particularly from October through February; 2) spring and fall bird migrations and movements of small flocks of Canada geese, especially during late summer and fall; 3) foraging activities of bird species such as meadowlarks and mourning doves on the airfield; and 4) nocturnal foraging activities of white-tailed deer and feral hogs. These hazards, as well as management strategies, are described in detail in the *Robins AFB BASH Plan*.

The best way to avoid aircraft strike hazards is to develop a thorough understanding of annual, seasonal, and daily bird and wildlife abundance, diversity, and movement patterns on and adjacent to the airfield. An avian radar study was conducted from July 2001 to July 2002 to develop a better understanding of bird activity in the airfield area. During spring and fall migration periods, thousands of birds move through the airspace over Robins AFB. Most of these birds are very small, fly below 3,000 feet AGL, and tend to be spread over a large area. Most movement occurs at night, starting shortly after sunset and concluding by sunrise. Sunrise and sunset are the most hazardous times to fly, particularly in fall and winter (late September to late February) when blackbirds flock. Aircraft strike hazards can be minimized during these hazardous periods by avoiding night flights, when possible, especially below 3,000 feet AGL, and by avoiding flying for 30 minutes before and 60 minutes after sunrise and sunset when practicable.

A team approach involving Base entomology staff, environmental personnel, members of the flying units, and members of Base operations is used to implement scare and lethal control tactics when necessary. Scare tools that are used to drive wildlife off the airfield include propane cannons, distress tapes, pyrotechnics, and shell crackers. Because scare tactics lose effectiveness over time without reinforcement, lethal measures must occasionally be employed, particularly for the control of blackbirds. At present, the most effective alternatives include the use of traps and extended hunting seasons for feral hog control in the forest east of the airfield, and, if all else fails, spotlighting and shooting these animals (with Georgia DNR's permission) at night.

The principal means of controlling airstrike hazards is through habitat management. Accordingly, the height of the grass on the airfield is maintained in the 7 to 14 inch range, areas on the airfield where water pools are filled and bare spots are seeded with grass. The original turf grass was Bermuda, but Bahia grass has spread widely to all areas of the Base. Efforts are underway to eradicate the dominant Bahia grass near the airfield to reduce the amount of grass seed that attracts wildlife to the area.

Fencing and cattle guards have been established on the airfield and associated supply roads to help keep large mammals out of this area. As of January 2012, 19.5 acres of wetlands south of the runway were filled as part of airfield improvement and wildlife habitat reduction.

Canada geese usually do not visit the airfield. The hazard posed by these birds occurs when they fly through aircraft flight routes on their way to Base lakes, especially Scout Lake. Robins AFB has worked with the USDA to have geese on Base captured and relocated to other lakes around the state. However, this is not a long-term solution. Scare tactics have not been very effective in frightening geese away from Scout Lake. The best solution to this problem is to reduce the attractiveness of Scout Lake to geese via habitat alterations such as reducing the amount of turf grass along the shore by planting shrubs and trees, and installing fencing if necessary. Base residents should not feed these birds, as this encourages their concentrations at the lakes.

BASH Management

- Coordinate overall management through the BHWG and control through the Bird Harassment Team. These groups represent cooperative efforts between several Base and hosted organizations.
- Manage habitat by reducing plant diversity and eliminating Bahia grass in the airfield area. Maintain grass height between 7 and 14 inches over the entire field. Sow Coastal or Tift Bermuda grass in unvegetated areas. Allowing taller roadside grass will provide a more attractive habitat away from the airfield. Fill or grade to eliminate low areas where water pools and keep drainage ways free of debris and open.
- Harassment with a combination of non-lethal methods is preferred where effective (scare cartridges for doves, cattle egrets, small migrant species; pyrotechnics for geese). Use harassment techniques to frighten wetland birds away from the ponds to the east and south of the runway. Maintaining a depth of 3-4 feet of water in these areas would reduce the attractiveness for wading birds.
- Lethal controls should be used periodically as necessary to control meadowlark, starling and blackbird populations. Capture and relocate geese to reduce population size.
- Minimize lighting on the airfield by turning off unnecessary lights to reduce attraction of aerial foragers.
- Control nuisance foxes and coyotes through harassment, trapping, or shooting if necessary. Conduct perimeter scans for control of deer and feral hog, emphasizing early morning and evening hours. Return of previously harassed animals may require other control actions such as tranquilizing, trapping, or shooting.

BASH Program Support

The 78 CEG/CEIE supports the BASH program as a participant in the Robins AFB BHWG. Support responsibilities include:

- Providing environmental expertise and advice to the BHWG on various control actions and environment modifications,
- Developing procedures for the removal or control of wildlife attractants,
- Conducting BASH surveys,
- Evaluating and making recommendations for reducing access to the airfield by large animals,
- Monitoring the agreement between 78 CEG/CEIE and the USDA Wildlife Services Division for controlling birds in buildings and hangars and monitoring the status of control permits,
- Coordinating proposed depredation permit actions with applicable federal and state fish and wildlife agencies and consulting with the USDA Wildlife Services Division, and
- Ensuring that designated personnel are trained on all bird dispersal equipment used at the Base.

In cooperation with the Pest Management and Airfield Management Operations groups, support also is provided through participation in the Bird Harassment Team (BHT). The 78 CEG/CEIE responsibilities as an appointee to the BHT include training BHT personnel in proper identification and control of bird hazards to ensure compliance with depredation permits and with federal and state laws, serving as a prime source for identifying conditions that could create strike hazards and recommending actions to reduce the hazard, and participating in semi-annual BHWG meetings.

7.13 Coastal Zone and Marine Resources Management

Applicability Statement

This section applies to AF installations that are located along coasts and/or within coastal management zones. This section **IS NOT** applicable to Robins AFB.

Program Overview/Current Management Practices

N/A.

7.14 Cultural Resources Protection

Applicability Statement

This section applies to AF installations that have cultural resources that may be impacted by natural resource management activities. This section **IS** applicable to Robins AFB.

Program Overview/Current Management Practices

Cultural resources at Robins AFB include 20 buildings, 1 historic districts (Officer's Circle), and 16 archaeological sites that are eligible for listing on the National Register for Historic Places (NRHP). The buildings include World War II and Cold War structures. These cultural resources are managed and protected in accordance with the *Integrated Cultural Resources Management Plan* (ICRMP [Robins AFB, 2011a]). No Native American Graves Protection and Repatriation Act (NAGPRA) concerns exist at the Base.

Natural resources management has limited potential for adversely affecting historic structures. Any land-disturbing activities related to natural resources management activities do have the potential to affect archaeological resources, if present. Such activities include establishing fire breaks, constructing trails, roads, or other structures, ground preparation related to silviculture practices, tree or wildlife food plot plantings, or erosion control practices. The 78 CEG/CEIE reviews requests for proposed actions provided

on AF Forms 813 or 332 to determine if the project has the potential to affect cultural resources. If there is a potential for adverse effect, then the project is further evaluated through the AF EIAP.

7.15 Public Outreach

Applicability Statement

This section applies to all AF installations that maintain an INRMP. Robins AFB **IS** required to implement this element.

Program Overview/Current Management Practices

The 78 CEG/CEIE and 78 FSS provide public outreach through education and volunteer programs. Coordination and support for outreach efforts are provided by the installation Public Affairs Office (WR-ALC/PA). Natural resources awareness programs on the Base, wildlife awareness outreach activities in public schools, and the use of educational materials are discussed under education in Section 7.5 Fish and Wildlife Management.

7.16 Geographic Information Systems (GIS)

Applicability Statement

This section applies to all AF installations that maintain an INRMP, since all geospatial information must be maintained within the AF GeoBase system. Robins AFB **IS** required to implement this element.

Program Overview/Current Management Practices

The original Intergraph MGE-based GIS has been converted to Environmental Systems Research Institute (ESRI) ArcGIS and is used at Robins AFB as an integral part of all natural resource management activities. The currently installed hardware and software represents a suite of tools that can be used to enter, access, analyze and plot mapped natural resources data. The natural resources data set contains data layers such as soil type, hydrology, wetlands and floodplains, forest types, significant natural communities, recreational areas, and other resources. Each graphical feature in each map is linked to a database table that contains descriptive information about that feature. Together they form a data layer.

The GIS data layers provide a baseline of natural resources information (Table: GIS Data Layers). Specific source data are used to build each data layer. The scale, accuracy, content, and date of each source is important for assessing the reliability and usability of the resulting data layers. Detailed information is updated and included in the data sets as available and additional data layers are developed as needed to meet planning goals and objectives. These activities are part of the ongoing maintenance of the natural resource management GIS.

The natural resource management GIS contains comprehensive, current information to serve as a decision support tool for planners and decision makers. It facilitates better use and overall management of Base natural resources by providing efficient access to accurate information about natural resources on the Base.

GIS Data Layers

Figure Name	Shapefile	Description	Shapefile	Description
100-Year Floodplain				
	Base Boundary	Base boundary outline	Surface_water_body_area.shp	Surface water polygon
	surf_wat_course_centerline.shp	Surface water outline	Roads_Area	Road polygon
	Buildings	Building polygon	Runway	Runway polygon
	Surface_Creeks	Creek polygon	Flood_zone_area.shp	500-Year and 100 year floodplain
Artifical Bird Nesting				
	Nesting_point.shp	Artifical bird nesting points	Surface_Creeks	Creek polygon
	Base Boundary	Base boundary outline	Surface_water_body_area.shp	Surface water polygon
	surf_wat_course_centerline.shp	Surface water outline	Roads_Area	Road polygon
	Buildings	Building polygon	Runway	Runway polygon
Equestrian Trail				
	Equestrian.shp	Equestrian trails	Buildings	Building polygon
	General_recreation_areas.shp	General recreation areas	Surface_Creeks	Creek polygon
	Special_interest_areas.shp	Special interest areas	Surface_water_body_area.shp	Surface water polygon
	Natural_environmental_areas.shp	Natural environmental areas	Roads_Area	Road polygon
	Base Boundary	Base boundary outline	Runway	Runway polygon
	surf_wat_course_centerline.shp	Surface water outline		
Floodplain Cover				
	Sample_points.shp	Sample points	Base Boundary	Base boundary outline
	water_tupelo.shp	Water tupelo polygon	surf_wat_course_centerline.shp	Surface water outline
	Mixed_hardwood_pine_forest.shp	Mixed hardwood pine forest	Buildings	Building polygon
	Mixed_bottomland_hardwood.sh	Mixed bottomland hardwood	Surface_Creeks	Creek polygon
	Disturbed_wet_floodplain_forest.	Disturbed wetland floodplain forest	Surface_water_body_area.shp	Surface water polygon
	Acidic_forest.shp	Acidic forest polygon		
Forest Type				
	Upland_forest1.shp	Upland forest polygon	surf_wat_course_centerline.shp	Surface water outline
	Upland_forest2.shp	Upland forest polygon	Buildings	Building polygon
	Upland_forest3.shp	Upland forest polygon	Surface_Creeks	Creek polygon
	Transitional_forest.shp	Transitional forest polygon	Surface_water_body_area.shp	Surface water polygon
	Bottomland_forest.shp	Bottomland forest polygon	Roads_Area	Road polygon

Figure Name	Shapefile	Description	Shapefile	Description
	Base Boundary	Base boundary outline	Runway	Runway polygon
Geology				
	Gelthare.shp	Geology polygon	Surface_Creeks	Creek polygon
	Base Boundary	Base boundary outline	Surface_water_body_area.shp	Surface water polygon
	surf_wat_course_centerline.shp	Surface water outline	Roads_Area	Road polygon
	Buildings	Building polygon	Runway	Runway polygon
Land Use				
	land_use_area.shp	Administrative, aircraft operations,	surf_wat_course_centerline.shp	Surface water outline
		airfield, cemetary, community	Buildings	Building polygon
		community (serv), forest, housing	Surface_Creeks	Creek polygon
		housing (unaccom), industrial,	Surface_water_body_area.shp	Surface water polygon
		medical, outdoor recreation, water	Roads_Area	Road polygon
	Base Boundary	Base boundary outline	Runway	Runway polygon
Management Emphasis Area				
	Natural resource_multiple_use.shp	Natural resources/multiple use	surf_wat_course_centerline.shp	Surface water outline
	Development_reserve.shp	Development reserve polygon	Buildings	Building polygon
	Intensive_recreation.shp	Intensive recreation polygon	Surface_Creeks	Creek polygon
	Managed_natural_habitat.shp	Managed natural habitats polygon	Surface_water_body_area.shp	Surface water polygon
	Natural _habitat_preserve.shp	Natural habitat preserves polygon	Roads_Area	Road polygon
	Urban_development.shp	Urban development polygon	Runway	Runway polygon
	Base Boundary	Base boundary outline		
Outdoor Recreation				
	General recreation_areas.shp	General recreation areas polygon	Buildings	Building polygon
	Special_interest_areas.shp	Special interest areas polygon	Surface_Creeks	Creek polygon
	Natural_environmental_areas.shp	Natural environmental areas polygon	Surface_water_body_area.shp	Surface water polygon
	Recreation_trail_centerline.shp	Recreation trail lines	Roads_Area	Road polygon
	Base Boundary	Base boundary outline	Runway	Runway polygon
	surf_wat_course_centerline.shp	Surface water outline		
Significant Natural				
	Flora_species_population_area.sh	Bottomland Hardwood Swamp,	surf_wat_course_centerline.shp	Surface water outline
		Creek Forest, Bay Swamp,	Buildings	Building polygon
		Gum Cypress Pond, Gum Pond,	Surface_Creeks	Creek polygon
		Grady Freshwater Meadow,	Surface_water_body_area.shp	Surface water polygon
		Upland Hardwood Bluff polygons	Roads_Area	Road polygon
	Base Boundary	Base boundary outline	Runway	Runway polygon

Figure Name	Shapefile	Description	Shapefile	Description
Soil Mapping				
	Soil_mapping_units.shp	Soil mapping units polygons	Surface_Creeks	Creek polygon
	Base Boundary	Base boundary outline	Surface_water_body_area.shp	Surface water polygon
	surf_wat_course_centerline.shp	Surface water outline	Roads_Area	Road polygon
	Buildings	Building polygon	Runway	Runway polygon
Surface Water				
	Base Boundary	Base boundary outline	Surface_water_body_area.shp	Surface water polygon
	surf_wat_course_centerline.shp	Surface water outline	Roads_Area	Road polygon
	Buildings	Building polygon	Runway	Runway polygon
	Surface_Creeks	Creek polygon		
Turf Management				
	Turf_management_areas.shp	Firebreaks, under constr., improved	Buildings	Building polygon
		enhanced, undergrowth, golf	Surface_Creeks	Creek polygon
		course, airfield, enhanced,	Surface_water_body_area.shp	Surface water polygon
		semi-improved polygons	Roads_Area	Road polygon
	Base Boundary	Base boundary outline	Runway	Runway polygon
	surf_wat_course_centerline.shp	Surface water outline		
Wetland Location				
	wetland_area.shp	Wetland areas polygon	Surface_Creeks	Creek polygon
	Base Boundary	Base boundary outline	Surface_water_body_area.shp	Surface water polygon
	surf_wat_course_centerline.shp	Surface water outline	Roads_Area	Road polygon
	Buildings	Building polygon	Runway	Runway polygon

8.0 MANAGEMENT GOALS AND OBJECTIVES

The installation establishes long term, expansive goals and supporting objectives to manage and protect natural resources while supporting the military mission. Goals express a vision for a desired condition for the installation's natural resources and are the primary focal points for INRMP implementation. Objectives indicate a management initiative or strategy for specific long or medium range outcomes and are supported by projects. Projects are specific actions that can be accomplished within a single year. Also, in cases where off-installation land uses may jeopardize AF missions, this section may list specific goals and objectives aimed at eliminating, reducing or mitigating the effects of encroachment on military missions. These natural resources management goals for the future have been formulated by the preparers of the INRMP from an assessment of the natural resources, current condition of those resources, mission requirements, and management issues previously identified. Below are the integrated goals for the entire natural resources program.

The installation goals and objectives are displayed in the 'Installation Supplement' section below in a format that facilitates an integrated approach to natural resource management. By using this approach, measurable objectives can be used to assess the attainment of goals. Individual work tasks support INRMP objectives. The projects are key elements of the annual work plans and are programmed into the conservation budget, as applicable.

Installation Supplement – Management Goals and Objectives

GOAL 1: MANAGE FORESTS TO MAINTAIN OR ENHANCE THE EXISTING LEVEL OF NATIVE PLANT SPECIES DIVERSITY AND FOREST STRUCTURE AND IMPROVE URBAN FOREST RECRUITMENT AND VERTICAL STRATIFICATION TO ACHIEVE LONG-TERM SUSTAINABILITY IN CONCERT WITH COMPETITIVE USES AND MANAGEMENT EMPHASIS AREA (MEA) FOCUS.

- OBJECTIVE 1.1: Reduce the presence and control the establishment of non-native plants and noxious weeds to preserve and enhance native plant diversity and wildlife value of the urban and natural forests.
    - PROJECT 1.1.1: Eradicate or control invasive exotic species and noxious weeds using recommended Integrated Pest Management (IPM) methods.
    - PROJECT 1.1.2: Continue to use prescribed fire to achieve vegetation management goals with emphasis on the Longleaf Pine Restoration Area, and to reduce fuel loads.
    - PROJECT 1.1.3: Review and update the Wildland and Prescribed Fire Management Plan.
    - PROJECT 1.1.4: Review landscaping plans and make recommendations that promote the use of native, drought-resistant species for ornamental and landscape plantings.
    - PROJECT 1.1.5: Retain standing or fallen dead trees for wildlife habitat throughout the Base, except for hazard trees which must be removed for safety.
    - PROJECT 1.1.6: Promote natural regeneration of native species wherever possible throughout the Base.
    - PROJECT 1.1.7: Take a "hands off" approach whenever possible in the Natural Habitat Management Emphasis Area (MEA).

- OBJECTIVE 1.2: Protect and conserve forest resources in the natural and built environments to maintain ecosystem integrity, sustain forest productivity, and promote a healthy, safe urban forest.
  - PROJECT 1.2.1: Maintain and improve forest resources, including forested wetlands and upland natural forests.
  - PROJECT 1.2.2: Restore and maintain the relict longleaf pine forest and conserve the upland hardwood bluff forest.
  - PROJECT 1.2.3: Integrate management recommendations from the 2004 Urban Forest Management Component Plan and 5-year work plan to improve urban tree health and vigor within the Urban Development MEA with emphasis on comprehensive disease monitoring, consistent tree maintenance practices, reforestation, and increased biodiversity and wildlife value, where possible.
  - PROJECT 1.2.4: Conduct the urban forestry program to continually satisfy the Tree City USA requirements of the National Arbor Day Foundation.
  - PROJECT 1.2.5: Enhance vertical stratification of the urban forest by improving understory species diversity and growth conditions and promote measures that will sustain a healthy, safe urban forest.
  - PROJECT 1.2.6: Manage pine plantations in the Development Reserve MEA for wildlife habitat and aesthetic values, subject to funding availability.
- OBJECTIVE 1.3: Limit management of natural and landscape vegetation to the extent necessary to maintain or enhance security along the perimeter of the Base and near sensitive facilities.
  - PROJECT 1.3.1: Maintain vegetation near secure areas and facilities through appropriate pruning or limited clearing of natural areas. Clearing should be limited to the minimum amount necessary to allow access for security and maintenance staff, to ensure integrity of fences or other barriers, and to allow visual detection of intruders.

GOAL 2: APPLY SOUND ECOSYSTEM MANAGEMENT PRINCIPLES AND THE BEST AVAILABLE SCIENCE TO ACHIEVE AND MAINTAIN HEALTHY POPULATION LEVELS, ECOLOGICALLY BALANCED COMPOSITION, AND SUSTAINABLE PRODUCTIVITY OF GAME AND NON-GAME FISH AND WILDLIFE SPECIES IN AQUATIC AND UPLAND HABITATS, AND CONTROL NUISANCE WILDLIFE.

- OBJECTIVE 2.1: Consult and coordinate management activities with fish and wildlife agencies as required or with other natural resource agencies when relevant.
  - PROJECT 2.1.1: Maintain updated cooperative agreements with the U.S. Fish and Wildlife Service (USFWS) and Georgia Department of Natural Resources (DNR) for management assistance.
  - PROJECT 2.1.2: Coordinate fish and wildlife surveys and methodologies with the Georgia DNR and USFWS as applicable, and solicit technical assistance on matters of fish and wildlife management, including pest problems.
  - PROJECT 2.1.3: Coordinate nuisance wildlife control activities with the USDA Wildlife Services office, the Georgia DNR, the USFWS, and the Base Entomology Shop as appropriate for the activity.
- OBJECTIVE 2.2: Manage natural habitats and timber resources to optimize game and non-game wildlife populations.

  - PROJECT 2.2.1: Manage wildlife habitat to meet the goals for Watchable Wildlife by recommending native plants with good wildlife value that are suitable for use in landscaping of urban areas, improving existing habitat through grounds maintenance recommendations, and by providing educational programs. These measures should also be implemented on the golf course.
  - PROJECT 2.2.2: Develop and implement appropriate short- and long-range management strategies to maintain populations of game and non-game species, primarily through habitat management actions such as a)mowing strips of vegetation between timber stands to increase habitat diversity; b) heavy thinning along edges of stands to increase habitat diversity; and/or removing trees to create a 25- to 50-foot wide gap between the pine stands and mixed hardwood forest for herbaceous vegetation development.
  - PROJECT 2.2.3: Evaluate options to improve hunting opportunities such as leasing hunting rights from local landowners.
  - PROJECT 2.2.4: Provide education on animal species that can cause human problems such as deer flies, mosquitoes, ticks, and snakes, and evaluate and implement optional IPM methods from the 2005 Terrestrial Arthropod Study for the prevention and control of insect groups that represent significant pests or potential human health concern.
  - PROJECT 2.2.5: Monitor select game and non-game species and their habitats to maintain a current habitat inventory, and update the inventory every 5 years.
  - PROJECT 2.2.6: Integrate management recommendations from the 2003 Reptile and Amphibian Survey for the conservation of reptiles and amphibians and their habitats.
- OBJECTIVE 2.3: Improve and sustain fishery resources of the existing lakes and support opportunities for increasing fishing access for Horse Creek.
  - PROJECT 2.3.1: Sample fish populations by seining in all three lakes; keep records of stocking; and conduct creel surveys to quantify fishing pressure, angler success rates, and angler needs.
  - PROJECT 2.3.2: Follow the management recommendations and schedule described in the 2005 Scout Lake Fisheries Habitat Restoration report to improve and sustain the fishery at Scout Lake.
  - PROJECT 2.3.3: Implement general fish habitat improvements as needed, such as fertilizing lakes, installing fish attractors, reducing sedimentation of water bodies, improving water quality, and eradicating exotic aquatic weeds.
  - PROJECT 2.3.4: Provide support and advice to the CEG and Force Support organizations for evaluating and developing options to increase fishing opportunities such as installing fishing platforms and improving angler access to Horse Creek.

GOAL 3: PROTECT INDIVIDUALS AND SUSTAIN OR INCREASE EXISTING POPULATION LEVELS OF FEDERAL AND STATE NATIVE THREATENED AND ENDANGERED PLANT AND ANIMAL SPECIES AND HABITATS, CONSERVE OTHER SPECIAL STATUS SPECIES AND HABITATS, AND PROMOTE POPULATION GROWTH THROUGH ACTIVE MANAGEMENT.

- OBJECTIVE 3.1: Protect individuals and maintain or increase existing population levels of native threatened and endangered plant and animal species and habitats consistent with Federal regulations, and to the extent possible with respect to mission requirements and funding availability, conserve special status species and habitats within the guidelines of sound ecosystem management.

- PROJECT 3.1.1: Conduct comprehensive threatened, endangered, and sensitive (TES) species surveys on unimproved grounds at least once every 5 years.
- PROJECT 3.1.2: Periodically update the inventory of TES plant species that was completed in the 1999 Final Rare Plants Survey and Management Plan.
- PROJECT 3.1.3: Conduct site-specific surveys for TES as necessary prior to any significant ground- or habitat-disturbing activities on unimproved grounds.
- PROJECT 3.1.4: Continue coordination with USFWS and DNR on TES species surveys and management activities as required or applicable.
- PROJECT 3.1.5: Periodically monitor population levels, species composition, and habitat conditions to assess long-term trends in TES species populations on Robins AFB and develop strategies to enhance species propagation and increase population sizes.
- PROJECT 3.1.6: Protect rare plant species, and conduct monitoring and management activities to enhance their propagation and survivability, such as mowing competing vegetation on Ocmulgee skullcap sites during winter months when this species is dormant.
- PROJECT 3.1.7: Develop a wetland assessment and protection plan for the Grady Freshwater Meadow to protect this unusual habitat and associated rare plants.

GOAL 4: PROTECT JURISDICTIONAL WETLANDS AND WATERS OF THE U.S. TO SUSTAIN "NO NET LOSS" AND PREVENT DEGRADATION OF EXISTING QUALITY, FUNCTION AND VALUE OF WETLAND, SURFACE WATER, AND FLOODPLAIN RESOURCES.

- OBJECTIVE 4.1: implement Lake and watercourse management actions as needed to protect water quality or to restore optimal habitat conditions and attributes.
  - PROJECT 4.1.1: Restore native vegetation and establish protected riparian buffers at least 25-feet in width along stream banks and lake shorelines where necessary to control erosion and prevent sedimentation of water bodies.
  - PROJECT 4.1.2: Restrict the operation of heavy machinery, soil or vegetation disturbance, and intensive activities within riparian buffer zones and recommend appropriate erosion control techniques for construction sites and other areas where the ground vegetation cover is disturbed, such as those techniques described in the Manual for Erosion and Sediment Control in Georgia and the 2005 Wetland Protection Plan.
  - PROJECT 4.1.3: Prevent the disturbance or removal of shoreline buffer vegetation in the Lake and Watercourse MEA and other riparian areas through the review of proposed actions and recommendation of Best Management Practices (BMPs) for the protection of Streamside Management Zones.
  - PROJECT 4.1.4: Monitor erosion-prone areas such as the Jeep Trail on a routine basis and implement erosion control BMPs and follow-up monitoring as necessary and appropriate for controlling erosion and protecting wetlands.
- OBJECTIVE 4.2: Maintain the existing level of water quality in lakes and streams and improve surface water quality as necessary.
  - PROJECT 4.2.1: Minimize the application of chemical pesticides through the use of appropriate pest control products and application techniques and substitute with non-chemical controls, where effective, to reduce the amount of chemical pesticides entering lakes and streams, especially at the Golf Course.

  - PROJECT 4.2.2: Require the use of BMPs for activities that may cause contaminants to contact and be transported in storm water runoff or otherwise enter waterbodies.
  - PROJECT 4.2.3: Protect natural vegetation buffers from disturbance along lakes, streams and wetlands and prohibit the application of pesticides or other chemicals within 50-75 feet of waterbodies, unless no practicable non-chemical alternative exists.
- OBJECTIVE 4.3: Conserve water resources by promoting practices and actions that reduce water use.
  - PROJECT 4.3.1: Promote the use of treated wastewater for irrigating the Golf Course.
  - PROJECT 4.3.2: Recommend the use of drought-tolerant plant species in landscape designs, and confine irrigation practices to evening hours as necessary.
- OBJECTIVE 4.4: Protect the natural features of creek and stream floodplains to preserve functions and minimize personnel and property risk from flood hazards.
  - PROJECT 4.4.1: Ensure that 100-year floodplain data are accurate, current, and maintained in the Base GIS for use in planning activities.
  - PROJECT 4.4.2: Review proposed developments to determine whether they will occur in the floodplain and recommend appropriate BMPs for floodplain protection when development would occur near floodplains.
- OBJECTIVE 4.5: Protect wetlands and Waters of the U.S. under the jurisdiction of the U.S. Army Corps of Engineers (USACE). Sustain “no net loss” and prevent degradation of existing functions and values.
  - PROJECT 4.5.1: Maintain a policy of “no net loss” of wetland acreage.
  - PROJECT 4.5.2: Consult with the USACE whenever a proposed project is likely to result in loss of existing wetland area or impact existing wetland function or value.
  - PROJECT 4.5.3: Maintain updated GIS coverage of jurisdictional wetland boundaries for use in Base planning, and ensure that wetland boundaries are defined in the field.
  - PROJECT 4.5.4: Review/survey jurisdictional wetland boundaries periodically as required by the USACE and update boundaries as appropriate.
  - PROJECT 4.5.5: Monitor wetland quality and restore or enhance the function and value of these habitats as practicable using management recommendations in the 2005 Wetland Protection Plan.

GOAL 5: MAINTAIN GROUNDS USING PRACTICES THAT CONSERVE EXISTING ECOSYSTEM INTEGRITY, OPTIMIZE WILDLIFE VALUE, ENHANCE BIODIVERSITY AT COMMUNITY AND LANDSCAPE LEVELS, AND THAT SUPPORT BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH) REDUCTION, FORCE READINESS AND MISSION EFFECTIVENESS.

- OBJECTIVE 5.1: Manage significant natural habitats to sustain the quality and enhance the biodiversity of these sensitive ecosystems, and manage habitat in the BASH Reduction MEA to minimize risk to personnel and aircraft from birds and wildlife.
  - PROJECT 5.1.1: Protect, and restore as needed, significant natural communities (Creek Swamp, Bay Swamp, Old Growth Bottomland Hardwood Forest, Gum Pond, Gum-Cypress Pond, Grady Freshwater Meadow, Upland Hardwood Bluff Forest, and Longleaf Pine Forest).
  - PROJECT 5.1.2: Monitor significant natural communities, including the BASH Reduction MEA, to ensure that management goals are being met.

  - PROJECT 5.1.3: Integrate management practices at the community and habitat level to enhance biodiversity at the landscape level.
- OBJECTIVE 5.2: Maintain improved, semi-improved, and unimproved grounds to standards defined by the Air Force and the Natural Resource Conservation Service (NRCS).
  - PROJECT 5.2.1: Reduce the frequency of mowing on improved and semi-improved lands where possible.
  - PROJECT 5.2.2: Convert selected turf areas to other types of vegetation that require less-intensive maintenance where possible.
  - PROJECT 5.2.3: Convert improved to semi-improved grounds through the planting of drought-tolerant native trees, shrubs, grasses and wildflowers in desired areas when practicable.
  - PROJECT 5.2.4: Minimize the application of chemical pesticides by following IPM principles, and through implementation of the current Integrated Pest Management Plan. Work with the Base Entomology Shop to revise this plan annually.
- OBJECTIVE 5.3: Reduce the bird/wildlife aircraft strike hazard in the BASH MEA in accordance with the BASH Plan and consistent with BASH Program guidelines.
  - PROJECT 5.3.1: Reduce the risk to aircraft from bird and other wildlife hazards through the active management of habitat and wildlife on and near the airfield. Management strategies and methods that are designed to deter target species are preferred.
  - PROJECT 5.3.2: Use integrated airfield management practices such as tree removal as needed to improve flight safety and reduce wildlife hazards to increase mission effectiveness.
- OBJECTIVE 5.4: Enhance force readiness and increase mission effectiveness where possible by improving the compatibility of outdoor recreation areas and facilities with adjacent land uses, activities, and customer needs.
  - PROJECT 5.4.1: Coordinate with the Base Planner on proposed outdoor recreation developments that may affect or that depend upon natural resource use.

GOAL 6: PROVIDE HIGH QUALITY NATURAL RESOURCE-RELATED OUTDOOR RECREATION FACILITIES AND OPPORTUNITIES THAT PROMOTE THE MENTAL, PHYSICAL, AND SOCIAL WELL-BEING OF BASE PERSONNEL, AND OTHERS SUBJECT TO AVAILABILITY, CONSISTENT WITH THE MILITARY MISSION AND SECURITY POLICIES AND WITH MINIMAL IMPACT ON SENSITIVE NATURAL RESOURCES.

- OBJECTIVE 6.1: Provide and maintain safe and aesthetically pleasing natural areas on Robins AFB to be used for hunting and fishing, other outdoor recreation pursuits, and natural resource education.
  - PROJECT 6.1.1: Maintain, upgrade or enhance the existing nature trails and explore opportunities for linkages among walking and nature trails.
  - PROJECT 6.1.2: Use the Longleaf Pine Restoration project and the Wiregrass Trail as an outdoor classroom and interpretive site.
  - PROJECT 6.1.3: Plan for future new natural resource-related recreation opportunities, such as new nature trails, additional fishing piers, or new creek-side boardwalks, picnic areas, canoe trails, and bicycle trails, particularly in the Intensive Recreation MEA.
  - PROJECT 6.1.4: Integrate natural resource-related recommendations of the Outdoor Recreation Management Plan into management planning as appropriate, and maintain a current outdoor recreation facility map on the Base web site.

- OBJECTIVE 6.2: Monitor recreational use of natural resources to minimize use impacts on natural resources and to sustain future use of these resources.
  - PROJECT 6.2.1: Regulate the use of all-terrain vehicles and other off-road machines to prevent damage to natural resources.
  - PROJECT 6.2.2: Regulate the use of motorized boats and other watercraft on lakes and creeks to protect existing water quality and to sustain resource use.
- OBJECTIVE 6.3: Promote learning about wildlife, habitat needs, and resource conservation through embracing the goals of conservation programs such as Partners in Flight, Partners in Amphibian and Reptile Conservation, and Watchable Wildlife.
  - PROJECT 6.3.1: Improve communication, enhance cooperation, and employ management strategies that would conserve Neotropical migratory birds.
  - PROJECT 6.3.2: Practice sound conservation and management of native herpetofauna (reptiles and amphibians) and provide educational efforts to raise public awareness about the conservation needs of reptiles and amphibians.
  - PROJECT 6.3.3: Provide opportunities for the public to enjoy wildlife; promote learning about wildlife and habitat needs; and actively support local and regional resource conservation initiatives.
- OBJECTIVE 6.4: Provide for public awareness of natural resources at Robins AFB and promote outdoor education through coordination and communication.
  - PROJECT 6.4.1: Through the Public Affairs Office, provide informative materials for the Base newspaper, the Nature Center, and local media.
  - PROJECT 6.4.2: Provide educational materials regarding natural resources to Base housing occupants.
  - PROJECT 6.4.3: Maintain and update the natural resources section of the Environmental Management web page.
  - PROJECT 6.4.4: Encourage volunteer participation in various aspects of the natural resources program, such as control of exotic weeds and fish and wildlife surveys.
  - PROJECT 6.4.5: Arrange cooperative projects with organizations such as Ducks Unlimited, The Nature Conservancy, The Georgia Master Gardener Association, and Boy Scouts of America.
  - PROJECT 6.4.6: Conduct a youth program for hunting safety and fishing.

GOAL 7: ENCOURAGE BETTER UTILIZATION AND CONSERVATION OF BASE NATURAL RESOURCES THROUGH EFFECTIVE MANAGEMENT AND COMMUNICATION THAT IS RESPONSIVE TO CUSTOMER NEEDS AND CONSISTENT WITH THE AIR FORCE MISSION.

- OBJECTIVE 7.1: Coordinate routinely with other organizations to facilitate the management and conservation of natural resources consistent with the Air Force mission.
  - PROJECT 7.1.1: Continue to promote the use of MEAs in coordinating resource management efforts with land use and development activities.
  - PROJECT 7.1.2: Continue communication between natural resource and other civil engineering personnel as a standard practice in Base planning, and continue regular meetings of Integrated Process Teams (IPTs) to discuss natural resource management issues and needs.
  - PROJECT 7.1.3: As an integral part of the planning process, continue consultations and the review and coordination of management strategies with cooperating local, state, and Federal regulatory agencies prior to their implementation. Agencies include; USFWS, U.S. Department

of Agriculture, NRCS, National Park Service (NPS), USACE, DNR, and the Georgia Forestry Commission.
    - PROJECT 7.1.4: Maintain open lines of communication between Robins AFB natural resources personnel and various conservation and natural resources organizations and agencies such as; DNR, NRCS, Sierra Club, Audubon Society, and The Nature Conservancy.
    - PROJECT 7.1.5: Create partnerships with neighboring property owners to improve success of ecosystem management goals, survival and propagation of rare species, and to assist with discouraging encroachment onto Base property.

GOAL 8: USE THE GEOGRAPHIC INFORMATION SYSTEM AND COORDINATED PLANNING TO FACILITATE INFORMED AND EFFECTIVE NATURAL RESOURCES MANAGEMENT AND DECISION-MAKING, AND TO PROMOTE NATURAL RESOURCE EDUCATION.

- OBJECTIVE 8.1: Use the GIS as a tool to facilitate environmental management and to aid informed decision-making.
    - PROJECT 8.1.1: Maintain a current natural resources database on the GIS to provide Base personnel with readily available access to natural resources data, and encourage the use of the GIS for planning and informed decision-making.
    - PROJECT 8.1.2: Provide public access to the INRMP through the public web site.
- OBJECTIVE 8.2: Integrate natural resources management planning to fully implement an effective natural resources management program.
    - PROJECT 8.2.1: Review the INRMP and implementation plan status annually. Document the annual review and update/coordinate the INRMP as necessary.
    - PROJECT 8.2.2: Update the INRMP at least every five years and coordinate with the USFWS and Georgia DNR.
    - PROJECT 8.2.3: Participate annually in at least one natural resources management workshop, or other pertinent training event, conference or workshop subject to funding availability

9.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

9.1 Natural Resources Management Staffing and Implementation

Natural Resources Management Staffing

Staffing requirements for implementing the INRMP include personnel from 78 CEG/CEIE, 78 SPGT, and 78 SFS. Oversight of goals and objectives and INRMP implementation is facilitated by members of the Base INRM IPT and the Pesticide IPT. Staff of the Georgia Forestry Commission, NRCS, and Georgia DNR also provide outside implementation support. No member of 78 CEG/CEIE is trained in law enforcement and no member of the 78 SFS is dedicated to enforcement of fishing or hunting regulations. The 78 SFS has requested a dedicated position for this purpose. Until the 78 SFS position is approved and staffed, enforcement of fishing and hunting regulations will continue in accordance with the MOU in the Robins AFB Instructions Appendix.

The 78 CEG/CEIE staff can implement most of the goals and objectives of this INRMP, although staffing levels are at a minimum for effective implementation as a result of recent leaning in military support staff

levels. INRMP implementation is supplemented by consultation with technical experts, conservation agency personnel, and contract support for some technical activities related to natural resource baseline surveys, monitoring, resource-specific management planning and component plan development, and identification of alternative and innovative best management practices.

Demands on the present natural resources management staff have hindered routine participation in training opportunities and professional conferences. At a minimum, at least one representative of the 78 CEG/CEIE staff should attend the annual workshop of the National Military Fish and Wildlife Association and personnel should periodically participate in other pertinent training or state, regional, or national conferences/ workshops based on natural resource management needs and funding availability.

Implementation

Implementation of natural resources management actions is prioritized for the planning period based on:

1. Actions necessary for compliance with the law,
2. Actions necessary for Base mission/planning support,
3. Actions important to natural resource conservation goals, and
4. Actions implementing general conservation management objectives.

Some projects are shorter-term and may be completed during the planning period, while others are longer-term and may be ongoing throughout the planning period, and some future development projects may only be initiated during the present planning period.

9.2 Monitoring INRMP Implementation

INRMP implementation will be monitored through use of the Work Plan Summary, FY18- FY22, described in the Annual Work Plans Section, and the ARSM described in the Annual INRMP Review and Update Requirements Section. The Natural Resources Manager, or designee, will conduct the implementation reviews annually and recommend appropriate adaptive management strategies or corrective actions to address any identified deficiencies in plan implementation. In some cases, where the objective or proposed action is no longer applicable or funding is not available within the planning period, the reasons for not implementing the action will be specified. Results of annual or in-progress implementation monitoring will be documented in the ARSM.

The effectiveness of plan implementation will be qualitatively monitored periodically by the Natural Resources Manager. Any necessary adaptive management strategies or corrective actions will be addressed as part of the ARSM process. Baseline surveys and inventories will be updated at appropriate timeframes, subject to funding availability.

9.3 Annual INRMP Review and Update Requirements

This INRMP, when approved by 78 CEG/CEIE and 78 ABW/CC, will serve as the overall guide for management of natural resources over the 5-year planning period. Annual reviews will be conducted by the INRM Integrated Process Team (IPT), chaired by 78 CEG/CEIE. Annual reviews will be documented through an INRMP Master Update List and INRMP Update Reports (see Attachments 1 and 2) and attached to the INRMP.

The INRMP must be updated at least every five years and reviewed in cooperation with the U.S. Fish and Wildlife Service (USFWS) and Georgia Department of Natural Resources (DNR). Interim updates and

revision of the INRMP, including review with USFWS and Georgia DNR, would only be required in cases where changes in the military mission, new environmental compliance requirements, or other new information significantly affect the ability to implement the INRMP.

The 78 CEG/CEIE will chair quarterly meetings of the Base INRM IPT and the Pesticide IPT to assess INRM effectiveness and address emerging issues. INRMP updates will be tracked on the Master Update List (Attachment 1) that will become part of the current INRMP. The INRMP will be updated and documented using Annual Update Reports (Attachment 2). The 78 CEG/CEIE will conduct annual reviews of the INRMP and updates and the annual reviews will be documented in an INRMP Annual Review Summary Memorandum (ARSM). The ARSM will provide a concise summary of INRM activities conducted during the review period and identify any implementation or other management issues as well as any adaptive management or corrective actions taken or proposed. Copies of the ARSM will be provided to USFWS Region 4 and the Georgia DNR to satisfy annual coordination requirements. Any input received from the coordinating agencies will be included with the ARSM as part of the annual review record.

10.0 ANNUAL WORK PLANS

The INRMP Annual Work Plans are included in this section. These projects are listed by fiscal year, including the current year and four succeeding years. For each project and activity, a specific timeframe for implementation is provided (as applicable). The work plans provide all the necessary information for building a budget within the AF framework.

GOAL/OBJECTIVE/ACTION		IMPLEMENTATION YEAR					
		Status	FY 18	FY 19	FY 20	FY 21	FY 22
	GOAL 1—*MANAGE FORESTS TO MAINTAIN OR ENHANCE THE EXISITNG LEVEL OF NATIVE PLANT SPECIES DIVERSITY AND FOREST STRUCTURE AND IMPROVE URBAN FOREST RECRUITMENT AND VERTICAL STRATIFICATION TO ACHIEVE LONG-TERM SUSTAINABILITY IN CONCERT WITH COMPETITIVE USES AND MANAGEMENT EMPHASIS AREA (MEA) FOCUS.*						
1.1	**Reduce the presence and control the establishment of non-native plants and noxious weeds to preserve and enhance native plant diversity and wildlife value of the urban and natural forests.**						
1.1.1	Eradicate or control invasive exotic species and noxious weeds, using recommended Integrated Pest Management (IPM) methods.	Contracted	X	X	X	X	X
1.1.2	Continue to use prescribed fire to achieve vegetation management goals, with emphasis on the Longleaf Pine Restoration Area, and to reduce fuel loads.	As needed					
1.1.3	Review and update the *Wildland and Prescribed Fire Management Plan*.	Contracted	X				
1.1.4	Review landscaping plans and make recommendations that promote the use of native, drought-resistant species for ornamental and landscape plantings.	As needed					
1.1.5	Retain standing or fallen dead trees for wildlife habitat throughout the Base, except for hazard trees which must be removed for safety.	On Going					
1.1.6	Promote natural regeneration of native species wherever possible throughout the Base.	On Going					
1.1.7	Take a “hands off” approach whenever possible in the Natural Habitat Management Emphasis Area (MEA).	On Going					
1.2	**Protect and conserve forest resources in the natural and built environments to maintain ecosystem integrity, sustain forest productivity, and promote a healthy, safe urban forest.**						
1.2.1	Maintain and improve forest resources, including forested wetlands and upland natural forests.	On Going					
1.2.2	Restore and maintain the relict longleaf pine forest and conserve the upland hardwood bluff forest.	Contracted	X	X	X	X	X
1.2.3	Integrate management recommendations from the 2004 *Urban Forest Management Component Plan* and 5-year work plan to improve urban tree health and vigor within the Urban Development MEA with emphasis on comprehensive disease monitoring, consistent tree maintenance practices, reforestation, and increased biodiversity and wildlife value, where possible.	Contracted	X	X	X	X	X
1.2.4	Conduct the urban forestry program to continually satisfy the Tree City USA requirements of the National Arbor Day Foundation.	On Going					
1.2.5	Enhance vertical stratification of the urban forest by improving understory species diversity and growth conditions and promote measures that will sustain a healthy, safe urban forest.	On Going					
1.2.6	Manage pine plantations in the Development Reserve MEA for wildlife habitat, and aesthetic values, subject to funding availability.	On Going					

GOAL/OBJECTIVE/ACTION		IMPLEMENTATION YEAR					
		Status	FY 18	FY 19	FY 20	FY 21	FY 22
1.3	**Limit management of natural and landscape vegetation to the extent necessary to maintain or enhance security along the perimeter of the Base and near sensitive facilities.**						
1.3.1	Maintain vegetation near secure areas and facilities through appropriate pruning or limited clearing of natural areas. Clearing should be limited to the minimum amount necessary to allow access for security and maintenance staff, to ensure integrity of fences or other barriers, and to allow visual detection of intruders.	As needed					
GOAL 2—*APPLY SOUND ECOSYSTEM MANAGEMENT PRINCIPLES AND THE BEST AVAILABLE SCIENCE TO ACHIEVE AND MAINTAIN HEALTHY POPULATION LEVELS, ECOLOGICALLY BALANCED COMPOSITION, AND SUSTAINABLE PRODUCTIVITY OF GAME AND NON-GAME FISH AND WILDLIFE SPECIES IN AQUATIC AND UPLAND HABITATS, AND CONTROL NUISANCE WILDLIFE.*							
2.1	**Consult and coordinate management activities with fish and wildlife agencies as required or with other natural resource agencies when relevant.**						
2.1.1	Maintain updated cooperative agreements with the U.S. Fish and Wildlife Service (USFWS) and Georgia Department of Natural Resources (DNR) for management assistance.	On Going					
2.1.2	Coordinate fish and wildlife surveys and methodologies with the Georgia DNR and USFWS as applicable, and solicit technical assistance on matters of fish and wildlife management, including pest problems.	As needed					
2.1.3	Coordinate nuisance wildlife control activities with the USDA Wildlife Services office, the Georgia DNR, the USFWS, and the Base Entomology Shop as appropriate for the activity.	Contracted	X	X	X	X	X
2.2	**Manage natural habitats and timber resources to optimize game and non-game wildlife populations.**						
2.2.1	Manage wildlife habitat to meet the goals for Watchable Wildlife by recommending native plants with good wildlife value that are suitable for use in landscaping of urban areas, improving existing habitat through grounds maintenance recommendations, and by providing educational programs. These measures should also be implemented on the golf course.	On Going					
2.2.2	Develop and implement appropriate short- and long-range management strategies to maintain populations of game and non-game species, primarily through habitat management actions such as a) mowing strips of vegetation between timber stands to increase habitat diversity; b) heavy thinning along edges of stands to increase habitat diversity; and/or c) removing trees to create a 25- to 50-foot wide gap between the pine stands and mixed hardwood forest for herbaceous vegetation development.	On Going					
2.2.3	Evaluate options to improve hunting opportunities such as leasing hunting rights from local landowners.	As needed					
2.2.4	Provide education on animal species that can cause human problems such as deer flies, mosquitoes, ticks, and snakes, and evaluate and implement optional IPM methods from the 2005 *Terrestrial Arthropod* Study for the prevention and control of insect groups that represent significant pests or potential human health concern.	On Going					

GOAL/OBJECTIVE/ACTION		IMPLEMENTATION YEAR					
		Status	FY 18	FY 19	FY 20	FY 21	FY 22
2.2.5	Monitor select game and non-game species and their habitats to maintain a current habitat inventory, and update the inventory every 5 years, subject to funding availability.	As needed					
2.2.6	Integrate management recommendations from the 2003 *Reptile and Amphibian Survey* for the conservation of reptiles and amphibians and their habitats.	As needed					
2.3	**Improve and sustain fishery resources of the existing lakes and support opportunities for increasing fishing access for Horse Creek.**						
2.3.1	Sample fish populations by seining in all three lakes; keep records of stocking; and conduct creel surveys to quantify fishing pressure, angler success rates, and angler needs.	As needed	X				
2.3.2	Follow the management recommendations and schedule described in the 2008 *Scout Lake Fisheries Habitat Restoration* report to improve and sustain the fishery at Scout Lake.	As needed					
2.3.3	Implement general fish habitat improvements as needed, such as fertilizing lakes, installing fish attractors, reducing sedimentation of water bodies, improving water quality, and eradicating exotic aquatic weeds.	As needed					
2.3.4	Provide support and advice to the CEG and Force Support organizations for evaluating and developing options to increase fishing opportunities such as installing fishing platforms and improving angler access to Horse Creek.	On Going					
GOAL 3—*PROTECT INDIVIDUALS AND SUSTAIN OR INCREASE EXISTING POPULATION LEVELS SPECIES AND HABITATS, CONSERVE OTHER SPECIAL STATUS SPECIES AND HABITATS, AND PROMOTE POPULATION GROWTH THROUGH ACTIVE MANAGEMENT.*							
3.1	**Protect individuals and maintain or increase existing population levels of consistent with Federal regulations, and to the extent possible with respect status species and habitats within the guidelines of sound ecosystem management.**						
3.1.1	Conduct comprehensive threatened, endangered, and sensitive (TES) species surveys on unimproved grounds at least once every 5 years.	Contracted	X				
3.1.2	Periodically update the inventory of TES plant species that was completed in the *1999 Final Rare Plants Survey and Management Plan.*	As needed					
3.1.3	Conduct site-specific surveys for TES as necessary prior to any significant ground- or habitat-disturbing activities on unimproved grounds.	As needed					
3.1.4	Continue coordination with USFWS and DNR on TES species surveys and management activities as required or applicable.	As needed					
3.1.5	Periodically monitor population levels, species composition, and habitat conditions to assess long-term trends in TES species populations on Robins AFB and develop strategies to enhance species propagation and increase population sizes.	On Going					
3.1.6	Protect rare plant species, and conduct monitoring and management activities to enhance their propagation and survivability, such as mowing competing vegetation on Ocmulgee skullcap sites during winter months when this species is dormant.	On Going					
3.1.7	Develop a wetland assessment and protection plan for the Grady Freshwater Meadow to protect this unusual habitat and associated rare plants.	As needed					

GOAL/OBJECTIVE/ACTION		IMPLEMENTATION YEAR					
		Status	FY 18	FY 19	FY 20	FY 21	FY 22
GOAL 4—PROTECT JURISDICTIONAL WETLANDS AND WATERS OF THE U.S. TO SUSTAIN "NO NET LOSS" AND PREVENT DEGRADATION OF EXISTING QUALITY, FUNCTION AND VALUE OF WETLAND, SURFACE WATER, AND FLOODPLAIN RESOURCES.							
4.1	**Implement lake and watercourse management actions as needed to protect water quality or to restore optimal habitat conditions and attributes.**						
4.1.1	Restore native vegetation and establish protected riparian buffers at least 25-feet in width along stream banks and lake shorelines where necessary to control erosion and prevent sedimentation of water bodies.	As needed					
4.1.2	Restrict the operation of heavy machinery, soil or vegetation disturbance, and intensive activities within riparian buffer zones and recommend appropriate erosion control techniques for construction sites and other areas where the ground vegetation cover is disturbed, such as those techniques described in the Manual for *Erosion and Sediment Control in Georgia* and the 2005 *Wetland Protection Plan*.	As needed					
4.1.3	Prevent the disturbance or removal of shoreline buffer vegetation in the Lake and Watercourse MEA and other riparian areas through the review of proposed actions and recommendation of Best Management Practices (BMPs) for the protection of Streamside Management Zones.	As needed					
4.1.4	Monitor erosion-prone areas such as the Jeep Trail on a routine basis and implement erosion control BMPs and follow-up monitoring as necessary and appropriate for controlling erosion and protecting wetlands.	As needed					
4.2	**Maintain the existing level of water quality in lakes and streams and improve surface water quality as necessary.**						
4.2.1	Minimize the application of chemical pesticides through the use of appropriate pest control products and application techniques and substitute with non-chemical controls, where effective, to reduce the amount of chemical pesticides entering lakes and streams, especially at the Golf Course.	On Going					
4.2.2	Require the use of BMPs for activities that may cause contaminants to contact and be transported in storm water runoff or otherwise enter waterbodies.	On Going					
4.2.3	Protect natural vegetation buffers from disturbance along lakes, streams and wetlands and prohibit the application of pesticides or other chemicals within 50-75 feet of waterbodies, unless no practicable non-chemical alternative exists.	On Going					
4.3	**Conserve water resources by promoting practices and actions that reduce water use.**						
4.3.1	Promote the use of treated wastewater for irrigating the Golf Course.	On Going					
4.3.2	Recommend the use of drought-tolerant plant species in landscape designs, and confine irrigation practices to evening hours as necessary.	On Going					
4.4	**Protect the natural features of creek and stream floodplains to preserve functions and minimize personnel and property risk from flood hazards.**						
4.4.1	Ensure that 100-year floodplain data are accurate, current, and maintained in the Base GIS for use in planning activities.	As needed					
4.4.2	Review proposed developments to determine whether they will occur in the floodplain and recommend appropriate BMPs for floodplain protection when development would occur near floodplains.	On Going					

GOAL/OBJECTIVE/ACTION		IMPLEMENTATION YEAR					
		Status	FY 18	FY 19	FY 20	FY 21	FY 22
4.5	**Protect wetlands and Waters of the U.S. under the jurisdiction of the U.S. Army Corps of Engineers (USACE). Sustain "no net loss" and prevent degradation of existing functions and values.**						
4.5.1	Maintain a policy of "no net loss" of wetland acreage.	On Going					
4.5.2	Consult with the USACE whenever a proposed project is likely to result in loss of existing wetland area or impact existing wetland function or value.	As needed					
4.5.3	Maintain updated GIS coverage of jurisdictional wetland boundaries for use in Base planning, and ensure that wetland boundaries are defined in the field.	As needed					
4.5.4	Review/survey jurisdictional wetland boundaries periodically as required by the USACE and update boundaries as appropriate.	As needed					
4.5.5	Monitor wetland quality and restore or enhance the function and value of these habitats as practicable using management recommendations in the 2005 *Wetland Protection Plan*.	As needed					
GOAL 5—MAINTAIN GROUNDS USING PRACTICES THAT CONSERVE EXISTING ECOSYSTEM INTEGRITY, OPTIMIZE WILDLIFE VALUE, ENHANCE BIODIVERSITY AT COMMUNITY AND LANDSCAPE LEVELS, AND THAT SUPPORT BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH) REDUCTION, FORCE READINESS AND MISSION EFFECTIVENESS.							
5.1	**Manage significant natural habitats to sustain the quality and enhance the biodiversity of these sensitive ecosystems, and manage habitat in the BASH Reduction MEA to minimize risk to personnel and aircraft from birds and wildlife.**						
5.1.1	Protect, and restore as needed, significant natural communities (Creek Swamp, Bay Swamp, Old Growth Bottomland Hardwood Forest, Gum Pond, Gum-Cypress Pond, Grady Freshwater Meadow, Upland Hardwood Bluff Forest, and Longleaf Pine Forest).	As needed					
5.1.2	Monitor significant natural communities, including the BASH Reduction MEA, to ensure that management goals are being met.	On Going					
5.1.3	Integrate management practices at the community and habitat level to enhance biodiversity at the landscape level.	On Going					
5.2	**Maintain improved, semi-improved, and unimproved grounds to standards defined by the Air Force and the Natural Resource Conservation Service (NRCS).**						
5.2.1	Reduce the frequency of mowing on improved and semi-improved lands where possible.	On Going					
5.2.2	Convert selected turf areas to other types of vegetation that require less-intensive maintenance where possible.	On Going					
5.2.3	Convert improved to semi-improved grounds through the planting of drought- tolerant native trees, shrubs, grasses and wildflowers in desired areas when practicable.	On Going					
5.2.4	Minimize the application of chemical pesticides by following IPM principles, and through implementation of the current *Integrated Pest Management Plan*. Work with the Base Entomology Shop to revise this plan annually.	On Going					

GOAL/OBJECTIVE/ACTION		IMPLEMENTATION YEAR					
		Status	FY 18	FY 19	FY 20	FY 21	FY 22
5.3	**Reduce the bird/wildlife aircraft strike hazard in the BASH MEA in accordance with the BASH Plan and consistent with BASH Program guidelines.**						
5.3.1	Reduce the risk to aircraft from bird and other wildlife hazards through the active management of habitat and wildlife on and near the airfield. Management strategies and methods that are designed to deter target species are preferred.	On Going					
5.3.2	Use integrated airfield management practices such as tree removal as needed to improve flight safety and reduce wildlife hazards to increase mission effectiveness.	As needed					
5.4	**Enhance force readiness and increase mission effectiveness where possible by improving the compatibility of outdoor recreation areas and facilities with adjacent land uses, activities, and customer needs.**						
5.4.1	Coordinate with the Base Planner on proposed outdoor recreation developments that may affect or that depend upon natural resource use.	As needed					
GOAL 6—PROVIDE HIGH QUALITY NATURAL RESOURCE-RELATED OUTDOOR RECREATION FACILITIES AND OPPORTUNITIES THAT PROMOTE THE MENTAL, PHYSICAL, AND SOCIAL WELL-BEING OF BASE PERSONNEL, AND OTHERS SUBJECT TO AVAILABILITY, CONSISTENT WITH THE MILITARY MISSION AND SECURITY POLICIES AND WITH MINIMAL IMPACT ON SENSITIVE NATURAL RESOURCES.							
6.1	**Provide and maintain safe and aesthetically pleasing natural areas on Robins AFB to be used for hunting and fishing, other outdoor recreation pursuits, and natural resource education.**						
6.1.1	Maintain, upgrade or enhance the existing nature trails and explore opportunities for linkages among walking and nature trails.	On Going					
6.1.2	Use the Longleaf Pine Restoration project and the Wiregrass Trail as an outdoor classroom and interpretive site.	On Going					
6.1.3	Plan for future new natural resource-related recreation opportunities, such as new nature trails, additional fishing piers, or new creek-side boardwalks, picnic areas, canoe trails, and bicycle trails, particularly in the Intensive Recreation MEA.	On Going					
6.1.4	Integrate natural resource-related recommendations of the *Outdoor Recreation Management Plan* into management planning as appropriate, and maintain a current outdoor recreation facility map on the Base web site.	As needed					
6.2	**Monitor recreational use of natural resources to minimize use impacts on natural resources and to sustain future use of these resources.**						
6.2.1	Regulate the use of all-terrain vehicles and other off-road machines to prevent damage to natural resources.	On Going					
6.2.2	Regulate the use of motorized boats and other watercraft on lakes and creeks to protect existing water quality and to sustain resource use.	On Going					
6.3	**Promote learning about wildlife, habitat needs, and resource conservation through embracing the goals of conservation programs such as Partners in Flight, Partners in Amphibian and Reptile Conservation, and Watchable Wildlife.**						
6.3.1	Improve communication, enhance cooperation, and employ management strategies that would conserve Neotropical migratory birds.	As needed					
6.3.2	Practice sound conservation and management of native herpetofauna (reptiles and amphibians) and provide educational efforts to raise public awareness about the conservation needs of reptiles and amphibians.	As needed					

GOAL/OBJECTIVE/ACTION		IMPLEMENTATION YEAR					
		Status	FY 18	FY 19	FY 20	FY 21	FY 22
6.3.3	Provide opportunities for the public to enjoy wildlife; promote learning about wildlife and habitat needs; and actively support local and regional resource conservation initiatives.	On Going					
6.4	Provide for public awareness of natural resources at Robins AFB and promote outdoor education through coordination and communication.						
6.4.1	Through the Public Affairs Office, provide informative materials for the Base newspaper, the Nature Center, and local media.	On Going					
6.4.2	Provide educational materials regarding natural resources to Base housing occupants.	On Going					
6.4.3	Maintain and update the natural resources section of the Environmental Management web page.	As needed					
6.4.4	Encourage volunteer participation in various aspects of the natural resources program, such as control of exotic weeds and fish and wildlife surveys.	As needed					
6.4.5	Arrange cooperative projects with organizations such as Ducks Unlimited, The Nature Conservancy, The Georgia Master Gardener Association, and Boy Scouts of America.	As needed					
6.4.6	Conduct a youth program for hunting safety and fishing.	On Going					
GOAL 7—ENCOURAGE BETTER UTILIZATION AND CONSERVATION OF BASE NATURAL RESOURCES THROUGH EFFECTIVE MANAGEMENT AND COMMUNICATION THAT IS RESPONSIVE TO CUSTOMER NEEDS AND CONSISTENT WITH THE AIR FORCE MISSION.							
7.1	Coordinate routinely with other organizations to facilitate the management and conservation of natural resources consistent with the Air Force mission.						
7.1.1	Continue to promote the use of MEAs in coordinating resource management efforts with land use and development activities.	On Going					
7.1.2	Continue communication between natural resource and other civil engineering personnel as a standard practice in Base planning, and continue regular meetings of Integrated Process Teams (IPTs) to discuss natural resource management issues and needs.	On Going					
7.1.3	As an integral part of the planning process, continue consultations and the review and coordination of management strategies with cooperating local, state, and Federal regulatory agencies prior to their implementation. Agencies include; USFWS, U.S. Department of Agriculture, NRCS, National Park Service (NPS), USACE, DNR, and the Georgia Forestry Commission.	On Going					
7.1.4	Maintain open lines of communication between Robins AFB natural resources personnel and various conservation and natural resources organizations and agencies such as; DNR, NRCS, Sierra Club, Audubon Society, and The Nature Conservancy.	On Going					
7.1.5	Create partnerships with neighboring property owners to improve success of ecosystem management goals, survival and propagation of rare species, and to assist with discouraging encroachment onto Base property.	On Going					

GOAL/OBJECTIVE/ACTION		IMPLEMENTATION YEAR					
		Status	FY 18	FY 19	FY 20	FY 21	FY 22
GOAL 8—USE THE GEOGRAPHIC INFORMATION SYSTEM AND COORDINATED PLANNING TO FACILITATE INFORMED AND EFFECTIVE NATURAL RESOURCES MANAGEMENT AND DECISION-MAKING, AND TO PROMOTE NATURAL RESOURCE EDUCATION.							
8.1	Use the GIS as a tool to facilitate environmental management and to aid informed decision-making.						
8.1.1	Maintain a current natural resources database on the GIS to provide Base personnel with readily available access to natural resources data, and encourage the use of the GIS for planning and informed decision-making.	Contracted	X				
8.1.2	Provide public access to the INRMP through the public web site.	On Going					
8.2	Integrate natural resources management planning to fully implement an effective natural resources management program.						
8.2.1	Review the INRMP and implementation plan status annually. Document the annual review and update/coordinate the INRMP as necessary.	On Going					
8.2.2	Update the INRMP at least every five years and coordinate with the USFWS and Georgia DNR.	On Going					
8.2.3	Participate annually in at least one natural resources management workshop, or other applicable training event, conference or workshop, subject to funding availability.	On Going					

11.0 REFERENCES

11.1 Standard References (Applicable to all AF installations)

1. AFI 32-7064, *Integrated Natural Resources Management*
2. Sikes Act
3. eDASH Natural Resources Program Page
4. Natural Resources Playbook – a Internal AF reference available at https://cs1.eis.af.mil/sites/ceportal/CEPlaybooks/NRM2/Pages/

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12.0 ACRONYMS

12.1 Standard Acronyms (Applicable to all AF installations)

- eDASH Acronym Library
- Natural Resources Playbook – Acronym Section
- U.S. EPA Terms & Acronyms

12.2 Installation Acronyms

- **°F** - Degrees Fahrenheit
- **78 ABW/CC** - 78th Air Base Wing/Commander
- **78 ABW/JA** - 78th Air Base Wing/Judge Advocate
- **78 CEG** - 78th Civil Engineer Group
- **78 CEG/CEIE** - 78th Civil Engineer Group/Environmental Management Branch
- **78 CES** - 78th Civil Engineer Group/Civil Engineering Squadron
- **78 FSS** - 78th Force Support Squadron
- **78 SFS** - 78th Security Forces Squadron
- **78 MSG** - 78th Mission Support Group
- **94 APS** - 94th Aerial Port Squadron
- **116 ACW** - 116th Air Control Wing
- **171 AVN REGT** - 171st Aviation Regiment
- **339 FLTS** - 339th Flight Test Squadron
- **367 RCG** - 367th Recruiting Group

- **638 SCMG** - 638th Supply Chain Maintenance Group
- **689 CCW** - 689th Combat Communications Wing
- **AGL** - Above Ground Level
- **AFB** - Air Force Base
- **AFLSA/JACE** - Air Force Legal Office
- **AFMC** - Air Force Materiel Command
- **AICUZ** - Air Installation Compatible Use Zone
- **AMC** - Air Mobility Command
- **ARSM** - Annual Review Summary Memorandum
- **BHT** - Bird Harassment Team
- **BTI** - Bacillus thuringensis israelensis
- **CEG** - Civil Engineer Group
- **ESOH** - Environmental, Safety, and Occupational Health
- **FAMCamp** - Family Campground
- **HMLA-773** - Marine Light Attack Helicopter Squadron-773
- **HQ AFRC** - Headquarters Air Force Reserve Command
- **INRM** - Integrated Natural Resources Management
- **IPT** - Integrated Process Team
- **MAG-49** - Marine Aircraft Group-49
- **MAJCOM** - Major Command
- **MEA** - Management Emphasis Area
- **MGRDC** - Middle Georgia Regional Development Commission
- **MILCON** - Military Construction
- **NA** - Natural Area
- **NAGPRA** - Native American Graves and Repatriation Act
- **NRSCS** - Natural Resources Soil Conservation Service
- **NRHP** - National Register of Historic Places
- **PAVE-PAWS** - PAVE (Air Force program name) Phased Array Warning System radar
- **Prime BEEF** - Prime Base Engineering Emergency Force
- **QOL** - Quality of Life
- **RAFBI** - Robins Air Force Base Instruction
- **RV** - Recreational Vehicle
- **SAF/IE** - Designated Air Force Natural Resources Trustee
- **SF** - State Forest
- **TES** - Threatened and Endangered Species
- **WMA** - Wildlife Management Area
- **WR-ALC** - Warner Robins Air Logistics Center
- **WR-ALC/CC** - Warner Robins Air Logistics Center / Commander
- **WR-ALC/PA** - Warner Robins Air Logistics Center / Public Affairs
- **WR-ALC/SEF** - Warner Robins Air Logistics Center/Flight Safety

13.0 TABLES

14.0 APPENDICES

15.0 ASSOCIATED PLANS