INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
TOWNSEND BOMBING RANGE
MCINTOSH AND LONG COUNTIES, GEORGIA

PLAN YEARS 2017-2022

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Petty Officer 2nd Class Joseph Wax

Integrated Natural Resources Management Plan
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Georgia National Guard
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TOWNSEND BOMBING RANGE
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
2017-2022

This Integrated Natural Resources Management Plan (INRMP) supersedes previous natural resources plans. The Sikes Act Improvement Amendments of 1997 (SAIA) require that the proposed INRMP be prepared in cooperation with the United States Fish and Wildlife Service (USFWS) and the State Fish and Wildlife Agency, and that the management of fish and wildlife in this INRMP reflect mutual agreement of the parties. Mutual agreement is required only with respect to those elements of this Plan that are subject to the otherwise applicable legal authority (i.e., authority derived from a source other than the SAIA, such as the Endangered Species Act) of the USFWS and the State Fish and Wildlife Agency to conserve, protect, and manage fish and wildlife resources.

To the extent that resources permit, the USFWS, Georgia Department of Natural Resources, and Marine Corps Air Station Beaufort by signature of their agency representative, do hereby agree to enter a cooperative program for the conservation, protection and management of fish and wildlife resources on Townsend Bombing Range. The intention of this agreement is to develop functioning, sustainable ecological communities on Townsend Bombing Range that integrate the interests and mission of the agencies charged with conservation, protection, and management of national heritage in the public interest. This agreement may be modified and amended by mutual agreement of the authorized representatives of the three agencies. The agreement will become effective upon the date subscribed by the last signatory and shall continue in full force for a period of 5 years or until terminated by written notice to the other parties, in whole or in part, by any of the parties signing this agreement.

By their signatures below, or an enclosed letter of concurrence, all parties grant their concurrence and acceptance of the following document.

Approving Officials:

Commanding Officer, MCAS Beaufort	Date
U.S. Fish and Wildlife Service	Date
Georgia Department of Natural Resources	Date

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List of Acronyms

ABD	Applied Biology Department
amsl	Above Mean Sea Level
APHIS	Animal and Plant Health Inspection Service
ASO	Air Station Order
BMP	Best Management Practice
CAA	Clean Air Act
CATEX	Categorical Exclusion
CFR	Code of Federal Regulations
CLEO	Chief Law Enforcement Officer
CNIC	Commander Navy Installations
CNO	Chief of Naval Operations
CNRSE	Commander, Navy Region Southeast
CO	Commanding Officer
CRTC	Combat Readiness Training Center
CWA	Clean Water Act
DoD	Department of Defense
DoDINST	Department of Defense Instruction
DON	Department of the Navy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act of 1973
° F	Degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FR	Federal Register
GAANG	Georgia Air National Guard
GADNR	Georgia Department of Natural Resources
GAEPD	Georgia Environmental Protection Division
GFC	Georgia Forestry Commission
GIS	Geographic Information System
GLCP	Georgia Land Conservation Program
HQ	Headquarters
HTREA	Host-Tenant Real Estate Agreement
I-95	Interstate 95
INRMP	Integrated Natural Resources Management Plan
IPM	Integrated Pest Management
JAG	Judge Advocate General
LLC	Limited Liability Company
MBTA	Migratory Bird Treaty Act
MCAS	Marine Corps Air Station
MCICOM	Marine Corps Installation Command
MCO	Marine Corps Order
MOU	Memorandum of Understanding
MWR	Morale, Welfare, and Recreation Division
NAAQS	National Ambient Air Quality Standards
NAVFAC	Naval Facilities
NAVFAC SE	Naval Facilities Engineering Command Southeast
NDAA	National Defense Authorization Act

NEPA	National Environmental Policy Act
NO_2	Nitrogen Dioxide
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRM	Natural Resources Manager
NWCG	National Wildfire Coordination Group
NWI	National Wetlands Inventory
O_3	Ozone
O&M (MC)	Marine Corps Operation and Maintenance
OGC	Office of the General Counsel
OPNAVINST	Chief of Naval Operations Instruction
PGM	Precision-Guided Munitions
PL	Public Law
PM-10	Particulate matter less than or equal to 10 microns in diameter
PM-2.5	Particulate matter less than 2.5 microns in diameter
PMP	Pest Management Plan
R&D	Research and Development
ROICC	Resident Officer in Charge of Construction and Contracts
RPA	Resources Planning Act
RTE	Rare, Threatened, and Endangered Species
SAIA	Sikes Act Improvement Act of 1997
SECNAV	Secretary of the Navy
SO_2	Sulfur Dioxide
SPP	Species
SR	State Route
SSURGO	Soil Survey Geographic
SWAP	State Wildlife Action Plan
SWPPP	Stormwater Pollution Prevention Plan
TBR	Townsend Bombing Range
TNC	The Nature Conservancy
TSI	Timber Stand Improvement
U.S.	United States
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USMC	U.S. Marine Corps
USNVC	U.S. National Vegetation Classification
WMA	Wildlife Management Area

Executive Summary

Executive Summary

ES.1 TYPE OF DOCUMENT

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

ES.2 PURPOSE OF DOCUMENT

The purpose of this document is to meet statutory requirements under the Sikes Act Improvement Act (SAIA), Public Law (PL) 105-85, Div. B. Title XXIX, Nov. 18, 1997, 111 Stat 2017- 2019, 2020-2022. In November 1997, the Sikes Act, 16 United States Code (U.S.C.) § 670a et seq., was amended to require the Secretary of Defense to carry out a program to provide for the conservation and rehabilitation of natural resources on military Installations. To facilitate this program, the amendments require the Secretaries of the military departments to prepare and implement INRMPs for each military Installation in the U.S. unless the absence of significant natural resources on a particular Installation makes preparation of a plan for the Installation inappropriate. Marine Corps Air Station (MCAS) Beaufort has prepared this updated INRMP for Townsend Bombing Range (TBR).

ES.3 GOALS AND OBJECTIVES OF THE INRMP

The goal of this INRMP is to implement an ecosystem conservation program that (1) provides for conservation and rehabilitation of natural resources in a manner consistent with the military mission; (2) provides for sustainable multipurpose uses of natural resources; (3) integrates and coordinates all natural resources management; and (4) provides public access for use of natural resources subject to safety and military security considerations. A total of 17 objectives have been identified for these four complex-wide ecosystem management goals. The objectives were developed to implement each goal addressing natural resources issues the Installation is facing. This updated INRMP covers a period of 5 years and will be reviewed annually. Following are the goals, issues, and objectives for TBR.

Goal 1: Preserve access to air and land to meet military readiness requirements.

Issue: The military mission at TBR requires the management of natural resources to maintain clear zones around all targets. The following objectives were developed to accomplish Goal 1.

Objective 1.1: Maintain clear zones around all targets that are free of unwanted vegetation.

Objective 1.2: Maintain forest buffers around all targets that provide a buffer from shrapnel and noise.

Objective 1.3: Prevent and minimize the potential for wildfire to affect the military mission, facilities, surrounding lands, and ecological communities.

Objective 1.4: Implement environmentally beneficial grounds maintenance and landscaping practices.

Goal 2: Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices.

Issue: As development and training activities have a significant potential to affect natural communities at TBR, land management decisions and practices will become increasingly important aspects of ecosystem management. The use and management of lands for military mission needs, as well as the decision-making process regarding such land use, can directly affect the sustainability of the ecosystem. To conserve and rehabilitate natural resources while ensuring the continuation of the military mission, the following objectives were developed to address Goal 2:

Objective 2.1: Avoid, minimize, and mitigate impacts on wetland quantity and quality.

Objective 2.2: Maintain the attenuation capacity and function of the 100-year floodplain.

Objective 2.3: Avoid and minimize pollution of surface waters.

Objective 2.4: Control and remove invasive and exotic species.

Objective 2.5: Control nuisance animal populations and minimize attractants of new populations.

Objective 2.6: Conserve, restore, and enhance habitats supporting rare species and species listed as threatened, endangered, or candidate species under the Endangered Species Act (ESA), so as not to interfere with the military mission.

Objective 2.7: Avoid and minimize impacts on migratory birds and their nests in accordance with the Migratory Bird Treaty Act (MBTA).

Objective 2.8: Conserve sensitive and regionally important habitats for utilization by listed species and species of special concern, so as not to interfere with the military mission.

Objective 2.9: Maintain a Geographic Information System (GIS) database to facilitate effective species and habitat management at TBR.

Objective 2.10: Maintain up-to-date training of natural resource personnel.

Goal 3: Manage and provide for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation.

Issue: The SAIA requires that military Installations evaluate the potential for providing outdoor recreational resources to the general public. Recreation on and adjacent to TBR is mainly supported by a large tract of land placed under restrictive easement with a commercial timber interest. As such, management objectives for TBR need to include the administration of dual-use programs for forestry and hunting. The following objectives were developed to address Goal 3:

Objective 3.1: Produce a sustainable yield of commercial timber products from native species.

Objective 3.2: Manage populations of game animals for healthy populations.

Goal 4: Provide public access to Installation lands, where practicable, provided such access does not conflict with military readiness and does not harm sensitive natural resources on TBR.

Issue: The SAIA requires that military Installations evaluate the potential for providing outdoor recreational resources to the general public. In general, access for outdoor recreation is limited to active duty and reserve military personnel assigned to work at the Installation, as well as their dependents and accompanied guests; Federal civilian employees, as well as their dependents and accompanied guests; and military retirees. However, public access to TBR is restricted for security and safety. Limited access for hunting and special events is authorized by TBR instructions when appropriate. The following objectives were developed to address Goal 4:

Objective 4.1: Identify outdoor recreational needs and opportunities and provide these opportunities where consistent with other program elements.

Objective 4.2: Ensure applicable environmental and hunting laws are adhered on TBR.

ES.4 ECOSYSTEM AND SPECIES MANAGEMENT

The natural resource actions described in this INRMP are for the benefit of the plants, animals, and ecosystems occurring on this Installation. These actions are long-term conservation measures that provide benefits for terrestrial and aquatic habitats on the Installation. Management actions such as soil conservation and stormwater management, for example, control sediment and pollutant runoff to protect water quality for species such as alligators and salamanders. Forestry actions such as prescribed fires, timber harvests, and reforestation help to establish pine (*Pinus* spp.) stands and

herbaceous low-lying vegetation that provide habitat and resources for gopher tortoises (*Gopherus polyphemus*), for example.

The Threatened and Endangered Species section of this INRMP (Section 5.3.2) includes additional goals, objectives, strategies, and projects for the benefit and long-term conservation of rare, threatened, and endangered (RTE) species found, or potentially found, on the Installation. RTE species explicitly accounted for in this INRMP include the following:

- Frosted flatwoods salamander (*Ambystoma cingulatum*) (Photograph ES-1)
- Gopher tortoise (Photograph ES-2)
- American alligator (*Alligator mississippiensis*) (Photograph ES-3)

Photograph ES-1. Frosted flatwoods salamander (Photograph Credit: United States Fish and Wildlife Service [USFWS])

Photograph ES-2. Gopher tortoise (Photograph Credit: USFWS)

Photograph ES-3. American alligator (Photograph Credit: USFWS)

ES.5 PROJECTS OF THE INRMP

The projects to be implemented by TBR are presented in Appendix A. Projects were identified by the MCAS Natural Resources Manager (NRM) in consultation with foresters and fish and wildlife biologists, as well as with other agency wildlife biologists, botanists, and land managers.

It is the intent of TBR to implement the projects to the greatest extent practicable. The implementation of projects is largely dependent upon availability of funds. Funding for implementation of this INRMP will come from the Headquarters Marine Corps. The natural resources programs and projects described here are divided into mandatory and stewardship categories to reflect implementation priorities. Every effort will be made to acquire Marine Corps Operation and Maintenance (O&M (MC)) Environmental or other funding to implement Department of Defense (DoD) mandatory projects in the timeliest manner possible.

ES.6 MISSION SUSTAINABILITY

The goal at TBR is to maintain and enhance the capability of military lands to support the training mission, while conserving the area's natural resources. Implementation of this INRMP will primarily focus on enhancing and sustaining the military mission. The resource managers will implement projects designed to enhance and protect the natural resources within TBR since the natural habitat is necessary for success of the military mission. Issues such as uncontrolled erosion and downstream sedimentation, inappropriate use of herbicides, and unplanned public use of aquatic resources must be addressed to ensure that enforcement actions by regulatory agencies do not affect the military training mission.

Table ES-1 provides a cross reference of the discussions presented in this INRMP and the November 2013 Navy Guidance for INRMPs (Department of Defense [DoD] 2013). Sections that are not applicable for TBR are also identified.

Table ES-1. Cross-Reference of Navy Guidance to Format Used in this INRMP

Recommended INRMP format from Navy Guidance	Cross-Reference to required information in this document
Cover Page	Cover Page
Signature Page	Signature Page
Executive Summary	Executive Summary
Table of Contents	Table of Contents
Chapter 1 - Overview	Chapter 1.0 – Introduction
1.a – Purpose	1.1 – Purpose and Organization
1.b – Scope	1.4 – Scope
1.c – Goals and Objectives Summary	1.5 – Goals and Objectives
1.d – Responsibilities of Stakeholders	1.3 – Responsibilities
1.e – Commitment of Regulatory Agencies	1.7 – Commitment of Regulatory Agencies

Table ES-1. Cross-Reference of Navy Guidance to Format Used in this INRMP

Recommended INRMP format from Navy Guidance	Cross-Reference to required information in this document
1.f – Authority	1.2 – Authority
1.g – Stewardship of Compliance Statement	1.6 – Stewardship and Compliance
1.h – Review and Revision Process	1.8 – Review and Revision Process
1.i – Management Strategies	1.9 – Management Strategy
1.j – Integration with other Plans	Not applicable
Chapter 2 – Current Conditions and Use	Chapter 2.0 – Current Conditions and Use
2.0 – Installation Information	2.1 – Installation Information
2.a.1 – Location Statement (concise)	2.1.1 – General Description
2.a.2 – Regional Land Use	2.1.6 – Regional Land Use
2.a.3 – History and Pre-Military Land Use (abbreviated)	2.1.5 – Abbreviated History and Pre-Military Land Use
2.a.4 – Military Mission (concise)	2.1.2 – Military Mission
2.a.5 – Operations and Activities	2.1.1 – General Description
2.a.6 – Constraints Map	2.1.3 – Constraints Map
2.a.7 – Opportunities Map	2.1.4 – Opportunities Map
2.b – General Physical Environment and Ecosystems	2.2 – General Physical Environment and Ecosystems
2.c – General Biotic Environment	2.3 – Biological Environment
2.c.1 – Threatened and Endangered Species and Species of Concern	2.3.2 – Rare, Threatened, and Endangered Species
2.c.2 – Wetlands and Deep Water Habitats	2.2.5.6 – Wetlands
2.c.3 – Fauna	2.3.1 – Natural Communities
2.c.4 - Flora	2.3.1 – Natural Communities
Chapter 3 – Environmental Management Strategy and Mission Sustainability	Chapter 3.0 – Environmental Management Strategy and Mission Sustainability
3.a – Supporting Sustainability of the Military Mission and the Natural Environment	3.1 – Supporting Sustainability of the Military Mission and the Natural Environment
3.a.1 – Integrate Military Mission and Sustainability Land Use	3.1.1 – Military Mission and Sustainable Land Use
3.a.2 – Define Impact to the Military Mission	3.1.2 – Defining Impact on the Military Mission
3.a.3 – Describe Relationship to Range Complex Management Plan or other Operational Area Plans	3.1.2 – Defining Impact on the Military Mission
3.b – Natural Resources Consultation Requirements (Section 7, EFH)	3.2 – Natural Resource Consultation Requirements
3.c – NEPA Compliance	3.3 – Planning for National Environmental Policy Act Compliance
3.d – Opportunities for Beneficial Partnerships and Collaborative Resource Planning	3.4 – Beneficial Partnerships and Collaborative Resource Planning
3.e – Public Access and Outreach	3.5 – Public Access and Outreach
3.e.1 – Public Access and Outdoor Recreation	3.5 – Public Access and Outreach
3.e.2 – Public Outreach	3.5 – Public Access and Outreach
3.e.3 – Encroachment Partnering	3.6 – Encroachment Partnering
3.e.4 – State Comprehensive Wildlife Plans	3.7 – Georgia's State Wildlife Action Plan

Table ES-1. Cross-Reference of Navy Guidance to Format Used in this INRMP	
Recommended INRMP format from Navy Guidance	**Cross-Reference to required information in this document**
(SCWP) Integration	Integration
Chapter 4 – Program Elements	Chapter 5.0 – Program Elements
4.a – Threatened and Endangered Species and Species Benefit, Critical Habitat, Species of Concern Management	5.3.2 –Threatened and Endangered Species
4.b – Wetlands and Deep Water Habitats	5.1.1 – Wetlands
4.c – Law Enforcement	Not Applicable
4.d – Fish and Wildlife	5.3 – Fish and Wildlife
4.e – Forestry	5.2 – Forest Management
4.f – Vegetation	5.1 – Land Management
4.g – Migratory Birds	5.3.1 – Migratory Birds
4.h – Invasive Species	5.1.6 – Invasive, Exotic, and Noxious Species
4.i – Pest Management	5.3.3 – Nuisance Wildlife
4.j – Land Management	5.1 – Land Management
4.k – Agricultural Outleasing	Not Applicable
4.l – GIS Management, Data Integration, Access, and Reporting	5.5.2 – Geographical Information Systems, Data Integration, and Reporting
4.m – Outdoor Recreation	5.4 – Outdoor Recreation
4.n – Bird Aircraft Strike Hazard	5.3.3 – Nuisance Wildlife
4.o – Wildland Fire	5.2.2 – Forest Protection
4.p – Training of Natural Resource Personnel	5.5.1 – Training of Natural Resource Personnel
4.q – Coastal/Marine	Not Applicable
4.r – Floodplains	5.1.4 – Floodplain Management
4.s – Other Leases	Not Applicable
Chapter 5 – Implementation	Chapter 6 – Implementation
5.a – Summary of Project Prescription Development Process	Appendix A – TBR Projects
5.b – Achieving No Net Loss	6.2 – Planning and Mission Sustainability
5.c – Use of Cooperative Agreements	6.3 – Partnerships
5.d – Funding Process	6.4 – Funding
Appendix 1. Acronyms	List of Acronyms
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Appendix 5. Research Requirements	Not Applicable
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Section 1.0

1.0 INTRODUCTION

1.1 PURPOSE AND ORGANIZATION

This Integrated Natural Resources Management Plan (INRMP) is a long-term, comprehensive planning document that provides direction for managing the natural resources at Townsend Bombing Range (TBR). This document meets statutory requirements under the Sikes Act Improvement Act (SAIA), Public Law (PL) 105-85, Div. B. Title XXIX, November 18, 1997, 111 Stat 2017-2019, 2020-2022. The Sikes Act, 16 United States Code (U.S.C.) § 670a et seq., was amended in November 1997 to require the Secretary of Defense to carry out a program to provide for the conservation and rehabilitation of natural resources on military Installations. The amendments require the secretaries of the military departments to prepare and implement INRMPs for each military Installation in the United States (U.S.) unless the absence of significant natural resources on a particular Installation makes preparation of a plan inappropriate. The SAIA mandated all military Installations with significant natural resources to prepare and implement an INRMP by November 17, 2001.

The primary purpose of this INRMP is to ensure natural resources conservation measures and military operations on TBR are integrated and consistent with stewardship and legal requirements. This INRMP was developed to balance the use of resources on TBR utilizing an ecosystem management approach, taking into account mission requirements and other land use activities affecting the Installation.

The U.S. Department of the Navy (DON) is updating this INRMP for TBR to comply with the SAIA and with Department of Defense Instruction (DoDINST) 4715.03 (DoD 2011). This INRMP also complies with the Environmental Compliance and Protection Manual (Marine Corps Order [MCO] P5090.2A) (U.S. Marine Corps [USMC] 2008).

The first three sections of this INRMP establish the existing conditions at TBR. Section 1 provides a general overview of the purpose and intent of this INRMP and processes for review, implementation, and revision of this INRMP. Section 2 establishes the importance of the military mission within the USMC, discusses the organization of TBR, provides a brief overview of the natural resources program and identifies Installation partnerships and stakeholders with a particular interest in the protection of Installation and regional natural resources. Section 3 discusses the existing physical and biological characteristics of the local and regional environments. Physical characteristics include climate, topography, geology, soils, hydrology, groundwater, and land use. Biological characteristics

include wetlands, wildlife, threatened and endangered species, coastal zone issues, and natural vegetative communities.

The remaining sections of this INRMP identify issues pertaining to the long-term management of the TBR ecosystem and land management programs and practices for achieving desired conditions. Section 4 discusses ecosystem management goals, objectives, strategies, initiatives, and projects that comprise a logical sequence of actions for achieving the long-range aim of ecosystem management. Section 5 discusses ecosystem management at TBR. Appendix A describes the projects that will be implemented by TBR. The TBR Forest Management Plan is provided as Appendix B and Appendix C provides information pertaining to outdoor recreation at TBR. Appendix D details the U.S. Department of Agriculture (USDA) soils descriptions for soils found at TBR. The U.S. Fish and Wildlife Service (USFWS) informal consultation conducted in 2011 is provided in Appendix E and Appendix F includes all agency correspondences regarding the Draft INRMP. Appendix G provides the 2001 Biological Assessment. The Wildland Fire Action Plan for TBR is included in Appendix H.

1.2 AUTHORITY

The TBR INRMP is written to meet the requirements of the SAIA (16 U.S.C. § 670a et seq.), and the requirements of the DoD Environmental Conservation Program (DoDINST 4715.03). It also incorporates guidance given in MCO P5090.2A and the Naval Facilities Engineering Command (NAVFAC) Real Estate Procedural Manual (NAVFAC P-73).

1.3 RESPONSIBILITIES

1.3.1 Internal Stakeholders

The Commanding Officer (CO), Marine Corps Air Station (MCAS) Beaufort is responsible for ensuring that TBR complies with DoD, Navy, and Marine Corps Installation Command (MCICOM) policy on this INRMP and associated National Environmental Policy Act (NEPA) document preparation, revision, and implementation; ensuring that the TBR INRMP undergoes annual and formal 5-year reviews; ensuring the programming of resources necessary to maintain and implement the TBR INRMP; and participating in the development and revision of the TBR INRMP.

The CO, MCAS Beaufort, is responsible for the preparation, completion, and implementation of this INRMP and associated NEPA documents for TBR and systematically applying the conservation practices set forth in this INRMP. The CO's role is to act as the steward of natural resources under his or her jurisdiction and integrate natural resources management requirements into the daily decision-making process; ensure that natural resources management and this INRMP comply with all natural resource-related legislation, Executive Orders (EOs) and Executive Memoranda, and DoD, Secretary of the Navy (SECNAV), Navy, MCICOM, and Marine Corps directives, instructions and

policies; involve appropriate tenant, operational, training, and research and development (R&D) commands in the INRMP review process to ensure no net loss of military mission. The CO has designated a Natural Resources Manager (NRM) who is responsible for the management efforts related to the preparation, revision, implementation and funding for this INRMP, as well as coordination with Installation trainers, subordinate commands and Installations; involve appropriate Navy Judge Advocate General (JAG) or Office of the General Counsel (OGC) Legal Counsel to provide advice and counsel with respect to legal matters related to natural resources management and this INRMP; and endorse this INRMP via CO signature.

Management of natural resources at MCAS Beaufort and TBR has been assigned to the Logistics Officer. Under the supervision and management of the Logistics Officer, the Natural Resources and Environmental Affairs Officer directs and coordinates the management and maintenance of natural resources at TBR. The Natural Resources and Environmental Affairs Officer directs a NRM and a conservation officer who work on the natural resources program. Additional staff, including Foresters, Forestry Technicians, Natural Resource Specialists, and Environmental Protection Specialists all work on other environmental programs at TBR.

1.4 SCOPE

The scope of this INRMP includes the management of the approximately 28,630 acres of lands known as TBR in McIntosh and Long Counties, Georgia (Figure 1-1). This INRMP creates the framework for the implementation of a natural resources management program to conserve and rehabilitate natural resources across the entire Installation. Appropriate and effective management of natural resources on Navy lands will be achieved in accordance with the principles and practices of ecosystem management. Ecosystem management initiatives include the following steps, which do not necessarily take place in a particular sequence and often occur in parallel with each other and can be repeated as the process evolves:

- recognizing and defining the problems or opportunities
- delineating boundaries
- identifying and involving participants
- establishing a common vision
- assessing ecological, economic, and social constraints and opportunities
- acquiring funding
- making decisions and implementing solutions
- monitoring progress, evaluating impacts, and adapting based on new information (The Keystone Center 1996)

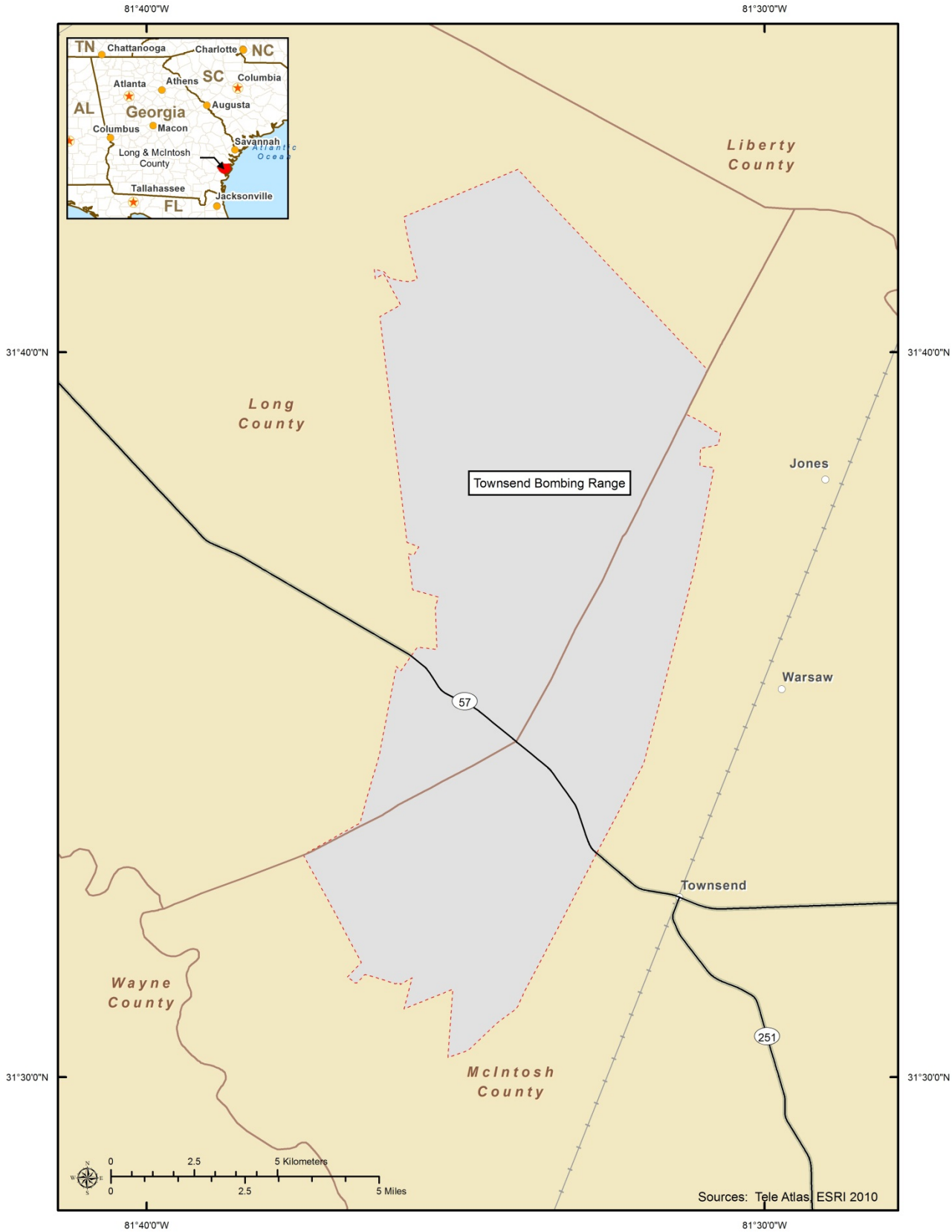

Figure 1-1. Vicinity Map

This INRMP does not substitute for a pest management plan, hazardous waste plan, stormwater retention plan, or integrated cultural resources management plan. It has the dual purpose of complying with various natural resources-related laws while supporting the military mission of TBR.

1.5 GOALS AND OBJECTIVES

The development and implementation of this INRMP is a dynamic, multidisciplinary planning process that incorporates as its primary goal supporting and sustaining the military mission while managing, protecting, and enhancing the biological integrity of military lands and waters. The military's use of land and water resources must comply with legal mandates and will, to the extent practicable, be integrated with ecosystem-level goals, plans, and use of lands and waters inside and outside the boundaries of military Installations. The objectives of this INRMP are to integrate wetland management, soil conservation, water quality control, floodplain management, grounds maintenance, land management, forest management, wildland fire management, vegetative management, fish and wildlife management, migratory bird management, and management for outdoor recreational opportunities, as practicable and consistent with the military mission and established land uses. Specific goals and objectives are discussed in detail in Section 4.

1.6 STEWARDSHIP AND COMPLIANCE

The responsibilities of the natural resources management program at TBR can be classified as either meeting stewardship needs or mandatory requirements. Stewardship projects (e.g., watchable wildlife projects, urban forestry) are based upon the land management responsibility of the USMC, and are not required to be implemented to meet regulatory needs. Mandatory projects (e.g., endangered and threatened species surveys) are required to be implemented to meet legal requirements that apply to the operations of TBR.

Legal requirements are laws, EOs, regulations, and memoranda regarding the protection and management of natural resources (Table 1-1). This INRMP will be updated as legal requirements change. Relevant legal requirements for natural resources management are also presented throughout Section 5.

Table 1-1. Legal Drivers for Natural Resources Management

Legal Driver	Citation
Off-road vehicle use	EO 11644
Bald and Golden Eagle Protection Act of 1940	16 U.S.C. 668
Clean Air Act	42 U.S.C. 7401
Clean Water Act (CWA)	33 U.S.C. 1251, 33 U.S.C. 1341
Coastal Zone Management Act	16 U.S.C. 1456
Endangered Species Act	16 U.S.C. 1531 & 1536
Environmental Conservation Program	DoDINST 4715.03

Table 1-1. Legal Drivers for Natural Resources Management	
Legal Driver	**Citation**
Erosion Protection Act	33 U.S.C. 426
Estuary Protection Act of 1968	16 U.S.C. 1221
Farm Land Protection Policy	7 Code of Federal Regulations (CFR) 658
Farmland Protection Policy Act of 1981	7 U.S.C. 4201
Federal Insecticide, Fungicide, and Rodenticide Act	7 U.S.C. 136
Federal Land Policy and Management Act of 1976	43 U.S.C. 1701
Federal Leadership in Environmental, Energy, and Economic Performance	EO 13514
Federal Noxious Weed Act of 1974	7 U.S.C. 2801
Federal Pest Plant Act	7 U.S.C. 150
Fish and Wildlife Conservation Act	16 U.S.C. 2901
Fish and Wildlife Coordination Act, as amended	16 U.S.C. 661-666c
Floodplain Management	EO 11988
Greening the Government through Environmental Management	EO 13148
Invasive Species	EO 13112
Management of Undesirable Plants of Federal Lands	7 U.S.C. 2814
Migratory Bird Treaty Act (MBTA)	16 U.S.C. 703
Military Construction and Authorization Act – Leases, Non-excess Property	10 U.S.C. 2667
Military Reservations and Facilities – Hunting, Fishing, and Trapping	10 U.S.C. 2671
Multiple-Use Sustained Yield Act of 1960	16 U.S.C. 528
National Environmental Policy Act of 1969	42 U.S.C. 4321
Natural Resources Management Program	32 CFR 190
North American Wetland Conservation Act	16 U.S.C. 2912, 4401, 4808
Outdoor Recreation – Federal/State Program Act	16 U.S.C. 460 P-3
Protection and Enhancement of Environmental Quality	EO 11514
Protection of Wetlands	EO 11990
Recreational Fisheries	EO 12962
Rivers and Harbors Act of 1899	33 U.S.C. 401
Sikes Act Improvement Act of 1997	16 U.S.C. 670
Soil and Water Conservation Act of 1977	16 U.S.C. 2001
Soil Conservation Act	16 U.S.C. 590
Timber Sales on Military Lands	10 U.S.C. 2665
Use of Off-Road Vehicles on DoD Lands	EO 11989
Water Resources Planning Act	42 U.S.C. 1962
Watershed Protection and Flood Prevention Act	16 U.S.C. 1001, 33 U.S.C. 701

Funding for implementation of this INRMP will come from the Headquarters Marine Corps natural resources fund sources. The natural resources programs and projects described in this INRMP are divided into stewardship and mandatory categories to reflect implementation priorities. Stewardship

projects will be funded through forestry, agricultural outlease, fish and wildlife, legacy, Installation funds, and other fund sources as funding and personnel resources become available. Every effort will be made to fund mandatory projects through O&M(MC) Environmental.

1.7 COMMITMENT OF REGULATORY AGENCIES

The USFWS and Georgia Department of Natural Resources (GADNR) are integral parts of this INRMP development, review, and revision process for TBR, as outlined in the SAIA. The USFWS and GADNR cooperate in the development of this INRMP and participate in the annual reviews and revisions, as well as the formal 5-year review of the TBR INRMP.

1.8 REVIEW AND REVISION PROCESS

TBR must complete an evaluation of the effectiveness of this INRMP annually. The evaluation can be readily completed using the web-based Marine Corps Natural and Cultural Resource Management Tool website located at https://www.usmcenvironm.com/ncrmt. This tool provides the means to evaluate performance in seven areas:

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

Annual reviews of the TBR INRMP will include annual revisions, so that the review and revision processes are integrated.

1.9 MANAGEMENT STRATEGY

The DoD takes an ecosystem approach to natural resources management. Ecosystem management is a goal-driven approach to managing natural resources that supports present and future mission requirements, preserves ecosystem integrity, is at a scale compatible with natural processes, is cognizant of nature's time frames, recognizes social and economic viability within functioning ecosystems, is adaptable to complex and changing requirements, and is realized through effective partnerships among private, local, state, tribal, and Federal interests. Ecosystem management is a process that considers the environment as a complex system functioning as a whole, not as a collection of parts, and recognizes that people and their social and economic needs are a part of the whole. This INRMP and the implementation of its management plans and projects provide for ecosystem management at TBR. This INRMP takes into account specific projects and management

techniques that serve to manage the ecosystem and maintain biological diversity at a landscape scale.

Ecosystem management at TBR is achieved through adaptive and cooperative management strategies. Adaptive management is a systematic approach for continually improving management practices by learning from the outcome of projects, programs and other experiences. Adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices. The Metrics Builder provides the means to evaluate performance in INRMP reviews and updates for TBR. The Metrics Builder can be applied to completed and ongoing projects, natural resource practices, and new proposals.

TBR manages its natural resources cooperatively with government agencies for responsible resource stewardship. In cooperative management, representatives of government agencies share information, resources, and responsibility. At TBR, USMC, USFWS, GADNR, and DON cooperatively manage the natural resources and strive to meet the military mission while conserving and enhancing the natural resources of the base.

Ecosystem management and cooperative natural resources management are holistic strategies that benefit individual species in the ecosystem, most notably Federally listed and state-listed threatened and endangered species. The DoD is obligated to comply with the Endangered Species Act of 1973 (ESA), and Federally listed species on TBR receive full protection under the ESA, enhanced by the effective cooperative relationship with the regulatory agencies. Ecosystem management protects and enhances habitats for listed species. Management actions such as erosion control and stormwater management, for example, control sedimentation and pollution runoff to adjacent rivers, protecting water quality for the frosted flatwoods salamander (*Ambystoma cingulatum*), a Federally listed threatened species. Forestry actions such as prescribed fires, thinning, and reforestation help maintain pine (*Pinus* spp.) stands and herbaceous vegetation that provide habitat and resources for gopher tortoises (*Gopherus polyphemus*), a Federally listed candidate species, for example. Migratory birds are specifically protected under the MBTA of 1918, as amended, and EO 13186 of 10 January 2001, Responsibilities of Federal Agencies to Protect Migratory Birds. The MBTA makes it illegal to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products, except as allowed by the implementing regulations. EO 13186 requires that Federal agencies avoid or minimize the impacts of their activities on migratory birds and make efforts to protect birds and their habitat.

Section 2.0

2.0 CURRENT CONDITIONS AND USE

2.1 INSTALLATION INFORMATION

2.1.1 General Description

TBR is located on the boundary of McIntosh and Long Counties, Georgia, on both sides of State Highway 57 (Figure 2-1). TBR is approximately 25 miles west of the Atlantic Ocean, approximately 60 miles south of Savannah, 2 miles west of Townsend, and 15 miles north of Darien. TBR encompasses approximately 31,642 acres and is adjacent to the Altamaha River corridor. TBR is owned by the DON and MCAS Beaufort is responsible for managing the land and operating the range.

2.1.2 Military Mission

TBR's overall strategic mission is to provide a realistic target and hostile threat environment to train combat aircrews from all services; to provide an environment for ground forces to conduct training; and to facilitate command and control, information, surveillance and reconnaissance training. TBR is a manned range with weapons scoring capability from the ground and has a Range Control Manager who is present on TBR and is in charge of aircraft operations. The current training operations at TBR are governed by a series of military plans, policies, and procedures. Currently, operations at TBR fulfill several critical training requirements for pilots from all four military branches. Fixed-wing and rotary-wing pilots travel from a number of air Installations on the East Coast and Carrier Battle Groups in the Atlantic Ocean to train at TBR. Training operations are used to fine-tune air-to-ground ordnance delivery and gunnery proficiency, and to practice electronic warfare and other combat skills. The air-to-ground training at TBR provides aircrew with the opportunity to practice the delivery of inert munitions, also referred to as ordnance, from aircraft to fixed and relocatable targets on the ground. TBR training involves the use of only inert munitions, which contain no explosives, but may contain a small smoke charge (spotting charge) to assist in scoring the event and providing feedback to the pilot. Key operational capabilities supported by TBR include the following:

- day/night operations
- air-to-ground weapons training
- surface-to-air and air-to-air threat identification and response
- employment of laser-guided training rounds
- cargo drops and other helicopter operations (e.g., door gunnery)

Figure 2-1. Location Map

- joint Large Force Exercises
- limited Unmanned Aircraft Systems training
- joint modular ground targets
- real and simulated electronic warfare (e.g., joint threat emitters)
- infrared/electro-optics
- Large-Scale Target Sensor System training
- Weapons Impact Scoring System training
- Situational Awareness Data Links and Remote Optical Video-Enhanced Receiver Video Data Link for training exercises, and real-time and post-exercise evaluation/feedback

2.1.3 Constraints Map

The Constraints Map illustrates all areas on TBR where restrictions on training or the mission occur, due to the presence of sensitive species or habitats (Figure 2-2). Operations on TBR are largely limited to use of targets and little activity occurs on the ground outside of the target clear zones. Thus, there are few constraints on training or the mission at TBR. Common constraints include habitats supporting threatened, endangered, or candidate species, wetlands, and areas of cultural significance. Cultural resources identified on TBR have been recommended not eligible for inclusion in the National Register of Historic Places (NRHP) or are considered undetermined and will require additional surveys to determine their NRHP eligibility. Constraints are illustrated in Figure 2-2 to the extent that they are currently known to occur on TBR.

2.1.4 Opportunities Map

The Opportunities Map illustrates all the areas on TBR where there are little to no restrictions on training or the mission (Figure 2-3). Because the mission at TBR generally results in limited adverse impacts on natural resources, there are no training restrictions on the majority of TBR. Thus, the Opportunities Map includes all those lands not identified in the Constraints Map (Figure 2-3).

2.1.5 Abbreviated History and Pre-Military Land Use

The lands comprising TBR were first opened as a 3,882-acre aerial gunnery range by the U.S. Navy in the early 1940s as “Glynco Bombing Range.” The Installation was used as such until 1972 when the facility was closed in conjunction with the closure of Naval Air Station Glynco near Brunswick, Georgia. In 1981 the USMC leased the original site from Union Camp Corporation and the Installation was reopened as “Townsend Air-to-Ground Gunnery Range”. In 1991, an additional 3,007 acres surrounding the original site were acquired from Union Camp Corporation to serve as a wooded buffer, and in 1992 the USMC purchased the land comprising the original site in fee. McIntosh County retained the timber easement on the property that was purchased from Union Camp Corporation; however the USMC purchased this easement from McIntosh County in 2013.

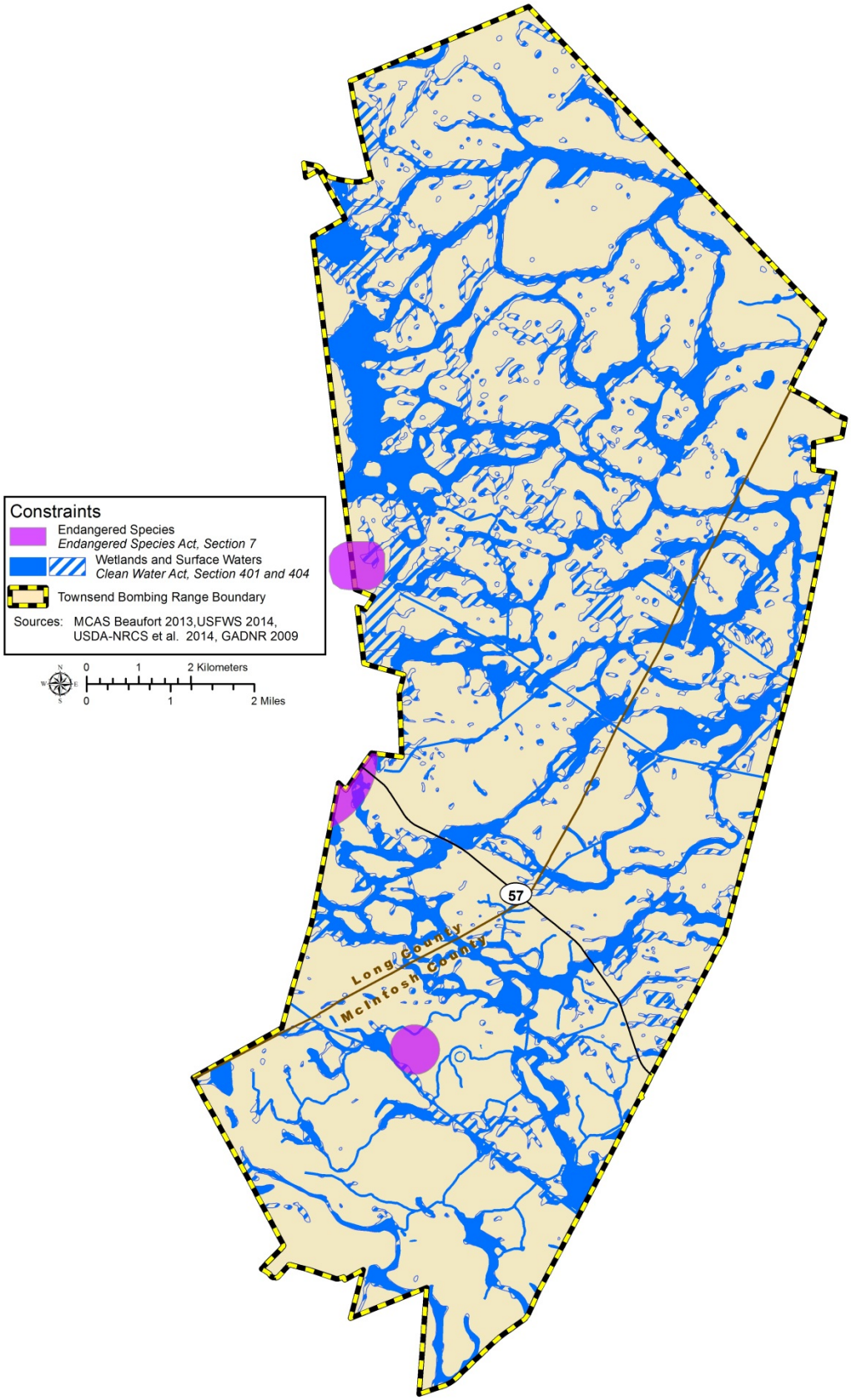

Figure 2-2. Constraints Map

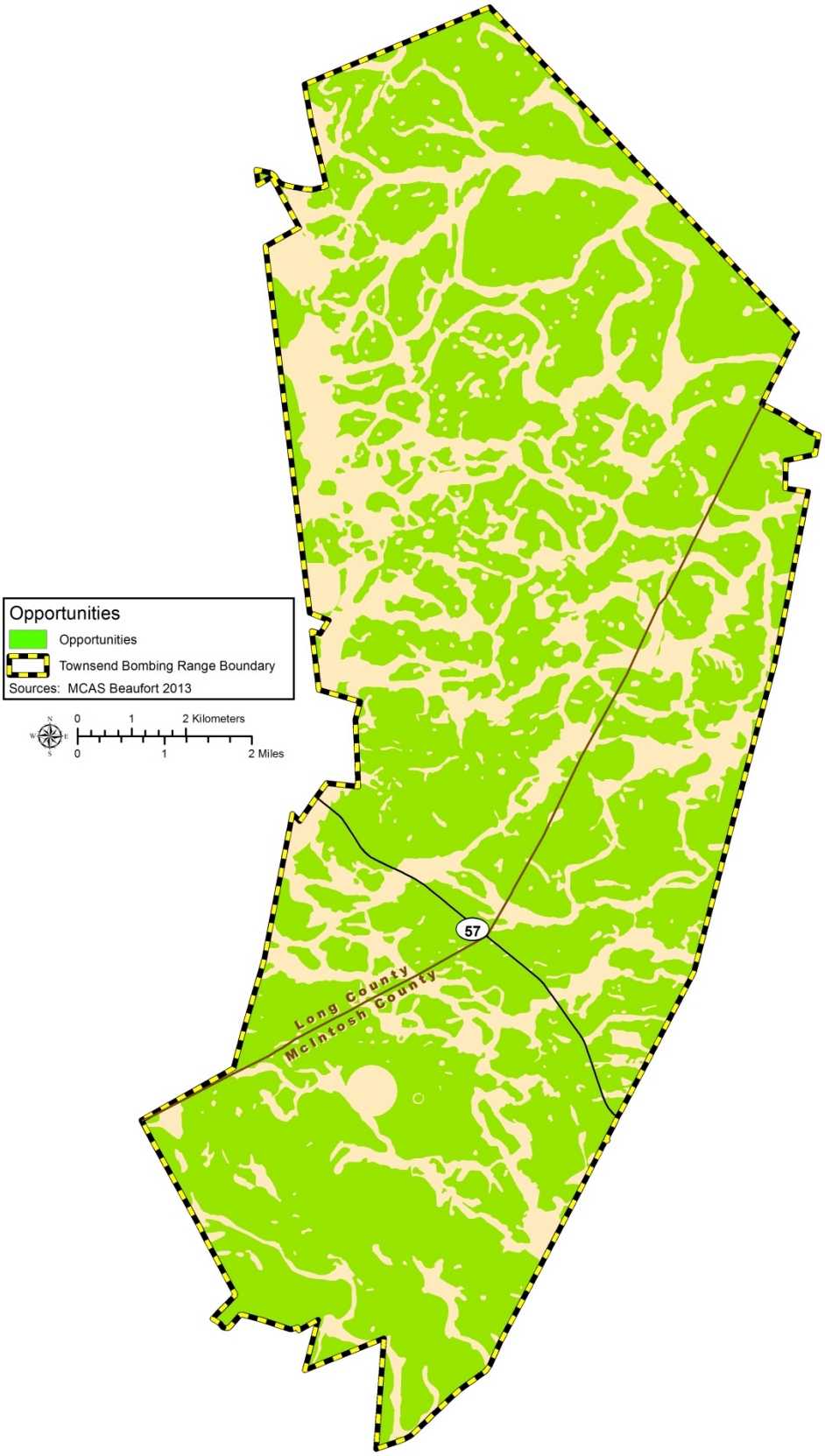

Figure 2-3. Opportunities Map

Since 1981, TBR has been used as a bombing range in support of air-to-ground, low-angle strafing, close air support, and electronic warfare training. In 2013, TBR completed the Final Environmental Impact Statement for the Proposed Modernization and Expansion of Townsend Bombing Range, Georgia (MCAS Beaufort 2013). Implementation of the Preferred Alternative identified in the 2013 Environmental Impact Statement (EIS) resulted in an approximately 28,630-acre expansion of TBR lands and updated existing infrastructure in support of precision-guided munitions (PGM) training. The approximately 31,642 acres comprising the lands operated as TBR historically belonged to large, private entities who managed the forestland for fiber and timber products.

2.1.6 Regional Land Use

McIntosh County and Long County are situated within the Outer Coastal Plain Land Resource Region, which extends from South Carolina and Georgia through much of central Florida, and along the Gulf coast lowlands of the Florida Panhandle, Alabama, and Mississippi (Commission for Environmental Cooperation 2011). TBR is situated within the Sea Island Flatwoods subregion, which is characterized by poorly drained flat plains with Pleistocene terraces and shoreline deposits (GADNR 2005, Griffith et al. 2001). In Georgia, approximately 14 percent of the Southern Coastal Plain is in some form of permanent or long-term conservation ownership, the vast majority of which is found on Okefonokee National Wildlife Refuge and Fort Stewart Military Reservation.

As defined by the Coastal Regional Commission of Georgia, southeastern Georgia consists of a 10-county region that includes Bulloch, Screven, Effingham, Bryan, Chatham, McIntosh, Long, Liberty, Glynn, and Camden Counties (Coastal Regional Commission of Georgia 2012). The majority of southeastern Georgia is forested, with numerous swamps or marshlands acting as natural constraints to development. Southeastern Georgia is viewed as an emerging growth area relative to other more developed areas of the state. Limited, low-density residential, commercial, and industrial development is dispersed throughout the region, and the primary urban areas are Savannah, Hinesville, Jesup, Brunswick, and St. Mary's. The Counties of Bryan and Effingham have experienced significant population growth and development over the last decade. The communities of Townsend and Cox in McIntosh County and Ludowici in Long County are smaller growth areas within proximity to TBR. No residential or commercial properties directly adjoin TBR.

Historical, existing, and future development patterns for the Coastal Georgia Region are largely driven by an abundance of surface water features and new or expanded roadways and utility systems. New development within the region is generally occurring along State Route (SR) 251 and SR 99, both of which provide direct access to Interstate 95 (I-95). Land use patterns show a gradual increase in development as forestlands are being converted to more intensive uses such as residential, commercial, and industrial.

Commercial forestry is a prevalent land use throughout the Southern Coastal Plain ecoregion and the socioeconomic region of southeastern Georgia. As is characteristic of the region, the majority of lands adjacent to TBR are privately owned and managed for commercial forestry operations with certain parcels leased for secondary activities such as hunting.

Conservation lands also are a prominent land use adjacent to TBR. The State of Georgia owns lands and holds conservation easements on a majority of the land west of TBR. Approximately 24,000 acres of land located generally north, south, and west of TBR are held in conservation easements. The easements cover both public and private sector lands in the vicinity of TBR and govern development to prevent land use conflicts with the military mission. These lands are discussed further in Section 3.6 of this INRMP.

2.2 GENERAL PHYSICAL ENVIRONMENT AND ECOSYSTEMS

2.2.1 Climate

TBR, located in proximity to the Atlantic Ocean, has a temperate climate characterized by hot, humid summers and mild, relatively dry winters. Rainfall averages 51 inches per year with the highest average precipitation occurring in August and the lowest average precipitation occurring in December. Hurricanes can occur anytime between June and November. Air temperature is highest in July with an average high of 90 degrees Fahrenheit (^{o}F) and lowest in January with an average low of 42° F.

2.2.1.1 Climate Change

Climate change is causing rising sea level, altering precipitation patterns, and changing ecological systems, and will shape strategic, infrastructure, and natural resources considerations for the foreseeable future. TBR must have the land, air, and water necessary to train and operate to successfully execute its military mission. The frequent and intense heat extremes projected to occur with climate change may limit outdoor training, strain personnel efficiency, degrade air quality through elevated ozone caused by higher temperatures, and strain electricity supply due to the increased demand on the electrical power grid for cooling. Changes in precipitation patterns will reduce water supply, increase the frequency and intensity of wildfires, damage local ecosystems, and cause shifts in species composition or geographic range.

2.2.2 Air Quality

The Clean Air Act (CAA) is the primary Federal statute governing the control of air pollution. The CAA requires the U.S. Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for seven criteria pollutants considered harmful to public health and the environment. These pollutants include the following: particulate matter less than or equal to 10

microns in diameter (PM-10); particulate matter less than or equal to 2.5 microns in diameter (PM-2.5); carbon monoxide; sulfur dioxide (SO_2); nitrogen dioxide (NO_2); lead; and ozone (O_3). The levels of these pollutants must not exceed limits set by the NAAQS. MacIntosh and Long Counties are currently designated as "in attainment" for all criteria pollutants and are not designated as maintenance areas for any criteria pollutant. A region is designated as "in attainment" if monitoring shows ambient concentrations of a specific pollutant are less than or equal to NAAQS.

Air pollutant emissions at TBR are generated from prescribed fires and wildfires, vehicle and equipment use, inert ordnance delivery, land disturbance activities, and aircraft operations. Prescribed and wildland fires are the most significant source of air pollutant emissions at TBR. Although the forested areas at TBR are susceptible to wildfires, the prescribed fire program helps reduce the potential for wildfires, which then lessens unmanaged air emissions. All prescribed fires are conducted in accordance with guidance established by the Georgia Forestry Commission (GFC). The prescribed fire program includes both forested areas and developed areas (primarily the air-to-ground target areas). Air pollutant emissions from the remaining sources (vehicle and equipment use, inert ordnance delivery, land disturbance activities, and aircraft operations) are considered minor (MCAS Beaufort 2013).

2.2.3 Geology, Topography, and Soils

The coastal area of Georgia is underlain by a thick sequence of unconsolidated layers of sand and clay that is poorly cemented to very dense layers of limestone and dolostone (Clarke et al 1990). These deposits range in age from Paleocene to Recent, and overlie Paleozoic to Mesozoic igneous, metamorphic, and sedimentary rocks (Chowns and Williams 1983). These sedimentary strata strike southwest-northeast, then dip and thicken to the southeast, and reach a maximum thickness of about 5,500 feet in Camden County (Wait and Davis 1986).

TBR is located in the Barrier Island Sequence District of the Coastal Plain Physiographic Province (Clark and Zisa 1976). The barrier island sequence consists of barrier islands, marshes, level plains, and a series of terraces resulting from sea-level advances and retreats during the Pleistocene age (Krause and Randolf 1989). Within the Barrier Island Sequence District, elevations range from sea level to approximately 160 feet above mean sea level (amsl) with a progression of step-like increases in elevation from east to west. The topography of TBR is relatively flat, with land surface elevations ranging from 13 to 60 feet amsl (Figure 2-4).

Soils present on TBR and their characteristics were obtained from the USDA Natural Resources Conservation Service (NRCS) Soil Survey Geographic (SSURGO) database (NRCS 2014) (Figure 2-5). The USDA soils descriptions are included in Appendix D. Of the 35 different soil types present at

Figure 2-4. Topography Map

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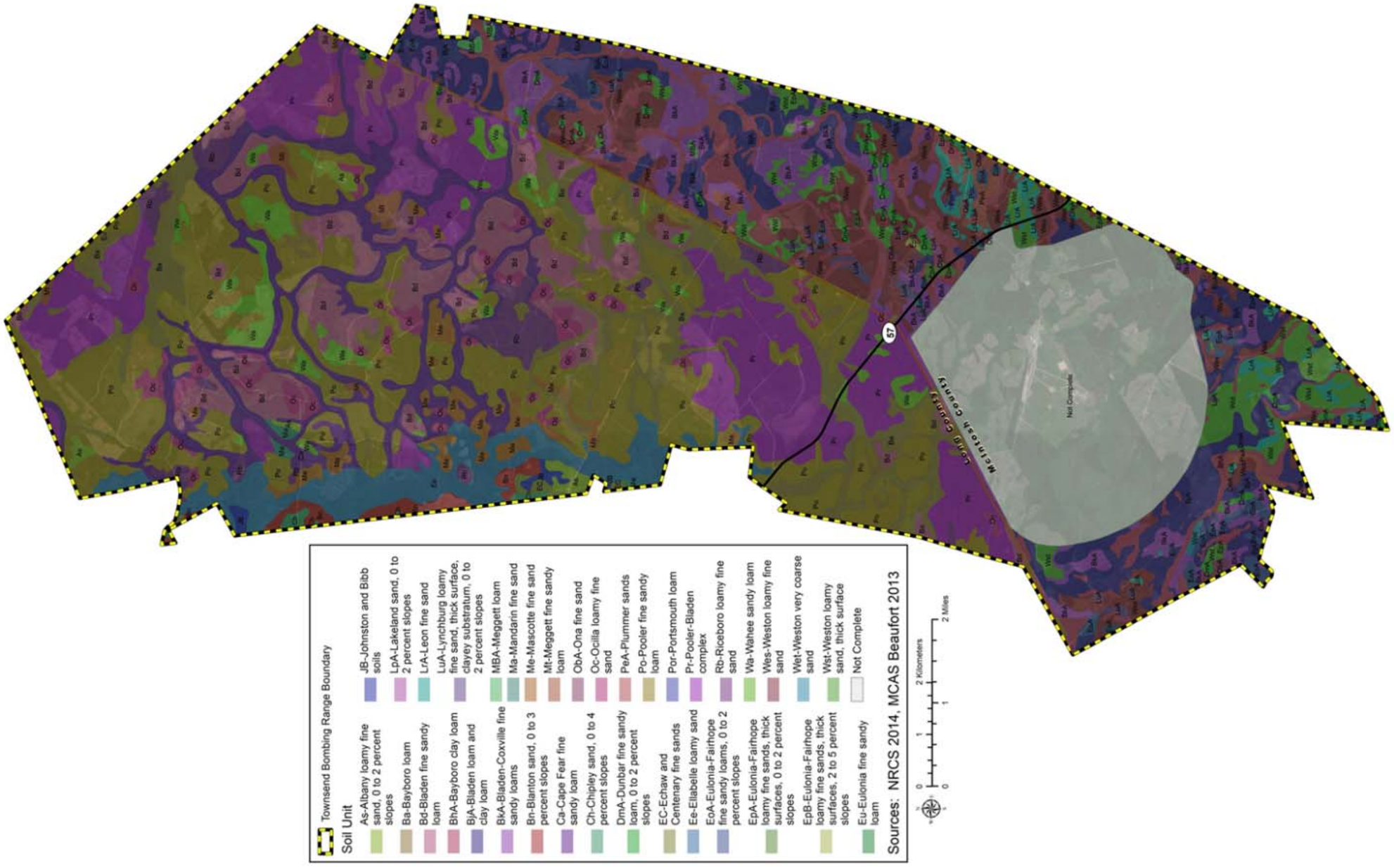

Figure 2-5. Soils Map

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TBR, six soil types are designated as prime farmland or farmland of statewide importance and are considered to be of higher agricultural value.

2.2.4 Hydrology

Watersheds and Surface Waters

As delineated in the national Watershed Boundary Database, most of TBR lies within the Ogeechee River Basin, Ogeechee River Coastal subbasin (Hydrologic Unit Code 03060204), and a portion of TBR near the western boundary lies within the Altamaha River Basin, Altamaha River subbasin (Hydrologic Unit Code 03070106) (USDA NRCS, U.S. Geological Survey [USGS], and USEPA 2014). Surface waters in these basins generally flow in a southeasterly direction and terminate in the Atlantic Ocean. Surface waters on TBR were identified using data from the National Hydrography Dataset (USGS 2010) and on-site field surveys of target areas.

TBR surface waters include intermittent and perennial natural streams, ditches, man-made canals, forested sloughs, and upland depressions (Figure 2-6). TBR can be delineated as three separate watersheds: Upper South Newport River, Young Swamp-Buck Hill Swamp, and Snuff Box Swamp-Buffalo Swamp. The Upper South Newport River watershed drains the northern portion of TBR and flows northeastward into the South Newport River, which empties into Sapelo Sound near the north end of Sapelo Island. The Tram Road Canal in the Young Swamp-Buck Hill Swamp watershed drains the central portion of TBR and also flows southeastward into Snuff Box Swamp. Snuff Box Canal drains the portion of TBR southwest of State Highway 57 as it flows southeastward into Snuffbox Swamp. Snuffbox Swamp drains into Cathead Creek, which drains into the Darien River. The Darien River flows into the Rockedundy River, which empties into Doboy Sound off the south tip of Sapelo Island. Some portion of the surface water on the southwestern portion of TBR may drain directly into the Altamaha River. TBR also contains depressions that may hold water seasonally. Some of these depressions are isolated and some have been artificially connected to intermittent and permanent streams via ditches.

Floodplains

The Federal Emergency Management Agency (FEMA) defines floodplains as areas subject to a 1 percent or greater chance of flooding in any given year (formerly referred to as the “100-year floodplain”). Floodplains are low, relatively flat areas adjoining inland and coastal waters. Extensive floodplain areas exist in the vicinity of TBR because of its slight elevation amsl and the relatively flat topographic relief of the land surface. Current FEMA maps show that areas predicted to be subject to a 100-year flood event on TBR lie between 6 feet and 14 feet amsl (North American Vertical Datum 1988 [NAVD88]). Portions of low-lying environments within TBR are within the 100-year floodplain (FEMA 2008 and 2009) (Figure 2-7).

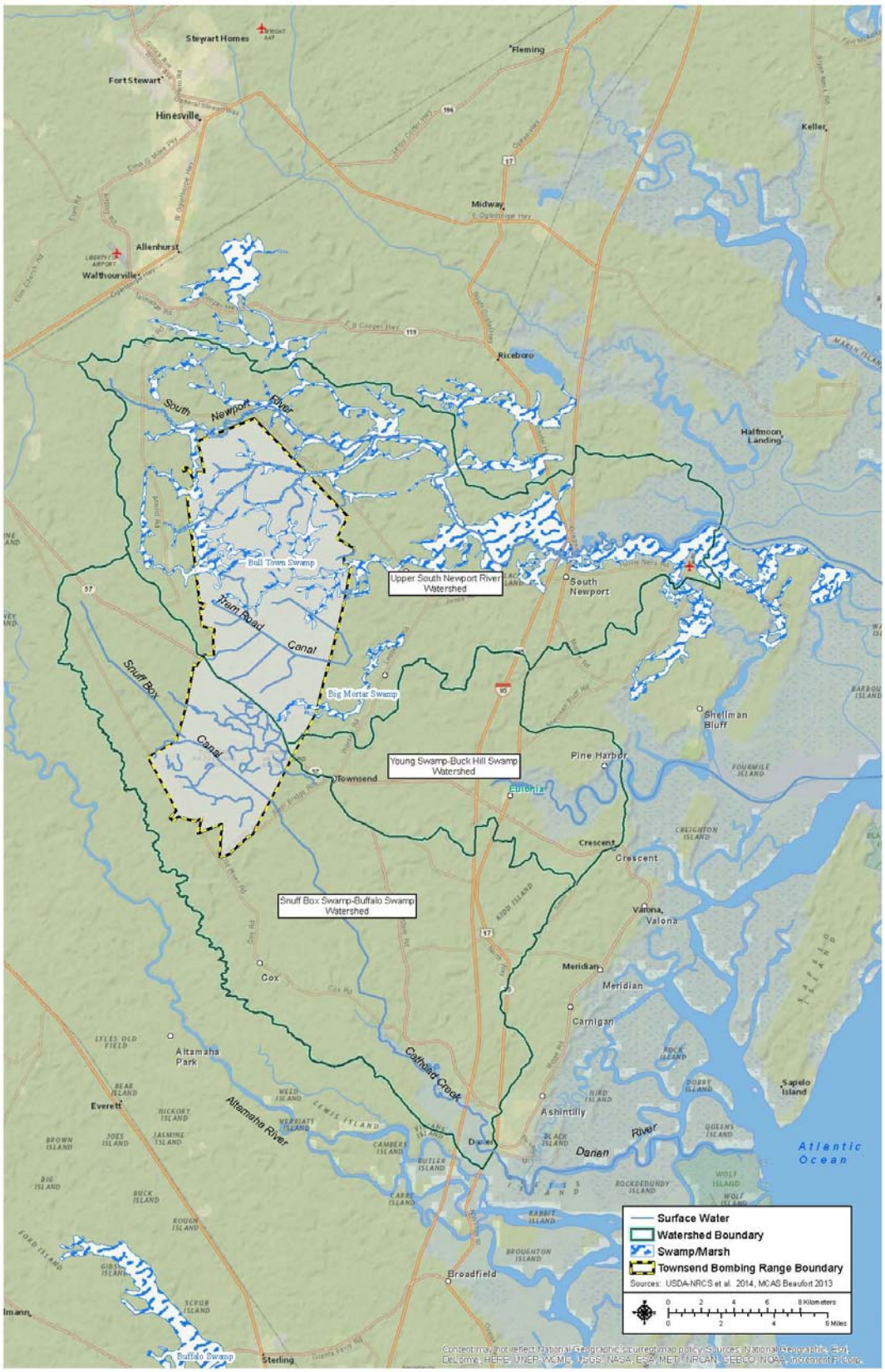

Figure 2-6. Surface Water Map

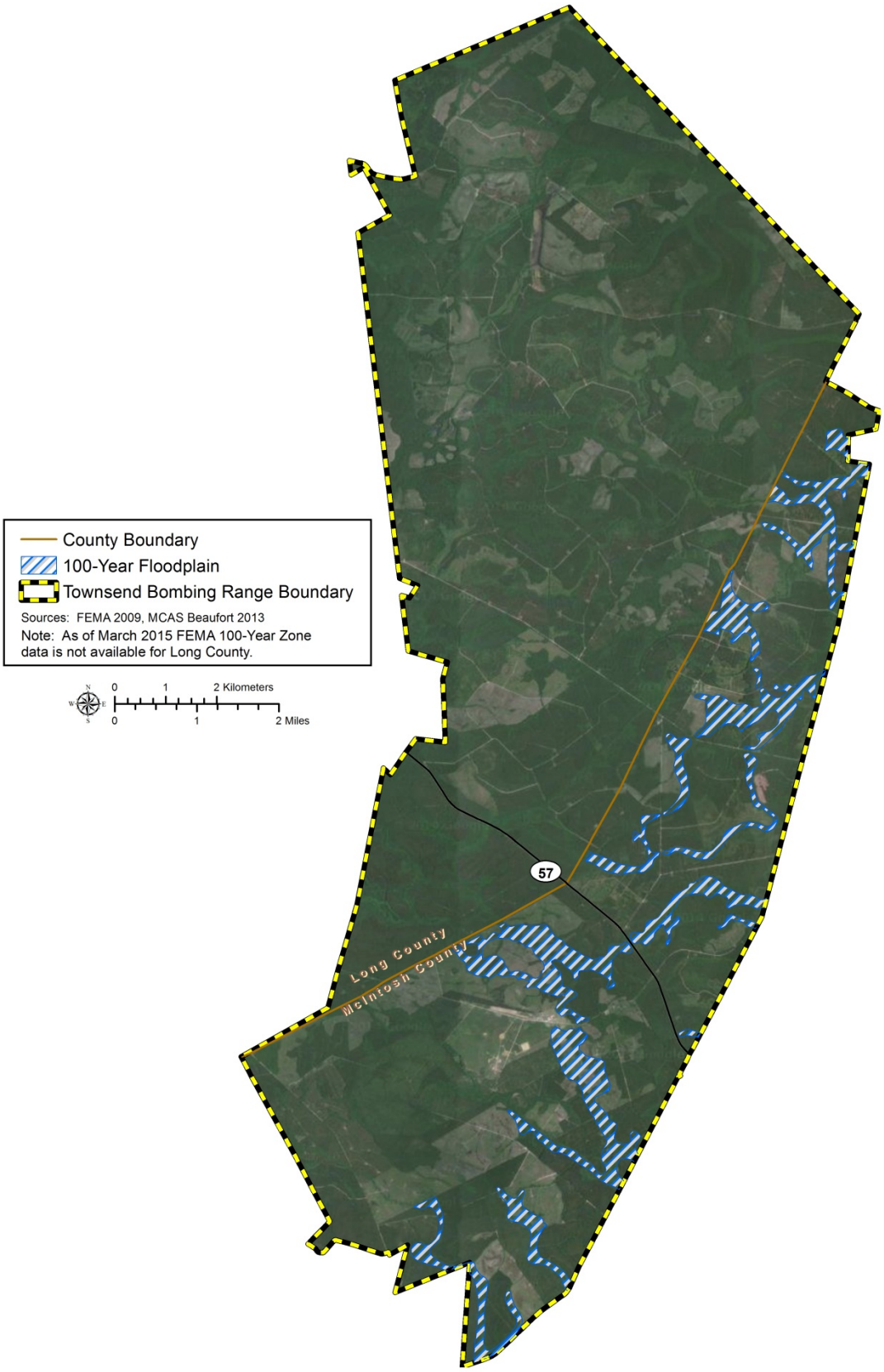

Figure 2-7. Floodplain Map

Jurisdictional Wetlands

In general terms, wetlands are lands on which water covers the soil or is present either at or near the surface of the soil or within the root zone all year or for varying periods of time during the year, including the growing season. The U.S. Army Corps of Engineers (USACE) (*Federal Register* [FR], Section 328.3[b], 1991) and the USEPA (FR, Section 230.4[t], 1991) jointly define jurisdictional wetlands as "…those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (USACE 1982). The USACE definition relies on three key parameters – hydrology, soil, and vegetation – which must all occur and meet the defined characteristics in order for a location to be classified as a wetland.

The current extent of jurisdictional wetlands on TBR has been estimated based on the USFWS National Wetlands Inventory (NWI) and on-site field surveys (Figure 2-8). Approximately 30 percent of McIntosh County is wetlands, and the same general proportion holds for TBR. Wetlands can be classified using the Cowardin System, which is a system based on water flow (i.e., marine, estuarine, riverine, lacustrine, or palustrine), vegetation physiognomy, hydrology, and salinity. Although species composition of the vegetation dominating a particular wetland can be used to further subdivide any given category using the Cowardin system (Cowardin et al. 1979), classification of wetlands on TBR has not been completed to this detail. The habitats supported by jurisdictional wetlands are managed as terrestrial habitats and are classified using the system described in Section 2.3.1 of this INRMP.

Groundwater

Contrasting geologic features and landforms of the physiographic provinces of Georgia affect the quantity and quality of groundwater throughout the state. The most productive aquifers in Georgia are in the Coastal Plain Physiographic Province in the southern half of the state. The Coastal Plain is underlain by alternating layers of sand, clay, dolomite, and limestone that dip and thicken to the southeast. Coastal Plain aquifers generally are confined, except near their northern limits where they crop out or are near land surface. Aquifers in the Coastal Plain that lie beneath TBR include the surficial aquifer system, Brunswick aquifer system, and the Floridan aquifer system (MCAS Beaufort 2013) (Table 2-1).

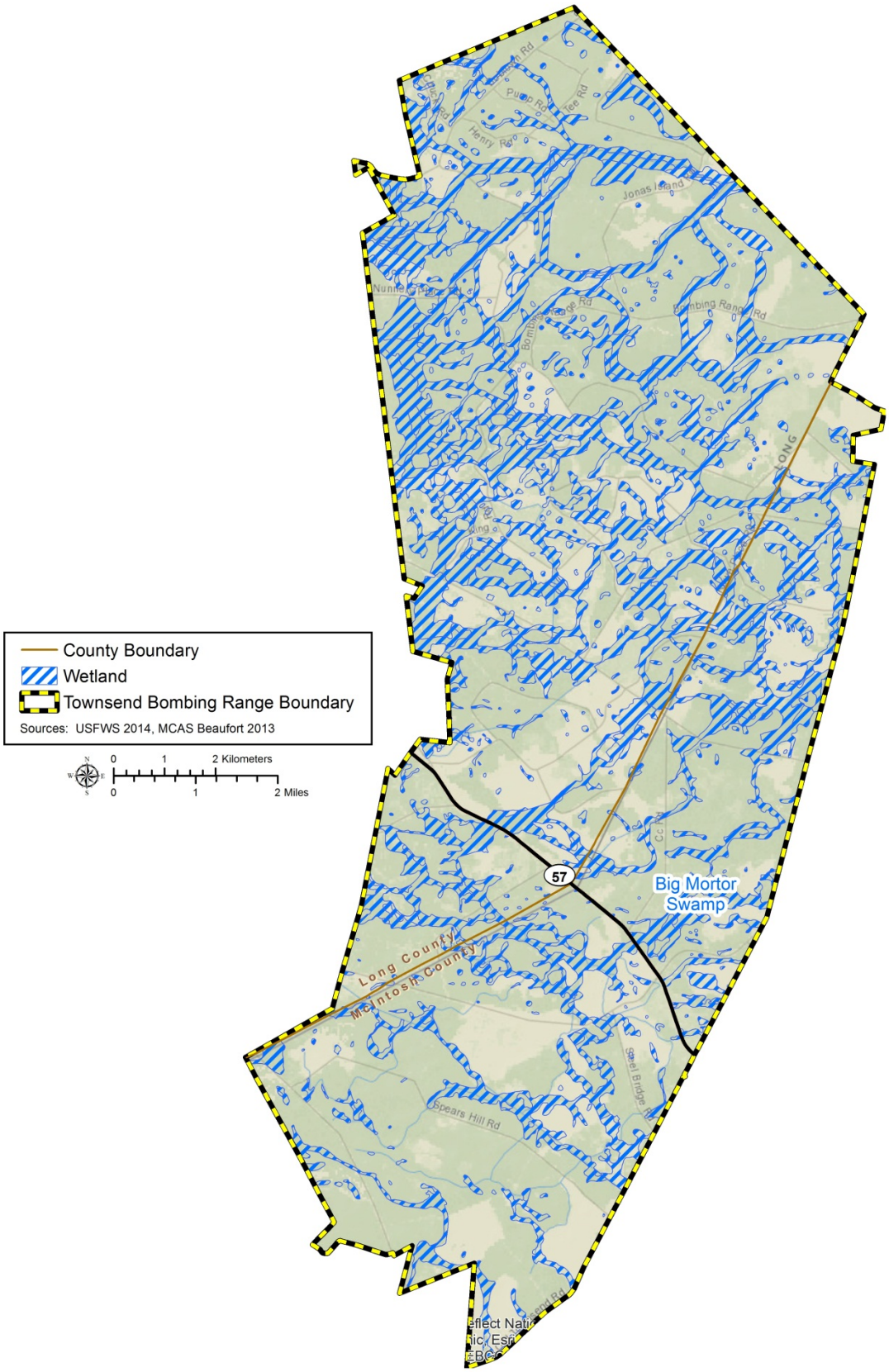

Figure 2-8. Wetland Map

Table 2-1. Description of Aquifers under TBR

Aquifer Name	Aquifer Description	Well Characteristics		
		Depth (feet)	Yield (gallons/minute)	
		typical range	typical range	may exceed
Surficial	Unconsolidated sediments and residuum; generally unconfined	11-300	2-25	75
Brunswick	Phosphatic and dolomitic quartz sand; generally confined	85-390	10-30	180
Floridan	Limestone, dolomite, and calcareous sand; generally confined	40-900	1,000-5,000	11,000

The surficial aquifer system is the primary source of water for domestic and livestock supply in rural areas. Water-level fluctuations are caused mainly by variations in precipitation, evapotranspiration, and natural drainage or discharge. Water levels generally rise rapidly during wet periods and decline slowly during dry periods. Prolonged droughts may cause water levels to decline below pump intakes in shallow wells, particularly those located on hilltops and steep slopes, resulting in temporary well failures. Usually, well yields are restored by precipitation.

The Brunswick Aquifer System is not a major source of water in coastal Georgia, but is considered a supplemental water supply to the Upper Floridan aquifer. The Brunswick Aquifer System may respond to pumping from the Upper Floridan aquifer as a result of the hydraulic connection between the aquifers. Elsewhere, the water level mainly responds to seasonal variations in recharge and discharge.

The Upper and Lower Floridan aquifers supply about 50 percent of groundwater in Georgia. In and near outcrop areas, the aquifers are semiconfined, and water levels in wells tapping the aquifers fluctuate seasonally in response to variations in recharge rate and pumping.

2.3 BIOTIC ENVIRONMENT

2.3.1 Terrestrial Habitats and Vegetation

GADNR is currently involved in developing an ecological community classification system based on the *U.S. National Vegetation Classification* (USNVC) system (GADNR 2005). The USNVC system is based on vegetation as it currently exists on the landscape (Federal Geographic Data Committee 2008) and is used in this INRMP to classify terrestrial habitats on TBR. Landforms, soils, and other features are not directly considered as part of the classification criteria, but ecological and biogeographical information help guide the structure of the classification. The system can be used to classify both natural and cultural vegetation types. As part of the GADNR Coastal Resource Mapping project, the ecological communities of McIntosh and Long Counties, including all of TBR, were

delineated using the USNVC system (Thompson 2010 and Elliott 2010, respectively) (Figure 2-9). Because forestry was the predominant land use on lands acquired for expansion of TBR, the distribution and extent of ecological communities has changed substantially since 2010. It is assumed that a large portion of the lands acquired by TBR have been cleared of all harvestable timber prior to transfer of ownership.

A brief description of each USNVC ecological community found on TBR in 2010 is provided below and can be found on the NatureServe website (usnvc.org). Each of the natural community types found on TBR is considered regionally important under the GADNR State Wildlife Action Plan (SWAP). Where equivalent, USNVC ecological communities are cross-referenced to the GADNR SWAP regionally important habitats, and the SWAP name for the equivalent USNVC ecological community is provided parenthetically. Each of the natural communities classified by the USNVC is considered a regionally important habitat under the GADNR SWAP. Some of the regionally important habitats identified in the SWAP are based on small topographical features, or other specific conditions that are typically associated with a more inclusive ecological community as defined by the USNVC. A discussion of these habitat features is included with the description of the encompassing ecological community.

Natural ecological communities are described first in order of decreasing elevation. Disturbed and cultural communities are described last beginning with the least culturally influenced and ending with the most culturally influenced communities.

2.3.1.1 Natural Ecological Communities

Upland Longleaf Pine Woodland communities occur on upland sites composed of loamy to sandy flats. Soils are acidic and typically infertile. Large patch or matrix upland habitats characterized by a sparse canopy of longleaf pine (*Pinus palustris)* (sometimes with slash pine [*P. elliottii*]) and a diverse herb layer dominated by wiregrass (*Aristida* spp.). These communities can range from mesic to dry, depending on topographic position and soils, and transition downslope into wet pine savannas, pine flatwoods, or other wetlands. These habitats are heavily dependent on frequent fire for maintenance. On drier sites within the matrix of longleaf pine, more fire tolerant oaks can form a portion of the canopy. The GADNR SWAP identifies these habitats as Longleaf Pine /Scrub Oak Woodlands (GADNR 2005). These habitats are described as sparse-canopied xeric longleaf pine system with patchy oak understory composed of turkey oak (*Quercus laevis*), sand post oak (*Quercus stellata*), bluejack oak (*Quercus incana*), blackjack oak (*Quercus marilandica*), and other scrub oak species, typically found on deep sand soils, on ridges, and upper slopes that contain a fairly diverse groundlayer of xerophytic grasses and forbs and scattered shrubs.

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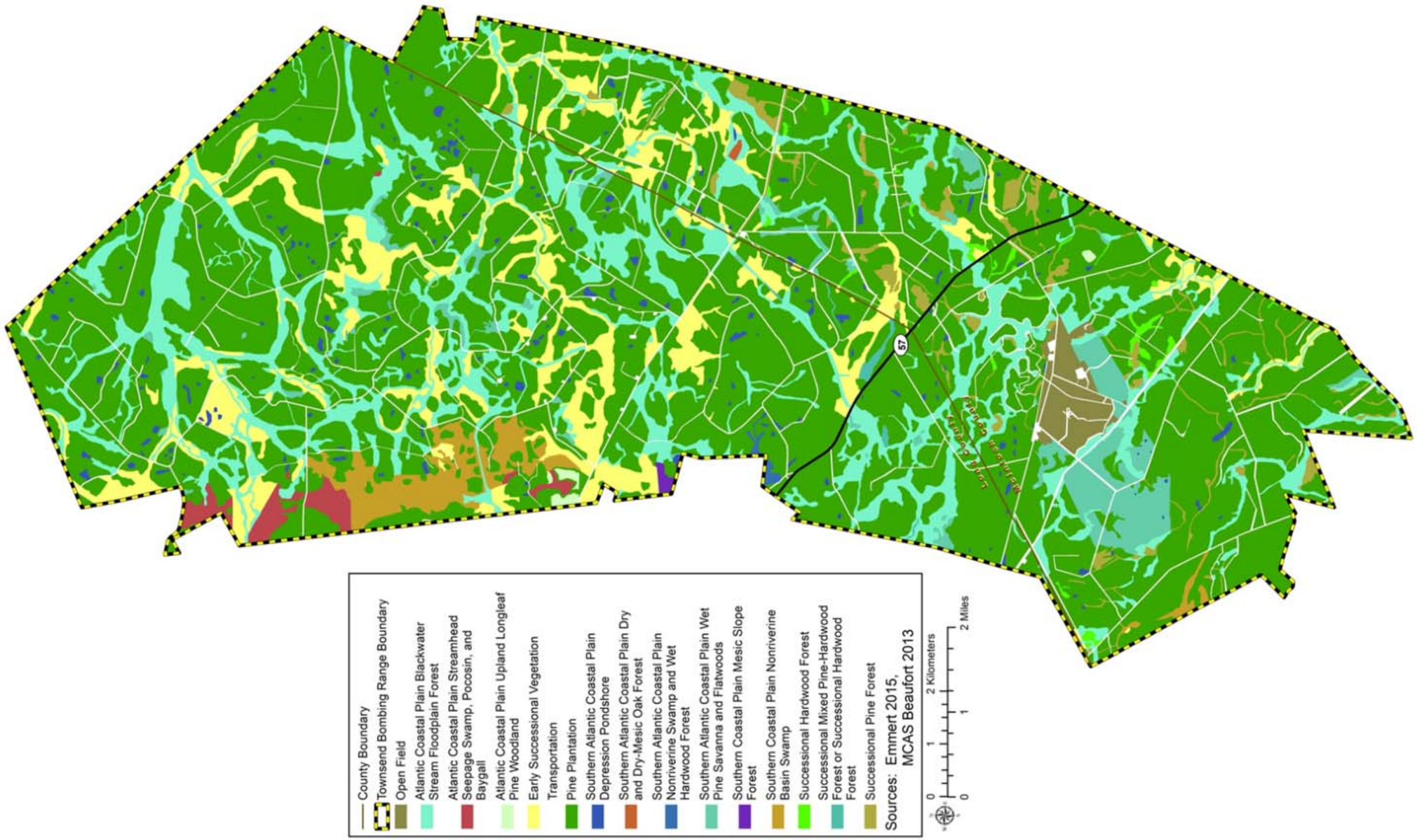

Figure 2-9. Terrestrial Habitat and Vegetation Map

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Dry Forest and Dry-Mesic Oak Forest are typically small isolated communities located in dry to slightly moist sites that are protected from frequent fire by surrounding or adjacent communities. These communities generally occur on terraces above bottomland hardwood forests, ravines, or nonalluvial flats protected from frequent fire. Vegetation is dominated by oak and hickory species including; water oak (*Quercus nigra*), white oak (*Quercus alba*), southern red oak (*Quercus falcata*), and pignut hickory (*Carya glabra*). Southern magnolia (*Magnolia grandiflora*), American holly (*Ilex opaca*), ironwood (*Olneya tesota*), flowering dogwood (*Cornus florida*), and spruce pine (*Pinus glabra*) typically occur where these communities are associated with small isolated uplands within a floodplain or depressional wetland.

Mesic Slope Forest communities are an uncommon hardwood forest type, typically found on very mesic river bluffs, and occasionally on gentle slopes that are naturally protected from fire by topographic setting. This community is often small in extent and occurs within a narrow zone between wetland and fire-maintained upland forests. This community is often associated with and in proximity to hillside seeps. In addition to American beech (*Fagus grandifolia*) and southern magnolia, the communities may contain spruce pine, water oak, water hickory (*Carya aquatica*), American holly, and other fire-intolerant species, as well as epiphytic species such as green-fly orchid (*Epidendrum magnoliae*).

Wet Pine Savanna and Flatwoods communities (a.k.a., Wet Pine Savanna, Herb and Shrub Bog, and Pine Flatwoods) are one of the most extensive and prevalent natural habitats of the Sea Island Flatwoods. These environments consist of open canopy areas with wet, seasonally saturated soils. Open canopies facilitate the development of diverse herbaceous groundcover species, and frequent fire limits development and recruitment of hardwood and shrub species. The communities were dominated formerly by longleaf pine, now typically by slash pine, occasionally with loblolly (*Pinus taeda*) or pond pine (*Pinus serotina*). Groundcover species are variant and dependent upon the frequency of fire and hydrologic conditions. The shrub layer may be sparse, consisting mainly of gallberry (*Ilex glabra*), saw palmetto (*Serenoa repens*), wax myrtle (*Morella cerifera*), and fetterbush (*Lyonia lucida*), lowbush blueberry (*Vaccinium angustifolium*), and other ericaceous species. The herbaceous layer is often diverse and dense, and can include wiregrass, broomsedge (*Andropogon virginicus*), yellow eyed grass (Xyris spp.), spike rush (*Eleocharis palustris*), chain fern (*Woodwardia* spp.), maiden cane (*Amphicarpum muhlenbergianum*), and *Hypercium* species. Wet Pine Savanna and Flatwoods communities may also include small peat-filled depressions dominated by titi (*Cyrilla racemiflora*) and other shrubs or by herbaceous bog plants.

Streamhead Seepage Swamp, Pocosin, and Baygall communities are seepage-fed wetlands often associated with ravines or side-slopes, along the headwaters of streams, or in areas of high groundwater. Vegetation consists of woody plant species with a dense shrub layer. Common

species include blackgum (*Nyssa sylvatica*), red maple (*Acer rubrum*), tulip tree (*Liriodendron tulipifera*), titi, fetterbush, gallberry, and dog hobble (*Leucothoe axillaris*). Hillside seeps are natural groundwater discharge points found on moist to wet lower slopes in sandy terrain that create small patch habitats. Hillside seeps may be dominated by shrubs or herbs and typically support pitcher plants.

Depression Pondshore communities are seasonally or semi-permanently flooded forests of depressional features in broad inter-stream flats. Depressional features include small basins formed by soil subsidence, swales, or natural blockage of small drainages. Soils range from mineral to organic and canopy dominants may include bays, pondcypress, or pond pine. Fire plays a role in maintaining some of these systems. Isolated wetlands that do not support fish populations are very important breeding habitats for amphibians such as the flatwoods salamander.

Non-riverine Basin Swamp communities occupy large seasonally inundated basins with peat substrates. These communities are located beyond the influence of streams. Common vegetation includes pond cypress (*Taxodium ascendens*), blackgum, slash pine, titi, and fetterbush.

Non-riverine Swamp and Wet Hardwood Forest communities occur on poorly drained areas saturated or inundated by rainfall. These communities are located beyond the influence of streams or tidal areas and include diverse hardwood-dominated forests found on natural levees, upper floodplain flats and terraces along brownwater and blackwater rivers. They are characterized by a diverse canopy of hardwood species dominated by various oaks, green ash (*Fraxinus pennsylvanica*), sweetgum (*Liquidambar styraciflua*), red maple, water hickory, and other mesic species. These extensive forested systems provide habitat for a wide variety of wildlife species, and are especially important for wide-ranging forest interior species. Bottomland hardwood forests have been impacted by altered hydrologic conditions, forest conversion, and invasive exotic species.

Blackwater Stream Floodplain Forest communities exists throughout much of TBR within low-lying areas associated with narrow bands of dense canopy hardwood species located in the floodplains of small streams and rivers. Seasonal and periodic flooding is an important ecological factor where inundation limits species compositions to flood-tolerant species. Vegetation is composed of wetland tree species such as bald cypress and blackgum, with associated species including red maple, sweetbay magnolia (*Magnolia virginiana*), loblolly bay (*Gordonia lasianthus*), water oak, and laurel oak (*Quercus hemisphaerica*). This community is important in areas of forestry where it can function as a buffer to erosion. Although this community often occupies a smaller area than surrounding communities, it is an important component of regional floral and faunal diversity. Canebrakes are thickets of native river cane found along rivers and creeks under sparse to full tree cover. Canebrakes are identified as regionally important habitat by the GADNR SWAP and provide habitat for a variety of

neotropical birds and insects (GADNR 2005). These habitats require periodic fire or other form of disturbance for maintenance.

2.3.1.2 Disturbed or Cultural Communities

Successional Hardwood Forest communities are associated with recently harvested or disturbed areas, often in mesic or topographically low-lying areas. This community represents a transition from early successional vegetation communities by the presence and establishment of a more defined canopy stratum. Vegetation is dependent upon the previously converted community but is characterized by a hardwood canopy stratum consisting of species such as red maple, water oak, laurel oak, beech, or hickory species.

Loblolly Pine-Water Oak-Sweetgum Successional Vegetation communities are associated with disturbed moist pine flatwoods or planted pine areas and represent a transition from early successional vegetation communities by the presence and establishment of a more defined canopy. This community is located on topographically flat and low elevations and is identified by a mixture of loblolly pine, water oak, and sweetgum where no one species is dominant.

Successional Pine Forest communities are associated with recently cleared or harvested pine plantation areas. Following harvest, areas are typically furrowed and replanted with pine species. Initially, the successional pine forest communities are composed of early successional and shrub species such as winged sumac (*Rhus copallinum*), blackberry (*Rubus* sp.), broomsedge, gallberry, wax myrtle, and saltbush (*Atriplex canescens*). Over time, planted pine species mature and outcompete herbaceous and shrub species as the community transitions back into a pine plantation environment.

Pine Plantation communities are densely planted loblolly, slash, or longleaf pine stands that are actively managed for silvicultural operations. Management activities for these areas include herbicide application, ditching and draining, and furrowing. Species composition is limited and many of these plantation communities lack age distribution of tree species. Midstory and understory species are inhibited due to low-light penetration and herbicide application. Pine plantation environments lack transition between adjacent environments and are typically bound by access roads, ditches, or maintained timber stands.

Successional Scrub communities are located in recently disturbed areas often associated with recent fire, hurricanes, or mechanical clearing activities. Vegetation is dominated by early successional and shrub species such as winged sumac, blackberry, broomsedge, gallberry, wax myrtle, and saltbush.

Open Field communities are maintained environments lacking a distinguished canopy or shrub layer. Species composition consists of grasses and weedy successional species. Perpetual maintenance,

such as prescribed fires, herbicide application, or mechanical cutting, maintains these areas in an herbaceous state.

2.3.1.3 Sensitive and Regionally Important Plants

The GADNR SWAP identifies sensitive and regionally important plant species associated with the Sea Island Flatwoods (Table 2-2) (GADNR 2005). These species are threatened by the loss of natural ecological communities and alteration of ecosystem processes. Because these species are uncommon, their occurrence on the landscape can have a substantial benefit on regional biodiversity. The biology, habitats, threats, and management recommendations for each of these species are provided below. Species classified as threatened or endangered by USFWS or GADNR and candidates for listing by the USFWS are discussed in Section 2.8 of this INRMP. Threatened, endangered, and candidate species are also sensitive and regionally important, but are afforded additional protections under the ESA and the Georgia Endangered Wildlife Act.

Table 2-2. Sensitive or Regionally Important Plants

Common Name	Scientific Name	Status	
		TBR	GADNR
Green-fly orchid	*Epidendrum conopseum*	CR	U
Hooded pitcher plant	*Sarracenia minor* var. *minor*	PR	U
Purple honeycomb-head	*Balduina atropurpurea*	PR	R
Velvet sedge	*Carex dasycarpa*	PR	R
Yellow flytrap	*Sarracenia flava*	PR	U

CR – confirmed resident; PR – possible resident; U – unusual; R – rare

Green-fly Orchid

The green-fly orchid is the only epiphytic orchid in the U.S. to occur outside of Florida and is known from the Coastal Plains of the southeastern U.S. and eastern Mexico (GADNR 2014b). The species grows on the limbs of southern magnolia and live oak trees in moist forests, usually along streams. Management for this species should include surveys to identify its presence and allowing the regeneration and protection of bottomland and floodplain forests.

Hooded Pitcher plant

The hooded pitcher plant is a perennial herb occurring in Georgia, Florida, South Carolina, and North Carolina (GADNR 2014b). Pitcher plants capture and digest insects and other small animals. Digestion enables the plants to absorb nitrogen, which is typically a limiting nutrient of bogs and other permanently saturated wetlands. Suitable habitats include wet savannas and pine flatwoods, seepage slopes, sphagnum seeps in swamps, bogs, and wet ditches. The hooded pitcher plant is one of the most common of Georgia's pitcher plants and is likely to occur on the expanded portion of TBR. Management for this species should include surveys to identify its presence, restoration of drainage networks, avoidance of soil disturbance, ditching, draining, firebreak construction, bedding,

and mechanical clearing in wetlands, prescribed fire, education of TBR users to avoid poaching, and eradication of feral hogs.

Purple Honeycomb-Head

Purple honeycomb-head is a perennial herb occurring in the coastal plain of Georgia, Florida, South Carolina, and, possibly, Alabama and North Carolina (GADNR 2014b). Purple honeycomb-head occupies pine flatwoods and savannas, seepage slopes, pitcher plant bogs, and wet ditches. About 45 populations have been recently documented in Georgia; however, this species is not known to occur on TBR. Management for this species should include surveys to identify its presence, use of prescribed fire, restoration of drainage networks, and avoidance of soil disturbance, ditching, draining, firebreak construction, bedding, and mechanical clearing in wetlands.

Velvet Sedge

The velvet sedge is a perennial grass-like herb occurring in Georgia, Florida, Alabama, Mississippi, and South Carolina (GADNR 2014b). Velvet sedge can be found on well-drained, sandy-loamy soils in a variety of habitats including mixed pine-hardwood forests on river bluffs and stream terraces, levees and swales in floodplains, maritime forests along Atlantic coast rivers, longleaf pine woodlands on barrier islands, and beech-magnolia-spruce pine forests. Conversion of habitat to pine plantations, agriculture, and development is the greatest threat to this species. Invasion by invasive plants has also impacted the velvet sedge. Management for this species should include surveys to identify its presence, restoration of drainage networks, avoidance of soil disturbance, ditching, draining, firebreak construction, bedding, and mechanical clearing in wetlands, prescribed fire, and control of invasive plants.

Yellow Flytrap

The yellow flytrap (yellow trumpet pitcher plant) is a perennial herb occurring in Georgia, west to Mississippi and north to southeastern Virginia, in the Coastal Plain (GADNR 2014b). Suitable habitats include wet savannas and pine flatwoods, seepage slopes, and bogs. Yellow flytrap is one of the more common of Georgia's pitcher plants and is likely to occur on the expanded portion of TBR. Management for this species should include surveys to identify its presence; restoration of drainage networks; avoidance of soil disturbance; ditching, draining, firebreak construction, bedding, and mechanical clearing in wetlands, prescribed fire; education of TBR users to avoid poaching; and eradication of feral hogs.

2.3.1.4 Invasive Plants

Invasive and exotic species on TBR are managed through the removal of the species and the restrictions on the introduction of the species to the Installation in accordance with EO 13112. Invasive plants are non-native to Georgia and cause harm to natural ecological communities or

human environments. Pest plant species on TBR are plants that specifically cause harm to the human environment, such as non-native Mediterranean annuals in maintained lawns, and poisonous native plants, such as poison ivy (*Toxicodendron radicans*). Pest plants can be found in natural ecological communities, but are not necessarily invasive in these environments. A survey of invasive plants on TBR was conducted in 2004 (Southern Division [SOUTHDIV] 2004).

Pine plantations of varying age are quite homogeneous in plant species composition at TBR. Forestry management practices have effectively eliminated and continue to inhibit establishment and growth of invasive plants within the interior of forest stands. However, invasive plants establish rapidly within recently disturbed areas and along roadsides and forest edges. The University of Georgia's (2014) Early Detection and Distribution Mapping System provides an online database of invasive species observations recorded in Georgia. There are 86 plant species that are non-native to the U.S., reported to be a problem somewhere in the U.S., and known to occur in McIntosh or Long Counties. The Georgia Exotic Plant Pest Council (2006) identifies non-native plants that pose threats to natural ecological communities in Georgia and classifies these plants using the following categories:

Category 1 - Exotic plant that is a serious problem in Georgia natural areas by extensively invading native plant communities and displacing native species.

Category 1 Alert - Exotic plant that is a not yet a serious problem in Georgia natural areas, but that has significant potential to become a serious problem.

Category 2 - Exotic plant that is a moderate problem in Georgia natural areas through invading native plant communities and displacing native species, but to a lesser degree than Category 1 species.

Category 3 - Exotic plant that is a minor problem in Georgia natural areas, or is not yet known to be a problem in Georgia but is known to be a problem in adjacent states.

Category 4 - Exotic plant that is naturalized in Georgia but generally does not pose a problem in Georgia natural areas or a potentially invasive plant in need of additional information to determine its true status.

The following invasive plant species have been observed on TBR: Japanese honeysuckle (*Lonicera japonica*), Japanese wisteria (*Wisteria floribunda*), torpedo grass (*Panicum repens*), camphor tree (*Cinnamomum camphora*), hemp sesbania (*Sesbania macrocarpa*), and Chinese privet (*Ligustrum sinense*) (SOUTHDIV 2004).

Camphor tree (*Cinnamomum camphora*, Category 2)

The camphor tree is an evergreen tree native to eastern Asia, growing to over 65 feet in height. It has glossy ovate leaves in a simple, alternate arrangement and produces small, black fruits, and white flowers in loose panicels. The crushed leaves and inner bark give off a strong odor of camphor (Langeland et al. 1998). It usually occurs in dry disturbed areas such as roadsides, but also invades upland pine and scrub communities and mesic hammocks where it can threaten sensitive native species (MacDonald et al. 2008). The most effective management strategy for controlling camphor trees is preventing their spread by removing immature trees before they begin to produce fruit. Repeated mowing can control seedings, and manual removal has been shown to control young trees (MacDonald et al. 2008). Mature trees can be controlled by a frilling treatment in which the outer bark is cut and peeled back to form a pocket or frill, into which a herbicide such as triclopyr (commercially available as Garlon® 4, 30 percent in oil) is poured (MacDonald et al. 2008).

Chinese privet (*Ligustrum sinense*, Category 1)

Chinese privet is a perennial shrub that grows up to 16 feet in height. The plant has gray bark with a smooth texture, and glossy elliptic or ovate leaves. Chinese privet and other invasive *Ligustrum* species are native to Asia, Europe, and North Africa. It was introduced in 1852 as an ornamental shrub and has since become established in many regions in the U.S. particularly the southeast. Chinese privet invades floodplain forests and other native communities, where it forms dense thickets and disrupts and out-competes native species (MacDonald et al. 2008). Frequent mowing and cutting is an effective management strategy for small populations, but will not eradicate the plant from an area. Application of glyphosate or triclopyr to foliage or freshly cut stumps of Chinese privet has been shown to kill the plant and is the recommended management technique for large infestations (MacDonald et al. 2008).

Cogongrass (*Imperata cylindrica*, Category 1)

Cogongrass is a fast-growing perennial grass that was introduced into the United States in 1911 near Mobile, Alabama. Cogongrass grows in patches and can reach 5 feet in height. Unlike other summer grasses, cogongrass produces fluffy, white, plume-like heads in early spring (late March through mid-June in south Georgia). It typically invades non-cultivated habitats including rights-of-way, forests, pastures, orchards, and waste areas. Tillage of new patches of cogongrass is an effective control measure. Frequent mowing and cutting is an effective management strategy for small populations but will not eradicate the plant from an area. Application of glyphosate or imazapyr twice a year has been shown to kill the plant and is the recommended management technique for large infestations. Older infestations may require 2 to 3 years of treatment to eliminate rhizomes. Within pine plantations, prescribed burning during winter before herbicide treatments will increase the effectiveness of the herbicide application (Evans et al. 2005).

Hemp sesbania (*Sesbania herbacia* [*macrocarpa*], Category 2)

Hemp sesbania (coffee weed) is an annual legume attaining a height of over 30 feet and having a fibrous woody stem and compound leaves. It produces yellow flowers and numerous black seeds that are toxic to humans and animals. It has become established throughout the Gulf Coastal Plain in ditches, along riparian areas, and in fallow fields and other disturbed areas. It threatens native species by shading and competition, and is also a major agricultural pest (Boyette et al. 2014). Herbicides such as lactofen and acifluorfen have been shown to effectively control hemp sesbania in agricultural plots, and biological controls such as certain fungi have also been shown to be effective (Boyette et al. 2014) . Some populations of hemp sesbania have been shown to be tolerant of glyphosate (Boyette et al. 2014). Mechanical removal or cutting is not considered to be an effective management strategy for hemp sesbania due to the large number of seeds it produces.

Japanese honeysuckle (*Lonicera japonica*, Category 1)

Japanese honeysuckle is a perennial vine that forms mounds and mats on open ground and climbs shrubs, low trees, and structures such as fencing by twining. It is native to Japan, Korea, China, and Taiwan and has become naturalized in much of the U.S., particularly in the southeast (Bravo 2003). It is present in nearly all southeastern forest communities and can dominate large areas, threatening sensitive native species, and can sometimes smother or strangle small trees. Where it occurs in small patches Japanese honeysuckle can be controlled through mechanical means including pulling entire vines and root systems, and frequent mowing (Bravo 2003). Larger infestations can be controlled effectively using systemic herbicides such as glyphosate (available commercially as Rodeo® for wetlands and Roundup® for uplands) and triclopyr (available commercially as Garlon® 3A) and applied when conditions are conducive to plant activity (Bravo 2003).

Japanese wisteria (*Wisteria floribunda,* Category 4)

Japanese wisteria is a perennial woody vine native to Japan. It forms dense thickets that overcrowd native species. It also climbs trees through twining and can overtake and strangle native shrubs and trees. It favors disturbed areas exposed to full sunlight such as forest edges and roadsides, and can create favorable conditions for itself by strangling and killing trees to reduce canopy cover. Small populations can be controlled mechanically by cutting vines as close to the root collar as possible early in the growing season. Established populations of Japanese wisteria have been effectively managed by applying systemic herbicides such as glyphosate and triclopyr to freshly cut stems. Large infestations can be controlled by applying a 2 percent concentration of glyphosate or triclopyr and water, and a 0.5 percent non-ionic surfactant to the foliage (Remaley 2005).

Torpedo grass (*Panicum repens*, Category 3)

Torpedo grass is a perennial grass with long, knotty rhizomes that often forms dense mats. It was introduced to the Gulf Coast of the U.S. over 100 years ago from an unknown place of origin (it is

native to countries in the Old and New World) and now occurs within various plant communities including coastal sand plant communities, marshes and other wetlands, riparian areas, along ditches and canals, and as an aquatic emergent (Stone 2011). Effective management strategies include top burning of torpedo grass mats in areas where there is a large infestation followed by application of herbicide such as imazapyr and glyphosate to the immature cuticle of young shoots (Stone 2011).

2.3.2 Aquatic Habitats and Vegetation

An aquatic habitat is specifically defined as an area of open water that supports aquatic or amphibious life, and a limited cover of emergent, submerged, or floating vegetation. Aquatic habitats on TBR are limited to surface waters of varying hydrology such as small streams, canals, and ponds. Lands near the southwestern boundary of the expanded TBR are within or drain directly into the Altamaha River corridor. Using the Cowardin system, aquatic habitats on TBR are classified as Lacustrine systems or Palustrine Unconsolidated Bottoms (Cowardin et al. 1979). Aquatic habitats are not classified by the USNVC. The GADNR SWAP identifies open-water ponds as a regionally important habitat and the Altamaha River corridor as a regionally important conservation area (GADNR 2005).

Open Water Ponds are aquatic habitats ranging from isolated depressions to impoundments created by beaver. Vegetation is sparse and consists primarily of emergent and floating macrophytes. These habitats are relatively uncommon in the Sea Island Flatwoods, and are maintained by periodic fire and fluctuating water levels. These habitats generally support common amphibians and reptiles, and can support rare amphibians where they do not support fish.

Seasonal Streams and Canals are surface waters characterized by channelized surface flow. The majority of seasonal streams on TBR are first order streams with seasonal hydrology. The two canals on TBR, Stink Hole Creek and Tobacco Bottom Canal, are each permanently inundated and channelized.

TBR abuts the Altamaha River corridor and several small streams and drainages located on TBR discharge directly into the Altamaha River. The Altamaha River is a large, low-gradient, meandering river with sandbars, sloughs, and an extensive floodplain that may remain inundated for extensive periods. Sand and silt are the dominant substrata and the river typically carries heavy sediment loads. Several rare and endemic bivalves have been reported from the Altamaha River, including the Altamaha spinymussel (*Elliptio spinosa*), listed as endangered under the ESA, and the Altamaha arcmussel (*Alasmidonta arcula*), a candidate for listing.

2.3.3 Fish and Wildlife

Fish and wildlife populations on TBR are typical of the Sea Islands Flatwoods. Comprehensive baseline surveys for animals were completed for TBR prior to the expansion (MCAS Beaufort 2013). Although the expansion area has not been systematically surveyed, it is likely to support similar fish and wildlife species.

2.4 SENSITIVE AND REGIONALLY IMPORTANT WILDLIFE

The GADNR SWAP identifies sensitive and regionally important plant species associated with the Sea Island Flatwoods (Table 2-3). Two of these species (Bachman's sparrow [*Peucaea aestivalis*] and Henslow's sparrow [*Ammodramus henslowii*]) are known to occur on TBR. In general, these species are threatened by loss of natural ecological communities and alteration of ecosystem processes. Because these species are uncommon, their occurrence on the landscape can have a substantial benefit on regional biodiversity. The biology, habitats, threats, and management recommendations for each of these species are provided below. Species classified as threatened or endangered by USFWS or GADNR and candidates for listing by the USFWS are discussed in Section 2.8 of this INRMP. Threatened, endangered, and candidate species are also sensitive and regionally important, but are afforded additional protections under the ESA and the Georgia Endangered Wildlife Act.

Table 2-3. Sensitive or Regionally Important Wildlife

Common Name	Scientific Name	Status	
		TBR	GADNR
Amphibians			
Gopher frog	*Lithobates capito*	PR	R
Reptiles			
Mimic glass lizard	*Ophisaurus mimicus*	PR	R
Spotted turtle	*Clemmys gutta*	PR	U
Mammals			
Rafinesque's big-eared bat	*Corynorhunus rafinesquii*	PM/PR	R
Birds			
Bachman's sparrow	*Aimphila aestivalis*	CR	R
Henslow's sparrow	*Ammadramus henslowii*	CR	R
Southeastern kestrel	*Falco sparverius paulus*	PM	R
Swallow-tailed kite	*Elanoides forficatus*	PM	R
Fish			
Blackbanded sunfish	*Enneacanthus chaetodon*	PR	E
Bluefin killifish	*Lucania goodei*	PR	R

CR – Confirmed resident; PM – Possible migrant or occasional visitor; PR – Possible resident; CR – confirmed resident; R – rare; U – unusual

Species descriptions below are in alphabetical order to facilitate ease of look-up and reference.

Bachman's Sparrow

Bachman's sparrow is a small insectivore often associated with open, mature pine forests (GADNR 2014b). The species prefers dense cover of grasses and forbs or palmetto scrub and can be found in mature open pinewoods, regenerating clear-cuts, utility rights-of-way, and old pastures. The Bachman's sparrow has become increasingly rare due to conversion of grassy fields to row crops or intensively grazed pastures, fire suppression in forested habitats, and dense stocking of pine seedlings when replanting, but is known to occur on TBR. Management for this species should include monitoring and surveys to identify areas of suitable habitat, conversion to pine dominated natural communities, prescribed fires, and avoidance of excessive herbicide use in suitable habitats.

Blackbanded Sunfish

The blackbanded sunfish is a small, laterally compressed and deep-bodied species reaching a maximum length of 4 inches and has five to six distinct black bars along its sides that extend from the dorsum to the venter. The first bar passes through the eye and the third through the first three membranes of the spinous dorsal fin to the upper edge. No other sunfish has this barring pattern. Blackbanded sunfish inhabit shallow, low-velocity, non-turbid waters of lakes, ponds, rivers, and streams. They are strongly associated with aquatic vegetation, and are typically found in acidic tea-stained waters, where they feed on aquatic invertebrates. Beaver ponds are important habitat for spawning, which generally occurs in spring, and for juvenile fish (GADNR 2014b). Various natural and anthropogenic factors may pose a threat to blackbanded sunfish, including alterations to drainage patterns within suitable habitat, excessive water withdrawal, removal of beaver dams, drought, competition or predation from other fish, and invasive species such as apple snails (*Pomacea spp.*) which threaten aquatic vegetation. Management for this species should include surveys to monitor and identify its presence within suitable habitats that employ a variety of survey techniques (e.g., seining, trapping, and dip netting), and protection of suitable habitat.

Bluefin Killifish

Bluefin killifish reach approximately 2 inches in length and have slender, compressed bodies with terminal, upturned snouts. They are sexually dimorphic with adult males having brightly colored dorsal, caudal, anal, and pelvic fins. Bluefin killifish are associated with aquatic vegetation in slow-flowing waters. They have been known to occur in ditches, ponds, sloughs, lakes, pools, and the backwaters of streams and spring runs. Bluefin killifish are also found in brackish water environments such as shallow estuaries (GADNR 2014b). Threats to bluefin killifish include habitat loss from reduced water levels in marshes and wetlands, flow reduction in tributaries and channels resulting from water withdrawal for irrigation, and removal of wetland and riparian vegetation. Management for

this species should include surveys to identify its presence, protection of wetlands, and avoidance of excessive water withdrawal from seasonal channels and small tributaries.

Gopher Frog

The gopher frog occurs throughout the Coastal Plain of the southeastern U.S. (GADNR 2014b). In Georgia, the gopher frog is restricted to longleaf pine dominated communities and occurs in well-drained and more poorly drained sites. Except when breeding, the gopher frog is essentially terrestrial and lives in animal burrows. Gopher tortoise and oldfield mouse (*Peromyscus polionotus*) burrows are typically used in drier habitats, while crayfish burrows may be used on wetter habitats. Gopher frogs breed in isolated, depressional wetlands, and optimal breeding sites provide a group or cluster of isolated wetlands. The gopher frog may potentially reside within TBR, so management for this species should include surveys to identify its presence, conversion to suitable pine-dominated natural communities, prescribed fires, and avoidance of pesticide use in occupied habitats.

Henslow's Sparrow

The Henslow's sparrow is a small insectivore and seed eater known to breed throughout much of the central and eastern midwest, along the very northern fringe of the southeast, in much of New York and Pennsylvania, and southwestern Ontario, Canada (GADNR 2014b). Wintering birds occur in the southeast Coastal Plain from North Carolina to eastern Texas and portions of the lower Mississippi River Valley. Breeding and wintering habitats are characterized by dense cover of grasses and forbs, well-developed litter layer, standing dead vegetation, and little or no woody vegetation. Sites with moist soils seem to be preferred. On its winter grounds, dense stocking of pines, lack of prescribed fire, draining of pitcher plant bogs and other wetlands, and unfavorable changes in power line maintenance procedures all reduce the dense grassy groundcover this bird prefers and leads to further population declines. This species has been observed on TBR and may use suitable wintering habitats throughout the expanded TBR. Management for this species should include monitoring of known occurrences, surveys to identify its presence elsewhere on TBR, conversion to suitable pine dominated natural communities, and prescribed fires.

Mimic Glass Lizard

The mimic glass lizard is a long, slender, limbless lizard occurring in a narrow band of the lower Coastal Plain from southeastern North Carolina to the Pearl River in Mississippi (GADNR 2014b). Mimic glass lizards are associated with longleaf pine communities, and habitat alteration in the lower Coastal Plain has contributed to substantial decline of this species. The last reported collection from Georgia occurred in 1978, and there are currently no known populations in the state. Destruction and fragmentation of mature, open pine forest habitat have been the greatest threats to the mimic glass lizard. It is unlikely that the mimic glass lizard occurs on the expanded portion of TBR. Management

for this species should include surveys to identify its presence, conversion to suitable pine dominated natural communities, and prescribed fires.

Rafinesque's Big-eared Bat

Rafinesque's big-eared bat has brownish-gray appearing dorsal hair, with individual dorsal hairs being dark brown to black at the base with pale red to brown tips. Its belly fur is dark at the base with contrasting white tips. Adults range from 3 to 4 inches in length, and weigh 0.25 to 0.5 ounce, with females tending to be slightly heavier than males. The wingspan ranges from 10 to 12 inches. The ears are large, usually exceeding 0.25 inch in length, are joined at the base, and are coiled (resembling the horns of a ram) when the bat is roosting. Rafinesque's big-eared bats are typically associated with forest communities such as mature bottomland and upland hardwood forests, and pine flatwood forests that are near water. Roosting sites include abandoned buildings, bridges, hollow trees, loose tree bark, rocky outcrops, and the entrances of caves and mines (GADNR 2014b). These bats are colonial roosters and suitable roost sites may hold up to 100 individuals. Rafinesque's big-eared bats forage among the canopies of large trees and feed exclusively on night-flying insects, especially moths. Primary threats to Rafinesque's big-eared bat populations include pesticides and destruction and alteration of forest habitat. Management for this species should include roost site surveys, surveys to identify suitable habitat (i.e., mature forests with plentiful hollow trees), avoidance of detrimental forest management practices such as culling of hollow trees, and avoidance of excessive use of pesticides near areas of suitable habitat.

Southeastern Kestrel

The southeastern kestrel is a small falcon occurring throughout much of North America (GADNR 2014b). In Georgia, the southeastern kestrel breeds in large open habitats including grasslands, pastures, sandhills, and open pine forests of the Coastal Plains. It is an obligate secondary cavity nester that uses old woodpecker holes or other cavities in trees. It also nests and roosts in nest boxes, buildings, and other human-made structures. The species preys on large invertebrates and small mammals, birds, and reptiles. Today the biggest threats to southeastern kestrel populations in Georgia are loss and alteration of open habitats, loss of cavity trees, and heavy pesticide use in feeding areas. Increased pesticide use can cause direct poisoning of birds as well as decrease prey numbers, particularly insects. This can lead to reduced survival rates for kestrels, as well as lowered reproductive success. Although the southeastern kestrel is not likely to occur on TBR, providing adequately designed nest boxes has increased populations in other areas. The management prescriptions identified in this INRMP which result in growth of large mature trees and maintenance of habitats with an open canopy could result in the creation of suitable habitats for the southeastern kestrel in the future.

Spotted Turtle

The spotted turtles are small aquatic turtles ranging from 3.5 to 4.5 inches in length, that occur from southern Maine southward along the Atlantic Coastal Plain and portions of the Piedmont to central Florida (GADNR 2014b). Populations also occur in the midwestern states and southern Canada. Heavily vegetated, shallow wetlands with standing or slowly flowing water are the typical habitat for the spotted turtle. Wetlands with a soft, mucky substrate seem to be preferred. During certain times of the year, spotted turtles spend a considerable amount of time on land. During this short activity period, terrestrial movements are often made from one wetland to another. At other times of the year, most spotted turtles bury themselves in moist, organic soil or muck either to aestivate or hibernate. A wide variety of plant and animal (live or carrion) material is consumed, including filamentous algae, aquatic grasses, aquatic insect larvae, crustaceans, snails, tadpoles, salamanders, and fishes. Although this species has not been identified on TBR, it could occur in the expanded portion of TBR. Management for the spotted turtle should include surveys to identify presence and avoidance of soil disturbance, ditching, draining, firebreak construction, bedding, and mechanical clearing in wetlands. Upland characteristics supporting the spotted turtle are not well understood; thus, management recommendations cannot be made for upland habitats.

Swallow-tailed Kite

The swallow-tailed kite is a migratory summer resident in Georgia (GADNR 2014b). The main breeding range in the U.S. is contained in just seven states and is restricted to riparian habitats throughout peninsular Florida and associated with major river systems of the lower coastal plains of South Carolina, Georgia, Alabama, Mississippi, Louisiana, and Texas. In Georgia this species occurs most commonly along the larger Atlantic drainage rivers, particularly the Altamaha, Savannah, Ogeechee, and Satilla rivers, but also in the Okefenokee Swamp and at sites scattered along the southern border of the state. This kite nests in trees that emerge above the surrounding forest, which in Georgia are typically very large pines found in small “pine islands” within floodplain or riparian forest, or in older stands of pine forest adjacent to floodplains of large rivers or tributary creeks. Foraging habitats include bottomland forests, cypress and mixed cypress-hardwood swamps, hardwood hammocks, pine flatwoods, pine forests bordering riparian areas, freshwater and brackish marshes, wet prairies, sloughs, and pastures. Loss of nesting, foraging, and roosting habitat from drainage of marshes and conversion of bottomland forests are the major threats to the species today.

Although nesting kites are relatively inaccessible and somewhat tolerant of human activity, roosting kites do not tolerate high levels of direct disturbance and are vulnerable to harassment. Areas possibly as large as 100,000 acres containing diverse riparian forest, upland pine edge, and open foraging areas are required to support viable populations. Areas capable of supporting kite populations now and in the future, especially those associated with large river and creek systems, must be identified and cooperatively managed to provide suitable habitat conditions for nesting and

foraging. Key roosting sites must also be protected. Conservation of swallow-tailed kites must involve lands actively managed for forestry and other uses in addition to wilderness areas and other public lands. Swallow-tailed kites have been observed foraging on TBR and are likely to forage in suitable habitats near the Altamaha River. Management for this species should include surveys to monitor and identify its presence, protection of wetlands, and allowing natural regeneration of floodplain communities.

2.5 MIGRATORY BIRDS AND BIRDS OF CONSERVATION CONCERN

The 1988 amendment to the Fish and Wildlife Conservation Act mandates the USFWS to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973." The USFWS identifies 35 migratory birds that have some potential to occur within McIntosh or Long Counties as a Bird of Conservation Concern (USFWS 2008a) (Table 2-4). Of these 35 birds, TBR is within the year-round range of nine species, the wintering range of 15 species, the breeding range of 10 species, and the migratory range of one species. Of these 35 birds, five have been documented on TBR. While the Atlanta Audubon Society does not identify any Important Bird Areas within TBR, the Altamaha River Wildlife Management Area (WMA) has been identified as such (Atlanta Audubon Society 2014).

Table 2-4. Birds of Conservation Concern, Southeastern Coastal Plain

Common Name	Scientific Name	Federal Status	Breeding Status
Red-throated loon	*Gavia stellata*	NONE	X
Black-capped petrel	*Pterodroma hasitata*	E	nb
Audubon's shearwater	*Puffinus lherminieri*	NONE	nb
American bittern	*Botaurus lentiginosus*	NONE	nb
Least bittern	*Ixobrychus exilis*	NONE	X
Roseate spoonbill	*Platalea ajaja*	NONE	nb
Swallow-tailed kite	*Elanoides forficatus*	NONE	X
Bald eagle	*Haliaeetus leucocephalus*	Delisted	X
American kestrel (*paulus* ssp.)	*Falco sparverius paulus*	NONE	X
Peregrine falcon	*Falco peregrinus*	Delisted	X
Yellow rail	*Coturnicops noveboracensis*	NONE	nb
Black rail	*Laterallus jamaicensis*	NONE	X
Limpkin	*Aramus guarauna*	NONE	X
Snowy plover (a)	*Charadrius nivosus*	NONE	X
Wilson's plover	*Charadrius wilsonia*	NONE	X
American oystercatcher	*Haematopus palliatus*	NONE	X
Solitary sandpiper	*Tringa solitaria*	NONE	nb
Upland sandpiper	*Bartramia longicauda*	NONE	nb
Whimbrel	*Numenius phaeopus*	NONE	nb
Long-billed curlew	*Numenius americanus*	NONE	nb

Table 2-4. Birds of Conservation Concern, Southeastern Coastal Plain

Common Name	Scientific Name	Federal Status	Breeding Status
Marbled godwit	*Limosa fedoa*	NONE	nb
Red knot (*rufa* ssp.)	*Calidris canutus rufa*	C	nb
Semipalmated sandpiper (Eastern)	*Calidris pusilla*	NONE	nb
Buff-breasted sandpiper	*Calidris subruficollis*	NONE	nb
Short-billed dowitcher	*Limnodromus griseus*	NONE	nb
Least tern (a)	*Sternula antillarum*	NONE	X
Gull-billed tern	*Gelochelidon nilotica*	NONE	X
Sandwich tern	*Thalasseus sandvicensis*	NONE	X
Black skimmer	*Rynchops niger*	NONE	X
Common ground-dove	*Columbina passerina*	NONE	X
Chuck-will's-widow	*Antrostomus carolinensis*	NONE	X
Whip-poor-will	*Antrostomus vociferus*	NONE	X
Red-headed woodpecker	*Melanerpes erythrocephalus*	NONE	X
Loggerhead shrike	*Lanius ludovicianus*	NONE	X
Brown-headed nuthatch	*Sitta pusilla*	NONE	X
Bewick's wren (*bewickii* ssp.)	*Thryomanes bewickii*	NONE	X
Sedge wren	*Cistothorus platensis*	NONE	nb
Wood thrush	*Hylocichla mustelina*	NONE	X
Blue-winged warbler	*Vermivora cyanoptera*	NONE	X
Black-throated green warbler	*Setophaga virens*	NONE	X
Prairie warbler	*Setophaga discolor*	NONE	X
Cerulean warbler	*Setophaga cerulea*	NONE	X
Prothonotary warbler	*Protonotaria citrea*	NONE	X
Swainson's warbler	*Limnothlypis swainsonii*	NONE	X
Kentucky warbler	*Geothlypis formosa*	NONE	X
Bachman's sparrow	*Peucaea aestivalis*	NONE	X
Henslow's sparrow	*Ammodramus henslowii*	NONE	X
LeConte's sparrow	*Ammodramus leconteii*	NONE	nb
Nelson's sharp-tailed sparrow	*Ammodramus nelsoni*	NONE	nb
Saltmarsh sharp-tailed sparrow	*Ammodramus caudacutus*	NONE	nb
Seaside sparrow (a)	*Ammodramus maritimus*	NONE	X
Painted bunting	*Passerina ciris*	NONE	X
Rusty blackbird	*Euphagus carolinus*	NONE	nb

E – Endangered, C – Candidate , nb – non-breeding
(a) non-listed subspecies or population of a Threatened or Endangered species

2.6 GAME ANIMALS

TBR supports several species of game animals including white-tailed deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo*), bobwhite quail (*Colinus virginianus*), and cottontail rabbit (*Sylvilagus floridanus*). TBR has conducted controlled hunts for white-tailed deer since 2004 and continues to offer approximately three recreational hunts per year. No fishing activities occur at TBR.

2.7 NUISANCE ANIMALS

A nuisance animal is any animal that causes direct or indirect adverse effects on native species or natural ecological communities. The most prevalent invasive animal on TBR is the feral pig (*Sus scrofa*). The extensive disturbance on soil and vegetation as a result of their rooting habits affects plant communities and may cause shifts in plant community structure (Georgia Museum of Natural History 2008). They also compete for food with native animal species, particularly mast crops (acorns) which are important sources of food for wild turkey and white-tailed deer. During the summer months, feral pigs create wallows in wet sites, destroying the integrity of the plant and soil community. Other invasive species on TBR are likely to include the nine-banded armadillo (*Dasypus novemcinctus*) and nutria (*Myocastor coypus*) (Georgia Invasive Species Task Force 2014). Invasive invertebrates are also known to occur on TBR, but are managed as forest pests.

2.8 THREATENED, ENDANGERED, AND CANDIDATE SPECIES

TBR has reviewed the GADNR SWAP, including the list of high-priority plants and animals associated with the Sea Island Flatwoods, the GADNR (2014a) database of protected and sensitive species occurrences in the USGS quarter quads encompassing the expanded range, and the USFWS (2014b) Information, Planning, and Conservation database of listed species potentially affected by any project occurring in Long or McIntosh Counties. TBR reviewed these lists and identified those species known to occur on TBR and those species which could be supported by habitats occurring or potentially occurring on TBR (Table 2-5). No portions of the expanded TBR contain critical habitat for Federally listed species as defined by the ESA. A brief description of each of these protected species and its management needs is provided below.

Table 2-5. Protected and Candidate Species Potentially Occurring on TBR

Common Name	Scientific Name	Status		
		TBR	USFWS	GADNR
Amphibians				
Frosted flatwoods salamander	*Ambystoma cingulatum*	CR	T	T
Striped newt	*Notophthalmus perstriatus*	LR	C	T
Reptiles				
American alligator	*Alligator mississippiensis*	CR	T/SA	-
Eastern indigo snake	*Drymarchon couperi*	LR	T	T
Gopher tortoise	*Gopherus polyphemus*	CR	C	T
Southern hognose snake	*Heterodon simus*	PR	-	T
Birds				
Bald eagle	*Haliaeetus leucocephalus*	PM	-	T
Red-cockaded woodpecker	*Picoides borealis*	PM	E	E
Wood stork	*Mycteria americana*	CM	E	E
Bachman's warbler	*Vermivora bachmanii*	U	E	E

Table 2-5. Protected and Candidate Species Potentially Occurring on TBR

Common Name	Scientific Name	Status		
Plants				
Corkwood	*Leitneria floridana*	PR	-	T
Dwarf witch-alder	*Fothergilla gardenia*	PR	-	T
Georgia plume	*Elliottia racemosa*	PR	-	T
Parrot pitcher plant	*Sarracenia psittacina*	PR	-	T
Pondspice	*Litsea aestivalis*	PR	-	T

CM – Confirmed migrant or occasional visitor; CR – Confirmed resident; PM – Possible migrant or occasional visitor; PR – Possible resident; LR – Likely resident; C – Candidate; E – Endangered; R – Rare; T – Threatened; T/SA – Threatened by similarity of appearance; U – Unusual

Species descriptions below are in alphabetical order to facilitate ease of reference.

American Alligator (*Alligator mississippiensis*, Federally Threatened by similarity of appearance)

The American alligator (Photograph 2-1) occurs throughout the southeastern U.S. (National Park Service [NPS] 2014). The species primarily inhabits freshwater swamps and marshes, but can also be found in rivers, lakes, and smaller bodies of water. Hunting and loss of habitat lead to the Federal listing of the species as endangered in 1967. Populations have since improved, and the American alligator was removed from the list of endangered species in 1987. The species is currently listed as threatened due to similarity of appearance to another listed species, the American crocodile. This listing status is intended to deter illegal hunting of either species to prevent inadvertent *take* of the American crocodile. Management for this species should include monitoring of population size and education of all users of TBR to avoid harm or harassment.

Photograph 2-1. American alligator
(Photograph Credit: USFWS)

Bachman's Warbler (*Vermivora bachmanii*, Federally Endangered)

The Bachman's warbler (Photograph 2-2) is the rarest songbird native to the U.S. and was listed as Federally endangered on March 11, 1967 (32 FR 4001; 35 FR 8495 [Endangered Species Preservation Act of 1966]). It is a small warbler species with a total length of 4 to 5 inches and a

slender slightly downward curving bill. Males have an olive-green dorsum with a yellow forehead, lores chin and belly, a black throat and crown, and dusky wings and tail (USFWS 1999). Females are drab in coloration, having an olive-green dorsum and underside with a gray crown, and lacking the black coloration present in males (USFWS 1999). The Bachman's warbler breeds in the southeastern U.S. and winters in western Cuba. The habitat associations of this species are not well known. However, historical records describe associated habitat as old-growth bottomland hardwood forests with open-canopy areas containing dense ground cover as nesting habitats (USFWS 1999). Bachman's warbler populations experienced drastic declines during the early 1900s, and it is now believed that this species is either extinct or near extinction. Several factors are thought to have played a role in the decline of Bachman's warbler including deforestation in the U.S. and Cuba, and severe tropical weather events (USFWS 1999). While it is unlikely that Bachman's warbler is present on TBR, surveys for other avian species conducted in bottomland hardwood habitat may document this species.

Photograph 2-2. Bachman's warbler
(Photograph Credit: Jerry A. Payne)

In addition to these threatened and endangered species known or likely to occur on the expanded TBR, there are numerous species of plants and animals identified as high priority for conservation by the GADNR SWAP that may occur on the expanded TBR or that would benefit from proposed management projects identified in this INRMP.

Bald Eagle (*Halieeatus leucocephalus*, State-listed Threatened)

Bald eagles (Photograph 2-3) are non-migratory and occur throughout most of the U.S. and Canada and extreme northern Mexico (GADNR 2014b). Nesting occurs at scattered sites throughout their range. Nesting in Georgia has been reported in significant numbers in the Coastal Plains, which includes the Sea Island Flatwoods, and nesting is especially common in coastal counties. Nesting is concentrated near open water including major rivers, wetlands, and reservoirs. Juvenile bald eagles and non-nesting adults can be seen throughout the state. The bald eagle's diet includes fish, waterfowl and other birds, turtles, small mammals, and carrion. Pesticides, primarily DDT, were a major factor leading to the Federal listing of the bald eagles in 1967. Outlawing of DDT and other

conservation efforts led to the de-listing of the species in 2007; however, other persistent toxic chemicals such as pesticides and herbicides continue to pose potential threats. The bald eagle is also susceptible to poisoned baits used for predator control. Bald eagles remain listed as threatened by the GADNR and are also protected under the Bald and Golden Eagle Protection Act.

Photograph 2-3. Bald eagle
(Photograph Credit: USFWS)

No known bald eagle nests have been documented within the expanded TBR. Juvenile and non-nesting adult bald eagles may utilize wetlands and other habitats within TBR for hunting and foraging. As the forests on TBR mature and produce larger trees, nesting could occur on TBR, especially near the Altamaha River. Management for this species should include surveys to identify its presence, educating TBR users, allowing trees to mature, and avoiding the use of poison baits for animal control.

Corkwood (*Leitneria floridana*, State-listed Threatened)

Corkwood (Photograph 2-4) is a deciduous shrub or small tree occurring in south Georgia, north Florida, east Texas, east Arkansas, and southeast Missouri (GADNR 2014b). Corkwood is found in shaded forested wetlands accompanied by red maple, cypress, and tupelo and prefers moist, poorly drained soils. The main threats to the species are impacts on wetlands and alteration of stream or river hydrology. There are three known populations of corkwood in Georgia, one of which is in McIntosh County. Management for this species should include surveys to identify its presence, avoidance of soil disturbance, ditching, draining, firebreak construction, bedding, and mechanical clearing in wetlands, and restoration of drainage networks.

Photograph 2-4. Corkwood
(Photograph Credit: William R. Carr)

Dwarf Witch-alder (*Fothergilla gardenia*, State-listed Threatened)

Dwarf witch-alder (Photograph 2-5) is a colonial deciduous shrub that is found in flat, low-lying swampy areas, particularly in the shrub-dominated margins of upland swamps, Carolina bays, and wet savannas (GADNR 2014b). The species is found throughout the Coastal Plain of Georgia, Florida, Alabama, South Carolina, and North Carolina. The main threats to the species are fire suppression, disruption of natural hydrology, and clearing and draining wetlands. Suitable habitat for the dwarf witch-alder exists along the edges of forested wetland environments on TBR. Management for this species should include surveys to identify its presence, use of prescribed fires, and avoidance of soil disturbance, ditching, draining, firebreak construction, bedding, and mechanical clearing in wetlands.

Photograph 2-5. Dwarf witch-alder
(Photograph Credit: Onlineplantguide.com)

Eastern Indigo Snake (*Drymarchon couperi*, Federally Threatened)

The eastern indigo snake (Photograph 2-6) is a large, black, non-venomous snake found in a variety of habitats throughout much of the southeastern U.S. (GADNR 2014b). In Georgia, the eastern indigo snake is most often associated with sand ridge habitats that often occur along major Coastal Plain streams. Eastern indigo snakes are often associated with the burrows of the gopher tortoise,

where they seek shelter from extreme temperatures and lay eggs. In areas lacking tortoise burrows, decayed stumps and logs are important habitat features used for cover. Individuals are likely to occupy upland habitats in association with gopher tortoise burrows during the summer and migrate to stream-bottom thickets in summer and make extensive movements during the late summer and fall. Eastern indigo snakes eat a variety of small mammals, amphibians, and other reptiles, including eastern diamondback rattlesnakes and gopher tortoise hatchlings.

Photograph 2-6. Eastern indigo snake
(Photograph Credit: USFWS)

The eastern indigo snake was Federally listed as a threatened species on January 31, 1978 (43 FR 4026). The objective of the Recovery Plan (USFWS 2008b) is to ensure that numerous populations continue to exist in the historical range of the species. Once this is established, the Recovery Plan calls for all states within the range to provide legal protection; delisting would then be considered, as eastern indigo snakes would be protected from interstate commerce by the Lacey Act.

Habitat loss is the most limiting factor affecting the eastern indigo snake, but collection, killing, vehicle strikes, and pesticides also impact this species. Observations of the eastern indigo snake have been documented west of State Highway 57 on the western boundary of TBR (MCAS Beaufort 2013). The eastern indigo snake is known to have a large range and utilize a variety of habitats, and therefore may utilize habitats within TBR. Management for this species should include surveys to identify its presence, conversion of pine plantation to suitable pine-dominated natural communities, and prescribed fires.

Frosted Flatwoods Salamander (*Ambystoma cingulatum*, Federally Threatened)

The frosted flatwoods salamander (Photograph 2-7) is restricted to the Coastal Plain of South Carolina, Georgia, Florida, and Alabama (GADNR 2014b). Breeding habitats include ephemeral wetlands, depressional wetlands dominated by pond cypress, blackgum, and slash pine that are seasonally flooded and geographically isolated from other bodies of water. These breeding habitats are typically devoid of predatory fish. Optimum breeding habitats are supported by appropriate upland habitats within 1,500 feet of a breeding site. Supporting upland habitats include moderately

moist open pine flatwoods or pine savannas with a transitional open canopy ecotone between upland and wetland habitats to facilitate transition between habitats.

Photograph 2-7. Frosted flatwoods salamander
(Photograph Credit: USFWS)

The frosted flatwoods salamander was Federally listed as threatened on April 1, 1999 (64 FR 15691) as populations declined due to loss of suitable habitat. Fire suppression and conversion of longleaf pine flatwoods into slash and loblolly pine plantations are the major threats to the frosted flatwoods salamander. Forestry practices such as ditching, draining, or bedding can alter local hydrology and eliminate or degrade potential breeding habitats. Extant populations are known from only four sites in Georgia; thus, fragmentation also threatens the species.

The frosted flatwoods salamander has been documented at TBR and may utilize ephemeral wetlands or ponds within the expanded TBR, where systematic surveys for this species have not occurred. Avoidance of mechanical disturbance to the soil and discontinuing practices that may result in adverse hydrological impacts on breeding sites are critical, especially within at least a 1-mile radius from the edge of all known breeding wetlands. Periodic lightning-season burns should be prescribed in pinelands inhabited by frosted flatwoods salamanders, and these fires should be allowed to burn into isolated wetlands. Known breeding sites should be monitored annually. Management should also include education of TBR users and efforts to restore a more natural hydrology through restoration of drainage networks.

Georgia Plume (*Elliottia racemosa*, State-listed Threatened)

The Georgia plume (Photograph 2-8) is a small tree or shrub found only in Georgia (GADNR 2014b). Georgia plume inhabits xeric environments including sand ridges and evergreen hammocks. Clear-cutting, conversion of natural communities, and fire suppression are the main threats to this species. Portions of the western boundary of the expanded TBR contain xeric environments suitable for the Georgia plume. Management should include surveys to determine its presence, conversion of pine plantation to suitable natural communities, and prescribed fires. Hand-clearing or low-intensity fire to

reduce competition with other woody vegetation is recommended in known or potential Georgia plume habitats. Older plants are killed by hot fires, and potential habitats for this species are best burned with cool fires during the winter.

Photograph 2-8. Georgia plume
(Photograph Credit: United States Botanic Garden)

<u>Gopher Tortoise (*Gopherus polyphemus*, Federal Candidate, State-listed Thratened)</u>

The gopher tortoise (Photograph 2-9) is separated into two populations by the USFWS. The western population, Federally listed as threatened on July 7, 1987 (52 FR 25376), is defined as those individuals that are found west of the Mobile and Tombigbee Rivers in Alabama, Mississippi, and Louisiana. All gopher tortoises located to the east are part of the eastern population. FR Docket No. FWS–R4–ES–2009–0029 (dated July 27, 2011; 76 FR 45130) states that listing the eastern population is warranted but precluded by higher-priority actions. As such, the gopher tortoise is Federally listed as a candidate species in an effort to conserve habitat to prevent the species from becoming listed. Likewise, the gopher tortoise is listed as threatened by the GADNR.

Photograph 2-9. Gopher tortoise
(Photograph Credit: USFWS)

Gopher tortoises are common in most types of upland communities with open canopies (GADNR 2014b). They are commonly found in habitats such as sandhills, pine flatwoods, scrub, scrubby flatwoods, dry prairies, xeric hammocks, pine-mixed hardwood forests, and coastal dunes. Gopher

tortoises construct burrows in sandy soils. The gopher tortoise resides in these burrows which protect them from other species and extreme heat. These burrows also provide similar protection for over 350 other commensal species. Gopher tortoises have been observed within xeric areas in the western portion of the expanded TBR and may occur in other areas. Management for this species should include monitoring of known populations, surveying to identify presence on other portions of TBR, conversion to suitable pine-dominated natural communities, and prescribed fires.

Parrot Pitcher Plant (*Sarracenia psittacina*, State-listed Threatened)

The parrot pitcher plant (Photograph 2-10) is a perennial herb occurring in Georgia, Florida, Alabama, Mississippi, and Louisiana (GADNR 2014b). Suitable habitats include wet savannas and pine flatwoods, seepage slopes, and bogs. Parrot pitcher plant is one of the more common of Georgia's pitcher plants and is likely to occur on the expanded portion of TBR. Management for this species should include surveys to identify its presence; restoration of drainage networks; avoidance of soil disturbance, ditching, draining, firebreak construction, bedding, and mechanical clearing in wetlands; prescribed fire; education of TBR users to avoid poaching; and eradication of feral hogs.

Photograph 2-10. Parrot pitcher plant
(Photograph Credit: GADNR)

Pondspice (*Litsea aestivalis*, State-listed Threatened)

Pondspice (Photograph 2-11) is a shrub or small tree occurring in the Coastal Plain of Georgia, Florida, South Carolina, North Carolina, Virginia, and Maryland (GADNR 2014b). Pondspice reproduces sexually, as well as vegetatively by suckering from underground stems (rhizomes). This species sometimes forms thickets and resprouts vigorously after fire. Suitable habitat occurs around the edges of swamps, cypress ponds, sandhill depression ponds, and Carolina bays. This species has not been observed on TBR, but may occur on suitable habitats within the expanded portion of TBR. Management for this species should include surveys to identify its presence; use of prescribed fires; restoration of drainage networks; and avoidance of soil disturbance, ditching, draining, firebreak construction, bedding, and mechanical clearing in wetlands.

Photograph 2-11. Pondspice
(Photograph Credit: North Carolina Native Plant Society)

Red-cockaded Woodpecker (*Picoides borealis*, Federally Endangered)

The red-cockaded woodpecker (Photograph 2-12) is a non-migratory cavity nester that was once common in mature pine forests throughout the southeastern U.S. from eastern Texas and Oklahoma to the Atlantic Coast and north to Missouri, Kentucky, and Maryland (GADNR 2014b). The current range for this species has been greatly reduced and fragmented due to destruction and fragmentation of mature, open pine forest habitat. Habitat loss led to the Federal listing of the red-cockaded woodpecker as endangered in 1970 (35 FR 16047). Georgia has five remaining population centers that comprise the vast majority the state's red-cockaded woodpecker population including Fort Benning, Fort Stewart, Okefenokee National Wildlife Refuge, Piedmont National Wildlife Refuge/Brender Experimental Forest/Oconee National Forest, and plantations in the Red Hills region of Thomas and Grady Counties where red-cockaded woodpecker habitat maintenance had been incidental to land management for quail hunting and aesthetics. Translocation efforts have re-established several family groups on Joseph Jones Ecological Research Center and Silver Lake WMA. A few scattered groups may remain elsewhere on private land.

Photograph 2-12. Red-cockaded woodpecker
(Photograph Credit: USFWS)

Southern Hognose Snake (*Heterodon simus*, State-listed Threatened)

The southern hognose snake (Photograph 2-13) is a short, stout-bodied snake primarily found in the Coastal Plain from southeastern North Carolina south and westward to the Pearl River in southern Mississippi, including much of peninsular Florida (GADNR 2014b). Southern hognose snakes are most often associated with well-drained, xeric, sandy soils where longleaf pine or scrub oaks (especially turkey oak) are the characteristic woody vegetation. Wiregrass is often a significant component of the groundcover. Ruderal habitats, including fallow fields, may also be used. Southern hognose snakes burrow both for cover and to unearth toads, their preferred prey. Although the southern hognose snake has declined or has possibly been extirpated from a large portion of its range, occurrences are regularly reported in many areas. Alteration of xeric habitats, non-native predators, especially imported red fire ants, road mortality, and human persecution have all been implicated, but no evidence of such threats can be clearly linked to the declines and disappearances at this time. Although it has not been observed, the southern hognose snake could occur on TBR. Management for this species should include surveys to determine its presence, control of imported red fire ants, and conversion to suitable pine-dominated natural habitats, and prescribed fire.

Photograph 2-13. Southern hognose snake
(Photograph Credit: Florida Museum of Natural History; John Jensen)

Striped Newt (*Notophthalmus perstriatus*, Federal Candidate, State-listed Threatened)

The striped newt (Photograph 2-14) was recently added as a candidate species to the USFWS threatened and endangered species list on June 7, 2011 (76 FR 32911). The striped newt is a small salamander found only in Georgia and Florida. Habitat includes longleaf pine-dominated savanna, scrub, or sandhills dominated by grass species. During the spring, the striped newt transitions from uplands into depressional and ephemeral wetlands to lay eggs. Suitable breeding habitat consists of shallow, isolated ponds, and wetlands devoid of fish. The primary threat to striped newts is habitat loss due to fire suppression and hardwood invasion (76 FR 32911-32923). The striped newt has not been documented on TBR, but may utilize ephemeral wetlands or ponds within TBR.

More research is needed to better understand the full range of requirements necessary for the survival of this unusual species. All efforts should be made to create low-impact buffer zones surrounding breeding sites that incorporate a substantial amount of upland habitat. In areas known to

contain striped newts, forest managers should minimize heavy soil disturbance, incorporate longer rotations, and reduce the basal area of planted pines. Habitat management actions for the gopher tortoise are also appropriate for the striped newt. Periodic fires are necessary to control woody midstory vegetation in upland habitats and should be allowed to burn into isolated wetlands. Drainage of isolated wetlands should be avoided.

Photograph 2-14. Striped newt
(Photograph Credit: USFWS)

<u>Wood Stork (*Mycteria americana*, Federally Endangered)</u>

The wood stork (Photograph 2-15) was listed as Federally endangered on February 28, 1984 (49 FR 7332). The wood stork is a colonial bird that nests in large rookeries often constructed in cypress or blackgum trees, or in mangroves on islands. Rookeries may be used from year to year as long as they remain undisturbed (USFWS 1986). They feed in flocks on small fish, crustaceans, amphibians, reptiles, and arthropods found within freshwater marshes, flooded roadside and agricultural ditches, and depressions in cypress heads, swamp sloughs, tidal creeks and pools, and estuaries. The wood stork is known to travel long distances (up to 80 miles) in search of feeding areas. Past research on Georgia wood stork colonies has found that foraging occurs 80 percent of the time within a 12-mile radius (USFWS 1986). A known wood stork rookery is located several miles northwest of TBR (USFWS 2009). Given the wood stork's ability to travel great distances, portions of TBR are likely to be utilized by wood stork as foraging habitat.

Photograph 2-15. Wood stork
(Photograph Credit: USFWS)

2.9 FOREST RESOURCES

The predominant forest cover at the Installation is loblolly pine, with lesser amounts of forest cover in slash pine, pine/hardwood, longleaf pine, and hardwood. Basic stand data, prescriptions, and records of completed actions are stored in a database. MCAS Beaufort uses this database in its Forest Management Plan for TBR (Appendix B). Forest Management Information System provides a means of recording and retrieving forest management data required for inventory control, analysis of stand information, and forest practices.

2.10 OUTDOOR RECREATIONAL RESOURCES

Because of the nature of the mission, safety concerns, and intensive, frequent use of TBR by aircraft, there is little practical opportunity for the public to engage in outdoor recreation. There are no recreational facilities such as nature trails, wildlife viewing areas, interpretive centers, picnic pavilions, or campgrounds on TBR. The primary activity for the public to participate in on TBR is the limited hunting program. However, the Range is considering inviting local bird watching groups to conduct limited, organized trips to participate in Christmas bird counts. TBR would benefit from these visits by virtue of the baseline bird survey information that would result, while providing additional public access to the property.

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3.0 ENVIRONMENTAL MANAGEMENT STRATEGY AND MISSION SUSTAINABILITY

3.1 SUPPORTING SUSTAINABILITY OF THE MILITARY MISSION AND THE NATURAL ENVIRONMENT

Sustainability is the ability to provide for the needs of the current mission without damaging the ability of future missions to maintain their needs in coordination with natural resources adaptive management. A sustainable process can be carried out repeatedly without substantial negative environmental impacts, increased operational costs or a decrease in mission readiness and training.

Training and management activities detrimental to the functional values of the natural communities on TBR can affect the USMC's military mission. For example, improper timber management around target areas could result in encroachment of trees and shrubs into the clear zones, dead and dying trees that create perches for large bird species, and heavy wildland fire fuel loads. These consequences would pose visibility and smoke issues that would negatively impact training. Conversely, properly managed timber provides open canopy and herbaceous forage to the benefit of imperiled species such as the gopher tortoise, improves visibility, and reduces wildland fire potential. Reforestation of harvested timber also prevents erosion and increased sediment loading in stormwater runoff, which may increase turbidity and reduce water quality in the surrounding watersheds, threatening vital aquatic habitat. Environmental conditions detrimental to the habitat of Federally protected or state-protected species could result in enforcement action by the responsible regulatory agency, possibly threatening the mission of TBR.

Outdoor recreational use by the public can affect the security and safety of the military mission. Outdoor recreational opportunities must be planned, developed, and used consistently with the constraints of the military mission, so as not to affect security or safety on TBR. Unplanned and unregulated use of natural recreational areas by the general public may also affect the military mission.

Monitoring and measurement is fundamental to adaptive natural resources management and mission sustainability. TBR will follow legal mandates and requirements to ensure that the effectiveness of management, plans, controls, and training is monitored. Furthermore, the use of Best Management Practices (BMPs) and established monitoring protocols will enable TBR's natural resources program to identify its progress toward achieving goals and objectives. Without effective monitoring and measurement it would be difficult for natural resources management to continually improve, which is the basis of sustainability.

3.1.1 Military Mission and Sustainable Land Use

The primary military mission on TBR is to fully support the operational and training missions of assigned tenants, enhancing the readiness of the USMC, its sister armed services, and other customers, especially with regard to aviation training in the use of a variety of ordnance. Merging the military mission with sustainable land use can be achieved through the maintenance of forestland to prevent encroachment onto the target areas and sustaining native environments such as low-lying scrubs. Maintenance of natural environments also better simulates “real world” conditions for trainees. Sustaining protected species habitat and air and water quality keeps TBR in compliance with environmental laws and USMC regulations. This INRMP creates a framework for sustainable land use that is compatible with the military training requirements while encouraging native and natural species abundance. Through the CO, MCAS Beaufort, and its constituent elements, TBR integrates its land use to meet the current and future military mission and ensure the conservation of the natural resources upon which effective training relies.

3.1.2 Defining Impact on the Military Mission

The military mission at TBR requires safe, natural-state land and environments for the training of aviators and other tenants. TBR will comply with environmental regulations and strive to conserve natural resources while also conducting effective training. Through the coordination of the various environmental programs (i.e., Forest Management, Fish and Wildlife Management), TBR ensures the availability of quality training opportunities and the protection of natural resources on its properties. TBR NRM and Range Control should coordinate during the planning phase of natural resources projects and training missions to ensure compatibility between the military mission and natural resources management. Resolutions should be established to ensure environmental regulations (e.g., ESA, CWA) are being satisfied while improving land and water resources and meeting the military mission.

3.2 NATURAL RESOURCES CONSULTATION REQUIREMENTS

All Federal agencies are required to implement protection programs for designated species and to use their authorities to further the purposes of the ESA. Furthermore, if a Federal action of any kind is found to potentially impact any species protected by the ESA, the responsible Federal agency must enter into Section 7 consultation with the USFWS. The USFWS is the primary agency responsible for implementing the ESA. In 2001, the USMC completed informal consultation to address the effects of implementing the 2001-2006 TBR INRMP on species listed under the ESA. Frosted flatwoods salamander populations have been documented at a single breeding pond on TBR. The Biological Opinion identifies conservation measures necessary to avoid adverse impacts on frosted flatwoods salamanders, and these conservation measures have been incorporated into this INRMP. It was

determined that the proposed management of the frosted flatwoods salamander may affect but is not likely to adversely affect the species.

This 2017-2022 INRMP expands the area in which previously proposed management actions would occur and proposes or details additional management actions not addressed in the 2001-2006 INRMP. As such, implementation of this INRMP requires consultation with the USFWS. ESA-listed species that may be affected by actions proposed in this INRMP are identified in Table 2-4. This INRMP and an Environmental Assessment will serve as the supporting information for informal consultation with the USFWS, and a letter of concurrence, if appropriate, will be included in Appendix F of this INRMP.

At present there are no areas designated as critical habitat for threatened or endangered species on TBR, although the frosted flatwoods salamander does occur on TBR. Activities proposed in this INRMP would provide “special management and protection” for the frosted flatwoods salamander as defined in the ESA. These activities meet the three criteria established by USFWS for special management and protection: 1) this INRMP provides a conservation benefit to the species by maintaining or increasing the frosted flatwoods salamander’s population on TBR through improvement of terrestrial habitat by use of prescribed fire and improvement of water quality and hydrologic regime of the breeding ponds; 2) this INRMP provides certainty that the management plan will be implemented on TBR; and 3) this INRMP provides certainty that the conservation effort will be effective.

Migratory birds are specifically protected under the MBTA of 1918, as amended, and EO 13186 of 10 January 2001, Responsibilities of Federal Agencies to Protect Migratory Birds. The MBTA makes it illegal to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products, except as allowed by the implementing regulations. EO 13186 requires that Federal agencies avoid or minimize the impacts of their activities on migratory birds and make efforts to protect birds and their habitat. Military preparedness and readiness activities such as small craft operations training are exempt from the MBTA. Although exempt per 50 CFR 21, MCAS Beaufort is responsible for monitoring the potential impacts on migratory birds from military readiness activities. This monitoring will be carried out in conjunction with monitoring and management conducted under EO 13186 as specified in the Memorandum of Understanding (MOU) between the DoD and USFWS to Promote the Conservation of Migratory Birds dated 31 July 2006, and in the DoD Guidance to implement said memorandum dated 3 April 2007.

3.3 PLANNING FOR NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE

NEPA requires an environmental analysis of major Federal actions, including actions that occur with Federal funding or on Federal lands. NEPA requires the evaluation of the environmental effects of proposed land use, development, and military training activities. Some USMC actions fall under existing categorical exclusions (CATEXs) and require no further environmental analysis. For those actions not covered by an existing CATEX, the initial environmental document, the Environmental Assessment (EA), determines the potential for significant project impacts and the feasibility of proposed actions. The NEPA process requires coordination with appropriate Federal and state agencies and the general public. The public review process identifies significant issues to develop and evaluate alternatives. The preparation of an EIS occurs only if significant impacts are identified. If the EA finds “no significant impacts”, the USMC would complete the preparation of a formal Finding of No Significant Impact and make it available for public review.

An EA resulting in a Finding of No Significant Impact was prepared to address the actions proposed by the initial TBR INRMP in 2001. Preparation of an EA is advisable if there are plans for new activities that were not analyzed in the initial EA, there is a significant change in land use or new military training activities, or new threatened or endangered species are discovered. Although the mission and management practices proposed in this INRMP do not represent a substantial change in quality from the mission and proposed management practices identified in the 2006 INRMP, the expansion of TBR represents a substantial increase in the area over which these practices will be implemented. Thus, an EA is being prepared for this 2017 INRMP to provide more current analysis and help guide decision-making.

The MCAS Beaufort NRM will serve as the NRM for TBR and will review all activities on TBR to ensure that implementation of the proposed activities meets the guidelines and standards provided in this INRMP. The MCAS Beaufort NRM will also monitor natural resource conditions, as described in this INRMP, to ensure that proposed activities are achieving their desired results. Routine review and update of this INRMP and monitoring data will ensure that all NEPA requirements are being upheld. The MCAS Beaufort NRM will adapt management prescriptions to address undesirable conditions and will re-initiate NEPA analysis if substantial adverse effects are observed or substantial modification of proposed activities are required.

3.4 BENEFICIAL PARTNERSHIPS AND COLLABORATIVE RESOURCE PLANNING

The limited staffing level of natural resources personnel at TBR and the need for outside expertise increases the importance of developing cooperative projects with other agencies, universities, contractors, other Installations, local residents, conservation organizations, and the MCAS Beaufort command. Cooperating Federal agencies, universities, and non-governmental organizations can provide a beneficial exchange of technical information, natural resources services, and field

assistance. TBR has a diversity of natural resources and, due to the need for a variety of expertise and assistance in developing and implementing sound management practices, has developed partnerships and cooperative agreements for technical assistance in managing its natural resources.

Stakeholders are those organizations and individuals who have a vested interest in land management on TBR. Stakeholders include the GADNR, USFWS, University of Georgia, the Fort Stewart/Altamaha River Longleaf Alliance, the USDA NRCS, U. S. Forest Service (USFS), GFC, the USACE, the USEPA, the Naval Facilities Engineering Command (NAVFAC Mid-Atlantic [Midlant]), Native American Tribes, especially the Catawba Indian Nation, as well as private individuals and groups with an interest in TBR's natural resources. Partnerships, cooperative agreements, and community programs that affect natural resources management at TBR are discussed below.

- **Invasive species program with the University of Georgia**. TBR will report the occurrence of invasive species identified on TBR to the University of Georgia's (2014) Early Detection and Distribution Mapping System. Early detection and response to invasive species can substantially improve the effectiveness of control efforts.
- **Local Emergency Response Teams**. TBR will report and coordinate response to wildland fires with local response teams as indicated in the Wildland Fire Action Plan (Appendix H). Wildland fires occurring throughout the region have the potential to affect the military mission and natural resources on TBR. Thus, collaborative use of resources in response to wildland fires will benefit regional partners, as well as TBR.
- **Fort Stewart/Altamaha River Longleaf Alliance**. TBR is a signatory partner of the Fort Stewart/Altamaha River Longleaf Alliance (Partnership). Partners have signed an MOU to conserve, enhance, and restore approximately 5,000,000 acres of longleaf pine natural communities throughout the Altamaha and Ogeechee river basins (Conservation Area). This MOU formalizes the collaborative environment necessary to sustain the seminal mission of the Partnership which is to provide technical expertise, strategic coordination, and leveraged resources for land conservation and ecosystem restoration in southeast Georgia in a manner compatible with the partners' conservation objectives, including the DoD's ability to conduct military training and sustain Installations within the Conservation Area. This MOU provides a formal venue to continue the work of the Partnership to achieve its goals: collaborative landscape-scale planning, protection and management of endangered species and rare natural communities, natural resource education, research, and the development of a flexible and functional ecosystem database for the Conservation Area for use by the Partnership members and other Federal, state, and local agencies.
- **USFWS.** USFWS provides signatory agreement concerning the conservation, protection, and management of the fish and wildlife resources presented in this INRMP. USFWS is the principal Federal agency for issues regarding fish and wildlife management, as well as the regulatory authority for the ESA and the MBTA (16 U.S.C. 703-711).
- **GADNR.** GADNR provides signatory agreement concerning the conservation, protection, and management of the fish and wildlife resources presented in this INRMP. GADNR is the primary state agency in Georgia for issues regarding fish and wildlife management and state-listed threatened and endangered species, as well as the regulatory and enforcement authority for hunting, fishing, and trapping. GADNR is also a consulting agency under the Fish and Wildlife Coordination Act (16 U.S.C. 662).
- **NRCS.** The NRCS works in cooperation with TBR to protect and enhance TBR lands by preventing soil erosion, restoring eroded areas, maintaining vegetative cover, protecting

watersheds, providing pest management and wildlife habitat management, and reducing downstream impacts both on and off military lands.

- **GFC.** The GFC provides technical assistance for control and prevention of forest insect and disease outbreaks and personnel for fire suppression, prescribed burning advice, and other forestry related assistance.
- **USACE.** USACE provides technical assistance for developing this INRMP, for monitoring threatened and endangered species, and establishing baseline species surveys for TBR. USACE Regulatory Division has regulatory authority for jurisdictional waters of the United States, including wetlands.
- **USEPA.** USEPA provides limited assistance on wetland delineations and issues regarding Federally listed threatened and endangered species.
- **NAVFAC Midlant.** NAVFAC Midlant assists MCAS Beaufort in developing and implementing conservation programs on TBR.

3.5 PUBLIC ACCESS AND OUTREACH

Opportunities for outdoor recreation at TBR are limited to hunting and special events as authorized. This INRMP proposes exploring opportunities to expanding the existing hunting program.

Access to natural resources management areas generally is limited to active duty and reserve military personnel assigned to the Installation, their dependents and accompanied guests, Federal and civilian employees, their dependents and accompanied guests, and military retirees. In general, public access to TBR is restricted for security and safety.

Access should also be considered in terms of accessibility of facilities and programs for the physically challenged. The Architectural Barriers Act of 1968 (PL 90-480) requires facilities to be accessible to the physically challenged. Section 504 of the Rehabilitation Act of 1973, as amended (PL 93-112), prohibits discrimination on the basis of handicap in program participation and in all facets of employment. The Americans with Disabilities Act of 1990 (PL 101-336) provides standards for addressing discrimination against individuals with disabilities in employment, transportation, telecommunications, public accommodations, and services operated by private entities. Military Installations, including dependents and employed civilians, are not exempt from these laws.

Outdoor recreational opportunities available at TBR were further discussed in Section 2.10.

3.6 ENCROACHMENT PARTNERING

Encroachment is any issue external to military operations that inhibits, curtails, or has the potential to impede the performance of the military mission. The majority of lands adjacent to TBR are privately owned and managed for commercial forestry operations with certain parcels leased for secondary activities such as hunting (Figure 3-1). Goodwood Georgia, Limited Liability Company (LLC), a subsidiary of FIATP SSF Timber, LLC, owns property to the northwest and southeast of TBR, and

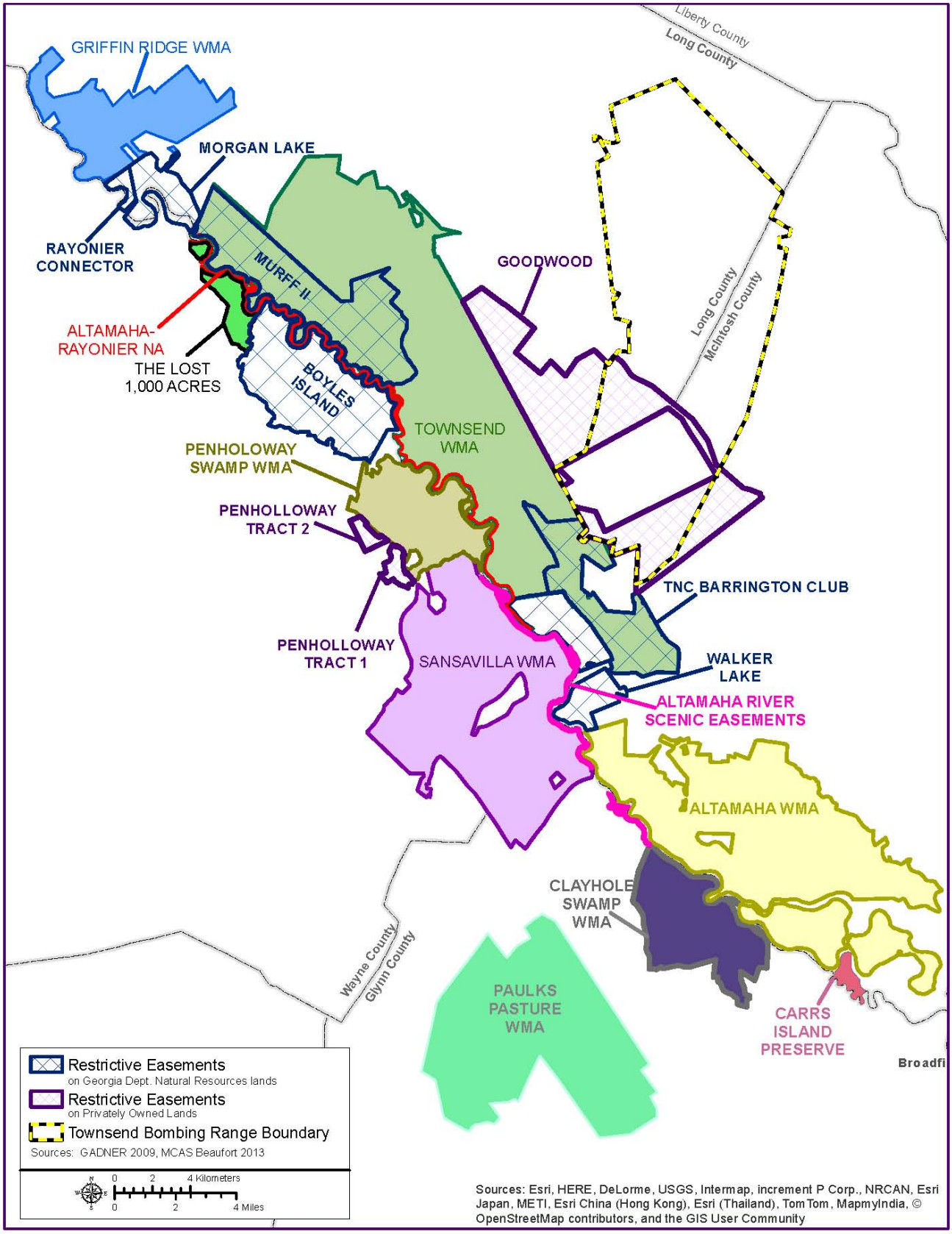

Figure 3-1. Encroachment Partnering Map

Rayonier Forest Resource Limited Partnership and Rayonier Timberlands Operating Company Limited Partnership own property northeast of TBR. State lands are in proximity to TBR in McIntosh and Long Counties; however, no residential or commercial properties directly adjoin TBR. The State of Georgia owns lands and holds conservation easements on a majority of the land immediately west of TBR. Approximately 24,000 acres of land generally located south and west of TBR are held as conservation easements. The easements cover both public and private sector lands in the vicinity of TBR and govern development to prevent land use conflicts with the military mission.

In 2009, the Land Conservation Council (which governs the Georgia Land Conservation Program [GLCP]) awarded the GADNR $6 million to acquire the 7,180-acre Lower Altamaha River tract adjacent to the Altamaha River in McIntosh and Long Counties (GLCP 2009). The tract contains the state's largest and oldest cypress and tupelo trees and at least 17 rare and threatened species. It connects with other state lands to comprise an area over 83,000 acres in size. The Nature Conservancy (TNC), the USFWS, and the GADNR's Nongame Program also contributed significant financial resources to secure the state's purchase from Rayonier Timber Company.

In 2010, just north of the previously acquired 7,180 acres, the GADNR acquired 6,911 acres along the Altamaha River in Long County (GLCP 2010). This property adjoins the Lower Altamaha River tract and helps create a 20-mile stretch of contiguous public land and buffers TBR. The area is currently managed by GADNR as the Townsend Wildlife Management Area (WMA). Key partners include TNC, which acquired the property from Rayonier Forest Resources; the USMC, which purchased an easement over the property; and the USFWS, which provided a grant for the state to acquire the remaining fee-title interest in the property. No state funds were used to acquire the tract.

In addition to these recent conservation efforts, TNC, the USMC, and the GADNR have been involved in other conservation efforts in the Lower Altamaha River Corridor. These include various easements and WMAs, including but not limited to the following: Georgia Department of Transportation-managed Ballard Tract; Penholloway Swamp WMA; Altamaha WMA; Townsend WMA (which now includes the aforementioned GADNR purchases); TNC Barrington Club Easement; and the Clayhole Swamp WMA (Figure 3-2).

3.7 GEORGIA STATE WILDLIFE ACTION PLAN (SWAP) INTEGRATION

The GADNR has developed a SWAP (GADNR 2005) to address habitats and species most at risk and strategies for their conservation. GADNR prioritized 78 actions to address the conservation needs of these species and habitats. From that list, the following five major conservation themes were identified as crucial for maintaining Georgia's biological diversity:

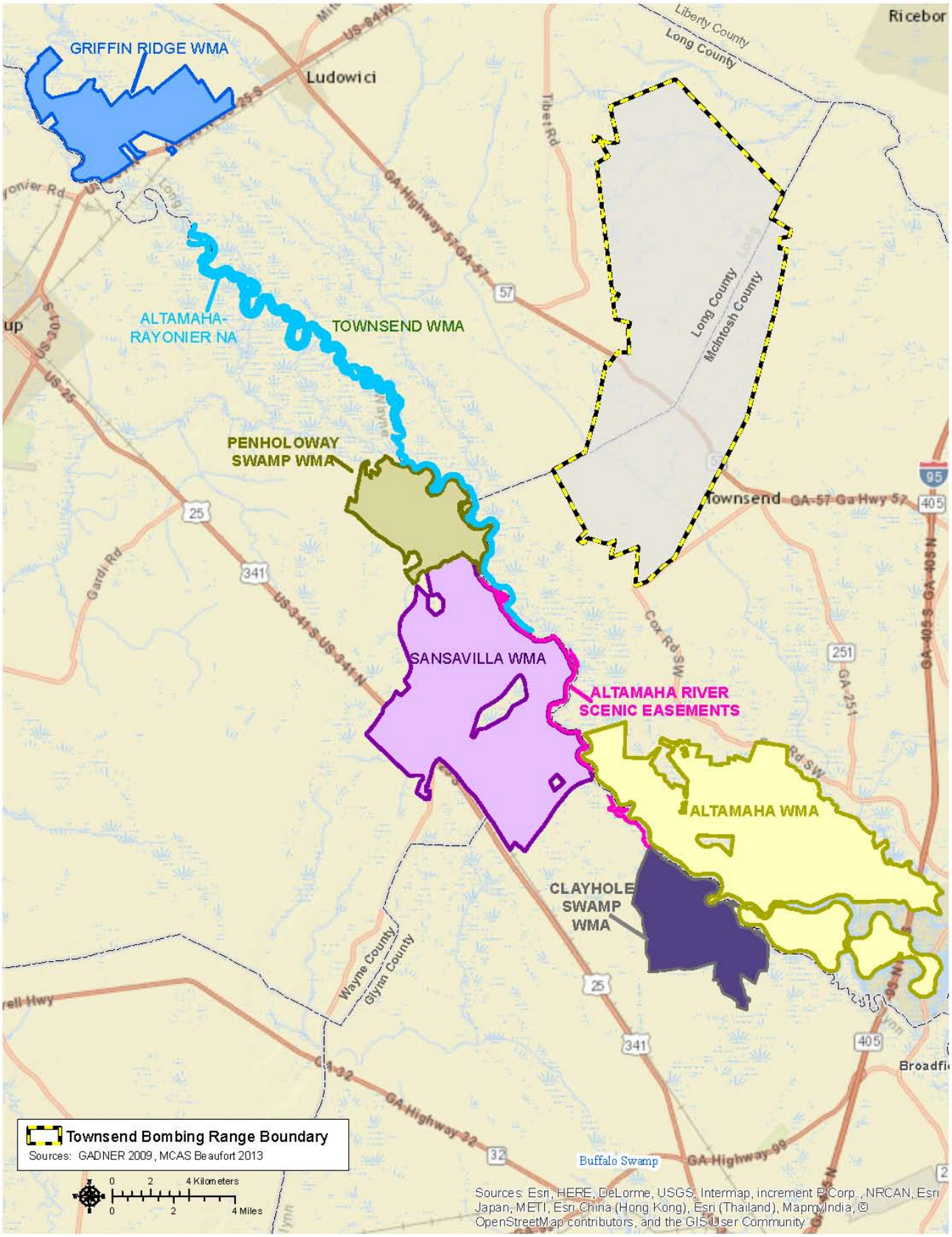

Figure 3-2. Conservation Partnering Map

- Increase the use of prescribed fire for habitat restoration
- Improve wetland protection and mitigation banking methods
- Provide technical and financial assistance to private landowners to voluntarily apply wildlife conservation methods on their property
- Develop a statewide strategy for invasive exotic species assessment and control
- Facilitate Georgia Land Conservation Program and other land protection efforts

These themes have been integrated into the TBR INRMP to the extent practical. The use of prescribed fire at TBR is primarily a means of preventing the spread of wildland fires caused by munitions use. TBR will integrate the control of fuel loads with restoration of sensitive and regionally important habitats by mimicking natural fire regimes, management of pine-dominated communities, and passive restoration of hardwood communities. Measures to avoid or minimize potential impacts on wetlands on TBR have been integrated with the military mission and other activities on TBR primarily through the delineation and avoidance of wetlands and secondarily though the implementation of BMPs to prevent and minimize the potential adverse impacts resulting from soil erosion, surface water pollution, and use of pesticides. TBR will continue to study hydrology and develop a plan to restore the drainage network of the Snuff Box Canal and explore opportunities to mitigate unavoidable impacts on wetlands through on-site creation and restoration. TBR will assess and control invasive exotic species range-wide and pursue opportunities for cooperation with local and regional agencies. Opportunities for cooperation include education on the most recent and locally effective control methods, design and implementation of studies to test effective control methods, and early warningof newly established invasive species in the region. The two remaining SWAP conservation themes address private and state efforts to conserve lands. Although TBR does not assist directly in these efforts, TBR does partner with the state to conserve lands surrounding TBR as a buffer to encroachment of land uses not compatible with the military mission at TBR.

The GADNR SWAP also identifies sensitive habitats and species that are of greatest conservation need in Georgia. This INRMP includes projects to identify the occurrence of these sensitive elements on TBR, assess their current and potential conditions, and implement measures to monitor, protect, conserve, and enhance these resources.

Section 4.0

4.0 NATURAL RESOURCES GOALS, OBJECTIVES, AND STRATEGIES

This section presents the goals, objectives, and strategies for natural resources management at TBR, to be reviewed annually. Four goals have been identified for TBR:

Goal 1 Preserve access to air and land to meet military readiness requirements.

Goal 2 Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices.

Goal 3 Manage and provide for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation.

Goal 4 Provide public access to Installation lands, where practicable, provided such access does not conflict with military readiness and does not harm sensitive natural resources on TBR.

Goal 1 primarily pertains to Land Management issues (see Section 5.1), Goal 2 pertains to Fish and Wildlife issues (see Section 5.2), Goal 3 pertains to Forestry (see Section 5.3), and Goal 4 pertains to Outdoor Recreation issues (see Section 5.4). Through these goals, TBR will create and maintain a balance between its natural resources and military operations. To ensure success in achieving these goals at TBR, a framework or "road map" of objectives, strategies, projects, and management initiatives is provided in this section. The goals, objectives, strategies, projects, and initiatives are referenced throughout this INRMP where appropriate and relevant.

Definitions

Goals: Goals are general expressions of desired future conditions that represent the long-range aim of management. For this INRMP, goals are compatible with the military mission of TBR and provide conservation and ecosystem management targets and direction.

Issues: Issues may include the presence, abundance, distribution, function, condition, and sensitivity of a particular natural resources feature, resources-based human function, or other attribute on the Installation, or a broader ecological or community setting. Issues may also include the effectiveness or ineffectiveness of existing or past practices regarding management and use of resources on the Installation, and the requirements for regulatory compliance regarding the management and use of these natural resources. Section 5 addresses issues that have been identified to establish objectives for achieving the stated INRMP goals at TBR.

Objectives: Objectives are defensible targets or specific components of a goal, the achievement of which represent measurable progress toward that goal. Objectives help focus management activities

and provide a yardstick against which to evaluate and communicate results. One or more objectives may be identified for successfully achieving a particular goal.

Strategies: Strategies establish the approach and expected end result for the actions that are necessary to accomplish stated objectives. One or more strategies may be identified for accomplishing a particular objective. Strategies define certain actions to be taken by DON, such as the completion of specific projects and the implementation of other management initiatives at TBR. Strategies usually specify time frames for completion of various actions.

Projects: Projects are discrete actions for fulfilling a particular strategy. Projects may be required to fulfill obligations by TBR to meet regulatory requirements regarding natural resources management, or may enhance existing measures for ensuring compliance. Other projects are not compliance-driven, but may allow for more effective and efficient management of natural resources and provide for sound natural resources stewardship. Projects require labor resources and funding in addition to the day-to-day requirements of the Installation.

Initiatives: Initiatives are fundamental, non-measurable actions necessary for successful implementation of a strategy. Some strategies identify the need for incorporating sound natural resources management principles into the day-to-day decision-making process, and other actions of the various departments at TBR. These types of initiatives typically strive to elevate awareness throughout the organization, avoid potentially reactive approaches to natural resources issues, and facilitate a proactive approach to addressing natural resources within the mission of the Installations. Initiatives attempt to solve problems that preclude meeting specific strategies.

Goal 1: Preserve access to air and land to meet military readiness requirements.

Issue: The military mission at TBR requires the management of natural resources to maintain clear zones around all targets. The following strategies were developed to accomplish Goal 1. Projects and initiatives pertaining to each strategy are also listed.

Objective 1.1: Maintain firebreaks that are free of woody vegetation.

Objective 1.2: Maintain forest buffers around all targets that provide a buffer from shrapnel and noise.

Objective 1.3: Prevent and minimize the potential for wildfire to affect the military mission, facilities, surrounding lands, and ecological communities.

Objective 1.4: Implement environmentally beneficial grounds maintenance and landscaping practices.

Objective 1.1: Maintain firebreaks that are free of woody vegetation.

Strategy 1.1.1: TBR will integrate firebreak maintenance with other program elements by developing site-specific maintenance plans, including necessary BMPs, for each target; manage conditions at firebreaks; and adapt management as necessary to avoid or minimize potential adverse effects.

Projects: Project No. 01 – Firebreak Maintenance

Initiatives:

(1) Control all unwanted vegetation within firebreaks

(2) Use mechanical and chemical methods to control invasive species as needed and only when use of prescribed fires is precluded or ineffective

(3) Identify and implement the site-specific BMPs necessary to avoid or minimize conditions promoting wildland fire, soil erosion, or the establishment and spread of invasive species and to avoid or minimize potential impacts on surface water, wetlands, sensitive and regionally important habitats and species, and migratory birds

(4) Review firebreak conditions as often as practicable to prescribe and adapt management as necessary

Objective 1.2: Maintain forest buffers around all targets that provide a buffer from shrapnel and noise.

Strategy 1.2.1: TBR will integrate the maintenance of forest buffers with other program elements by developing site-specific maintenance plans, including necessary BMPs in and around each target; manage conditions in the forest buffers; and adapt management as necessary to avoid or minimize potential adverse effects.

Projects: Project No. 01 – Firebreak Maintenance

Initiatives:

(1) Use mechanical or chemical methods to control invasive species as needed (only when use of prescribed fires is precluded or ineffective)

(2) Delineate the forest buffer around each target area

(3) Identify and implement the site-specific BMPs necessary to avoid or minimize conditions promoting wildland fire, soil erosion, or the establishment and spread of invasive species and to avoid or minimize potential impacts on surface water, wetlands, sensitive and regionally important habitats and species, and migratory birds

Objective 1.3: Prevent and minimize the potential for wildfire to affect the military mission, facilities, surrounding lands, and ecological communities.

Strategy 1.3.1: TBR will avoid adverse effects of wildfire as described in the Wildland Fire Management Plan through constructing and maintaining firebreaks, controlling fuel loads, maintaining readiness to respond, and developing partnerships. Integrate wildland fire management with other program elements by using an ecosystem management approach that mimics natural fire regimes; routinely monitor habitat conditions, and adapt management as necessary to avoid or minimize potential adverse effects from wildfire.

Projects: Project No. 01 – Firebreak Maintenance

Project No. 02 – Wildland Fire Management Plan

Initiatives:

(1) Delineate areas to be maintained as firebreaks and areas around infrastructure to be maintained with reduced fuel loads to reduce fire risk to infrastructure

(2) Following the guidelines presented in the Wildland Fire Management Plan

a. maintain firebreaks and areas of reduced fuel load

b. maintain readiness to respond to wildland fires

c. respond to wildland fires as they occur

(3) Evaluate firebreaks and buffers for effectiveness as often as practicable and adapt design and location as necessary

(4) Evaluate wildfire hazard potential to prescribe and adapt management as necessary

(5) Develop partnerships and opportunities for collaboration in the management of wildfire

Objective 1.4: Implement environmentally beneficial grounds maintenance and landscaping practices.

<u>Strategy 1.4.1</u>: TBR will review all grounds maintenance and landscaping activities to ensure consistency with the concepts presented in this INRMP; monitor conditions of maintained grounds; and adapt management as necessary to avoid or minimize potential adverse effects on natural resources.

Projects: None

Initiatives:

(1) Review grounds maintenance and landscaping practices with maintenance personnel on an annual basis, as new contracts are awarded, and as USMC grounds maintenance staff leadership changes

(2) Evaluate all grounds maintenance activities to ensure compliance with BMPs and note unanticipated or unintended effects on natural resources

(3) Review grounds maintenances activities and data routinely and adapt activities as appropriate

Goal 2: Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices.

Issue: As development and training activities have a significant potential to affect natural communities at TBR, land management decisions and practices will become increasingly important aspects of ecosystem management. The use and management of lands for military mission needs, as well as the decision-making process regarding such land use, can directly affect the sustainability of the ecosystem. To conserve and rehabilitate natural resources while ensuring the continuation of the military mission, TBR will implement practices to meet the following objectives:

Objective 2.1: Avoid, minimize, and mitigate impacts on wetland quantity and quality.

Objective 2.2: Maintain the attenuation capacity and function of the 100-year floodplain.

Objective 2.3: Avoid and minimize pollution of surface waters.

Objective 2.4: Control and remove invasive and exotic species.

Objective 2.5: Control nuisance animal populations and minimize attractants of new populations.

Objective 2.6: Conserve, restore, and enhance habitats supporting rare species and species listed as threatened, endangered, or candidate species under the ESA, so as not to interfere with the military mission.

Objective 2.7: Avoid and minimize impacts on migratory birds and their nests in accordance with the MBTA.

Objective 2.8: Conserve, enhance, and restore sensitive and regionally important habitats for utilization by listed species and species of special concern, so as not to interfere with the military mission.

Objective 2.9: Maintain a GIS database to facilitate effective species and habitat management at TBR.

Objective 2.10: Maintain up-to-date training of natural resource personnel.

Objective 2.1: Avoid, minimize, and mitigate impacts on wetland quantity and quality.

Strategy 2.1.1: Use the preliminary jurisdictional determination to help identify areas of likely wetlands impact during preliminary planning of development projects.

Projects: Project No. 03 – Wetlands Delineation

Project No. 09 – GIS Maintenance

Initiatives:

(1) Update planning level surveys as warranted

(2) Update jurisdictional determination as warranted by future development plans

(3) Review wetlands extent and quality every 5 years and adapt management properly

Strategy 2.1.2: Maintain no net loss of wetlands, promote 50-foot buffers for all wetlands, and ensure that land use and land management practices will not adversely affect wetlands.

Projects: Project No. 03 – Wetlands Delineation

Project No. 09 – GIS Maintenance

Initiatives:

(1) Establish a baseline from which to evaluate no net loss of wetlands

(2) Continue to implement management practices (e.g., prescribed fires) to enhance wetland habitat where appropriate

(3) Promote and monitor 50-foot vegetative buffers around all wetlands

(4) Create a GIS layer for wetland locations and quality

Objective 2.2: Maintain the attenuation capacity and function of the 100-year floodplain.

Strategy 2.2.1: Continue reviewing and monitoring proposed activities to avoid impacts on the attenuation capacity of the 100-year floodplain. If development is necessary within the 100-year floodplain to support the military mission, it shall be confined to previously disturbed areas of the floodplain whenever practicable.

Projects: Project No. 03 – Wetlands Delineation

Project No. 09 – GIS Maintenance

Initiatives:

(1) A representative of the TBR natural resources staff shall work with facility and environmental personnel to ensure implementation of the 100-year floodplain management strategy

(2) Map disturbed and undisturbed areas of the 100-year floodplain for use in the decision-making process

(3) Where there is no practical alternative to development within the 100-year floodplain, construction methods utilized on TBR should be such that damage would be minimized in the event of flooding to avoid contamination of waters

(4) Evaluate county floodplain regulations, including their applications to construction and building codes, as guidance for development in the 100-year floodplain

(5) Retain the natural attenuation and filtering capacity of wetlands within the 100-year floodplain by ensuring no net loss of wetlands and maintaining 50-foot vegetative buffers around wetlands

Objective 2.3: Avoid and minimize pollution of surface waters.

Strategy 2.3.1: Continue to implement BMPs for the prevention of stormwater pollution, identify and implement BMPs where necessary, and monitor implementation and effectiveness of all BMPs.

Projects: Project No. 03 – Wetlands Delineation

Initiatives:

(1) Review construction projects to evaluate stormwater discharge into wetlands and waterbodies and ensure that:

a. stormwater runoff is subjected to BMPs prior to discharging into wetlands and waterbodies. BMPs shall prevent or reduce the amount of pollution in water to a level compatible with Georgia's Water Quality Standards;

b. no site activities result in violation of state water quality standards associated with the siltation of wetlands, or reduction in the natural retention or filtering capability of wetlands; and

c. adequate soil erosion measures are implemented.

(2) Review implementation data, assess adequacy of BMPs, and adapt management as necessary

Strategy 2.3.2: Apply soil erosion management to the preservation of sensitive habitats and species.

Projects: Project No. 03 – Wetlands Delineation

Project No. 09 – GIS Maintenance

Initiatives:

(1) Determine areas where soil type presents a threat of erosion

(2) Train and educate all contract and department personnel on actions that may directly or indirectly contribute to soil erosion problems

(3) Work with facility and environmental personnel to ensure implementation of soil erosion control measures

Objective 2.4: Control and remove invasive and exotic species.

Strategy 2.4.1: Implement strategies for the control and removal of invasive and exotic species on TBR.

Projects: Project No. 04 – Invasive Species Management

Project No. 09 – GIS Maintenance

Initiatives:

(1) Maintain a register of existing and potential invasive and exotic species infestations that includes species' locations, appearance, habitats and ecology, and control methods

(2) Identify and delineate areas vulnerable to infestation (e.g., target areas, roadways, firebreaks, and other disturbed areas) for monitoring and control

(3) Survey vulnerable areas as needed to monitor occurrence, distribution, and abundance of invasive and exotic species; high-priority species include those plants classified as Category 1 or Category 2 by the Georgia Exotic Pest Plant Council

(4) Continue to develop and implement control recommendations identified in the 2004 Invasive Species Report

(5) Identify opportunities to partner with local and regional agencies and landowners in the development of effective control methods and the identification of new threats in the region

(6) Review data annually, adapt management as necessary, participate in regional control efforts, and ensure integration with the management of other program elements

Objective 2.5: Control nuisance animal populations and minimize attractants of new populations.

Strategy 2.5.1: Monitor existing nuisance animal populations to address ongoing and long-term problems and respond to temporary, non-routine issues as appropriate.

Projects: None

Initiatives:

(1) Routinely survey for indications of nuisance animal presence and activity, particularly as they pertain to grounds and property damage and threats to rare and protected animal and plant species

(2) Resolve nuisance animal issues through the humane control or removal of the animal(s), in accordance with appropriate DoD instructions and state laws

Objective 2.6: Conserve, restore, and enhance habitats supporting rare species and species listed as threatened, endangered, or candidate species under the ESA.

Strategy 2.6.1: Manage frosted flatwoods salamander populations and suitable habitats at TBR.

Projects: Project No. 05 – Frosted Flatwoods Salamander Management

Project No. 06 – Threatened, Endangered, Candidate, and Rare Species Management

Project No. 08 – Prescribed Burn Program

Project No. 09 – GIS Maintenance

Initiatives:

(1) Monitor known frosted flatwoods salamander populations in accordance with the 2001 Biological Assessment (Appendix G)

(2) Survey suitable habitats on TBR for occurrence of unknown potential frosted flatwoods salamander breeding sites on a recurring basis

(3) Use prescribed fires to maintain suitability of habitats for frosted flatwoods salamanders

(4) Identify and implement measures to reduce predatory fish access to frosted flatwoods salamander breeding sites

(5) Review results of surveys and prescribed fires with cooperating agencies and adapt management as necessary

Strategy 2.6.2: Manage populations of and habitats supporting threatened, endangered, candidate, and rare species at TBR.

Projects: Project No. 06 – Threatened, Endangered, Candidate, and Rare Species Management

Project No. 08 – Prescribed Burn Program

Project No. 09 – GIS Maintenance

Initiatives:

(1) Survey potentially suitable habitats for the occurrence of threatened, endangered, candidate, and rare species identified in Table 2-4 of this INRMP

(2) Review results of surveys and monitoring with cooperating agencies on an annual basis and improve management as necessary

(3) Institute informative programs to educate users on TBR about rare and listed species on the Range, and their habitat requirements

(4) Work with adjacent land-owning agencies to maximize conservation benefits to rare and listed species

Objective 2.7: Avoid and minimize impacts on migratory birds and their nests in accordance with the MBTA.

Strategy 2.7.1: Ensure adherence to the MBTA.

Projects: Project No. 06 – Threatened, Endangered, Candidate, and Rare Species Management

Project No. 07 – Migratory Bird Surveys

Project No. 09 – GIS Maintenance

Initiatives:

(1) Survey regularly for the occurrences, abundances, and seasonalities of migratory birds on the Range

(2) Identify and count (to the extent practicable) any migratory birds that are unavoidably taken during military readiness activities and report any takes up the chain of command

Objective 2.8: Conserve, enhance, and restore sensitive and regionally important habitats for utilization by listed species and species of special concern.

Strategy 2.8.1: Use prescribed fires to enhance and restore regionally important habitats by mimicking natural fire regimes that control invasive species and promote establishment and maintenance of desirable species composition and structure.

Projects: Project No. 08 – Prescribed Fire Program

Project No. 09 – GIS Maintenance

Initiatives:

(1) Develop a Prescribed Burn Program identifying management priorities, schedule, target fuel loads, typical burn plans, and BMPs

(2) Conduct prescribed fires to mimic natural fire regimes to the extent practical, while controlling fuel loads and invasive species, promoting vegetation composition and structure suitable for target species, and creating a diversity of conditions across the landscape

(3) Evaluate effectiveness of individual prescribed fires for controlling invasive species, establishing and maintaining desirable species and vegetation structure, and avoiding unintended or unanticipated effects on natural resources

(4) Review prescribed burn data annually, assess program adequacy, schedule and adapt management prescriptions as appropriate, and ensure integration with other program elements

Objective 2.9: Maintain a GIS database to facilitate effective species and habitat management at TBR.

Strategy 2.9.1: Attain, store, and access qualitative and quantitative data pertinent to the assessment and adaptation of natural resources management.

Projects: Project No. 09 – GIS Maintenance

Initiatives:
(1) Develop a GIS framework that will be compatible with the system used by MCAS Beaufort
(2) Develop and maintain layers for all natural resources management data

Objective 2.10: Maintain up-to-date training of natural resource personnel.

Strategy 2.10.1: Send personnel to natural resources training conferences and workshops as appropriate and necessary.

Projects: None

Initiatives:
(1) Remain current in knowledge of species and ecological communities present at TBR
(2) Remain current in knowledge and application of natural resources survey, monitoring, and research techniques

Goal 3: Manage and provide for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation.

Issue: The SAIA requires that military Installations evaluate the potential for providing outdoor recreational resources to the general public. Recreation on and adjacent to TBR is mainly supported by a large tract of land placed under restrictive easement with a commercial timber interest. As such, management objectives for TBR need to include the administration of dual-use programs for forestry and hunting. The following objectives were developed to address Goal 3:

Objective 3.1: Produce a sustainable yield of commercial timber products from native species.

Objective 3.2: Manage populations of game animals for healthy populations.

Objective 3.1: Produce a sustainable yield of commercial timber products

Strategy 3.1.1: Utilize sound, proven forest management techniques to support other program elements and enhance ecosystem benefits.

Projects: Project No. 09 – GIS Maintenance
Project No. 10 – Forest Management
Project No. 11 – Forest Inventory
Project No. 12 – Pest Management

Initiatives:
(1) Manage forest pests in accordance with the Integrated Pest Management (IPM) guidelines of the Forest Management Plan, described within this INRMP
(2) Identify areas suitable for timber harvest consistent with ecological and mission needs

(3) Recover merchantable value for standing timber on land designated to be cleared or developed for training or infrastructure

(4) Conduct thinning as needed to prevent overstocked conditions and improve forest health

(5) Prepare stands for harvest and conduct forest product sales in accordance with the Forest Management Plan

(6) Conduct reforestation and afforestation activities in accordance with the guidelines of the Forest Management Plan

Objective 3.2: Manage populations of game animals for healthy populations.

<u>Strategy 3.2.1</u>: Enhance white-tailed deer, turkey, and small game habitats, monitor harvest, and adapt management as necessary.

Projects: Project No. 09 – GIS Maintenance

Project No. 10 – Forest Management

Initiatives:

(1) Identify and designate priority areas for management and hunting of white-tailed deer, turkey, and small game

(2) Plant food plots in and near priority areas and manipulate habitat consistent with ecological and mission needs

(3) Monitor harvest for size and health of white-tailed deer and turkey populations

(4) Review management data with cooperating agencies and adapt management as necessary

Goal 4: Provide public access to Installation lands, where practicable, provided such access does not conflict with military readiness and does not harm sensitive natural resources on TBR.

Issue: The SAIA requires that military Installations evaluate the potential for providing outdoor recreational resources to the general public. However, public access to TBR is restricted for security and safety. Limited access for hunting and special events is authorized by TBR instructions when appropriate. The following objectives were developed to address Goal 4:

Objective 4.1: Identify outdoor recreational needs and opportunities and provide these opportunities where consistent with other program elements.

Objective 4.2: Ensure applicable environmental and hunting laws are adhered to on TBR.

Objective 4.1: Identify outdoor recreational needs and opportunities and provide these opportunities where consistent with other program elements.

<u>Strategy 4.1.1</u>: Identify opportunities to provide desirable recreation opportunities on TBR and continue to implement the hunting program on TBR.

Projects: None

Initiatives:

(1) Develop a system for managing hunter registration, access, and activities at TBR

(2) Educate all recreational users on the goals and objectives of this INRMP

(3) Ensure adherence to GADNR hunting regulations

(4) Ensure adherence to TBR security and safety considerations

(5) Review hunter activities and reporting records to identify any concerns and address them appropriately on an annual basis

Objective 4.2: Ensure applicable environmental and hunting laws are adhered to on TBR.

Strategy 4.2.1: Utilize conservation law enforcement personnel to enforce Federal and state natural resources related laws to protect game and nongame species, protect habitats and facilities, and ensure an equitable distribution of harvested game.

Projects: None

Initiatives:

(1) Maintain a natural resources law enforcement presence

(2) Enforce all Federal and state laws and regulations protecting natural resources and uphold the management guidelines and BMPs identified in this INRMP

(3) Document all infractions

(4) Review infractions to assess impact on management and alternatives for adapting management to prevent future infractions and minimize their adverse effects.

Section 5.0

5.0 PROGRAM ELEMENTS

This section discusses ecosystem management at TBR by dividing ecosystem management into four components: land management, forest management, fish and wildlife, and outdoor recreation. These components are further divided into sub-components; for example, land management addresses wetlands; noxious, invasive, and exotic species and pests; soil conservation and erosion control; stormwater and water quality control; and landscaping and grounds maintenance.

Sub-components are defined in this section. For each sub-component, this section discusses the issue(s), long-term management of the issue(s), the relationship of the issue(s) to ecosystem management at TBR, the relationships among ecosystem management sub-components, legal requirements, and sources for additional management information. This section also correlates the goals, objectives, and strategies (see Section 4) pertaining to ecosystem management issues.

The sub-components constitute natural resource management actions and benefit the plants, animals, and ecosystems occurring on this Installation. Special attention is given to RTE species and their habitats through management actions referenced in Table 5-1. These actions are long-term conservation measures that provide benefits for terrestrial and aquatic habitats on the Installation. Management actions such as soil conservation and stormwater management control sediment and pollutant runoff to protect water quality for species such as alligators and salamanders. Forestry actions such as prescribed fires, thinning, reforestation, and afforestation help to establish pine stands and herbaceous low-lying vegetation that provide habitat and resources for gopher tortoises, for example.

Table 5-1. Habitat Management Actions at TBR

Habitat Management Actions	Section
Wetland Management	5.1.1
Soil Conservation and Erosion Control	5.1.2
Stormwater and Water Quality Control	5.1.3
Floodplain Management	5.1.4
Landscaping and Grounds Maintenance	5.1.5
Invasive, Exotic, and Noxious Species	5.1.6
Silvicultural Activities (i.e., Thinning, Prescribed Burns)	5.2.1
Forest Protection	5.2.2

Table 5-1. Habitat Management Actions at TBR

Habitat Management Actions	Section
Fisheries Management	5.3.1
Threatened and Endangered Species	5.3.2
Wildlife Damage and Diseases and Nuisance Wildlife	5.3.3

5.1 LAND MANAGEMENT

Land management is the development of programs and techniques for managing wetlands, invasive, exotic, and noxious species and pests, soil conservation and erosion control, stormwater and water quality control, landscaping and grounds maintenance, and floodplains protection. The land management issues contained within this plan are not intended for directing land use activity (i.e., what buildings or activities should go where), but rather to provide managers with directions and general techniques (e.g., regarding soil conservation, stormwater management) to protect and enhance the natural environment, while continuing to provide for the needs associated with the military mission of TBR.

5.1.1 Wetlands Management

Wetlands are lands on which water covers the soil or is present either at or near the surface of the soil or within the root zone all year or for varying periods of time during the year, including the growing season. Federally, wetlands are protected under Sections 401 and 404 of the CWA and Section 10 of the Rivers and Harbors Act of 1899. In McIntosh and Long Counties, Georgia, Section 404 permitting is the responsibility of the USACE Savannah District.

Waters of the United States and wetlands are specifically defined under 33 CFR Part 328.3. The USACE mandates that wetlands exhibit three parameters in order to be classified as a wetland: (1) the vegetative community must be dominated by hydrophytic vegetation adapted to saturated conditions, (2) the area must show indicators of surface saturation or inundation, and (3) the area must contain indicators of anaerobic conditions within the soil. The USACE has jurisdiction over any wetland that has a significant nexus to traditional navigable waterways as defined by the CWA (USACE 2008). Approximately 30 percent of TBR is considered wetlands.

Issues

Wetlands at TBR provide habitat for birds, fish, wildlife, and plants, store and purify water, and provide open space and aesthetic value. Development constraints within TBR and the need for future development of lands require TBR to balance the wetland protection with support of the military mission.

Goals and Objectives

- Preserve access to air and land to meet military readiness requirements;
- Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices;
- Maintain clear zones around all targets that are free of unwanted woody vegetation;
- Avoid, minimize, and mitigate impacts on wetland quantity and quality;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Avoid and minimize pollution of surface waters;
- Control and remove invasive and exotic species;
- Conserve, restore, and enhance habitats supporting rare species and species listed as threatened, endangered, or candidate species under the ESA, so as not to interfere with the military mission;
- Conserve, enhance, and restore sensitive and regionally important habitats for utilization by listed species and species of special concern, so as not to interfere with the military mission;
- Maintain a GIS database to facilitate effective species and habitat management at TBR; and
- Maintain up-to-date training of natural resources personnel.

Projects

- Firebreak Maintenance (Project 01 in Appendix A)
- Wetlands Delineation (Project 03 in Appendix A)
- GIS Maintenance (Project 09 in Appendix A)

Management Strategies

- TBR will integrate firebreak maintenance with other program elements by developing site-specific maintenance plans; including necessary BMPs for each target; managing conditions at firebreaks; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will use the preliminary jurisdictional determination to help identify areas of likely wetlands impact during preliminary planning of development projects.
- TBR will maintain no net loss of wetlands, promote 50-foot buffers for all wetlands, and ensure that land use and land management practices will not adversely affect wetlands.
- TBR will continue reviewing and monitoring proposed activities to avoid impacts on the attenuation capacity of the 100-year floodplain. If development is necessary within the 100-year floodplain to support the military mission, it shall be confined to previously disturbed areas of the floodplain whenever practicable.
- TBR will continue to implement BMPs for the prevention of stormwater pollution, identify and implement BMPs where necessary, and monitor implementation and effectiveness of all BMPs.
- TBR will apply soil erosion management to the preservation of sensitive habitats and species.

- TBR will implement strategies for the control and removal of invasive and exotic species on TBR.
- TBR will monitor existing nuisance animal populations to address ongoing and long-term problems and respond to temporary, non-routine issues as appropriate.
- TBR will avoid impacts on threatened, endangered, candidate and rare species at TBR.
- TBR will attain, store, and access qualitative and quantitative data pertinent to the assessment and adaptation of natural resources management.
- TBR will send personnel to natural resources training conferences and workshops as appropriate and necessary.

Long-Term Management

TBR will establish and increase the width of existing vegetative buffers near wetlands that are less than 50 feet wide to a minimum of 50 feet, providing that buffer acreage is available and that buffers would not interfere with the military mission. Buffers will not be removed if any portion of the buffer is less than 50 feet wide. A minimum buffer width of 50 feet is required to provide the basic physical and chemical buffering needed to reduce siltation into the wetland, retain the natural attenuation and filtering capacity of the wetland, and maintain the wetland's biological communities.

In areas where the acreage available for buffering is not sufficient, or greater protection is needed, other appropriate measures will be employed. These protective measures could include (1) redirecting, discouraging, or prohibiting pedestrian and pet access to the wetland or buffer area by the placement of hedges, fences, or signs; and (2) planting vegetated filter strips, swaths of land planted with grasses and trees, to intercept uniform sheet flows of runoff before the runoff reaches a wetland. TBR will use these methods individually or in combination along the perimeters of wetlands.

In addition to creating and maintaining buffers to protect wetlands and subsequently water quality, TBR will manage stormwater (see Section 5.1.4) and the use of pesticides and herbicides (see Sections 5.1.5 and 5.2.1) to further protect water quality.

Integration with Other Natural Resources Management Activities

- Soil Conservation and Erosion, Section 5.1.2 – sedimentation into wetlands;
- Stormwater and Water Quality, Section 5.1.3 – stormwater runoff into wetlands;
- Floodplains, Section 5.1.4 – maintain wetlands to reduce flood impacts;
- Landscaping and Grounds Maintenance, Section 5.1.5 – maintain wetland buffer;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – potential pesticide contamination of wetlands;
- Silviculture, Section 5.2.1 – consider effects of burns and soil erosion on wetlands;
- Forest Protection, Section 5.2.2 – maintain regular burn cycles to ensure natural wetland conditions;

- Fisheries Management, Section 5.3.1 – wetland nursery habitat for juvenile fishes;
- Migratory Birds, Section 5.3.2 – wetlands are vital forage habitat for birds, particularly wading birds;
- Threatened and Endangered Species, Section 5.3.3 – wetlands provide vital habitat for many protected species;
- Nuisance Wildlife, Section 5.3.4 – consider propensity for wetlands to attract animals;
- Outdoor Recreation, Section 5.4 – restricted uses within wetlands;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on wetland laws, regulations, and management practices; and
- GIS, Section 5.5.2 – utilize GIS tools to improve wetland management.

Ecosystem Management

Wetlands management is an essential component of ecosystem management because it will preserve, enhance, and create habitat for a variety of wildlife species, while providing aesthetic and educational values. Changes to hydrology, geochemistry, substrate, or species composition may impair the ability of a wetland to function properly. Vegetative buffers between wetland and upland communities help maintain water quality by filtering sediments and other pollutants from runoff prior to discharge into wetlands. Vegetative buffers also provide habitat for a diversity of wetland and upland species.

Military Mission

TBR activities detrimental to wetland functions can affect the military mission by creating a conflict between TBR, GADNR, and USACE, as well as requiring high mitigation costs. Proper wetland management improves water quality for outdoor recreational activities, which helps maintain the morale of personnel assigned to TBR. Proper wetland management also helps mitigate the effects of flooding, which could pose a threat to the continuation and location of training activities.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Wetlands

- Federal Water Pollution Control Act, as amended by the CWA of 1977, 33 U.S.C. 1251, prohibits the discharge of dredged or filled materials into waters of the United States, including wetlands, without first obtaining a permit from USACE (Section 404 of the CWA).
- EO 11990, 24 May 1977, as amended, requires government agencies, in carrying out agency actions and programs affecting land use, to provide leadership and take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.
- CWA: Section 401 Water Quality Certification, 1986, 33 U.S.C. 1341, requires that states certify compliance of Federal permits or licenses with state water quality requirements and other applicable state laws. Under Section 401, states have authority to review any Federal permit or license that may result in a discharge to wetlands or other waters under state jurisdiction to ensure that the actions would be consistent with the state's water quality requirements.

- EO 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
- Coastal Zone Management Act, 16 U.S.C. 1451, establishes goals and a mechanism for states to control use and development of their coastal zone. Authorizes states to administer approved coastal nonpoint source pollution programs.
- MCO P5090.2A, Chapter 11, Paragraph 11104.2a, discusses natural resources management relating to wetland management.

Additional Sources of Information

USACE, Savannah District

http://www.sas.usace.army.mil/Missions/Regulatory/Permitting.aspx

USFWS, National Wetlands Inventory, Regional Wetlands Coordinator, Region 4

http://www.fws.gov/wetlands/Organization/rwc4.html

EPA, Water: Wetland

http://water.epa.gov/type/wetlands/index.cfm

Wetland Science Institute

http://www.pwrc.usgs.gov/wli

5.1.2 Soil Conservation and Erosion Control

Soil conservation involves the identification (e.g., type, location, and amount) and appropriate use of soil in accordance with the limits of its physical characteristics while protecting it from uncontrolled stormwater runoff to prevent and control soil erosion. Erosion is the detachment and movement of soil, usually by water, which results in sedimentation and physical damage. Soil characteristics and erosion potential will be used to plan the use and management of soils for construction, demolition, recreation facilities, and wildlife habitat. More fragile soil types require modifications to the timing, intensity, and frequency of land and wildlife management practices. Knowing where soil types are located on TBR and understanding the capabilities and limitations of the soils are prerequisites to selecting the most appropriate wildlife habitat improvement practices and appropriately guiding site selection for mission-related activities.

Issues

Soil erosion can undermine roadways, stream-side facilities, and other military structures, and often results in water quality problems (e.g., increased turbidity). It also increases maintenance costs associated with stormwater facilities. TBR has above average potential for severe erosion because of the soil types and abundant wetlands found on the Installation. Actions contributing to the susceptibility of the soil to erosion include:

- Pedestrian traffic on natural or undeveloped areas of low sustainability due to poor soil conditions, resulting in compaction of soils;
- Excessive and improper mowing activities and practices;
- Human-made alterations to the natural vegetative cover and topography, including the channeling of water flow (e.g., ditches) which decreases infiltration and increases the quantity and rate of flow, the exposure of soils and increased soil slopes, and the creation of impervious surfaces;
- Forestry practices (e.g., prescribed fires, thinning, and reforestation) that expose soils to rainfall and stormwater runoff;
- Combination of sandy soils, drought, and rainfall events that occur at TBR; and
- Failure to maintain a healthy ground cover in areas of low fertility and heavy use.

Areas at TBR that are either susceptible to erosion or have an erosion problem include road shoulders, stream banks, and areas adjacent to firebreaks and clearings. Proper grounds maintenance, which emphasizes vigorous growth of vegetation, is the best and most economical means of erosion control.

Goals and Objectives

- Preserve access to air and land to meet military readiness requirements;
- Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices;
- Prevent and minimize the potential for wildfire to affect the military mission, facilities, surrounding lands, and ecological communities;
- Maintain clear zones around all targets that are free of woody vegetation;
- Maintain forest buffers around all targets that provide a buffer from shrapnel and noise;
- Implement environmentally beneficial grounds maintenance and landscaping practices; and
- Avoid or minimize pollution of surface waters.

Projects

- Firebreak Maintenance (Project 01 in Appendix A)
- Wetlands Delineation (Project 03 in Appendix A)
- GIS Maintenance (Project 09 in Appendix A)
- Forest Management (Project 10 in Appendix A)

Management Strategies

- TBR will integrate firebreak maintenance with other program elements by developing site-specific maintenance plans, including necessary BMPs, for each target; managing conditions at firebreaks; and adapting management as necessary to avoid or minimize potential adverse effects.

- TBR will integrate the maintenance of forest buffers with other program elements by developing site-specific maintenance plans, including necessary BMPs in and around each target; managing conditions in the forest buffers; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will review all grounds maintenance and landscaping activities to ensure consistency with the concepts presented in this INRMP; monitor conditions of maintained grounds; and adapt management as necessary to avoid or minimize potential adverse effects on natural resources.
- TBR will continue to implement BMPs for the prevention of stormwater pollution, identify and implement BMPs where necessary, and monitor implementation and effectiveness of all BMPs.
- TBR will apply soil erosion management to the preservation of sensitive habitats and species.

Long-Term Management

Long-term management for soil conservation and erosion control will include identifying and understanding the suitability and sustainability of a soil unit for a proposed action. The USDA NRCS soil surveys may be used to identify the potential applicability and limitations of each soil unit for land use activities. The USDA soil survey provides information on potential erosion hazards; groundwater contamination; productivity of cultivated crops, trees, and grasses; and the protection of water quality, wetlands, and wildlife habitat.

To minimize soil erosion, TBR will implement the following:

- Continue the use of BMPs to control soil erosion. In addition, TBR will implement the following six principles for soil conservation and erosion management:
    1. Minimize areas of disturbance;
    2. Stabilize and protect disturbed areas from raindrop and runoff energies as soon as practical;
    3. Minimize runoff velocities;
    4. Protect disturbed areas from adjacent area runoff;
    5. Retain sediment within construction sites; and
    6. Reduce exposure time of disturbed soil before revegetating.
- Evaluate areas on the Installation for erosion control problems.
- Reduce mowing and increase grass height and coverage, where practicable.
- Implement BMPs during forest management activities such as road building, harvesting, reforestation, and timber stand improvement (TSI).
- Control potential erosion control problems by:
    1. Using vegetative and structural protective covers (e.g., permanent seeding, groundcover);
    2. Using sediment barriers (e.g., straw bales, silt fence, brush);

3. Creating sediment detention ponds and basins (e.g., sediment traps and basins);
4. Implementing stream and pond bank protection (e.g., natural vegetation);
5. Constructing pervious surface walkways in areas of high pedestrian traffic;
6. Constructing water conveyances (e.g., slope drains, check dam inlet and outlet protection);
7. Implementing temporary construction and road stabilization (e.g., placement of stone and geotextile fabrics);
8. Repairing bare and slightly eroded areas quickly; and
9. Maintaining healthy ground cover in improved and semi-improved areas.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – control sedimentation into wetlands;
- Stormwater and Water Quality, Section 5.1.3 – control stormwater to reduce erosion;
- Floodplains, Section 5.1.4 – identify soil types to reduce flood damage;
- Landscaping and Grounds Maintenance, Section 5.1.5 – ensure mowing plans and landscaping do not compromise soil conservation;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – ensure removal of undesired plants does not enhance erosion;
- Silviculture, Section 5.2.1 – consider effects of soil erosion;
- Forest Protection, Section 5.2.2 – burns promote the health of herbaceous ground cover to prevent erosion;
- Fisheries Management, Section 5.3.1 – control erosion into fishing areas;
- Migratory Birds, Section 5.3.2 – control erosion into wading areas;
- Threatened and Endangered Species, Section 5.3.3 – control erosion to maintain habitat and water quality for protected species;
- Nuisance Wildlife, Section 5.3.4 – controlling nuisance species that root (e.g., feral pigs) enhances erosion control;
- Outdoor Recreation, Section 5.4 – educate resource users to minimize erosion;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on BMPs; and
- GIS, Section 5.5.2 – utilize GIS tools to improve soil mapping and management.

Ecosystem Management

Soil conservation is an essential component of the ecosystem management concept. Soils are particularly susceptible to erosion from uncontrolled stormwater runoff and may discharge into waterbodies from point and nonpoint sources. Sediments in stormwater runoff have the capacity to obstruct drainage infrastructure and to reduce the volume capacity of wetlands, potentially resulting in damaging flood conditions. Turbidity pollution, derived from soil erosion, may also affect surface water quality in adjacent freshwater, estuarine, and marine environments.

Military Mission

Erosion can undermine roads, potentially affecting the military mission. It can also increase sediment loading in stormwater runoff, which increases turbidity and reduces water quality in surrounding waters, violating environmental laws and creating a conflict between TBR and GADNR.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Soil Conservation

- Soil Conservation Act, 16 U.S.C. 590(a) et seq., provides for soil conservation practices on Federal lands.
- Federal Water Pollution Control Act, as amended by the CWA of 1977, 33 U.S.C. 1251, regulates the dredging and filling of wetlands and establishes procedures for identifying and regulating nonpoint sources of polluted discharge, including turbidity, into waterways.
- CWA, Section 401, requires an applicant for a Federal license or permit to provide a certification that any discharges from the facility will comply with the CWA, including water quality standard requirements.
- CWA, Section 402, National Pollutant Discharge Elimination System (NPDES) Program, 2002, 33 U.S.C. 1251, controls direct discharges into navigable waters. NPDES permits, issued by either the USEPA or an authorized state or tribe, contain industry-specific technology-based limits and establish pollutant monitoring and reporting requirements.
- CWA, Section 404, establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands.
- Rivers and Harbors Act, requires authorization from the USACE for the construction of any structure in or over any navigable water of the United States and the excavation, dredging, and deposition of material in these waters or any obstruction or alteration in navigable waters.
- EOs 11989 and 12608, close areas to off-road vehicles where soil, wildlife, or other natural resources may be adversely affected.
- EO 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems. Vegetative buffers and landscaping to control soil erosion must comply with this EO.
- MCO P5090.2a Chapter 11, Paragraph 11104.2d, discusses natural resources management relating to soil conservation management.

Additional Sources of Information

USDA NRCS in Georgia

http://www.nrcs.usda.gov/wps/portal/nrcs/site/ga/home/

NPDES Stormwater Pollution Prevention Plans

http://cfpub.epa.gov/npdes/stormwater/swppp.cfm

USDA SSURGO Database

http://soils.usda.gov/survey/geography/ssurgo/

The National Soil Erosion Research Laboratory

http://www.ars.usda.gov/main/site_main.htm?modecode=36-02-15-00

5.1.3 Stormwater and Water Quality Control

Stormwater runoff is precipitation that falls onto surfaces (e.g., roofs, streets, the ground, etc.) and is not absorbed or retained by that surface, but collects volume and velocity as it flows off. Stormwater runoff management addresses measures to reduce stormwater runoff and pollutants in stormwater runoff, and to control discharge from point and nonpoint sources. Nonpoint source pollution is the polluting of surface water and groundwater resources by diffuse sources, rather than by discrete, identifiable point sources. Point and nonpoint source pollutants are commonly associated with land use. These pollutants routinely include sediments from land disturbance, pesticides and nutrients from urban lawns and landscaping, and oil, grease, heavy metals, and other toxic materials from streets, rooftops, and parking lots. Stormwater runoff is the most common transport mechanism for nonpoint source pollution. The majority of pollutant loading occurs during and immediately after storm events.

Issues

Stormwater discharges have been increasingly identified as a significant source of water pollution in numerous nationwide studies on water quality. As development increases at TBR, the control of stormwater drainage is an increasingly important aspect of water quality control. More impermeable surface area (less land available for absorption and filtration) translates into faster runoff rates and increased pollution loads. More development means more land clearing and landscaping activities that require appropriate stormwater management practices. It is especially important to have proper stormwater management when developed areas are in proximity to surface waterbodies or wetlands.

Goals and Objectives

- Preserve access to air and land to meet military readiness requirements;
- Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices;
- Maintain clear zones around all targets that are free of unwanted vegetation;
- Maintain forest buffers around all targets that provide a buffer from shrapnel and noise;
- Implement environmentally beneficial grounds maintenance and landscaping practices;
- Avoid or minimize pollution of surface waters;
- Avoid, minimize, and mitigate impacts on wetland quantity and quality;
- Maintain the attenuation capacity and function of the 100-year floodplain;
- Conserve, enhance, and restore sensitive and regionally important habitats for utilization by listed species and species of special concern, so as not to interfere with the military mission;
- Maintain a GIS database to facilitate effective species and habitat management at TBR; and
- Maintain up-to-date training of natural resources personnel.

Projects

- Wetlands Delineation (Project 03 in Appendix A)
- Prescribed Burn Program (Project 08 in Appendix A)
- GIS Maintenance (Project 09 in Appendix A)

Management Strategies

- TBR will integrate firebreak maintenance with other program elements by developing site-specific maintenance plans, including necessary BMPs, for each target; managing conditions at firebreaks; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will integrate the maintenance of forest buffers with other program elements by developing site-specific maintenance plans, including necessary BMPs, in and around each target; managing conditions in the forest buffers; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will review all grounds maintenance and landscaping activities to ensure consistency with the concepts presented in this INRMP; monitor conditions of maintained grounds; and adapt management as necessary to avoid or minimize potential adverse effects on natural resources.
- TBR will continue to implement BMPs for the prevention of stormwater pollution, identify and implement BMPs where necessary, and monitor implementation and effectiveness of all BMPs.
- TBR will use the preliminary jurisdictional determination to help identify areas of likely wetlands impact during preliminary planning of development projects.
- TBR will continue reviewing and monitoring proposed activities to avoid impacts on the attenuation capacity of the 100-year floodplain. If development is necessary within the 100-year floodplain to support the military mission, it shall be confined to previously disturbed areas of the floodplain whenever practicable.
- TBR will continue to implement BMPs for the prevention of stormwater pollution, identify and implement BMPs where necessary, and monitor implementation and effectiveness of all BMPs.
- TBR will apply soil erosion management to the preservation of sensitive habitats and species.
- TBR will use prescribed fires to mimic natural fire regimes that control invasive species and promote establishment and maintenance of desirable species composition and structure.
- TBR will attain, store, and access qualitative and quantitative data pertinent to the assessment and adaptation of natural resources management.
- TBR will send personnel to natural resources training conferences and workshops as appropriate and necessary.

Long-Term Management

There is currently no stormwater infrastructure associated with TBR. Stormwater discharges associated with construction activities would comply with the requirements of the CWA NPDES permit program as administered by the Georgia Environmental Protection Division (GAEPD). TBR will implement additional programs to reduce pollutant loading and stormwater runoff into wetlands and

waterbodies. Wetland quality and wildlife habitat will benefit from the reduction of pollutant loading. TBR will operate under the following management guidelines for stormwater runoff and water quality control:

1. TBR will manage stormwater runoff from new development to achieve no net increase in stormwater discharge volume from TBR, unless there are no means to do so that will meet the military mission.
2. TBR will implement forestry BMPs during silvicultural activities (e.g., thinning, reforestation, afforestation, and prescribed fires) to prevent soil erosion and other adverse impacts on the soil.
3. TBR will use natural or created buffers to provide wildlife habitat; reduce impacts associated with runoff; filter sediments and sediment-bound pollutants; and facilitate infiltration prior to discharge into waterbodies.
4. TBR will use permeable alternatives to impervious surfaces; for example, wood decks instead of concrete patios, grass swales instead of concrete, as practicable.
5. With the intent of helping to protect water quality, TBR will inventory its use of pesticides and fertilizers and will assess alternatives to reduce the use of mineral fertilizers and pesticides. TBR intends to use pesticides with lower toxicity levels and to apply them at reduced rates.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – control runoff and sedimentation into wetlands;
- Soil Conservation and Erosion, Section 5.1.2 – stormwater control will reduce erosion;
- Floodplains, Section 5.1.4 – proper stormwater drainage helps reduce flood damage;
- Landscaping and Grounds Maintenance, Section 5.1.5 – landscape to reduce runoff velocity and maximize absorption;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – ensure removal of undesired plants does not accentuate the effects of runoff;
- Silviculture, Section 5.2.1 – consider effects of stormwater runoff and water quality;
- Forest Protection, Section 5.2.2 – burns promote the health of herbaceous ground cover to prevent erosion from stormwater;
- Fisheries Management, Section 5.3.1 – control water quality in fishing areas;
- Migratory Birds, Section 5.3.2 – control water quality in wading areas;
- Threatened and Endangered Species, Section 5.3.3 – maintain water quality for protected species;
- Nuisance Wildlife, Section 5.3.4 – control pesticide to reduce runoff in stormwater;
- Outdoor Recreation, Section 5.4 – educate resource users not to accentuate the effects of runoff;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on stormwater and water quality BMPs; and
- GIS, Section 5.5.2 – utilize GIS tools to improve management of stormwater runoff.

Ecosystem Management

Like soil conservation, the effective management of stormwater, and associated pollutant loading is essential to realize the ecosystem management concept. Implementation of BMPs in developed, semi-developed, and unimproved areas will help protect water quality and habitat for aquatic life. BMPs address the reduction of sedimentation, nutrient overloading, bacterial and parasitic pests, and harmful chemicals in stormwater. Construction of any new stormwater ponds in accordance with the stormwater and water quality management concept will increase wildlife habitat and reduce the potential for additional discharge from new development into nearby creeks.

Military Mission

Improper stormwater management could lead to increased flooding on TBR, altering the timing and location of training. It can also lead to increased erosion, pollution, and sedimentation into waterbodies, which increases turbidity and reduces water quality, violating environmental laws, and potentially violating Federal permits.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Stormwater and Water Quality

- CWA, Section 404, establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands.
- EO 11990, 24 May 1977, as amended, directs the preservation and enhancement of wetlands.
- Oil Pollution Act of 1990 (OPA 90), 33 U.S.C. 2701, requires planning for, rescue of, minimization of injury to, and assessment of damages or injury to fish and wildlife resources from the discharge of oil.
- Comprehensive, Environmental Response, Compensation and Liability Act, 42 U.S.C. 9601 et seq., authorizes Natural Resources Trustees to recover damages for injury to, destruction of, or loss of natural resources resulting from the release of a hazardous substance.
- CWA, Section 401, requires an applicant for a Federal license or permit to provide a certification that any discharges from the facility will comply with the CWA, including water quality standard requirements.
- CWA, Section 402 NPDES Program, 2002, 33 U.S.C. 1251, controls direct discharges into navigable waters. NPDES permits, issued by either the USEPA or an authorized state or tribe, contain industry-specific, technology-based and water-quality-based limits and establish pollutant monitoring and reporting requirements.
- Federal Water Pollution Control Act, as amended by the CWA of 1977, 33 U.S.C. 1251, regulates the dredging and filling of wetlands and establishes procedures for identifying and regulating nonpoint sources of polluted discharge, including turbidity, into waterways.
- MCO P5090.2A, Chapter 7, Paragraph 7104.12b, establishes requirements, guidelines and standards for the assessment of damages arising from the release of oil or hazardous substances.

- MCO P5090.2A, Chapter 11, Paragraph 11104.2b, discusses natural resources management relating to nonpoint source pollution.

Additional Sources of Information

NPDES Stormwater Pollution Prevention Plans
http://cfpub.epa.gov/npdes/stormwater/swppp.cfm

USEPA Office of Wetlands, Oceans, and Watersheds
http://water.epa.gov/aboutow/owow/

USGS Water Resources Programs
http://water.usgs.gov/programs.html

Environmental Law Institute
www.eli.org

Nonpoint Source Pollution of Surface Waters
http://water.epa.gov/aboutow/owow/

5.1.4 Floodplain Management

Floodplain management is the operation of an overall program of corrective and preventive measures for reducing flood damage. In addition to storing water during flood events, floodplains provide many ecological functions, such as the transport and cycling of nutrients and provision of productive and essential habitats.

Issues

Extensive portions of TBR are within the 100-year floodplain (see Section 2.2.4). To prevent adverse impacts on the floodplain, TBR must minimize development and activities that occur in the floodplain.

Goals and Objectives

- Preserve access to air and land to meet military readiness requirements;
- Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices;
- Maintain clear zones around all targets that are free of unwanted vegetation;
- Avoid, minimize, and mitigate impacts on wetland quantity and quality;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Avoid or minimize pollution of surface waters;

- Conserve, restore, and enhance habitats supporting rare species and species listed as threatened, endangered, or candidate species under the ESA, so as not to interfere with the military mission;
- Conserve, enhance, and restore sensitive and regionally important habitats for utilization by listed species and species of special concern, so as not to interfere with the military mission;
- Maintain a GIS database to facilitate effective species and habitat management at TBR; and
- Maintain up-to-date training of natural resources personnel.

Projects

- Firebreak Maintenance (Project 01 in Appendix A)
- Wetlands Delineation (Project 03 in Appendix A)
- GIS Maintenance (Project 09 in Appendix A)

Management Strategies

- TBR will integrate firebreak maintenance with other program elements by developing site-specific maintenance plans, including necessary BMPs, for each target; managing conditions at firebreaks; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will use the preliminary jurisdictional determination to help identify areas of likely wetlands impact during preliminary planning of development projects.
- TBR will maintain no net loss of wetlands, promote 50-foot buffers for all wetlands, and ensure that land use and land management practices will not adversely affect wetlands.
- TBR will continue reviewing and monitoring proposed activities to avoid impacts on the attenuation capacity of the 100-year floodplain. If development is necessary within the 100-year floodplain to support the military mission, it shall be confined to previously disturbed areas of the floodplain whenever practicable.
- TBR will continue to implement BMPs for the prevention of stormwater pollution, identify and implement BMPs where necessary, and monitor implementation and effectiveness of all BMPs.
- TBR will apply soil erosion management to the preservation of sensitive habitats and species.
- TBR will implement strategies for the control and removal of invasive and exotic species on TBR.
- TBR will monitor existing nuisance animal populations to address ongoing and long-term problems and respond to temporary, non-routine issues as appropriate.
- TBR will avoid impacts on threatened, endangered, candidate and rare species at TBR.
- TBR will attain, store, and access qualitative and quantitative data pertinent to the assessment and adaptation of natural resources management.
- TBR will send personnel to natural resources training and workshops as appropriate and necessary.

Long-Term Management

TBR will avoid construction or management practices that will adversely affect the attenuation capacity of the 100-year floodplain unless it finds that (1) there is no practicable alternative; or (2) the proposed action has been designed to minimize harm to or within the floodplain. To enforce this, preferred sites for development will be outside the 100-year floodplain. If there is no suitable location outside the 100-year floodplain that will satisfy the need of the military mission (for example, proximity to dependent function), preferred sites for development will be within previously disturbed areas of the 100-year floodplain. For all development within the 100-year floodplain, TBR will evaluate alternatives and techniques for controlling and reducing the potential for flood damages. TBR will use the county's floodplain regulation and building codes as guidance for development in the floodplain. Consistent with DON's policy of no net loss of wetlands, TBR will avoid any construction in wetlands within the 100-year floodplain. Wetlands play an important role in flood control by providing storage, slowing flood waters, reducing flood peaks, and increasing the duration of the flow.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – manage to maintain viability of floodplains;
- Soil Conservation and Erosion, Section 5.1.2 – identify soil types in floodplain;
- Stormwater and Water Quality, Section 5.1.4 – proper stormwater drainage helps reduce flood damage;
- Landscaping and Grounds Maintenance, Section 5.1.5 – use appropriate landscape practices in floodplains;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – ensure removal of undesired plants is consistent with maintaining floodplain function;
- Silviculture, Section 5.2.1 – ensure silviculture is consistent with maintaining floodplain function;
- Forest Protection, Section 5.2.2 – burns promote the health of herbaceous ground cover to prevent erosion during flooding;
- Fisheries Management, Section 5.3.1 – proper management of floodplains improves water quality in fishing areas;
- Migratory Birds, Section 5.3.2 – undeveloped floodplains provides bird habitat away from infrastructure;
- Threatened and Endangered Species, Section 5.3.3 – controlling development in floodplains enhances habitat and water quality for protected species;
- Nuisance Wildlife, Section 5.3.4 – consider floodplain function when modifying habitat on the airfield;
- Outdoor Recreation, Section 5.4 – controlling development in floodplains enhances outdoor recreational opportunities;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on floodplain laws; and
- GIS, Section 5.5.2 – utilize GIS tools to improve management of floodplains.

Ecosystem Management

Proper management of the 100-year floodplain is an essential ecosystem management concept. Floodplains perform important natural functions, including temporary storage of floodwaters, moderation of peak flows, maintenance of water quality, groundwater recharge, and erosion prevention. Floodplains also provide habitat for wildlife, recreational opportunities, aesthetic benefits, and areas of archaeological significance.

Military Mission

Inappropriate floodplain management practices have the potential to decrease the flood attenuation capacity of the floodplain and increase the amount and rate at which flooding occurs. Flooding has the potential to adversely affect necessary infrastructure components of the military mission.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Floodplains

- EO 11988, Floodplain Management, 24 May 1977, requires Federal service agencies to avoid construction or management practices that will adversely affect floodplains, unless it is found that there is no practical alternative and the proposed action has been designed to minimize harm to or within the floodplain.
- MCO P5090.2A, Paragraph 11104.2c, discusses natural resources management relating to floodplain management.
- Georgia Mountain and River Corridor Protection Act, O.C.G.A 12-2-8, authorizes the Department of Natural Resources to develop minimum standards for the protection of river corridors (and mountains, watersheds, and wetlands) that can be adopted by local governments.

Additional Sources of Information

FEMA Floodplain Management Publications
http://www.fema.gov/plan/prevent/floodplain/publications.shtm

USFWS Floodplain Management
http://www.fws.gov/policy/613fw1.html

5.1.5 Landscaping and Grounds Maintenance

Landscaping and grounds maintenance is defined here as landscaping design and construction practices intended to benefit the environment and to generate long-term cost savings. Such practices include using native species and drought-tolerant/non-invasive exotics, which will reduce the need for irrigation and fertilization, stabilize soil, and improve wildlife habitat. Grounds maintenance is provided by MCAS Beaufort.

Issues

Grounds maintenance efforts are needed for aesthetic reasons, as well as to prevent erosion and protect soil by maintaining good, stable ground cover. TBR has accomplished this in past years by maintaining vegetation cover, by installing stormwater diversion measures, and maintaining and planting forestry areas. TBR needs to continue to minimize landscaping costs while ensuring the quality of aesthetic and environmental resources.

Goals and Objectives

- Preserve access to air and land to meet military readiness requirements;
- Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices;
- Maintain clear zones around all targets that are free of unwanted vegetation;
- Maintain forest buffers around all targets that provide a buffer from shrapnel and noise;
- Prevent and minimize the potential for wildfire to affect the military mission, facilities, surrounding lands, and ecological communities;
- Implement environmentally beneficial grounds maintenance and landscaping practices;
- Avoid, minimize, and mitigate impacts on wetland quantity and quality;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Control and remove invasive and exotic species;
- Avoid or minimize pollution of surface waters;
- Conserve, restore, and enhance habitats supporting rare species and species listed as threatened, endangered, or candidate species under the ESA; so as not to interfere with the military mission;
- Avoid or minimize impacts on migratory birds and their nests in accordance with the MBTA;
- Conserve, enhance, and restore sensitive and regionally important habitats for utilization by listed species and species of special concern; so as not to interfere with the military mission;
- Maintain a GIS database to facilitate effective species and habitat management at TBR; and
- Maintain up-to-date training of natural resources personnel

Projects

- Firebreak Maintenance (Project 01 in Appendix A)
- Wetlands Delineation (Project 03 in Appendix A)
- Invasive Species Management (Project 04 in Appendix A)
- Threatened, Endangered, Candidate, and Rare Species Management (Project 06 in Appendix A)
- Migratory Bird Surveys (Project 07 in Appendix A)
- GIS Maintenance (Project 09 in Appendix A)

Management Strategies

- TBR will integrate firebreak maintenance with other program elements by developing site-specific maintenance plans, including necessary BMPs, for each target; managing conditions at firebreaks; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will integrate the maintenance of forest buffers with other program elements by developing site-specific maintenance plans, including necessary BMPs in and around each target; managing conditions in the forest buffers; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will avoid adverse effects of wildfire as described in the Wildland Fire Management Plan through constructing and maintaining firebreaks, controlling fuel loads, maintaining readiness to respond, and developing partnerships; integrate wildland fire management with other program elements by using an ecosystem management approach that mimics natural fire regimes; routinely monitor habitat conditions, and adapt management as necessary to avoid or minimize potential adverse effects from wildfire. A Wildland Fire Action Plan was developed to assist in the first response of a report wildland fire on TBR (Appendix H).
- TBR will review all grounds maintenance and landscaping activities to ensure consistency with the concepts presented in this INRMP; monitor conditions of maintained grounds; and adapt management as necessary to avoid or minimize potential adverse effects on natural resources.
- TBR will use the preliminary jurisdictional determination to help identify areas of likely wetlands impact during preliminary planning of development projects.
- TBR will maintain no net loss of wetlands, promote 50-foot buffers for all wetlands, and ensure that land use and land management practices will not adversely affect wetlands.
- TBR will continue reviewing and monitoring proposed activities to avoid impacts on the attenuation capacity of the 100-year floodplain. If development is necessary within the 100-year floodplain to support the military mission, it shall be confined to previously disturbed areas of the floodplain whenever practicable.
- Continue to implement BMPs for the prevention of stormwater pollution, identify and implement BMPs where necessary, and monitor implementation and effectiveness of all BMPs.
- TBR will apply soil erosion management to the preservation of sensitive habitats and species.
- TBR will implement strategies for the control and removal of invasive and exotic species on TBR.
- TBR will avoid impacts on threatened, endangered, candidate and rare species at TBR.
- TBR will ensure adherence to the MBTA.
- TBR will use prescribed fires to mimic natural fire regimes that control invasive species and promote establishment and maintenance of desirable species composition and structure.
- TBR will attain, store, and access qualitative and quantitative data pertinent to the assessment and adaptation of natural resources management.
- TBR will send personnel to natural resources training and workshops as appropriate and necessary.

Long-Term Management

EO 13148 of 21 April 2000, Section 207, calls for landscaping practices that benefit the environment and generate long-term cost savings at Federal facilities. The EO provides the following guidelines to be followed when cost-effective and to the extent practicable:

- Use regionally native plants for landscaping;
- Design, use, or promote construction practices that minimize adverse effects on the natural habitat;
- Take measures to prevent pollution (i.e., reduce fertilizer and pesticide use);
- Implement water-efficient practices; and
- Promote awareness of environmental and economic benefits of native landscaping.

TBR will landscape by xeriscaping around all newly constructed buildings and other facilities to create relatively low-maintenance and low-cost landscapes and reduce the need for intensive labor (i.e., hand trimming and bed maintenance). Xeriscaping will also be phased into existing landscaped areas. Xeriscaping offers a viable alternative to the typically high-volume water requirements of other landscaping approaches by conserving water through creative landscaping. Xeriscaping uses native plants, which are adapted to local climatic conditions and variations, generally resistant to drought, disease, and pests, and require less water than non-native species. The potential benefits of xeriscaping include reduced water use (typically from 30 to 80 percent), reduced heating and cooling costs from placement of appropriate tree species, decreased stormwater and irrigation runoff, fewer pesticide and fertilizer applications, less yard waste, increased habitat for plants and animals, and lower labor and maintenance effort and thus lower costs. Xeriscaping incorporates seven principles:

1. Planning and design for water conservation and beauty;
2. Creating practical turf areas using manageable sizes, shapes, and appropriate grass species;
3. Selecting plants with low water requirements and grouping plants with similar water needs, then experimenting to determine how much and how often to water the plants;
4. Using soil amenities, such as compost or manure, appropriate to site and plant needs;
5. Using mulches, such as wood chips, to reduce evaporation and reduce soil temperatures;
6. Irrigating efficiently with properly designed systems (including hose-end equipment) and by applying the right amount of water at the right time; and
7. Maintaining the landscape by mowing, weeding, pruning, and fertilizing properly. Grass mowing should not be excessive and should be based on height rather than by arbitrarily specified time intervals.

TBR will evaluate current landscaping practices to determine how effective the principles of xeriscaping would be in improving existing conditions. TBR will determine (1) if implementation of xeriscaping principles will provide sufficient benefits to justify any additional cost, (2) if the

implementation of certain principles may achieve the desired results, or (3) if continuation of existing conditions will achieve desired results. TBR will monitor the success of integrating the principles of xeriscaping with existing landscaped areas and adjust management practices as warranted.

Grounds maintenance at TBR will be accomplished using the following guidelines:

- Avoid excessive mowing. Grass mowing should be scheduled on the basis of height, rather than by arbitrarily specified time intervals, if practicable;
- Maintain good ground cover through proper fertilization to prevent erosion. If erosion occurs, it will be addressed and corrected as soon as possible;
- Maintain healthy lawns to prevent insect infestations and disease; and
- Minimize hand trimming.

Grounds maintenance personnel will contact the NRM for technical advice prior to tree and shrub pruning, fertilization, grass replacement, species selection, new landscape projects, and new irrigation projects. Pesticide and fertilizer applications during landscaping and grounds maintenance will be consistent with the long-term management concepts pertaining to pesticides and fertilizers in Sections 5.1.6 and 5.3.3.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – maintain a 50-foot buffer around wetlands;
- Soil Conservation and Erosion, Section 5.1.2 – landscape to reduce erosion;
- Stormwater and Water Quality, Section 5.1.3 – use proper amounts of herbicide and fertilizers to avoid excessive runoff in stormwater;
- Floodplains, Section 5.1.4 – ensure landscaping in floodplains does not alter floodplain function;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – replace removed exotic species with native vegetation;
- Forest Protection, Section 5.2.2 – maintain grounds to reduce fuel loads;
- Migratory Birds, Section 5.3.1 - use proper amounts of herbicide and fertilizers to avoid runoff into wading areas;
- Threatened and Endangered Species, Section 5.3.2 – landscape and maintain grounds to maintain and enhance habitat for protected wildlife;
- Nuisance Wildlife, Section 5.3.3 – control nuisance animals to prevent landscape damage;
- Outdoor Recreation, Section 5.4 – maintain aesthetically pleasing grounds for recreation;
- Natural Resources Training, Section 5.5.1 – ensure personnel are aware of landscaping and grounds issues and practices; and
- GIS, Section 5.5.2 – utilize GIS tools to improve landscaping plans.

Ecosystem Management

Beneficial landscaping through construction and design practices is consistent with an ecosystem management approach because it reduces the need for irrigation, pesticides, and fertilizers and relies on the functions and characteristics of native plant species. The use of native species also is recommended for the reduction and control of invasive species. Reducing irrigation, fertilizer, and pesticide demand reduces costs associated with grounds maintenance and reduces pollutant loading to stormwater runoff and surrounding surface waters and aquatic communities.

Military Mission

Inappropriate landscaping and grounds maintenance practices (e.g., excessive use or application of inappropriate pesticides) may potentially affect water quality and Federally and state-designated endangered or threatened species, resulting in regulatory actions by agencies such as the USFWS, GADNR, or USACE, which could threaten the military mission of TBR. In addition, appropriate landscaping and maintenance practices improve quality of life.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Landscaping and Grounds Maintenance

- EO 13148, 21 April 2000, Section 207, requires implementing landscaping practices that are intended to benefit the environment and generate long-term cost savings.
- EO 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
- The President's April 16, 1994, Memorandum on Environmentally Beneficial Landscaping, requires implementing landscaping practices that are intended to benefit the environment and generate long-term cost savings.
- Federal Insecticide, Fungicide and Rodenticide Act, 7 U.S.C. 136, governs the use and application of pesticides in natural resources management programs.
- Federal Water Pollution Control Act as amended by the CWA of 1977, 33 U.S.C. 1251, prohibits the discharge of dredged or filled materials into waters of the United States, including wetlands, without first obtaining a permit from USACE (Section 404 of the CWA).
- MCO P5090.2A, Paragraph 11201.2, discusses natural resources management relating to environmentally and economically beneficial landscaping.
- DoDINST 7310.5, administers the reimbursement of costs related to managing forest resources for timber production. Under this regulation, only expenses related to the maintenance of timber for commercial sales are reimbursed.

Additional Sources of Information

American Water Works Association, WaterWiser

http://www.awwa.org/waterwiser/

Georgia Native Plant Society
http://www.gnps.org/

Georgia Native Nurseries
http://www.gnps.org/resources/Native_Nurseries.php

5.1.6 Invasive, Exotic, and Noxious Species

Species can be categorized as invasive, exotic, and noxious, none of which is exclusive. Invasive species are alien species whose introduction does, or is likely to, cause harm to the economy, environment, or human health. An exotic species is a non-indigenous (non-native) species that was either purposefully or accidentally introduced into an area outside its natural range. Noxious species are those that are harmful to other species. A native species is a species whose presence in that region is the result of only natural processes with no human intervention. Plant and animal species can be classified as having one, two, or all three of these characteristics. Native species can be also be invasive, noxious, or both.

EO 13112, Invasive Species, 3 February 1999, requires executive agents to restrict the introduction of exotic organisms into natural ecosystems. The Federal Noxious Weed Act of 1974 (7 U.S.C. 2801-2814) provides for the control and eradication of noxious weeds and their regulation in interstate and foreign commerce. It defines noxious weeds as “any living stage (including but not limited to, seeds and reproductive parts) of any parasitic or other plant of a kind, or subdivision of a kind, which is of foreign origin, is new to or not widely prevalent in the United States, and can directly or indirectly injure crops, other useful plants, livestock, poultry, and agricultural irrigation navigation, the fish and wildlife resources of the United States, and the public health” (7 U.S.C. 2802 (c)).

The higher temperatures and changes in precipitation patterns associated with climate change are anticipated to cause shifts in species composition and geographic range. Among the species shifts anticipated are movement of wildlife to more favorable habitat, shifts in vector-borne diseases, and expansion of invasive grasses and shrubs. Invasive plants contribute fuel load for wildfires, which in turn increases the likelihood, range, and intensity of wildfires. Ongoing management of exotic and invasive species is therefore vital to offset the potential vulnerability of properties and native communities on TBR. Exotic and invasive species found on TBR include Japanese honeysuckle, Japanese wisteria, camphor tree, torpedo grass, hemp sesbania, Chinese privet, and potentially cogongrass.

Issues

Invasive species have the potential to interfere with military and recreational activities, wildlife habitats, forests, wetlands, and other natural areas. Invasive species often interfere with ecosystem

functions. Some of them can form expansive monocultures when left uncontrolled and, in extreme cases, will lead to complete loss of native plant communities and reduction in regional biodiversity. TBR currently does not have a formal program to address the control of noxious, invasive, and exotic species.

Goals and Objectives

- Preserve access to air and land to meet military readiness requirements;
- Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices;
- Maintain clear zones around all targets that are free of unwanted vegetation;
- Maintain forest buffers around all targets that provide a buffer from shrapnel and noise;
- Implement environmentally beneficial grounds maintenance and landscaping practices;
- Avoid, minimize, and mitigate impacts on wetland quantity and quality;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Avoid or minimize pollution of surface waters;
- Control and remove invasive and exotic species;
- Conserve, restore, and enhance habitats supporting rare species and species listed as threatened, endangered, or candidate species under the ESA, so as not to interfere with the military mission;
- Avoid or minimize impacts on migratory birds and their nests in accordance with the MBTA;
- Conserve, enhance, and restore sensitive and regionally important habitats for utilization by listed species and species of special concern, so as not to interfere with the military mission;
- Maintain a GIS database to facilitate effective species and habitat management at TBR;
- Maintain up-to-date training of natural resources personnel;
- Manage and provide for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation; and
- Produce a sustainable yield of commercial timber products from native species.

Projects

- Firebreak Maintenance (Project 01 in Appendix A)
- Wetlands Delineation (Project 03 in Appendix A)
- Invasive Species Management (Project 04 in Appendix A)
- Threatened, Endangered, Candidate, and Rare Species Management (Project 06 in Appendix A)
- Migratory Bird Surveys (Project 07 in Appendix A)
- Prescribed Burn Program (Project 08 in Appendix A)
- GIS Maintenance (Project 09 in Appendix A)

- Forest Management (Project 10 in Appendix A)
- Forest Inventory (Project 11 in Appendix A)
- Pest Management (Project 12 in Appendix A)

Management Strategies

- TBR will integrate firebreak maintenance with other program elements by developing site-specific maintenance plans, including necessary BMPs, for each target; managing conditions at firebreaks; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will integrate the maintenance of forest buffers with other program elements by developing site-specific maintenance plans, including necessary BMPs in and around each target; managing conditions in the forest buffers; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will avoid adverse effects of wildfire as described in the Wildland Fire Management Plan through constructing and maintaining firebreaks, controlling fuel loads, maintaining readiness to respond, and developing partnerships; integrating wildland fire management with other program elements by using an ecosystem management approach that mimics natural fire regimes; routinely monitoring habitat conditions, and adapting management as necessary to avoid or minimize potential adverse effects from wildfire. A Wildland Fire Action Plan was developed to assist in the first response of a report wildland fire on TBR (Appendix H).
- TBR will review all grounds maintenance and landscaping activities to ensure consistency with the concepts presented in this INRMP; monitor conditions of maintained grounds; and adapt management as necessary to avoid or minimize potential adverse effects on natural resources.
- TBR will use the preliminary jurisdictional determination to help identify areas of likely wetlands impact during preliminary planning of development projects.
- TBR will maintain no net loss of wetlands, promote 50-foot buffers for all wetlands, and ensure that land use and land management practices will not adversely affect wetlands.
- TBR will continue reviewing and monitoring proposed activities to avoid impacts on the attenuation capacity of the 100-year floodplain. If development is necessary within the 100-year floodplain to support the military mission, it shall be confined to previously disturbed areas of the floodplain whenever practicable.
- Continue to implement BMPs for the prevention of stormwater pollution, identify and implement BMPs where necessary, and monitor implementation and effectiveness of all BMPs.
- TBR will apply soil erosion management to the preservation of sensitive habitats and species.
- TBR will implement strategies for the control and removal of invasive and exotic species on TBR.
- TBR will monitor existing nuisance animal populations to address ongoing and long-term problems and respond to temporary, non-routine issues as appropriate.
- TBR will avoid impacts on threatened, endangered, candidate, and rare species at TBR.
- TBR will ensure adherence to the MBTA.
- TBR will use prescribed fires to enhance and restore regionally important habitats by mimicking natural fire regimes that control invasive species and promote establishment and maintenance of desirable species composition and structure.

- TBR will attain, store, and access qualitative and quantitative data pertinent to the assessment and adaptation of natural resources management.
- TBR will send personnel to natural resources training conferences and workshops as appropriate and necessary.
- TBR will utilize sound, proven forest management techniques to support other program elements and enhance ecosystem benefits.

Long-Term Management

Invasive and exotic species will be managed through the removal of the species and through restrictions on the introduction of the species on TBR in accordance with EO 13112. An invasive plant survey and management plan for TBR was completed in 2004 (SOUTHDIV 2004). This plan will be implemented to control invasive and exotic species to acceptable levels. The NRM will screen all lists of landscaping plants proposed for TBR to ensure that invasive and exotic species are not used.

Prior to the use of pesticides at TBR, the Installation's NRM will contact the Applied Biology Department (ABD) of NAVFAC Midlant for information regarding approved pesticides, including the location of use, amount, and concentrations, as well as treatment methods. TBR will also consider the applicability of burning and hand clearing in combination with pesticides, as well as non-pesticide removal methods alone.

The use of pesticides for removal of invasive and exotic species and pests will be conducted in accordance with Federal and state laws regulating the use of pesticides. According to the EPA, a "pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest". Pests can be insects, mice and other animals, unwanted plants (weeds), fungi, or microorganisms like bacteria and viruses; the term pesticide also applies to herbicides, fungicides, and various other substances used to control pests" (http://www.epa.gov/pesticides/about/). Under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA; 7 U.S.C. 136), pesticides are registered at the Federal level and by individual states. Therefore, a particular pesticide product that is Federally registered by the USEPA is not legal for use until it is also registered by an individual state. FIFRA allows individual state registrations to be more restrictive than Federal registrations, but not less so.

Pesticides will be applied by skilled, DOD-certified workers and according to label instructions to ensure their application does not contaminate surface waters or affect flora and fauna. Careful prescription of the type and amount of chemical to be applied and the use of buffer areas around surface waters will also help prevent misdirected application or deposition. TBR will use pesticides with lower toxicity and apply them at rates below those specified on the label, when it is believed that

such modifications can adequately address the problem. TBR will also consider the applicability of non-pesticide removal methods, which could be implemented through the use of volunteer groups.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – prevent contamination of wetlands by pesticides;
- Soil Conservation and Erosion, Section 5.1.2 – control nuisance animals that contribute to erosion;
- Stormwater and Water Quality, Section 5.1.3 – prevent contamination of water quality by pesticides;
- Floodplains, Section 5.1.4 – ensure exotic species do not compromise attenuation properties of floodplains;
- Landscaping and Grounds Maintenance, Section 5.1.5 – landscape with native plants to reduce the opportunity for exotics to become established;
- Silviculture, Section 5.2.1 – ensure activities promote native vegetation in the forest understory;
- Forest Protection, Section 5.2.2 – burn to accentuate the environmental conditions of native plants and wildlife;
- Migratory Birds, Section 5.3.1 – conserve native vegetation used by migratory birds;
- Threatened and Endangered Species, Section 5.3.2 – control exotic plants and wildlife that would otherwise compete with protected species for resources;
- Nuisance Wildlife, Section 5.3.3 – reduce nuisance species concurrent with control of invasive and exotic species;
- Outdoor Recreation, Section 5.4 – eliminate exotic vegetation to enhance outdoor recreation;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on exotic and invasive control procedures and laws; and
- GIS, Section 5.5.2 – utilize GIS tools to improve management of exotic and invasive species.

Ecosystem Management

The management of exotic and invasive species is a fundamental component of the ecosystem management concept. Invasive species typically out-reproduce native species and have a propensity to spread into unstable or disturbed areas (e.g., highway and utility right-of-ways, site disturbance areas, ponds, and wetland areas). Therefore, the control of invasives and replacement with native species at TBR is essential to protect and enhance biodiversity, and for the proper functioning of wetlands as water storage and purifying systems.

Military Mission

Invasive species have a propensity to spread rapidly, potentially creating hazardous situations when they interfere with infrastructure systems (e.g., along and around roadway intersections and electric distribution lines and substations).

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Invasive, Exotic, and Noxious Species

- Federal Noxious Weed Act of 1974, 7 U.S.C. 2801 et seq., provides for the control and eradication of noxious weeds and their regulation in interstate and foreign commerce.
- EO 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
- FIFRA, 7 U.S.C. 136, requires that all pesticides, whether for commercial or private use, be applied in accordance with product labeling and that containers are properly disposed of. USEPA is responsible under FIFRA for the registration of all pesticide active ingredients used in the United States.
- OPNAVINST 6350.4B, 27 August 1998, DoD Pest Management Programs, provides the DON with policies for implementing pest management programs directed against pests that conflict with or adversely affect the mission of the DoD; affect the health and well-being of DON personnel and their dependents; attack or damage real property, supplies, or equipment; adversely affect the environment; or are otherwise undesirable.
- Federal Plant Pest Act, 7 U.S.C. 150a et seq., regulates the importation and interstate movement of plant pests and authorizes the Secretary of Agriculture to take emergency measures to destroy infected plants or materials.
- MCO P5090.2A, Paragraph 1104.1g, discusses natural resources management relating to the control of noxious weeds and the control of invasive species.

Additional Sources of Information

USDA Invasive and Noxious Weeds

http://plants.usda.gov/java/noxiousDriver

Federal Noxious Weed Act

http://www.fws.gov/laws/lawsdigest/fednox.html

FIFRA Act

http://www.epa.gov/agriculture/lfra.html

USDA State-Specific Threats

http://www.invasivespeciesinfo.gov/unitedstates/ga.shtml

Center for Plant Conservation

http://www.centerforplantconservation.org/

TNC, Protecting Native Plants and Animals

http://www.nature.org/ourinitiatives/habitats/forests/howwework/protecting-native-plants-and-animals-taking-on-the-invaders.xml

USFWS Invasive Species

http://www.fws.gov/invasives/

Georgia Exotic Pest Plant Council
http://www.gaeppc.org/

Southeastern Invasive Plant Information
http://www.invasive.org/eastern/

Southeast Exotic Pest Plant Council
http://www.se-eppc.org/

5.2 FOREST MANAGEMENT

TBR will protect and enhance forest resources by practicing ecologically sound forest management leading to sustained yield of quality forest products, watershed protection, and wildlife habitat protection and management. Ecologically sound stewardship involves managing forestland for various components, including forest products, wildlife habitat, aesthetics, and recreation. Components of TBR's annual work plan generally include prescribed fires, timber sales, timber inventory, timber stand improvement, site preparation, reforestation, and afforestation. To protect and enhance forest resources, TBR will implement the strategies, projects, and initiatives described in Section 4 of this INRMP.

Forest Management on TBR will be the responsibility of NAFVAC SE; whereas NAFVAC Midlant will be responsible for management of the other natural resources found on TBR. Forest Management may be divided into two major components: silviculture and forest protection. Silvicultural practices include timber harvesting, prescribed fires, establishment of firebreaks, herbicide application, forest fertilization, site preparation, and regeneration. Forest protection includes protection from wildfire, diseases, and insects. TBR recognizes that the frequent and intense heat extremes and altered precipitation patterns projected to occur with climate change may increase the frequency and intensity of wildfires. Ongoing and continued forest management and protection measures are therefore vital to offset the potential vulnerability of properties on TBR.

The 10-Year Forest Management Plan for TBR (Appendix B) is utilized by TBR's NR managers as a planning tool and guidance for use conducting forest management practices at TBR. Since this plan was prepared, the forest management at TBR has not significantly altered the cover type. Upland stands account for approximately 67 percent of TBR's forested area and are composed of planted pine (slash and loblolly pine). Natural pine stands of natural longleaf pine approximately 50 years old are present and account for approximately 5 percent of the forested area on TBR. Mixed hardwoods are found within low-lying drainages and wetland areas and account for approximately 19 percent of the forested area. The mixed hardwoods include blackgum, pond cypress, sweetgum, yellow poplar, red and white oak, other miscellaneous hardwood species and scattered pockets of slash and loblolly pine.

Slash, loblolly, and longleaf pine are the favored species, and will be perpetuated on those sites suited for these particular species. Hardwoods are limited in total area, but they nevertheless contribute much to the food and habitat needs of wildlife in the area. Hardwoods will be given equal importance with pine in areas where hardwood species can be managed. Retaining mast trees, den trees, and cavity trees for wildlife purposes, will be given a high priority. During the next 10-year period, forest stands will continue to be thinned to improve the quality of merchantable trees to be carried through the rotation age (80 years unless modified for the military mission or stand health). In addition, prescribed fires and herbicide and fertilizer applications will be utilized to improve stand quality and habitat.

5.2.1 Silvicultural Activities

Silvicultural activities include timber harvesting, prescribed fires (including the establishment of firebreaks), herbicide application, forest fertilization, site preparation, and regeneration. Timber harvesting methods include the following: thinning; improvement cutting; salvage cutting; clearcutting; seed tree cutting; and shelterwood cutting. Silvicultural practices are described below.

- **Thinnings** are cuttings in planted immature stands to increase the rate of growth of timber products and maintain stand composition. A thinning can be a removal of rows of trees, or the removal of selected trees that are merchantable or low-value trees that are competing with future crop trees. In either case, a thinning will redistribute the growth potential of the site to the best trees so that they continue to grow at an acceptable growth rate. This action also increases sunlight penetration to the forest floor, which stimulates understory growth and creates food and cover for wildlife.
- **Improvement cuttings** are made of stands older than the sapling stage, usually to improve species composition. This type of cut is most often applied to wild stands being placed under management and involves removal of undesirable trees that are of sufficient size to provide merchantable products, as well as trees that are diseased, mechanically injured, unhealthy (likely to die before the next harvest), insect-infested, and of poor form (forked or crooked). Improvement cuttings and thinnings in a stand are usually concurrent operations.
- **Salvage cuttings** remove dead and injured trees in order to utilize them before they become unable to be harvested. Trees are salvaged promptly following storm events, severe fires, or attacks of insects and diseases. Salvage cuts are sometimes required to clear construction sites.
- **Clearcuttings** will be used at the discretion of the NRM in consultation with NAVFAC SE foresters and fish and wildlife biologists, as well as other Federal and state agencies. Clearcutting will be used when there is an identified need to change species (e.g., slash pine to longleaf pine), remove an over-mature or diseased stand, or for another reason deemed essential (i.e., following natural disasters). Occasionally, clearcutting is required to meet mission safety criteria.
- **Shelterwood cuttings** will be used at the discretion of the NRM in consultation with NAVFAC SE foresters and fish and wildlife biologists, as well as other Federal and state agencies. Shelterwood cutting will be used to regenerate forest stands through a series of perhaps two to three cuts. This system is frequently used to regenerate heavy seeded species. Cuttings may be separated by as much as 20 years.

- **Seed tree cuttings** will be used at the discretion of the NRM in consultation with NAVFAC SE foresters and fish and wildlife biologists, as well as other Federal and state agencies. Seed tree cutting involves the removal of all trees except trees of the desired species in sufficient numbers to reseed the cut-over area.
- **Prescribed burning** is the purposeful application of fire in a controlled, knowledgeable manner to remove and reduce forest fuels on a specific land area under selected weather conditions. A prescribed fire involves the movement of a surface fire through forest stands. Prescribed burning improves habitat by removing dense, scrubby understory vegetation, and allowing early successional flora to grow. Burning removes forest floor litter, promotes wildlife forage, promotes germination of plant seeds scarified by the heat, releases minerals and nutrients tied up in vegetation to the soil, and creates an edge effect along the boundaries between burned and unburned areas. In addition, prescribed burning reduces fuel levels and the chance of wildfires, which could destroy or seriously damage forest stands and potentially cause a threat to the military mission.
- **Firebreaks** are a necessary part of a fire management program. Existing features such as roads and streams may be used as firebreaks, but oftentimes such features are not present. Where existing features do not occur, man-made firebreaks must be established. Plowed firebreaks will be disked and leveled to prevent soil erosion and interruption of boundaries and hydrology. Permanent firebreaks may later be used for forest access.
- **Herbicide application** is used as a TSI practice to control unwanted vegetation in areas where prescribed burning cannot be accomplished or fire has proven to be ineffective in accomplishing the desired results.
- **Forest fertilization** is used as a TSI practice to improve timber growth rates on relatively poor quality sites. Combined with herbicide applications, prescribed burning, and thinning, fertilization will promote rapid development of the forest stand so that other ecosystem values can be realized.
- **Site preparation** includes activities designed to improve conditions for seeding or planting that result in increased germination or seedling survival and tree growth. Examples include land-clearing activities, such as roller drum chopping, shearing, raking, windrowing, burning, and pesticide applications. Additional methods of site preparation include complete vegetation removal through chipping and other debris removal methods, followed by disking or scarification.
- **Regeneration** is the renewal of a forest by either natural or artificial means. Regeneration is generally preceded by a clear cut, a seed tree cut, or a shelterwood cut. Regeneration methods include natural seeding, planting, and direct seeding.

Issues

Forest stands at TBR require periodic maintenance (i.e., use of silvicultural activities). Neglected maintenance represents a threat to the military mission and to the sustainability of forestry and wildlife resources. Timber stands require maintenance to increase the growth rate of the preferred trees, to reduce the potential for wildfires, to control diseases and insect pests, and to ensure the continuation of fire-dependent plant and wildlife communities.

Goals and Objectives

- Preserve access to air and land to meet military readiness requirements;
- Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices;

- Manage and provide for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation;
- Maintain clear zones around all targets that are free of unwanted vegetation;
- Maintain forest buffers around all targets that provide a buffer from shrapnel and noise;
- Prevent and minimize the potential for wildfire to affect the military mission, facilities, surrounding lands, and ecological communities;
- Avoid, minimize, and mitigate impacts on wetland quantity and quality;
- Implement environmentally beneficial grounds maintenance and landscaping practices;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Avoid or minimize pollution of surface waters;
- Control and remove invasive and exotic species;
- Conserve, restore, and enhance habitats supporting rare species and species listed as threatened, endangered, or candidate species under the ESA; so as not to interfere with the military mission;
- Avoid or minimize impacts on migratory birds and their nests in accordance with the MBTA;
- Conserve, enhance, and restore sensitive and regionally important habitats for utilization by listed species and species of special concern; so as not to interfere with the military mission;
- Maintain a GIS database to facilitate effective species and habitat management at TBR;
- Maintain up-to-date training of natural resources personnel; and
- Produce a sustainable yield of commercial timber products from native species.

Projects

- Firebreak Maintenance (Project 01 in Appendix A)
- Wildland Fire Management Plan (Project 02 in Appendix A)
- Wetlands Delineation (Project 03 in Appendix A)
- Invasive Species Management (Project 04 in Appendix A)
- Frosted Flatwoods Salamander Management (Project 05 in Appendix A)
- Threatened, Endangered, Candidate, and Rare Species Management (Project 06 in Appendix A)
- Migratory Bird Surveys (Project 07 in Appendix A)
- Prescribed Burn Program (Project 08 in Appendix A)
- GIS Maintenance (Project 09 in Appendix A)
- Forest Management (Project 10 in Appendix A)
- Forest Inventory (Project 11 in Appendix A)
- Pest Management (Project 12 in Appendix A)

Management Strategies

- TBR will integrate firebreak maintenance with other program elements by developing site-specific maintenance plans, including necessary BMPs, for each target; managing conditions at firebreaks; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will integrate the maintenance of forest buffers with other program elements by developing site-specific maintenance plans, including necessary BMPs in and around each target; managing conditions in the forest buffers; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will avoid adverse effects of wildfire as described in the Wildland Fire Management Plan through constructing and maintaining firebreaks, controlling fuel loads, maintaining readiness to respond, and developing partnerships. Integrate wildland fire management with other program elements by using an ecosystem management approach that mimics natural fire regimes; routinely monitor habitat conditions, and adapt management as necessary to avoid or minimize potential adverse effects from wildfire. A Wildland Fire Action Plan was developed to assist in the first response of a report wildland fire on TBR (Appendix H).
- TBR will review all grounds maintenance and landscaping activities to ensure consistency with the concepts presented in this INRMP; monitor conditions of maintained grounds; and adapt management as necessary to avoid or minimize potential adverse effects on natural resources.
- TBR will use the preliminary jurisdictional determination to help identify areas of likely wetlands impact during preliminary planning of development projects.
- TBR will maintain no net loss of wetlands, promote 50-foot buffers for all wetlands, and ensure that land use and land management practices will not adversely affect wetlands.
- TBR will continue reviewing and monitoring proposed activities to avoid impacts on the attenuation capacity of the 100-year floodplain. If development is necessary within the 100-year floodplain to support the military mission, it shall be confined to previously disturbed areas of the floodplain whenever practicable.
- TBR will continue to implement BMPs for the prevention of stormwater pollution, identify and implement BMPs where necessary, and monitor implementation and effectiveness of all BMPs.
- Apply soil erosion management to the preservation of sensitive habitats and species.
- TBR will implement strategies for the control and removal of invasive and exotic species on TBR.
- TBR will manage frosted flatwoods salamander populations and suitable habitats at TBR.
- TBR will avoid impacts on threatened, endangered, candidate, and rare species at TBR.
- TBR will ensure adherence to the MBTA.
- TBR will use prescribed fires to mimic natural fire regimes that control invasive species and promote establishment and maintenance of desirable species composition and structure.
- TBR will attain, store, and access qualitative and quantitative data pertinent to the assessment and adaptation of natural resources management.
- TBR will send personnel to natural resources training and workshops as appropriate and necessary.
- TBR will utilize sound, proven forest management techniques to support other program elements and enhance ecosystem benefits.

Long-Term Management

The forest management program at TBR is administered and carried out by the MCAS Beaufort NRM and Forester with assistance from the TBR Natural Resources staff. The program provides for sustained yield of quality timber products, and protection and development of other natural resources in a multiple-use, integrated concept.

The program is set up using a 10-Year Management Plan with continual review and updating as required. The 10-Year Forest Management Plan for TBR is included in Appendix B. The actual forestry operations are implemented by the NRM and NAVFAC SE Forester, TBR Natural Resources staff, NAVFAC SE, and contractual services. Basic operation, such as marking and cruising timber, prescribed burning, inspection of timber contracts, and general forest management, are the responsibility of the Installation NRM and Forester. NAVFAC SE foresters provide technical support and assist in contract specification preparation. The Resident Officer in Charge of Construction and Contracts (ROICC) advertises, awards, and maintains records on forestry service contracts.

Forest stands at TBR are managed with an ecosystem approach for sustained yield and health. Planned silvicultural activities for this 10-year period include thinning, prescribed burning, herbicide application, forest fertilization, and reforestation. Harvest and prescribed burn cycles will be conducted consistent with the long-term management concepts for wildlife (Section 5.3). To accomplish this, foresters from NAVFAC SE, as well as other appropriate Federal, state, and county agencies will review the annual increment of forestry work. This review will help ensure that ongoing management techniques include those that enhance wildlife populations that are dependent on forest ecosystems. Silvicultural activities in relation to the 10-Year Forestry Management Plan are discussed below.

<u>Thinning</u>

Scheduled thinnings reduce the stand density as measured by “basal area” in square feet per acre. The desired reduction in density will be determined by the NRM, and will reflect the needs of the forest stand and the associated ecosystem represented by the stand and surrounding area. Thinnings, which should decrease stand density between 60 to 80 percent, will be designed to promote forest stand health by leaving quality seed spaced appropriately. In pine communities, the cutting cycle, which will be scheduled at the discretion of the NRM, will begin when the stand reaches merchantable size (approximately 13 to 15 years) and will continue every 7 to 10 years until the rotation age of 80 years. A target basal area for pine regeneration at rotation age (80 years) will be from 20 to 60 square feet of basal area per acre. Stands older than 80 years will be evaluated by the NRM, as well as by NAVFAC SE foresters, for their value as wildlife habitat. Harvesting activities in forested wetlands will occur as determined by the NRM. TBR will practice snag retention, the practice of leaving dead

trees standing in managed forests to enhance wildlife habitat. Dead trees are often colonized and used by various wildlife species. A snag will not be removed at TBR unless it jeopardizes property or is a safety risk.

Prescribed Burning

Prescribed burning, the primary forestry management tool at TBR, will be conducted by trained personnel, and is dependent upon weather conditions and mission-related activities. Pine forest stands will be burned on a 3-year rotation, or at the discretion of the NRM. Burns will be hot enough to kill hardwoods, and will be scheduled during the winter months to reduce fuel loads to allow growing season burns in subsequent years, if desired. Prescribed burns will be scheduled in wetlands for habitat management. The timing of prescribed burning will account for ecosystem needs within the forest stand and surrounding area and will be conducted during both the growing season and the dormant season (winter months) as determined by the NRM.

Firebreaks must be established as part of the prescribed burning program to prevent fire from escaping the burn area. Existing barriers such as roads and wetlands will be used as firebreaks where feasible, but firebreaks must be established and maintained where existing barriers are not present. Equipment necessary to conduct fire management includes crawler tractors, transport trucks, all-terrain vehicles, gyro-tracs, and other fire ignition and suppression equipment.

Along with fire-related parameters, the following conditions must be understood and described in each prescription for prescribed fires to be an effective management technique: (1) biological requirements of target species, (2) vegetative condition of the stand to be burned, and (3) expected results for understory and species composition.

Herbicide Application

Herbicide application is scheduled in forest areas where prescribed burning is not effective or may not be authorized due to proximity to residential areas and other smoke-sensitive sites. Prescribed fire can be introduced after initial treatment by herbicide in most cases. The removal of undesirable exotic species using herbicides is also discussed in the land management section of this INRMP. The control of exotic species will be coordinated with the Forest Management Plan (Appendix B) so forestry operations can enhance the control effort (i.e., prescribed burning following an exotic species control project).

Forest Fertilization

Fertilization is scheduled in forest areas where site quality is relatively poor. These forest stands are usually fertilized every 10 years.

Unplanned Activities

Unplanned activities that will require a change to the work plan in forest areas may result due to natural causes or mission-related requirements. Natural causes include the effects of wildfire, insect and disease outbreaks, nuisance animal damage, and weather-related events such as tornadoes, tropical storms, and hurricanes. Mission-related requirements may include reduction of forest areas to construct new facilities and training requirements that require an interruption in the thinning or prescribed burn schedule. Should scheduled prescribed burns not occur due to mission-related requirements, the application of approved pesticides in forest areas, combined with the cutting and removal of understory vegetation, may be scheduled as an unplanned activity.

Silvicultural actions for unplanned activities include the full range of available and acceptable practices as described above, as well as forest harvesting methods. Unplanned activities such as clearcutting, debris removal, chipping, roller drum chopping, shearing, raking, windrowing, burning, pesticide applications, and conversion to a different forest age class may be necessary if the unplanned activity is dictated by natural events. The specific project, if mission-related, shall include complete environmental documentation separate from the actions designated by this INRMP as unplanned activities. The environmental authorization established by this INRMP will cease for an existing forest stand if it is converted to another use for mission purposes.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – maintain a 50-foot buffer around wetlands;
- Soil Conservation and Erosion, Section 5.1.2 – consider and control erosion during silvicultural activities such as thinning;
- Stormwater and Water Quality, Section 5.1.3 – use proper amounts of herbicide and fertilizers to avoid excessive runoff in stormwater;
- Floodplains, Section 5.1.4 – ensure silvicultural activities do not compromise the function of floodplains;
- Landscaping and Grounds Maintenance, Section 5.1.5 – ensure silvicultural projects are consistent with landscaping and grounds maintenance tasks;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – reduce and control exotic vegetation in forest stands;
- Forest Protection, Section 5.2.2 – maintain forest stands to reduce fuel loads;

- Migratory Birds, Section 5.3.1 - use proper amounts of herbicide and fertilizers to avoid runoff into wading areas;
- Threatened and Endangered Species, Section 5.3.2 – maintain and enhance forest habitat for protected wildlife;
- Nuisance Wildlife, Section 5.3.3 – be aware of creating potential habitat for birds and wildlife;
- Outdoor Recreation, Section 5.4 – maintain aesthetically pleasing forests for recreation;
- Natural Resources Training, Section 5.5.1 – ensure personnel are aware of forestry issues and practices; and
- GIS, Section 5.5.2 – utilize GIS tools to improve forest management and silvicultural plans.

Ecosystem Management

Silvicultural activities are essential to maintain healthy forests (especially fire-dependent ecosystems) that provide quality wildlife habitat and sustainable yields of forest products. Harvesting activities are means by which to redistribute the site's growth potential to the best trees so that they maintain an acceptable rate of growth. Harvesting also stimulates understory growth, which creates food and cover for some wildlife. Fire is a natural part of many ecosystems at TBR, and, prescribed burning when used in combination with harvesting, can maintain healthy and vigorous forest stands on the Installation, as well as provide habitat for RTE species.

Military Mission

Silvicultural practices, such as harvesting, herbicide applications, and prescribed burning on TBR, decrease forest fuel loads, thus decreasing fuel available to wildfires, which could threaten TBR military mission activities, facilities, and housing, and affect scheduling for training.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Silvicultural Activities

- Resources Planning Act (RPA), passed by Congress in 1974, requires a complete national assessment or inventory of all forest, rangeland resources, and public needs every 10 years, along with a plan to meet those needs.
- Soil Conservation Act, 16 U.S.C. 590a et seq., provides for soil conservation practices on Federal lands.
- Federal Noxious Weed Act of 1974, 7 U.S.C. 2801, establishes control and eradication of noxious weeds and regulates them in interstate and foreign commerce.
- EO 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems. Vegetative buffers and landscaping to control soil erosion must comply with this EO.
- EOs 11989 and 12608, close areas to off-road vehicles where soil, wildlife, and other natural resources may be adversely affected.
- Federal Water Pollution Control Act, as amended by the CWA of 1977, 33 U.S.C. 1251, regulates the dredging and filing of wetlands and establishes procedures to identify and regulate nonpoint sources of pollutant discharge, including turbidity, into wetlands.

- CWA Section 401, requires an applicant for a Federal license or permit to provide a certification that any discharges from the facility will comply with the CWA, including water quality standard requirements.
- CWA, Section 402 NPDES Program, 2002, 33 U.S.C. 1251, controls direct discharges into navigable waters. NPDES permits, issued by either the USEPA or an authorized state or tribe, contain industry-specific, technology-based and water-quality-based limits and establish pollutant monitoring and reporting requirements.
- CWA Section 404, establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands.
- Endangered Species Act, protects threatened and endangered species and their habitats until they are out of danger of extinction.
- DoD 7000.14-R, Volume 11A, Chapter 16 administers the reimbursement of costs of managing forest resources for timber production. Under this regulation, only expenses related to the maintenance of timber for commercial sale are reimbursed.
- MCO P5090.2A, Paragraph 11203, discusses laws that govern natural resources management relating to the protection and management of forest resources.
- Sikes Act, 16 U.S.C. 670a-o, authorizes conservation programs on military reservations.
- DoD Directive 4715.1E, establishes the Defense Environmental Security Council; the Environment, Safety, and Occupational Health Policy Board and the Defense Environmental Security Council Committee structure; and the Armed Forces Pest Management Board.

Additional Sources of Information

Eglin Air Force Base Forest Restoration

http://www.eglin.af.mil/library/factsheets/factsheet_print.asp?fsID=6449&page=1

Tall Timbers Research Station

http://www.talltimbers.org/

TNC Fire Management Manual

http://www.tncfiremanual.org/

A Guide for Prescribed Fire in Southern Forests

http://www.sref.info/resources/publications/file_03_22b_06

American Forests

http://www.americanforests.org/

National Association of State Foresters

http://www.stateforesters.org/

Society of American Foresters

http://www.safnet.org/

USFS

http://www.fs.fed.us/

Treelink

http://www.treelink.org/

GFC

http://www.gfc.state.ga.us

GADNR

http://www.gadnr.org/

Southern Research Station (Publication-Scientific)

http://www.srs.fs.usda.gov/pubs/

American Forests

http://www.americanforests.org/

5.2.2 Forest Protection

TBR protects its forest stands against wildfires, insects, and diseases, and endeavors to maintain desirable environmental and aesthetic forest qualities. For example, a desirable aesthetic quality may be a dense stand of healthy trees near a roadside.

- **Wildfires** are uncontained fires in forested or open areas. Wildfires may result from human activities or weather events. The potential for damage from severe wildfires may be decreased by implementing prescribed burning programs, which decrease fuel loads in forest stands (see Section 5.2.1).
- **Diseases**, such as fusiform rust (*Cronartium fusiforme*), are present on TBR. Galls are the first signs of fusiform rust, and grow on branches and tree trunks, eventually killing the tree. Thinnings will emphasize salvage and removal of diseased trees from various pathogens. It is possible that highly infected plantations may have to be cleared and replanted because, after salvage cutting, too few trees per acre will remain for future growth and development.
- **Insects**, such as the southern pine, ips, and black turpentine beetles (*Dendroctonus frontalis*, *Ips calligraphus*, and *Dendroctonus terebrans*), attack and kill pine trees. The attack intensity depends on site conditions, tree vigor, and weather. Needles on trees will turn brown within several days after a fatal attack. A number of additional species of insects also threaten hardwoods. The threat of insect infestations may be lowered by the use of pesticides and maintaining thinned, healthy forests (see Section 5.2.1). Damage to trees by machinery, especially in pine stands, should be minimized because the wounds may attract insects.

Issues

Wildfires, insects, and diseases have the potential to cause severe damage in forest stands on TBR. Silvicultural activities and proper training to control wildfires, insects, and diseases at TBR are

essential to carrying out the goals and objectives of this INRMP. Proper forest protection activities will increase the growth rate of the preferred trees, reduce the potential for wildfires, control diseases and insect pests, and ensure the continuation of healthy forest communities.

Goals and Objectives

- Preserve access to air and land to meet military readiness requirements;
- Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices;
- Manage and provide for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation;
- Maintain clear zones around all targets that are free of unwanted vegetation;
- Maintain forest buffers around all targets that provide a buffer from shrapnel and noise;
- Prevent and minimize the potential for wildfire to affect the military mission, facilities, surrounding lands, and ecological communities;
- Implement environmentally beneficial grounds maintenance and landscaping practices;
- Avoid, minimize, and mitigate impacts on wetland quantity and quality;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Avoid or minimize pollution of surface waters;
- Control and remove invasive and exotic species;
- Conserve, restore, and enhance habitats supporting rare species and species listed as threatened, endangered, or candidate species under the ESA, so as not to interfere with the military mission;
- Avoid or minimize impacts on migratory birds and their nests in accordance with the MBTA;
- Conserve, enhance, and restore sensitive and regionally important habitats for utilization by listed species and species of special concern, so as not to interfere with the military mission;
- Maintain a GIS database to facilitate effective species and habitat management at TBR;
- Maintain up-to-date training of natural resources personnel; and
- Produce a sustainable yield of commercial timber products from native species.

Projects

- Firebreak Maintenance (Project 01 in Appendix A)
- Wildland Fire Management Plan (Project 02 in Appendix A)
- Wetlands Delineation (Project 03 in Appendix A)
- Invasive Species Management (Project 04 in Appendix A)
- Frosted Flatwoods Salamander Management (Project 05 in Appendix A)
- Threatened, Endangered, Candidate, and Rare Species Management (Project 06 in Appendix A)
- Migratory Bird Surveys (Project 07 in Appendix A)

- Prescribed Burn Program (Project 08 in Appendix A)
- GIS Maintenance (Project 09 in Appendix A)
- Forest Management (Project 10 in Appendix A)
- Forest Inventory (Project 11 in Appendix A)
- Pest Management (Project 12 in Appendix A)

Management Strategies

- TBR will integrate firebreak maintenance with other program elements by developing site-specific maintenance plans, including necessary BMPs, for each target; managing conditions at firebreaks; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will integrate the maintenance of forest buffers with other program elements by developing site-specific maintenance plans, including necessary BMPs in and around each target; managing conditions in the forest buffers; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will avoid adverse effects of wildfire as described in the Wildland Fire Management Plan through constructing and maintaining firebreaks, controlling fuel loads, maintaining readiness to respond, and developing partnerships. Integrate wildland fire management with other program elements by using an ecosystem management approach that mimics natural fire regimes; routinely monitor habitat conditions, and adapt management as necessary to avoid or minimize potential adverse effects from wildfire. A Wildland Fire Action Plan was developed to assist in the first response of a report wildland fire on TBR (Appendix H).
- TBR will review all grounds maintenance and landscaping activities to ensure consistency with the concepts presented in this INRMP; monitor conditions of maintained grounds; and adapt management as necessary to avoid or minimize potential adverse effects on natural resources.
- TBR will use the preliminary jurisdictional determination to help identify areas of likely wetlands impact during preliminary planning of development projects.
- TBR will maintain no net loss of wetlands, promote 50-foot buffers for all wetlands, and ensure that land use and land management practices will not adversely affect wetlands.
- TBR will continue reviewing and monitoring proposed activities to avoid impacts on the attenuation capacity of the 100-year floodplain. If development is necessary within the 100-year floodplain to support the military mission, it shall be confined to previously disturbed areas of the floodplain whenever practicable.
- TBR will continue to implement BMPs for the prevention of stormwater pollution, identify and implement BMPs where necessary, and monitor implementation and effectiveness of all BMPs.
- Apply soil erosion management to the preservation of sensitive habitats and species.
- TBR will implement strategies for the control and removal of invasive and exotic species on TBR.
- TBR will manage frosted flatwoods salamander populations and suitable habitats at TBR.
- TBR will avoid impacts on threatened, endangered, candidate, and rare species at TBR.
- TBR will ensure adherence to the MBTA.

- TBR will use prescribed fires to mimic natural fire regimes that control invasive species and promote establishment and maintenance of desirable species composition and structure.
- TBR will attain, store, and access qualitative and quantitative data pertinent to the assessment and adaptation of natural resources management.
- TBR will send personnel to natural resources training and workshops as appropriate and necessary.
- TBR will utilize sound, proven forest management techniques to support other program elements and enhance ecosystem benefits.

Long-Term Management

Forest stands at TBR are managed with an ecosystem approach to sustain yield and health. Planned silvicultural activities in the Forest Management Plan (Appendix B) that are directly related to forest protection include prescribed burning, thinning, and pesticide application (see Section 5.2.1). The NRM will have timber prescriptions reviewed by foresters and fish and wildlife biologists from NAVFAC SE, as well as other appropriate Federal, state, and county agencies, to ensure proper forest protection management.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – use proper amounts of pesticides to avoid wetland contamination;
- Soil Conservation and Erosion, Section 5.1.2 – consider and control erosion during forest protection activities such as thinning;
- Stormwater and Water Quality, Section 5.1.3 – use proper amounts of pesticides to avoid excessive runoff in stormwater;
- Floodplains, Section 5.1.4 – ensure forest protection activities do not compromise the function of floodplains;
- Landscaping and Grounds Maintenance, Section 5.1.5 – ensure forest protection activities are consistent with landscaping and grounds maintenance tasks;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – reduce and control destructive pests in forest stands;
- Silvicultural Activities, Section 5.2.1 – maintain forest stands to reduce fuel loads;
- Migratory Birds, Section 5.3.1 – use proper amounts of pesticides to avoid runoff into wading areas;
- Threatened and Endangered Species, Section 5.3.2 – protect forest health and habitat for protected wildlife;
- Nuisance Wildlife, Section 5.3.3 – be aware of creating potential habitat for birds and wildlife;
- Outdoor Recreation, Section 5.4 – maintain aesthetically pleasing forests for recreation;
- Natural Resources Training, Section 5.5.1 – ensure personnel are aware of forestry issues and practices; and
- GIS, Section 5.5.2 – utilize GIS tools to improve forest protection

Ecosystem Management

Forest protection activities are essential to maintain healthy forests that provide quality wildlife habitat and sustainable yields and prevent the accumulation of fuel loads, which could cause detrimental effects on forest stands. In addition, forest protection activities enhance the functional capacities of wetland areas within TBR by allowing prescribed fires to remove invasive species within wetland areas, and minimize the potential for catastrophic wildfires that could decimate forest stands and expose large areas of soil to erosion.

Military Mission

Forest protection helps prevent wildfires which could threaten TBR military mission activities and facilities.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Forest Protection

- Federal Noxious Weed Act of 1974, 7 U.S.C. 2801, establishes control and eradication of noxious weeds and regulates them in interstate and foreign commerce.
- EO 13112, Invasive Species, as previously described.
- FIFRA, 7 U.S.C. 136, requires that all pesticides, whether for commercial or private use, be applied in accordance with product labeling and that containers are properly disposed of. USEPA is responsible under FIFRA for the registration of all pesticide active ingredients used in the United States.
- Federal Plant Pest Act, 7 U.S.C. 150a et seq., regulates the importation and interstate movement of plant pests and authorizes the Secretary of Agriculture to take emergency measures to destroy infected plants or materials.
- DoD 7000.14R, Volume 11A, Chapter 16 administers the reimbursement of costs of managing forest resources for timber production. Under this regulation, only expenses related to the maintenance of timber for commercial sale are reimbursed.
- MCO P5090.2A, Paragraph 11203, discusses laws that govern natural resources management relating to the protection and management of forest resources.

Additional Sources of Information

Tall Timbers Research Station

http://www.talltimbers.org/

TNC Fire Management Manual

http://www.tncfiremanual.org/

A Guide for Prescribed Fire in Southern Forests

http://www.sref.info/resources/publications/file_03_22b_06

National Association of State Foresters

http://www.stateforesters.org/

Society of American Foresters
http://www.safnet.org/

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Southern Research Station (Publication-Scientific)
http://www.srs.fs.usda.gov/pubs/

American Forests
http://www.americanforests.org/

5.3 FISH AND WILDLIFE

Fish and wildlife management actions are designed to preserve, enhance, and manage indigenous fish and wildlife and their habitats. These actions include the conservation of protected species and nongame species, management and harvest of game species, and animal damage and disease control. Primary management issues at TBR are (1) wildlife management, (2) migratory bird management, (3) threatened and endangered species and natural communities management, and (4) nuisance wildlife.

Habitat management is the basis on which wildlife programs are conducted at TBR. However, animal damage control is also included in the management scheme. An objective of the wildlife management program at TBR is to protect, conserve, and manage wildlife and threatened and endangered species as vital elements of the ecosystem. Generally, species dependent on wetlands, fire, and mixed pine-hardwood forest communities have been the focus of wildlife management at TBR. Wildlife have benefited from forest management practices (i.e., prescribed burning), native landscaping, preservation of natural communities, and wetlands protection. A second objective of the wildlife management program is to prevent nuisance wildlife populations from interfering with the military mission or other natural resources programs.

Current demands on wildlife resources and long-term needs for wildlife programs include the following:

- Species protection and habitat development program;
- Surveys and protection program for threatened and endangered species and natural communities;
- Survey and protection program for neotropical migratory birds;
- Wildlife damage and diseases program;
- Nuisance wildlife monitoring and control program; and
- Protection and habitat development for game species (white-tailed deer, turkey, and small game).

5.3.1 Migratory Birds

The MBTA (16 U.S.C. 703-711) protects migratory birds and their parts (e.g., eggs, nests, and feathers). Migratory birds face serious challenges, including habitat loss, collisions with artificial structures, and environmental contaminants, resulting in species decline. Protecting migratory birds requires a coordinated effort involving multiple jurisdictions and interests because they cross national boundaries, watersheds, and ecosystems. Pursuant to the 2003 National Defense Authorization Act (NDAA), the Armed Forces are exempted from the incidental *taking* of migratory birds during military readiness activities. Military readiness activities include all training and operations of the Armed Forces that relate to combat and the adequate testing of military equipment, vehicles, weapons and sensors for proper operation and suitability for combat use. However, the NDAA also requires that the Secretaries of Defense and Interior identify ways to minimize, mitigate, and monitor the *take* of migratory birds during military readiness activities.

Issues

Migratory birds at TBR are protected under the MBTA against *take* for normal and routine operations such as Installation support functions. Take includes, but is not limited to, pesticide application, nest or egg removal, and, occasionally, tree removal. The temporal and spatial presence of migratory bird species must therefore be considered when carrying out all management activities described in this INRMP. Neither habitat modification as a result of timber sales nor nest removal outside nesting season would constitute a *take*.

Goals and Objectives

- Preserve access to air and land to meet military readiness requirements;
- Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices;

- Manage and provide for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation;
- Maintain clear zones around all targets that are free of unwanted vegetation;
- Maintain forest buffers around all targets that provide a buffer from shrapnel and noise;
- Prevent and minimize the potential for wildfire to affect the military mission, facilities, surrounding lands, and ecological communities;
- Implement environmentally beneficial grounds maintenance and landscaping practices;
- Avoid, minimize, and mitigate impacts on wetland quantity and quality;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Avoid or minimize pollution of surface waters;
- Control and remove invasive and exotic species;
- Control nuisance animal populations and minimize attractants of new populations;
- Conserve, restore, and enhance habitats supporting rare species and species listed as threatened, endangered, or candidate species under the ESA; so as not to interfere with the military mission;
- Avoid or minimize impacts on migratory birds and their nests in accordance with the MBTA;
- Conserve, enhance, and restore sensitive and regionally important habitats for utilization by listed species and species of special concern; so as not to interfere with the military mission;
- Maintain a GIS database to facilitate effective species and habitat management at TBR;
- Maintain up-to-date training of natural resources personnel;
- Produce a sustainable yield of commercial timber products from native species;
- Provide public access to Installation lands, where practicable, provided such access does not conflict with military readiness and does not harm sensitive natural resources on TBR;
- Identify outdoor recreational needs and opportunities and provide these opportunities where consistent with other program elements; and
- Ensure applicable environmental and hunting laws are adhered to on TBR.

Projects

- Firebreak Maintenance (Project 01 in Appendix A)
- Wildland Fire Management Plan (Project 02 in Appendix A)
- Wetlands Delineation (Project 03 in Appendix A)
- Invasive Species Management (Project 04 in Appendix A)
- Threatened, Endangered, Candidate, and Rare Species Management (Project 06 in Appendix A)
- Migratory Bird Surveys (Project 07 in Appendix A)
- Prescribed Burn Program (Project 08 in Appendix A)
- GIS Maintenance (Project 09 in Appendix A)

- Forest Management (Project 10 in Appendix A)
- Forest Inventory (Project 11 in Appendix A)
- Pest Management (Project 12 in Appendix A)

Management Strategies

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- TBR will integrate the maintenance of forest buffers with other program elements by developing site-specific maintenance plans, including necessary BMPs in and around each target; managing conditions in the forest buffers; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will avoid adverse effects of wildfire as described in the Wildland Fire Management Plan through constructing and maintaining firebreaks, controlling fuel loads, maintaining readiness to respond, and developing partnerships. Integrate wildland fire management with other program elements by using an ecosystem management approach that mimics natural fire regimes; routinely monitor habitat conditions, and adapt management as necessary to avoid or minimize potential adverse effects from wildfire. A Wildland Fire Action Plan was developed to assist in the first response of a report wildland fire on TBR (Appendix H).
- TBR will review all grounds maintenance and landscaping activities to ensure consistency with the concepts presented in this INRMP; monitor conditions of maintained grounds; and adapt management as necessary to avoid or minimize potential adverse effects on natural resources.
- TBR will use the preliminary jurisdictional determination to help identify areas of likely wetlands impact during preliminary planning of development projects.
- TBR will maintain no net loss of wetlands, promote 50-foot buffers for all wetlands, and ensure that land use and land management practices will not adversely affect wetlands.
- TBR will continue reviewing and monitoring proposed activities to avoid impacts on the attenuation capacity of the 100-year floodplain. If development is necessary within the 100-year floodplain to support the military mission, it shall be confined to previously disturbed areas of the floodplain whenever practicable.
- TBR will continue to implement BMPs for the prevention of stormwater pollution, identify and implement BMPs where necessary, and monitor implementation and effectiveness of all BMPs.
- Apply soil erosion management to the preservation of sensitive habitats and species.
- TBR will implement strategies for the control and removal of invasive and exotic species on TBR.
- TBR will manage frosted flatwoods salamander populations and suitable habitats at TBR.
- TBR will avoid impacts on threatened, endangered, candidate, and rare species at TBR.
- TBR will ensure adherence to the MBTA.
- TBR will use prescribed fires to mimic natural fire regimes that control invasive species and promote establishment and maintenance of desirable species composition and structure.
- TBR will attain, store, and access qualitative and quantitative data pertinent to the assessment and adaptation of natural resources management.

- TBR will send personnel to natural resources training and workshops as appropriate and necessary.
- TBR will utilize sound, proven forest management techniques to support other program elements and enhance ecosystem benefits.
- TBR will identify opportunities to provide desirable recreation opportunities on TBR and continue to implement the hunting program on TBR.
- TBR will utilize law enforcement personnel to enforce Federal and state natural resources related laws to protect game and nongame species, protect habitats and facilities, and ensure an equitable distribution of harvested game.

The NRM will be informed before routine support action is taken that may affect any migratory bird species. The NRM would determine if the possible impacts associated with the routine action would impact migratory bird species and, if necessary, would initiate discussions or obtain a permit from USFWS. Bird surveys are vital to knowing when and where migratory birds occur on TBR and will be conducted to monitor the bird populations at TBR. Where possible, military readiness activities should be sited in ways to avoid or minimize impacts on migratory birds. If clear evidence of bird *takes* is noted, such as the sight of numerous dead or injured birds, TBR will consider modifying its activities, as practicable, to reduce *take* of migratory birds.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – wetlands provide forage habitat for various bird species;
- Soil Conservation and Erosion, Section 5.1.2 – control sedimentation into bird foraging areas;
- Stormwater and Water Quality, Section 5.1.3 – control water quality in bird foraging areas;
- Floodplains, Section 5.1.4 – limited development in floodplains provides habitat for migratory birds away from Complex infrastructure;
- Landscaping and Grounds Maintenance, Section 5.1.5 – ensure nests are not removed in the nesting season during grounds maintenance activities;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – exotic species can provide unwanted nesting areas and materials for birds near infrastructure;
- Silviculture, Section 5.2.1 – consider nesting season during planting, thinning and prescribed burn activities;
- Forest Protection, Section 5.2.2 – maintain forests to prevent disease and monitor dead trees that provide nesting habitat for species;
- Threatened and Endangered Species, Section 5.3.2 – migratory bird management aids the status and survival of rare bird species;
- Nuisance Wildlife, Section 5.3.3 – control feral animals to protect migratory birds;
- Outdoor Recreation, Section 5.4 – enlist avid bird watchers in bird inventories;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on MBTA and related laws; and
- GIS, Section 5.5.2 – utilize GIS tools to improve migratory bird management.

Ecosystem Management

Migratory bird management is one component of ecosystem management at TBR. Other management activities described in this INRMP, such as wetland management and nuisance animal control, benefit migratory bird management. Many birds that migrate through TBR spread seeds, eat rodents, and perform other functions that benefit the health of the entire ecosystem.

Military Mission

Appropriate landscaping and management of migratory birds will minimize potential impacts on the military mission resulting from the MBTA. The integration of the various management actions described in this INRMP and an understanding of how they relate to migratory bird management will enable TBR to accomplish all its training objectives within the framework of the MBTA.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Migratory Birds

- MBTA, as amended 16 U.S.C. 703-712, prohibits the *taking* or harming of a migratory bird, its eggs, nests, or young without the appropriate permit.
- Bald and Golden Eagle Protection Act, 16 U.S.C. 668-668c, prohibits anyone, without a permit issued by the Secretary of the Interior, from *taking* bald eagles, including their parts, nests, or eggs.
- EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, describes specific actions to advance migratory bird conservation, avoid or minimize the *take* of migratory birds, and ensure that DoD operations, other than military readiness activities, are consistent with the MBTA.
- 2003 National Defense Authorization Act, exempts the Armed Forces from the incidental *taking* of migratory birds during military readiness activities.
- Endangered Species Act, 16 U.S.C. 35, 32 CFR 190, provides for the identification and protection of threatened and endangered species of fish, wildlife, and plants and their critical habitats. It requires Federal agencies to ensure that no agency action is likely to jeopardize the continued existence of a threatened or endangered species.
- Sikes Act, as amended 16 U.S.C. 670a-o, requires each military department to manage fish and wildlife resources in accordance with a tripartite cooperative plan agreed to by the USFWS and state wildlife agency.
- Fish and Wildlife Conservation Act, 16 U.S.C. 2901, encourages all Federal departments and agencies to utilize their statutory and administrative authority, to the maximum extent practicable and consistent with each agency's statutory responsibilities, to conserve and promote conservation of nongame fish and wildlife and their habitats.
- MCO P5090.2A, Paragraph 11104.3d, discusses natural resources management relating to migratory birds.

Additional Sources of Information

Smithsonian National Zoological Park, Migratory Bird Center

http://nationalzoo.si.edu/ConservationAndScience/MigratoryBirds/

USFWS Division of Migratory Bird Management
http://www.fws.gov/migratorybirds/

Birds of Conservation Concern
www.fws.gov/migratorybirds/reports/BCC2002.pdf

East Gulf Coastal Plain Priority Bird Populations and Habitats
http://www.blm.gov/wildlife/pl_04sum.htm

MBTA
http://www.fws.gov/permits/mbpermits/regulations/mbta.hml

TNC, Migratory Bird Program
http://www.nature.org/initiatives/programs/birds/

5.3.2 Threatened and Endangered Species

The ecological integrity of wetland and upland communities will be maintained for the protection of native plant and animal species, including numerous RTE species. RTE species will be preserved and protected to ensure that there is no reduction in species numbers or population sizes. Wildlife habitat management is the approach used by TBR; management activities at TBR are described in this INRMP for wetlands, floodplains, and forests, and these activities are intended to enhance habitat for fish, birds, and wildlife on and adjacent to TBR, including RTE species.

Species are listed as endangered or threatened if, based upon scientific and commercial data, there is a current or threatened habitat loss, disease, over-exploitation, or other factors affecting its existence. The ESA prohibits Federal agencies from authorizing, funding, or carrying out any actions that destroy or adversely modify “critical habitat.” Critical habitat for a threatened or endangered species is defined as (1) the specific areas within the geographical area occupied by the species at the time it is listed as threatened or endangered on which are found physical or biological features essential to the conservation of the species, and which may require special management considerations or protection; and (2) specific areas outside the geographical areas occupied by the species at the time it is listed, upon a determination by the Secretary of Interior that such areas are essential for the conservation of the species.

TBR is within, or approached by, the range of approximately 15 RTE species. These species include the frosted flatwoods salamander, striped newt, American alligator, eastern indigo snake, gopher tortoise, southern hognose snake, bald eagle, red-cockaded woodpecker, Bachman’s warbler, wood stork, corkwood, dwarf witch-alder, Georgia plume, parrot pitcher plant, and pondspice (see Section 2.8, Table 2-5). Three species (frosted flatwoods salamander, American alligator, and gopher

tortoise) are confirmed residents of TBR, the wood stork is a confirmed migrant, and two additional species (striped newt and eastern indigo snake) are likely residents of TBR but their presence has not been confirmed.

Issues

Federally listed and state-listed species inhabit TBR. These species are protected under various laws, including the ESA. Section 7(a)(1) of the ESA provides that all Federal agencies, in consultation with USFWS, shall use their authorities to further the purpose of the ESA by carrying out programs for the conservation of endangered and threatened species. Section 7(a)(2) requires Federal agencies to ensure, in consultation with USFWS, that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of any endangered or threatened species or result in destruction or adverse modification of critical habitat.

Natural communities at TBR provide habitat for many protected species and require special protection and management. There are no areas designated as critical habitat for threatened and endangered species on TBR.

Goals and Objectives

- Preserve access to air and land to meet military readiness requirements;
- Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices;
- Manage and provide for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation;
- Maintain clear zones around all targets that are free of unwanted vegetation;
- Maintain forest buffers around all targets that provide a buffer from shrapnel and noise;
- Prevent and minimize the potential for wildfire to affect the military mission, facilities, surrounding lands, and ecological communities;
- Implement environmentally beneficial grounds maintenance and landscaping practices;
- Avoid, minimize, and mitigate impacts on wetland quantity and quality;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Avoid or minimize pollution of surface waters;
- Control and remove invasive and exotic species;
- Control nuisance animal populations and minimize attractants of new populations;
- Conserve, restore, and enhance habitats supporting rare species and species listed as threatened, endangered, or candidate species under the ESA; so as not to interfere with the military mission;
- Avoid or minimize impacts on migratory birds and their nests in accordance with the MBTA;

- Conserve, enhance, and restore sensitive and regionally important habitats for utilization by listed species and species of special concern; so as not to interfere with the military mission;
- Maintain a GIS database to facilitate effective species and habitat management at TBR;
- Maintain up-to-date training of natural resources personnel;
- Manage and provide for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation;
- Produce a sustainable yield of commercial timber products from native species;
- Provide public access to Installation lands, where practicable, provided such access does not conflict with military readiness and does not harm sensitive natural resources on TBR;
- Identify outdoor recreational needs and opportunities and provide these opportunities where consistent with other program elements; and
- Ensure applicable environmental and hunting laws are adhered to at TBR.

Projects

- Firebreak Maintenance (Project 01 in Appendix A)
- Wildland Fire Management Plan (Project 02 in Appendix A)
- Wetlands Delineation (Project 03 in Appendix A)
- Invasive Species Management (Project 04 in Appendix A)
- Frosted Flatwoods Salamander Management (Project 05 in Appendix A)
- Threatened, Endangered, Candidate, and Rare Species Management (Project 06 in Appendix A)
- Migratory Bird Surveys (Project 07 in Appendix A)
- Prescribed Burn Program (Project 08 in Appendix A)
- GIS Maintenance (Project 09 in Appendix A)
- Forest Management (Project 10 in Appendix A)
- Forest Inventory (Project 11 in Appendix A)
- Pest Management (Project 12 in Appendix A)

Management Strategies

- TBR will integrate firebreak maintenance with other program elements by developing site-specific maintenance plans, including necessary BMPs, for each target; managing conditions at firebreaks; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will integrate the maintenance of forest buffers with other program elements by developing site-specific maintenance plans, including necessary BMPs in and around each target; managing conditions in the forest buffers; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will avoid adverse effects of wildfire as described in the Wildland Fire Management Plan through constructing and maintaining firebreaks, controlling fuel loads, maintaining readiness to respond, and developing partnerships. Integrate wildland fire management with other program elements by using an ecosystem management approach that mimics natural fire

regimes; routinely monitor habitat conditions, and adapt management as necessary to avoid or minimize potential adverse effects from wildfire. A Wildland Fire Action Plan was developed to assist in the first response of a report wildland fire on TBR (Appendix H).

- TBR will review all grounds maintenance and landscaping activities to ensure consistency with the concepts presented in this INRMP; monitor conditions of maintained grounds; and adapt management as necessary to avoid or minimize potential adverse effects on natural resources.
- TBR will use the preliminary jurisdictional determination to help identify areas of likely wetlands impact during preliminary planning of development projects.
- TBR will maintain no net loss of wetlands, promote 50-foot buffers for all wetlands, and ensure that land use and land management practices will not adversely affect wetlands.
- TBR will continue reviewing and monitoring proposed activities to avoid impacts on the attenuation capacity of the 100-year floodplain. If development is necessary within the 100-year floodplain to support the military mission, it shall be confined to previously disturbed areas of the floodplain whenever practicable.
- TBR will continue to implement BMPs for the prevention of stormwater pollution, identify and implement BMPs where necessary, and monitor implementation and effectiveness of all BMPs.
- Apply soil erosion management to the preservation of sensitive habitats and species.
- TBR will implement strategies for the control and removal of invasive and exotic species on TBR.
- TBR will manage frosted flatwoods salamander populations and suitable habitats at TBR.
- TBR will avoid impacts on threatened, endangered, candidate, and rare species at TBR.
- TBR will ensure adherence to the MBTA.
- TBR will use prescribed fires to mimic natural fire regimes that control invasive species and promote establishment and maintenance of desirable species composition and structure.
- TBR will attain, store, and access qualitative and quantitative data pertinent to the assessment and adaptation of natural resources management.
- TBR will send personnel to natural resources training and workshops as appropriate and necessary.
- TBR will utilize sound, proven forest management techniques to support other program elements and enhance ecosystem benefits.
- TBR will utilize law enforcement personnel to enforce Federal and state natural resources related laws to protect game and nongame species, protect habitats and facilities, and ensure an equitable distribution of harvested game.

Long-Term Management

TBR will actively manage areas and natural communities to provide habitat for RTE species that are known to occur on the Installation. Other Federally or state-listed threatened and endangered species will also be managed as conditions warrant. TBR will continue to monitor populations of frosted flatwoods salamander, gopher tortoises, bird species, and protected plants. The NRM will undertake measures, as appropriate, to ensure activities and actions conducted within TBR are not detrimental to RTE species or habitats upon which they depend.

Species dependent upon wetlands and fire-dependent communities are the focus of most management activities at TBR. Natural communities and other wildlife habitats will be managed to sustain and enhance wildlife resources on TBR consistent with the military mission.

Well-informed, resources-based ecosystem management will enable TBR to serve the military mission while playing an important role in the protection of Georgia's native biodiversity. Most habitat development will occur in conjunction with forest management. TBR will sustain existing natural communities and forests for wildlife and enhance other ecosystems for urban and non-urban species using a combination of the following management concepts at the discretion of the NRM.

- Retain suitable large snags and trees for den and cavity during forest management activities;
- Provide nest boxes/platforms for birds and bats;
- Leave brush material along woodland edges following necessary clearing (e.g., military mission);
- Plant trees and shrubs, or seed open areas for soil stabilization and to provide wildlife habitat;
- Maintain pine stands with basal areas low enough to prevent crown closure in order to stimulate understory growth, which in turn, creates food and cover;
- Prescribe burn on rotation through fire-dependent communities to increase food production and maintain desired habitat structure;
- Avoid habitat fragmentation. Although fragmentation increases edge, arbitrarily locating human-made linear and nonlinear features within wildlife areas hinders ecological processes through the separation of wildlife populations and may render the fragmented parcel unsustainable for wildlife;
- Create or enhance connections between habitats to facilitate wildlife movement between areas. The necessary characteristics of connections will vary depending on the species; for instance, amphibians need water or moist areas to move between ponds and wet areas, and most vertebrates require protective cover such as trees, shrubs, dense ground cover, downed trees, and existing burrows;
- Maintain vegetative buffers around ponds and wetland areas and along stream edges;
- Leave snags and downed logs for nesting, roosting, foraging, cover, perching, and territorial displays;
- Maintain hardwood areas for foraging activities;
- Seed cleared areas associated with silvicultural activities (i.e., logging decks) with wildlife food plant species to prevent erosion and provide forage; and
- Avoid impacts on wetlands and surface waters.

The following sub-sections describe management recommendations and benefits of this INRMP for RTE species known to occur at TBR. Changes in management practices may result from: (1) the listing or removal of a species under the ESA or (2) a change in a species occurrence at TBR. TBR will continue to conduct species survey updates to identify changes in populations and habitat on the properties. Species information provided in the surveys will be used to modify management practices. Modification of management practices will be administered by the NRM in consultation

with NAVFAC SE foresters and NAVFAC Midlant biologists, as well as other Federal, state, and county agencies.

Three species (frosted flatwoods salamander, American alligator, and gopher tortoise) are confirmed residents at TBR, the wood stork is a confirmed migrant, and two additional species (striped newt and eastern indigo snake) are likely residents of TBR but their presence has not been confirmed.

Federally Listed Species

American Alligator (*Alligator mississippiensis*)

Status: Threatened (Federal) due to similarity of appearance to protected crocodilians

The American alligator occurs throughout the southeastern U.S. (NPS 2014). Alligators inhabit low-lying areas near water, preferring freshwater but also venturing into brackish or saltwater. Females build nests near water and lay clutches of 20 to 60 eggs between May and July. They are protective of their nesting areas during this season and such areas should be avoided. Alligators should not be fed, as this causes them to associate humans with food, thereby increasing the likelihood of potentially deadly encounters. Staff and visitors will be educated about the dangers of interacting with alligators. This INRMP protects habitat and water quality for alligators through active management of factors such as wetlands (Section 5.1.1), erosion control (Section 5.1.2), stormwater control (Section 5.1.3), and floodplain management (Section 5.1.4). The following projects described in this INRMP would benefit and conserve alligator habitat: Wetlands Delineation; Threatened, Endangered, Candidate, and Rare Species Management; and GIS Maintenance (see Appendix A for descriptions).

Frosted Flatwoods Salamander (*Ambystoma cingulatum*)

Status: Threatened (Federal) and Threatened (State)

The frosted flatwoods salamander has been documented in two seasonally inundated pond cypress depressions on the northeastern edge of TBR prior to the expansion. The frosted flatwoods salamander may also utilize ephemeral wetlands or ponds within the expanded TBR. It requires ephemeral, depressional wetlands dominated by pond cypress, blackgum, and slash pine that are seasonally flooded and geographically isolated from other bodies of water. These breeding habitats are typically devoid of predatory fish. Optimum breeding habitats are supported by appropriate upland habitats within 1,500 feet of a breeding site. Supporting upland habitats include moderately moist open pine flatwoods or pine savannas with a transitional open canopy ecotone between upland and wetland habitats to facilitate transition between habitats. This INRMP protects habitat for frosted flatwoods salamanders through active management of factors such as wetland management (Section 5.1.1), erosion control (Section 5.1.2), silvicultural activities (particularly prescribed fires [Section 5.2.1]), and forest protection (Section 5.2.2). Projects described in this INRMP that benefit and conserve frosted flatwoods salamander habitat include Frosted Flatwoods Salamander Management,

Firebreak Maintenance, Wildland Fire Management Plan, GIS Maintenance, Invasive Species Management, Threatened, Endangered, Candidate, and Rare Species Management, Prescribed Burn Program, Forest Management, and Pest Management (see Appendix A for descriptions).

Gopher Tortoise (*Gopherus polyphemus*)

Status: Candidate (Federal) and Threatened (State)

Gopher tortoises are present on TBR throughout the upland communities with open canopies. Gopher tortoises prefer xeric uplands with open canopy and ample low-lying herbaceous vegetation for foraging. Several species, including the gopher frog, eastern indigo snake, pine snake (*Pituophis melanoleucus*), and eastern diamondback rattlesnake (*Crotalus atrox*), depend upon gopher tortoise burrows for shelter. Forest management strategies such as thinning and prescribed burning maintain an open canopy and promote the growth of forage material. Gopher tortoises are vulnerable to predation by nuisance animals such as coyotes (*Canis latrans*), feral cats, and raccoons (*Procyon lotor*), so control of such species is beneficial. This INRMP protects habitat for gopher tortoises through active management of factors such as landscaping and grounds maintenance (Section 5.1.5), invasive species control (Section 5.1.6), silvicultural activities (particularly thinning and prescribed fires [Section 5.2.1]), and forest protection (Section 5.2.2). Projects described in this INRMP that benefit and conserve gopher tortoise habitat include Firebreak Maintenance, Wildland Fire Management Plan, GIS Maintenance, Invasive Species Management, Threatened, Endangered, Candidate, and Rare Species Management, Prescribed Burn Program, Forest Management, and Pest Management (see Appendix A for descriptions).

Eastern Indigo Snake (*Drymarchon couperi*)

Status: Threatened (Federal) and Threatened (State)

Observations of eastern indigo snakes have been documented within the expanded acreage of TBR by the USFWS Georgia Ecological Services Field Office (MCAS Beaufort 2013). In Georgia, the eastern indigo snake is most often associated with sand ridge habitats that occur along major Coastal Plain streams. Eastern indigo snakes are often associated with the burrows of the gopher tortoise, where they seek shelter from extreme temperatures and lay eggs. The natural communities of Georgia's Coastal Plain have been significantly reduced and altered as a result of agricultural and silvicultural activities (GADNR 2009b). This has resulted in smaller, isolated fragments of suitable habitat.

This INRMP protects habitat for indigo snakes through active management of factors such as landscaping and grounds maintenance (Section 5.1.5), invasive species control (Section 5.1.6), silvicultural activities (particularly thinning and prescribed fires [Section 5.2.1]), and forest protection (Section 5.2.2). Projects described in this INRMP that benefit and conserve indigo snake habitat

include Firebreak Maintenance, Wildland Fire Management Plan, GIS Maintenance, Invasive Species Management, Threatened, Endangered, Candidate, and Rare Species Management, Prescribed Burn Program, Forest Management, and Pest Management (see Appendix A for descriptions).

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – wetland provide habitat for many rare species;
- Soil Conservation and Erosion, Section 5.1.2 – control sedimentation into wetland habitat;
- Stormwater and Water Quality, Section 5.1.3 – control water quality for rare aquatic species;
- Floodplains, Section 5.1.4 – maintaining floodplain conditions benefits rare species;
- Landscaping and Grounds Maintenance, Section 5.1.5 – be aware of habitat utilization by rare species during grounds maintenance;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – control exotic species, especially those that compete with native rare species;
- Silviculture, Section 5.2.1 – thinning and controlled burns benefit upland rare species such as gopher tortoises;
- Forest Protection, Section 5.2.2 – controlling wildfires prevents damage to rare species and their habitats;
- Migratory Birds, Section 5.3.1 – combine migratory bird surveys with efforts to inventory protected species;
- Nuisance Wildlife, Section 5.3.2 –reduce predation by nuisance carnivores;
- Outdoor Recreation, Section 5.4 – properly educate recreational participants in stewardship of the resource and aquatic environment;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on protected species rules and regulations; and
- GIS, Section 5.5.2 – utilize GIS tools to improve management of rare species and their habitats;

Ecosystem Management

The concepts presented in this section are consistent with ecosystem management. By effectively managing wildlife habitats and natural communities on TBR, it is not only enhancing wildlife communities, but may also be providing opportunities for new species, including migratory species, to thrive. For example, increasing gopher tortoise habitat may also benefit other species, such as the gopher frog, eastern indigo snake, and pine snake, which often utilize gopher tortoise burrows for cover.

Military Mission

Federal law prohibits harassment and all other forms of *take* for Federally protected species. TBR must maintain a working knowledge of the protected species and their required habitats on its properties and take prudent steps to protect those species and habitats. Failure to do so could result

in regulatory action by the USFWS and GADNR, which could impact military training operations at TBR.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Threatened and Endangered Species

- Endangered Species Act, 16 U.S.C. 35, 32 CFR 190, provides for the identification and protection of threatened and endangered species of fish, wildlife, and plants and their critical habitats. It requires Federal agencies to ensure that no agency action is likely to jeopardize the continued existence of a threatened or endangered species.
- MBTA, as amended 16 U.S.C. 703-712, prohibits the *taking* or harming of a migratory bird, its eggs, nests, or young without the appropriate permit.
- Sikes Act, as amended 16 U.S.C. 670a-o, requires each military department to manage fish and wildlife resources in accordance with a tripartite cooperative plan agreed to by the USFWS and state wildlife agency.
- Bald and Golden Eagle Protection Act, 16 U.S.C. 668-668c, prohibits anyone, without a permit issued by the Secretary of the Interior, from *taking* bald eagles, including their parts, nests, or eggs.
- EO 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
- MCO P5090.2A, Paragraphs 11104.3a and 11104.3b, discuss natural resources management relating to the protection of and management of threatened and endangered species.

Additional Sources of Information

Habitat Conservation Planning Handbook

http://endangered.fws.gov/hcp/hcpbook.htm

USFWS

http://www.fws.gov/

Effects of Fire on Threatened and Endangered Plants

http://fire.r9.fws.gov/ifcc/T&EPlants/T&EPlants.htm#Abstract

Fire Effects on Plants and Wildlife

http://www.fs.fed.us/database/feis/

Prevention and Control of Wildlife Damage and Wildlife Diseases and Humans

http://www.ces.ncsu.edu/nreos/wild/wildlife/wdc/index.html

5.3.3 Nuisance Wildlife

Some species of wildlife can cause inconveniences to humans, can threaten health and safety of human populations, and have the potential to cause property damage. Effects can be relatively

minor, such as reducing the aesthetic qualities of an area, or major, such as damaging landscaped areas, damaging property, or causing personal injury. Nuisance wildlife also may act as vectors for human disease.

MCAS Beaufort provides pest control support at TBR through implementation of its Pest Management Plan (PMP). It provides for implementation and maintenance of a written PMP for integrated pest management procedures, applicator certification, and a medical surveillance program to monitor the health and safety of personnel occupationally exposed to pesticides. Certification is awarded per the DoD 4150.7, *DoD Pest Management Program and the DoD Plan for Certification of Applicators.* The PMP for TBR addresses RTE species, as well as invasive, exotic, and other managed species.

A number of insect and animal pests occur on TBR, including pine bark beetles, common household insects such as cockroaches, common outdoor irritants such as mosquitoes, and common wildlife nuisances such as feral cats and raccoons, and the control of these pests is an integral part of ecosystem management practices. Preventing conditions that attract insects and other pests is key to pest management. While uses of organic and petrochemical-based pesticides are usually effective in eliminating undesirable insects, they eliminate desirable ones as well.

Issues

Animal pests can cause structural damage to buildings at TBR. Fire ants create nuisances by building ant mounds across the landscape. The climate and environment around TBR are ideal for the proliferation of insects such as mosquitoes and ticks, which act as vectors for blood-borne diseases. Many people suffer from allergens to dander and certain insect bites or stings. The wet habitats across TBR harbor alligators and venomous snakes that must be regarded with caution by base tenants and visitors.

Goals and Objectives

- Preserve access to air and land to meet military readiness requirements;
- Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices;
- Manage and provide for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation;
- Maintain clear zones around all targets that are free of unwanted vegetation;
- Maintain forest buffers around all targets that provide a buffer from shrapnel and noise;
- Implement environmentally beneficial grounds maintenance and landscaping practices;
- Avoid or minimize pollution of surface waters;
- Control nuisance animal populations and minimize attractants of new populations;

- Conserve, restore, and enhance habitats supporting rare species and species listed as threatened, endangered, or candidate species under the ESA; so as not to interfere with the military mission;
- Maintain a GIS database to facilitate effective species and habitat management at TBR;
- Maintain up-to-date training of natural resources personnel; and
- Produce a sustainable yield of commercial timber products from native species.

Projects

- Firebreak Maintenance (Project 01 in Appendix A)
- Frosted Flatwoods Salamander Management (Project 05 in Appendix A)
- GIS Maintenance (Project 09 in Appendix A)
- Forest Management (Project 10 in Appendix A)
- Forest Inventory (Project 11 in Appendix A)
- Pest Management (Project 12 in Appendix A)

Management Strategies

- TBR will integrate firebreak maintenance with other program elements by developing site-specific maintenance plans, including necessary BMPs, for each target; managing conditions at firebreaks; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will integrate the maintenance of forest buffers with other program elements by developing site-specific maintenance plans, including necessary BMPs in and around each target; managing conditions in the forest buffers; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will review all grounds maintenance and landscaping activities to ensure consistency with the concepts presented in this INRMP; monitor conditions of maintained grounds; and adapt management as necessary to avoid or minimize potential adverse effects on natural resources.
- TBR will monitor existing nuisance animal populations to address ongoing and long-term problems and respond to temporary, non-routine issues as appropriate.
- TBR will continue to implement BMPs for the prevention of stormwater pollution, identify and implement BMPs where necessary, and monitor implementation and effectiveness of all BMPs.
- TBR will manage frosted flatwoods salamander populations and suitable habitats at TBR
- TBR will attain, store, and access qualitative and quantitative data pertinent to the assessment and adaptation of natural resources management.
- TBR will send personnel to natural resources training and workshops as appropriate and necessary.
- TBR will utilize sound, proven forest management techniques to support other program elements and enhance ecosystem benefits.

Long-Term Management

TBR will continue to monitor the health and size of animal populations and control nuisance species as needed. A long-term management policy of public awareness (e.g., informing employees and visitors) for wildlife-related diseases focuses on, but is not limited to, the following issues:

- Knowledge of the diseases in the area and the specific times of year that present the greatest risk of exposure;
- Knowledge of and recognition of early symptoms of diseases and the condition of exposure;
- The use of extreme caution when approaching or handling a wild or feral animal, especially one that looks sick or abnormal;
- The use of protective measures against fungal diseases where there is an accumulation of animal feces (e.g., under a bird roost);
- Protection from vector-borne disease in high-risk areas using measures such as mosquito or tick repellent and wearing special clothing; and
- Reduction in host populations and their ectoparasites.

In the event that TBR identifies a wildlife conflict, a damage control program will be established. The program will have four parts (Dolbeer et al. 1994):

1. **Problem definition** to determine the species and number of animals causing the problem, the amount of loss or nature of the conflict, and other biological and social factors related to the problem
2. **Ecology of the problem species** to understand the life history of the species, especially in relationship to the conflict
3. **Control method** to take the information gained from parts 1 and 2 and develop an appropriate management program to alleviate or reduce the conflict
4. **Evaluation of control** to assess the reduction in damage in relation to costs and impact of the control on target and non-target populations and the environment

TBR would use recommended PMP practices to control pests. Because of the technical nature of this program, TBR would utilize sources of technical information, such as university researchers, to remain advised of current techniques. Additionally, TBR grounds managers would be provided with continual training and education on the most recent techniques and issues. IPM practices together form a total management system, which includes chemical, cultural, biological, genetic, and mechanical controls.

- **Chemical Controls** often form part of an IPM strategy. The key is to use the pesticides to complement, rather than hinder, other strategy elements and to limit negative environmental effects. It is also important to understand the life cycle of a pest so that the pesticide can be applied when the pest is most vulnerable, and to achieve maximum effect at minimum concentration levels. Chemical controls include the following:
    - ***Conventional***: include carbamates, chlorinated hydrocarbons, some botanicals and analogs, new compounds; and

- ***Biorational***: include pheromones, antifeedants, heat/cold, minerals, oils, some botanicals, and microbials

- **Cultural Controls** include plant variety and site selection rotations, cultivations, and sanitation. These control measures are often referred to as the older forms of pest control.

- **Biological Controls** maintain pests at levels that do not cause great economic or aesthetic losses. The principle behind biological pest control is that a given pest can be killed by predators, parasites, or pathogens. By introducing or encouraging such adversaries, the population of pest organisms should decline. There are three general approaches to biological pest control: importation, augmentation, and conservation.

  - ***Importation*** involves importing a specific organism to control another; however, there are dangers with this approach. This method requires extensive research before a control organism is released in order to determine whether it will attack species other than the pest species.

  - ***Augmentation*** consists of manipulating existing natural enemies to increase their effectiveness. This can be achieved by mass production and periodic release of natural enemies of the pest, and by genetic enhancement of the enemies to increase their effectiveness at control.

  - ***Conservation*** involves identifying and modifying factors that may limit the effectiveness of the natural enemy. In some situations, this may include reducing the application of pesticides, as pesticides may kill predators as well as killing pests. Sometimes part of a crop area is left untreated so that natural enemies will survive and re-colonize the treated areas.

- **Genetic Controls** include the transfer of resistance genes into a plant, or the engineering of a disadvantageous trait in the pest, then releasing modified individuals into the pest control area. Another method is the introduction of sterile members of the pest species.

- **Physical or Mechanical Controls** alter environmental factors in a way that reduces pest populations. These controls may be performed by the individual groundskeeper; examples include crop rotation and pruning. Another physical control method, sometimes called “mating disruption,” involves the use of sex pheromones produced by females to attract males for mating. Many of these pheromones are reproduced synthetically in the laboratory and are available commercially. Quantities of pheromone placed around an orchard can disrupt mating by confusing male insects, which are then less likely to find a mate.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – ensure pesticides do not contaminate wetlands;
- Soil Conservation and Erosion, Section 5.1.2 – control sedimentation into wetland habitat;
- Stormwater and Water Quality, Section 5.1.3 – prevent contamination of water quality by pesticides;
- Floodplains, Section 5.1.4 – ensure continued attenuation capacity of the floodplain;
- Landscaping and Grounds Maintenance, Section 5.1.5 – utilize IPM practices during landscaping and grounds maintenance;
- Invasive and Exotic Species, Section 5.1.6 – control of nuisance animals may correlate with control of invasive and exotic species;
- Silviculture, Section 5.2.1 – utilize IPM to reduce risk of disease and infestation of forest trees;

- Forest Protection, Section 5.2.2 – burn to accentuate the environmental conditions for native plants and wildlife;
- Migratory Birds, Section 5.3.2 – ensure pest control complies with the MBTA;
- Threatened and Endangered Species, Section 5.3.3 – control nuisance animals, such as feral cats, that prey on protected species;
- Outdoor Recreation, Section 5.4 – educate recreational users about precautions against disease-bearing insects and hazardous wildlife;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on IPM procedures and laws; and
- GIS, Section 5.5.2 – map habitat types around airfields to identify risks and solutions.

Ecosystem Management

An integrated ecosystem approach compliant with the SAIA, as amended, is used to manage habitats for wildlife. Safety and health issues must be considered when developing management plans to control nuisance wildlife.

Military Mission

Nuisance wildlife and the outbreak of disease on TBR could pose a threat to implementation of the military mission through the infection of military personnel and the consequent limitation of access to areas of TBR to control a problem. Structural damage to military infrastructure from infestation could also result in delays and costs to operations.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Nuisance Wildlife

- Endangered Species Act, 16 U.S.C. 35, 32 CFR 190, provides for the identification and protection of threatened and endangered species of fish, wildlife, and plants and their critical habitats. It requires Federal agencies to ensure that no agency action is likely to jeopardize the continued existence of a threatened or endangered species.
- MBTA, as amended 16 U.S.C. 703-712, prohibits the *taking* or harming of a migratory bird, its eggs, nests, or young without the appropriate permit.
- Bald and Golden Eagle Protection Act, prohibits anyone, without a permit issued by the Secretary of the Interior, from *taking* bald eagles, including their parts, nests, or eggs.
- EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, imposes substantive obligations on the United States for the conservation of migratory birds and their habitats.
- 2003 National Defense Authorization Act, exempts the Armed Forces from the incidental *taking* of migratory birds during military readiness activities.
- NASWFINST 3571.1A, provides guidance for bird/animal strike hazard reduction and establishes areas of responsibility for bird control, bird hazard warning conditions, and local aircraft bird avoidance operating procedures.
- EO 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
- MCO P5090.2A, Paragraph 11104.2f, discusses USMC policy regarding invasive species.

- FIFRA, 7 U.S.C.136, states that a pesticide that is Federally registered by the USEPA is not legal for use until it is also registered by an individual state.
- Forest Pest Suppression Memorandum of Agreement between the Department of Agriculture and DoD, 11 December 1990, is the planning, coordination, and execution of field operations to prevent and suppress damaging forest insects and disease outbreaks.
- MCO P5090.2A, Paragraph 11104.1b, discusses the use of pesticides on USMC Installations.
- Armed Forces Pest Management Board, Technical Information Memorandum No. 37, presents guidelines for reducing feral cat populations on military Installations in the U.S.
- CNO Policy Letter (Ser. N456M/1U595820), 10 Jan 2002, requires Navy commands to institute proactive pet management procedures to prevent the establishment of feral cat and dog populations.

Additional Sources of Information

Wildlife damage and diseases information provided by the University of Nebraska Cooperative Extension Service, Great Plains Agricultural Council, and the USDA
http://www.ces.ncsu.edu/nreos/wild/wildlife/wdc/index.html

Nuisance Wildlife Control Information
http://www.aphis.usda.gov/ws

USGS National Wildlife Health Center Web
http://www.nwhc.usgs.gov/

USDA Animal and Plant Health Inspection Service (APHIS) Wildlife Damage Management
http://www.aphis.usda.gov/wildlife_damage/

Wildlife Disease/Health Related Links
http://wildlifedisease.nbii.gov/

National Integrated Pest Management Network
http://webipm.ento.vt.edu/ipm-www/nipmn/nipmn_presentation/nipmnhome.html

Biological Control Virtual Information Center
http://cipm.ncsu.edu/ent/biocontrol/

US Bird Avoidance Model
http://www.usahas.com/bam/

5.4 OUTDOOR RECREATION

Outdoor recreation is the use of natural resources, including indoor interpretive centers, where the primary focus is on the understanding and application of the natural environment. Outdoor recreation

includes nature trails, picnic and camping areas, consumptive and non-consumptive uses of natural resources, establishment and management of recreational trails, scenic rivers, equestrian areas, the use of off-road vehicles, as well as other uses of natural resources. It does not include other highly developed outdoor uses such as golf courses, tennis courts, ball/athletic fields, or swimming pools. Outdoor recreation opportunities are dependent upon the natural environment and can be classified as concentrated or dispersed.

The only outdoor recreation opportunity at TBR is the limited hunting program. The program is managed by TBR range personnel in accordance with Air Station Order (ASO) 1700.2E. The hunting regulations are enforced by the Chief Law Enforcement Officer (CLEO) in coordination with the GADNR, and hunters must comply with all applicable State of Georgia and Federal regulations and provisions of the Hunting, Fishing, and Boating Regulations (Appendix C). Applicants are drawn by lottery and those chosen must attend a mandatory safety briefing given by Range personnel.

Issues

Access to outdoor recreation is generally limited to active duty and reserve military personnel assigned to work at the Installation, and their dependents and accompanied guests, Federal civilian employees, and their dependents and accompanied guests, and military retirees. However, public access to TBR is restricted for security and safety. Limited access for hunting and special events is authorized by TBR when appropriate.

Goals and Objectives

- Preserve access to air and land to meet military readiness requirements;
- Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices;
- Manage and provide for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation;
- Maintain clear zones around all targets that are free of unwanted vegetation;
- Maintain forest buffers around all targets that provide a buffer from shrapnel and noise;
- Prevent and minimize the potential for wildfire to affect the military mission, facilities, surrounding lands, and ecological communities;
- Implement environmentally beneficial grounds maintenance and landscaping practices;
- Avoid, minimize, and mitigate impacts on wetland quantity and quality;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Avoid or minimize pollution of surface waters;
- Control and remove invasive and exotic species;
- Control nuisance animal populations and minimize attractants of new populations;

- Conserve, restore, and enhance habitats supporting rare species and species listed as threatened, endangered, or candidate species under the ESA, so as not to interfere with the military mission;
- Avoid or minimize impacts on migratory birds and their nests in accordance with the MBTA;
- Conserve, enhance, and restore sensitive and regionally important habitats for utilization by listed species and species of special concern, so as not to interfere with the military mission;
- Maintain a GIS database to facilitate effective species and habitat management at TBR;
- Maintain up-to-date training of natural resources personnel;
- Manage and provide for multiple uses when appropriate, including sustainable yield of all renewable resources, scientific research, education, and recreation;
- Produce a sustainable yield of commercial timber products from native species;
- Manage populations of game animals for healthy populations;
- Provide public access to Installation lands, where practicable, provided such access does not conflict with military readiness and does not harm sensitive natural resources on TBR;
- Identify outdoor recreational needs and opportunities and provide these opportunities where consistent with other program elements; and
- Ensure applicable environmental and hunting laws are adhered to on TBR.

Projects

- Firebreak Maintenance (Project 01 in Appendix A)
- Wildland Fire Management Plan (Project 02 in Appendix A)
- Wetlands Delineation (Project 03 in Appendix A)
- Invasive Species Management (Project 04 in Appendix A)
- Threatened, Endangered, Candidate, and Rare Species Management (Project 06 in Appendix A)
- Migratory Bird Surveys (Project 07 in Appendix A)
- Prescribed Burn Program (Project 08 in Appendix A)
- GIS Maintenance (Project 09 in Appendix A)
- Forest Management (Project 10 in Appendix A)
- Forest Inventory (Project 11 in Appendix A)
- Pest Management (Project 12 in Appendix A)

Management Strategies

- TBR will integrate firebreak maintenance with other program elements by developing site-specific maintenance plans, including necessary BMPs, for each target; managing conditions at firebreaks; and adapting management as necessary to avoid or minimize potential adverse effects.
- TBR will integrate the maintenance of forest buffers with other program elements by developing site-specific maintenance plans, including necessary BMPs in and around each

target; managing conditions in the forest buffers; and adapting management as necessary to avoid or minimize potential adverse effects.

- TBR will avoid adverse effects of wildfire as described in the Wildland Fire Management Plan through constructing and maintaining firebreaks, controlling fuel loads, maintaining readiness to respond, and developing partnerships; integrating wildland fire management with other program elements by using an ecosystem management approach that mimics natural fire regimes; routinely monitoring habitat conditions, and adapt management as necessary to avoid or minimize potential adverse effects from wildfire.
- TBR will review all grounds maintenance and landscaping activities to ensure consistency with the concepts presented in this INRMP; monitor conditions of maintained grounds; and adapt management as necessary to avoid or minimize potential adverse effects on natural resources.
- TBR will use the preliminary jurisdictional determination to help identify areas of likely wetlands impact during preliminary planning of development projects.
- TBR will maintain no net loss of wetlands, promote 50-foot buffers for all wetlands, and ensure that land use and land management practices will not adversely affect wetlands.
- TBR will continue reviewing and monitoring proposed activities to avoid impacts on the attenuation capacity of the 100-year floodplain. If development is necessary within the 100-year floodplain to support the military mission, it shall be confined to previously disturbed areas of the floodplain whenever practicable.
- TBR will continue to implement BMPs for the prevention of stormwater pollution, identify and implement BMPs where necessary, and monitor implementation and effectiveness of all BMPs.
- TBR will apply soil erosion management to the preservation of sensitive habitats and species.
- TBR will implement strategies for the control and removal of invasive and exotic species on TBR.
- TBR will monitor existing nuisance animal populations to address ongoing and long-term problems and respond to temporary, non-routine issues as appropriate.
- TBR will avoid impacts on threatened, endangered, candidate, and rare species at TBR.
- Ensure adherence to the MBTA.
- Use prescribed fires to mimic natural fire regimes that control invasive species and promote establishment and maintenance of desirable species composition and structure.
- Attain, store, and access qualitative and quantitative data pertinent to the assessment and adaptation of natural resources management.
- TBR will send personnel to natural resources training and workshops as appropriate and necessary.
- TBR will utilize sound, proven forest management techniques to support other program elements and enhance ecosystem benefits.
- TBR will enhance white-tailed deer, turkey, and small game habitats, monitor harvest, and adapt management as necessary.
- TBR will identify opportunities to provide desirable recreation opportunities on TBR and continue to implement the hunting program on TBR.
- TBR will utilize law enforcement personnel to enforce Federal and state natural resources related laws to protect game and nongame species, protect habitats and facilities, and ensure an equitable distribution of harvested game.

Long-Term Management

An Outdoor Recreation Plan should be prepared by TBR to evaluate current trends and provide management guidance and recommendations for outdoor recreation at TBR. Using the Outdoor Recreation Plan as a guide, TBR will survey existing outdoor recreational opportunities and usage and continue to develop natural resources-based outdoor recreational opportunities that do not adversely affect natural systems. In addition, TBR will continue to implement the hunting program at TBR. Generally recommended natural resources-based projects include the following:

- Implement and maintain appropriate ecosystem management practices and continue efforts to protect areas with significant natural resources (i.e., protected plant or animal communities);
- Develop a system for managing hunter registration, access, and activities at TBR;
- Develop an outdoor education/interpretation program for the hunters that focuses on the natural resources at TBR;
- Develop management of hunter activities and reporting records to identify concerns and address them appropriately on an annual basis; and
- Establish a system to promote the existing, as well as future, outdoor recreation opportunities, such as hunting; develop special promotions; make information on these areas readily available to possible users.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – ensure recreational opportunities do not compromise wetlands;
- Soil Conservation and Erosion, Section 5.1.2 – control sedimentation during recreational activities;
- Stormwater and Water Quality, Section 5.1.3 – ensure recreational opportunities do not compromise water quality;
- Floodplains, Section 5.1.4 – development of new recreational facilities must not compromise attenuation capacity of the floodplain;
- Landscaping and Grounds Maintenance, Section 5.1.5 – develop aesthetically pleasing landscapes for recreation;
- Invasive and Exotic Species, Section 5.1.6 – reduce invasive and exotic species to enhance the outdoor recreational experience;
- Silviculture, Section 5.2.1 – use BMPs to reduce sedimentation and contamination of water quality for aquatic activities;
- Forest Protection, Section 5.2.2 – protect forest health to the benefit of pleasant recreational experiences;
- Migratory Birds, Section 5.3.1 – avid bird watchers may be able to provide information;
- Threatened and Endangered Species, Section 5.3.3 – ensure recreational activities do not harass protected species, and make wildlife observers aware of rare species;
- Nuisance Wildlife, Section 5.3.4 – control nuisance wildlife to enhance the outdoor recreational experience;

- Natural Resources Training, Section 5.5.1 – ensure personnel are current on applicable laws and recreational policies and regulations; and
- GIS, Section 5.5.2 – utilize maps to the benefit of outdoor recreation.

Ecosystem Management

Ecosystem management practices are enhanced by environmental stewardship and by educating the general public about environmental conservation issues, problems, and solutions. By providing natural recreational and educational opportunities on TBR, public awareness of vital environmental resources issues can be enhanced, thus providing a regional educational resource. Using TBR personnel for the physical construction of recreational and educational facilities provides opportunities to educate them on the values and characteristics of a healthy ecosystem and on the problems and solutions associated with human use of the environment.

Military Mission

Outdoor recreational opportunities are dependent upon the environment and the security and safety constraints of the military mission, but at the same time, serve to enhance the well-being and morale of the participants. Outdoor recreational opportunities must be developed and used consistently with the sustainability of the land. The over-utilization or improper location of an outdoor recreation area could impact natural resources and the military mission.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Outdoor Recreation

- SAIA, 16 U.S.C. 670a(b)(1)(G), requires public access to a military Installation for the necessary, appropriate, and sustainable use of natural resources by the public to the extent that the use is not inconsistent with the needs of the fish and wildlife resources or with safety and military security.
- Outdoor Recreation – Federal/State Program Act, 16 U.S.C. 460c, defines a program for managing lands for outdoor recreation.
- MCO P5090.2A, Paragraph 11205, discusses natural resources management relating to the protection and management of outdoor recreational resources.
- National Historic Preservation Act, 16 U.S.C. 470-470m, establishes a program for the preservation of historic properties throughout the nation and for other purposes.
- EO 11989, establishes policies and procedures to ensure the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands.
- NAVFAC MO – 100.4, provides technical guidance for establishing goals and objectives and planning requirements for outdoor recreation.
- DoDINST 4715.03, states DoD Installations may engage in public awareness and outreach programs to educate the public regarding the resources on military lands and the DoD efforts to conserve those resources.
- SECNAVINST 5090.8, requires integration of environmental protection, natural resources, and cultural resources programs into DON operations and activities.

- ASO 1700.2E, establishes the hunting, fishing, boating regulations for MCAS Beaufort, Laurel Bay Housing Areas, and TBR.
- Georgia Statewide Comprehensive Outdoor Recreation Plan, Georgia Code 12-3-1, implements a comprehensive statewide recreation policy.

Additional Sources of Information

NPS

http://www.nps.gov/index.htm

GADNR, Wildlife Resources Division

http://www.georgiawildlife.com/hunting

5.5 TRAINING

This section addresses the development and implementation of programs and techniques for training natural resources personnel. The training issues of this INRMP include training of GIS data integration, access, and reporting.

The natural resources program at TBR shall support military readiness and sustainability while continuing to protect and conserve the natural resources on its properties. Natural resources and land management planning should be integrated with other base planning processes. All projects occurring on TBR that potentially impact natural resources (e.g., wetlands, natural areas, floodplains, water quality) will be evaluated prior to implementation. This will allow those projects to be reviewed by appropriate personnel so potential constraints (e.g., threatened and endangered species, wetlands, floodplains) can be identified.

Natural resources personnel will review pertinent literature to stay informed on current methodologies and techniques for natural resources management. Natural resources personnel should ensure that project plans, including military construction projects, are consistent with this INRMP's management goals, objectives, and strategies. TBR will implement adaptive management to accommodate new strategies resulting from monitoring, scientific findings, and new management guidelines.

Partnerships are often necessary and effective in implementing an INRMP while maintaining cost-effectiveness. Cooperative agreements are often used in partnerships with states, local governments, non-governmental organizations, and individuals to provide for the benefit, maintenance, and improvement of natural resources on DoD Installations. Cooperative agreements are authorized to implement INRMP projects (MCO P5090.2A). NAVFAC Midlant is tasked with providing the technical and administrative guidance for the development of cooperative agreements to implement natural resources plans and execute cooperative agreements on behalf of Installation commanders upon request.

5.5.1 Training of Natural Resource Personnel

Natural resources personnel at TBR are expected to maintain a working knowledge of current research, issues, and technologies pertinent to natural resources management at TBR. In addition, personnel engaged in wildland fire management, timber marking, and pesticide application must receive specific training, as described below:

Wildland Fire Personnel Training

The DoD has recently adopted the National Wildfire Coordination Group's (NWCG) Federal Wildland Fire Policy to govern all wildland fire activities carried out by DoD personnel. The DoD is presently exploring the possibility of seeking membership in the NWCG. The NWCG is made up of all Federal agencies (except the DoD) with wildland fire responsibilities and the National Association of State Foresters. The Federal Wildland Fire Policy requires that all personnel involved in prescribed fire and/or wildfire activities meet certain training and physical qualifications. The DoD is presently reviewing how it will implement this requirement. Some military Installations have already implemented this requirement with most of them making it mandatory for new hires and positions and voluntary for current employees. TBR's requirements for personnel qualifications will be reviewed and the Prescribed Fire Plan within the Forest Management Plan will contain complete information on personnel qualifications.

Timber Marking

All personnel engaged in timber marking at TBR, at a minimum, must meet the qualifications established by the Office of Personnel Management for Forestry Technician GS 0462-05 (see 'Additional Sources of Information' at the end of this section). Additional training will be given regarding local requirements and procedures. This training will be under actual field conditions in a productive capacity.

Pesticide Applicator Training

Pest Management is provided through implementation of the Integrated Pest Management Plan. The Integrated Pest Management Plan provides a comprehensive, long-range document that captures all the pest management operations and pesticide-related activities conducted at TBR. All Complex personnel who apply pesticides shall have received and maintain the DoD certification (government staff) as pesticide applicators for the categories of pest control engaged.

Federal Personnel

Federal personnel applying any pesticide on Federal land require DoD certification in accordance with OPNAVINST 6250.4B. Only Federal employees under hiring programs

with duties as pesticide applicators can participate in the on-the-job training program. During this time, the new employee works under the direct supervision of a certified pesticide applicator until they are qualified (1 year of on-the-job training experience) and satisfactorily complete the DoD Pest Management Certification Course and can work independently.

Civilian Contractors

Civilian contractors applying any pesticide on TBR require a certification in the category or applicable sub-categories of work performed. All of the contractor's pest management staff who apply pesticides must be certified as pesticide applicators. Non-certified contractor employees are prohibited from applying pesticides.

Inspectors

Individuals who evaluate the quality of work of pest control contracts should also be trained in the pest management categories of work being performed.

Supervisor

Direct supervision is defined in the DoD Instruction 4150.7 as supervision that includes being at the specific location where pest management work is conducted, providing instruction and control, and maintaining a line-of-sight view of the work performed. Certain circumstances may temporarily remove the line-of-sight view of the application of pesticide from the supervisor such as topographic, vegetation, or structural constraints. Under these temporary circumstances, the supervisor shall be responsible for the actions of the pesticide applicators.

Training and Certification

Training and certification will be conducted at the government expense for DoD personnel. Certified pest control personnel shall be re-certified in accordance with the DoD requirements as specified above. Employed pesticide applicators must be certified and the quality assurance evaluator must be trained in the following categories when appropriate. Certification and training is required when performing pest control operations that involve restricted-use or state-limited-use pesticides, supervising other employees conducting pest control involving restricted-use or state-limited-use pesticides, or evaluating contractor performance relating to pest control within these categories:

- Forest pest control (DoD & USEPA category 2);
- Ornamental and turf pest control (DoD & USEPA category 3);

- Aquatic pest control (DoD & USEPA category 5);
- Right-of-way pest control (DoD & USEPA category 6);
- Industrial, Institutional, Structural, and Health-related pest control (DoD & USEPA category 7);
- Public health (DoD & USEPA category 8); and
- Aerial Application (DoD & USEPA category 11) if planned to be used.

Continuing Education and Training

Personnel who are involved in pesticide applications on a regular or seasonal basis, especially when mixing formulations is required, are encouraged to attend local pest management classes, workshops, and seminars. This is important in order to keep abreast of pest problems and pest management techniques, which are unique to the area surrounding the Installation. This is particularly true when dealing with vegetation control, since many of the herbicide labels indicate that choices in strength and application technique should be based on local conditions.

The time and labor expended in this type of training is easily recouped through improved efficiency in pest management. Local pest management training may include on-site training in addition to any off-site re-certification training, such as the DoD course or state re-certification requirements. Other personnel who deal directly with pest control operations, but who may not need to be certified, are also encouraged to attend local seminars to better understand pest management needs.

Issues

Training is important to ensure the limited staff at TBR is able to accomplish all necessary facets of natural resources management on TBR. Personnel should also be knowledgeable of environmental laws pertaining to Federal lands and DoD Installations. Lack of training or improper training can result in damage to native communities and plant and animal populations, including RTE species and habitats.

Goals and Objectives

- Protect and maintain natural resources within the TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices; and
- Maintain up-to-date training of natural resources personnel.

Projects

- None

Management Strategies

- Send personnel to natural resources training and workshops as appropriate and necessary.

Long-Term Management

Adequate staffing and training are essential components of long-term natural resources management at TBR. Partnerships and cooperation with regulatory agencies, NAVFAC Midlant, university researchers, conservation groups, and non-government organizations are also vital to the continued success of management activities.

Integration with Other Natural Resources Management Activities

Training natural resources personnel at TBR is important to successfully accomplish every natural resources management activity described in this INRMP, from wetland management (Section 5.1.1) and soil conservation (Section 5.1.2) to grounds maintenance (Section 5.1.5), threatened and endangered species conservation (Section 5.1.6), and silvicultural activities (Section 5.2.1). Staff training is not only integrated into all of these activities, but it is essential to successful integration between all of these activities as well.

Ecosystem Management

Ecosystem management is at the core of training for natural resources staff at TBR, and would therefore be compromised by a lack of training.

Military Mission

A properly trained natural resources staff is TBR's first line of protection against activities that could result in violations of environmental laws and policies. Communication between the NRM and the chain of command and other departments is vital to ensure that TBR remains in compliance with environmental legislation, thus avoiding regulatory action that could delay or otherwise compromise the military mission.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Training of Natural Resources Personnel

- Sikes Act, as amended 16 U.S.C. 670 a-o, requires each military department to manage fish and wildlife resources in accordance with a tripartite cooperative plan agreed to by the USFWS and state wildlife agency, to provide its personnel with professional training in fish and wildlife management.
- Fish and Wildlife Conservation Act, 16 U.S.C. 2901, encourages all Federal departments and agencies to utilize their statutory and administrative authority, to the maximum extent practicable and consistent with each agency's statutory responsibilities, to conserve and promote conservation of nongame fish and wildlife and their habitats.

- DoD Instruction 4150.7, requires a supervisor to be at the specific location where pest management work is conducted, providing instruction and control, and maintaining a line-of-sight view of the work performed.

- MCO P5090.2A, Chapter 5, discusses environmental training and education at USMC Installations.

Additional Sources of Information

Environmental Law Institute
http://www.eli.org/

Georgia Department of Agriculture, Pesticide Application
http://agr.georgia.gov/pesticides.aspx

NWCG
http://www.nwcg.gov/

Qualifications of a Forestry Technician GS 0462-04 and Greater
http://www.opm.gov/qualifications/standards/IORs/gs0400/0462.htm

Naval Civil Engineering Officer's Corps School
http://www.cecosweb.com/

Student Conservation Association
http://www.thesca.org/

5.5.2 Geographical Information Systems, Data Integration, and Reporting

Mapping and spatial analysis are integral components of natural resources management that are fulfilled through the use of GIS data and software. Data provide documentation for the location and attributes of resources, while software contains the tools necessary for the management, display, and analysis of these data. A major goal of any GIS database is the development of rigorous organization and accuracy standards. These standards provide for a sound base dataset needed for rigorous analysis used in managing natural resources.

Issues

Natural resources data gathered from surveys and studies should be integrated into TBR's GIS and made available to planners and land managers to aid in decision making and ensure that resource management techniques and planned land uses do not conflict with natural resources conservation. The NRM must ensure that newly acquired and updated natural resources data are integrated into the Installation GIS database on a regular basis.

Goals and Objectives

- Protect and maintain natural resources within TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices;
- Avoid, minimize, and mitigate impacts on wetland quantity and quality;
- Maintain the attenuation capacity and function of the 100-year floodplain;
- Avoid or minimize pollution of surface waters;
- Control and remove invasive and exotic species;
- Conserve, restore, and enhance habitats supporting rare species and species listed as threatened, endangered, or candidate species under the ESA; so as not to interfere with the military mission;
- Avoid or minimize impacts on migratory birds and their nests in accordance with the MBTA;
- Conserve, enhance, and restore sensitive and regionally important habitats for utilization by listed species and species of special concern; so as not to interfere with the military mission;
- Maintain a GIS database to facilitate effective species and habitat management at TBR; and
- Manage populations of game animals for healthy populations.

Projects

- Wetlands Delineation (Project 03 in Appendix A)
- Invasive Species Management (Project 04 in Appendix A)
- Frosted Flatwoods Salamander Management (Project 05 in Appendix A)
- Threatened, Endangered, Candidate, and Rare Species Management (Project 06 in Appendix A)
- Migratory Bird Surveys (Project 07 in Appendix A)
- Prescribed Burn Program (Project 08 in Appendix A)
- GIS Maintenance (Project 09 in Appendix A)
- Forest Management (Project 10 in Appendix A)
- Forest Inventory (Project 11 in Appendix A)

Management Strategies

- Use the preliminary jurisdictional determination to help identify areas of likely wetlands impact during preliminary planning of development projects;
- Maintain no net loss of wetlands, promote 50-foot buffers for all wetlands, and ensure that land use and land management practices will not adversely affect wetlands;
- Continue reviewing and monitoring proposed activities to avoid impacts on the attenuation capacity of the 100-year floodplain. If development is necessary within the 100-year floodplain to support the military mission, it shall be confined to previously disturbed areas of the floodplain whenever practicable;
- Apply soil erosion management to the preservation of sensitive habitats and species;
- Implement strategies for the control and removal of invasive and exotic species on TBR;

- Manage frosted flatwoods salamander populations and suitable habitats at TBR;
- Avoid impacts on threatened, endangered, candidate, and rare species at TBR;
- Ensure adherence to the MBTA;
- Use prescribed fires to mimic natural fire regimes that control invasive species and promote establishment and maintenance of desirable species composition and structure;
- Attain, store, and access qualitative and quantitative data pertinent to the assessment and adaptation of natural resources management; and
- Enhance white-tailed deer, turkey, and small game habitats, monitor harvest, and adapt management as necessary.

Long-Term Management

GIS databases and mapping capabilities will be used for daily decisions, as well as long-term planning of natural resources management and its integration with the military mission. This work is driven by laws such as the ESA, the CWA, and NEPA. All impacts on Federal land from a proposed project must be considered before the project can be implemented, in accordance with NEPA. These impacts may affect natural resources such as endangered species, water, and timber, so detailed maps are required to assess the potential impacts on resources. A list of data layers that should be developed and maintained includes:

- RTE species occurrences
- Streams and wetlands
- Invasive species locations
- Migratory bird locations
- Forest stand inventory data
- Firebreaks and prescribed fire areas
- Solid waste management areas
- Hazardous waste management
- Groundwater and soil remediation areas
- Stormwater pollution prevention

The NRMs also have access to ancillary data such as infrastructure, Installation boundaries, and geodetic reference points via the NAVFAC Midlant Geo-Readiness Center. The NAVFAC Midlant Geo-Readiness Center maintains a server where finalized data, intermediate working data, and all supporting files are stored. Data for the USMC's training mission, such as training area boundaries, short range fire ranges, and training impact areas, are maintained by TBR.

Integration with Other Natural Resources Management Activities

GIS is integrated into every natural resources management activity described in this INRMP, from wetland management (Section 5.1.1) and soil conservation (5.1.2) to grounds maintenance (Section 5.1.5), silvicultural activities (Section 5.2.1), and RTE species conservation (Section 5.3.2). Data from surveys, studies, and other projects completed for any of these management activities should be submitted to the NRM and NAVFAC Midlant to ensure inclusion in the applicable GIS databases. This will also facilitate integration between the management activities themselves.

Ecosystem Management

The use of GIS enhances ecosystem management by making data available and decipherable across all components of the ecosystem. Air quality, water quality, land use, species presence, natural vegetation communities, and forest stands, among other factors, can more easily be consolidated into overall analyses of ecosystem function on TBR.

Military Mission

Uninterrupted performance of the military mission at TBR depends upon compliance with environmental laws and policies and delineating environmentally sensitive areas such as wetlands and the occurrences of protected species and their habitats. GIS is a crucial tool in this delineation and the accessibility of GIS databases by various departments at TBR facilitates the avoidance and minimization of impacts on sensitive areas and the military mission.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Geographical Information Systems, Data Integration, and Reporting

- Sikes Act, as amended 16 U.S.C. 670 a-o, requires each military department to manage fish and wildlife resources in accordance with a tripartite cooperative plan agreed to by the USFWS and state wildlife agency, to provide its personnel with professional training in fish and wildlife management.
- Fish and Wildlife Conservation Act, 16 U.S.C. 2901, encourages all Federal departments and agencies to utilize their statutory and administrative authority, to the maximum extent practicable and consistent with each agency‘s statutory responsibilities, to conserve and promote conservation of nongame fish and wildlife and their habitats.
- MCO-P5090.2A, Chapter 1, Paragraph 1211, discusses USMC policy relating to Environmental Information Technology and Services.

Additional Sources of Information

Geo-Readiness Explorer

https://rsims.navfac.navy.mil/RSIMS/MapViewer/Default.aspx?MapID=3879

GIS.com

http://www.gis.com/

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Section 6.0

6.0 IMPLEMENTATION

Over the course of its implementation, this INRMP will:

- Enable TBR to make progress towards achieving a sustainable natural resources base and a realistic training environment which is embodied in the diversity of its natural ecosystems;
- Establish appropriate stewardship policies that serve to protect both natural resources and the military mission;
- Ensure compliance with environmental laws;
- Provide a continuity of direction and effort that can accommodate changes in personnel and leadership;
- Promote cost-effectiveness through better planning and coordination;
- Promote good public relations by demonstrating TBR's commitment to stewardship, as well as a multiple-use concept for the general public; and
- Make use of innovative strategies to accomplish specific management objectives.

6.1 PLAN IMPLEMENTATION AND REVIEW

The annual INRMP reviews and metrics found on the USMC Natural and Cultural Resource Management Tool website located at https://www.usmcenvironm.com/ncrmt will be used to assess implementation. A general summary of major projects during the next 5 years and programs they support are provided in Appendix A. Projects will be developed during the budgetary process and coordinated with USMC natural resources personnel.

6.2 PLANNING AND MISSION SUSTAINABILITY

The goal at TBR is to maintain and enhance the capability of military lands to support the training mission while conserving natural resources. The implementation of projects, future revisions, and updates of this INRMP will assist TBR in maintaining natural habitats, assessing the impacts of military training activities on flora and fauna populations, controlling erosion and sedimentation in stream channels, roads, and unvegetated areas, implementing ecosystem management, managing TBR's forest areas, and providing recreational opportunities.

Frequent and close coordination between the TBR natural resources staff and range management staff will be necessary to implement this plan and minimize impacts and conflicts with military training. The natural resources staff and range management staff will schedule and manage airfield use and must be aware of proposed management actions on the properties. All actions that involve

contractors or workers must coordinate with TBR natural resources staff. These actions will include, but are not limited to, timber harvest, invasive species control, and plant and animal surveys. In addition, the natural resources staff must know when and where military training is occurring so work can be coordinated with those activities. Range management provides a list of the range and training areas scheduled for use on a regular basis to assist with work planning.

6.3 PARTNERSHIPS

The magnitude and complexity of the management requirements necessitate outside assistance. This assistance can vary, but usually takes the form of a partnership, which may include funding, technical and logistical support, GIS, or an agreement between agencies to achieve common goals. The USMC has partnered with Fort Stewart for several projects that occurred on TBR; it is assumed that the USMC will continue to form partnerships with USFWS, GADNR, TNC, USACE, and the Fort Stewart/Altamaha River Longleaf Alliance as this INRMP is implemented.

6.4 FUNDING

Funding for implementation of this INRMP will come from the Headquarters Marine Corps natural resources fund sources. The natural resources programs and projects described in this INRMP are divided into mandatory and stewardship categories to reflect implementation priorities (Appendix A). Every effort will be made to acquire O&M(MC) Environmental, or other funding to implement the DoD mandatory projects in the timeliest manner possible. Stewardship-type projects will be funded through Headquarters Marine Corps, forestry, fish and wildlife, Marine Corps Community Services, or other fund sources as funding and personnel resources become available.

Section 7.0

7.0 LIST OF PREPARERS

This INRMP was prepared in 2015 by:

Name	Agency/ Organization	Discipline/ Expertise	Experience	Role in Preparing INRMP
William Drawdy	USMC MCAS Beaufort	Natural Resources & Environmental Affairs Officer	22 years of environmental planning	INRMP data review
Gary Herndon	USMC	Natural and Cultural Resources Manager	14 years of natural and cultural resources studies	INRMP data review
Jered Jackson	NAVFAC SE	Natural Resources	12 years of natural resources studies	Project Manager for NAVFAC SE
Tim Money	NAVFAC SE	Forestry	34 years of natural resources studies	INRMP data review
Sherry Ethell	GSRC	Biologist	24 years of natural resources studies	INRMP preparation
Dennis Peters	GSRC	Marine Biology	32 years of marine biologic studies	INRMP preparation
Michael Hodson	GSRC	Ecologist	10 years of natural resources studies	INRMP preparation
Todd Wilkinson	GSRC	Ecologist	23 years of natural resources studies	INRMP preparation
Howard Nass	GSRC	Forestry and Wildlife Management	23 years of natural resources studies	INRMP review
Steve Oivanki	GSRC	Geology & QA/QC	35 years of environmental resources studies	INRMP review
Liz Ayarbe-Perez	GSRC	GIS/Graphics	17 years of GIS experience	Graphics
Mary Ryan-Richardson	Marstel-Day	Ecologist	8 years of natural resources studies	INRMP data review

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APPENDIX A

PROJECTS OF THE INRMP

Appendix A describes the projects to be implemented by Townsend Bombing Range (TBR). Projects were identified by TBR and Marine Corps Air Station (MCAS) Beaufort Natural Resources Managers (NRMs) in cooperation with foresters, fish and wildlife biologists, and soil conservationists at NAVFAC Midlant, as well as with Federal, state, and county wildlife biologists, foresters, and land managers. Appendix A discusses the purpose, relevance to the goals and objectives listed in Section 4, location, description, baselines, monitoring, and legal requirements of each project.

TBR intends to implement the projects as described in Appendix A to the greatest extent possible. The implementation of projects is largely dependent upon availability of funds. Funding for implementation of the Integrated Natural Resources Management Plan (INRMP) will come from the Marine Corps Installation (MCI) East or Naval Facilities Engineering Command (NAVFAC) Midlant natural resources fund. Every effort will be made to acquire Operational and Maintenance Marine Corps (O&M(MC)) Environmental or other funding to implement DoD mandatory projects, in the timeliest manner possible. Stewardship projects will be funded through fish and wildlife licenses or other fund sources as funds and personnel become available. Forestry funding is provided through MCAS Beaufort from the sale of timber products. Funding for special projects in natural resources may be available from MCI East through surplus funding sources or forestry reserve accounts. Non-compliance funding may come from the Legacy Act. Funding for compliance with environmental legislation and regulations is requested through the Marine Corps Status Tool for the Environmental Program (STEP). The natural resources programs and projects described here are divided into mandatory and stewardship categories to reflect implementation priorities. Every effort will be made to acquire O&M(MC) Environmental or other funding to implement DoD mandatory projects in the most timely manner possible. Stewardship projects will be funded through forestry, agricultural outlease, fish and wildlife, Legacy, or other fund sources as funding and personnel resources become available.

Table A-1 summarizes the projects.

Table A-1 TBR PROJECTS

Project No.	Project Description	INRMP Page Ref.	Scheduled Implementation (FY)	Prime Legal Driver	Funding Priority (*1)	Fund Source	NEPA Requirement
1	Firebreak Construction and Maintenance	A-4	2015 - 2020	8	M	FR, FOR	No
2	Wildland Fire Management Plan	A-5	2015 - 2025	8	M	FR, FOR	No
3	Wetlands Delineation Survey	A-6	2015 - 2018	4, 6, 7, 11	M	ENV, STA	No
4	Invasive Species Management	A-7	2015 - 2025	1, 9	M	ENV, STA	No
5	Frosted Flatwoods Salamander Management	A-8	2015 - 2025	3, 8	M	ENV, STA	No
6	Threatened, Endangered, Candidate, and Rare Species Management	A-9	2015 - 2025	3, 8	M	ENV, STA, LY, AO	No
7	Migratory Bird Surveys	A-10	2015 - 2025	3, 5, 8	M	ENV	No
8	Prescribed Burn	A-11	2015 - 2025	8	M	FR, FOR	No
9	GIS Database Maintenance	A-12	2015 - 2025	N/A	S	ENV	No
10	Forest Management	A-13	2015 - 2025	8	M	FR, FOR	No
11	Forest Inventory	A-15	2015 - 2025	8	M	ENV, STA	No
12	Pest Management	A-16	2015 - 2025	8, 9	M	ENV, STA	No
13	Update/Revise INRMP	A-17	2015 - 2025	2	M	ENV	Yes

Key

(*1) M = Mandatory Project or S = Stewardship Project

Fund Source

ENV - Environmental
FOR - Forestry
FR - Forestry Reserve
LY - Legacy
STA - Station O&M

Primary Legal Drivers

(1) 7 U.S.C. 2814 Federal Noxious Weed Act
(2) 16 U.S.C. 670a-f Sikes Act Improvement Act
(3) 16 U.S.C. 1531 & 1536 Endangered Species Act
(4) 33 U.S.C. 1251 Clean Water Act
(5) 16 U.S.C. 703 Migratory Bird Treaty Act
(6) 16 U.S.C. 2912 North American Wetlands Conservation Act
(7) 16 U.S.C. 590A Soil and Water Conservation Act
(8) 32 CFR 190 Natural Resources Management Program
(9) EO 13112 Invasive Species
(10) EO 12962 Recreational Fisheries
(11) EO 11990 Wetlands Protection

Project No. 01 **Firebreak Construction and Maintenance**

Purpose: To prevent or minimize the potential for wildland fires to affect the military mission, facilities, surrounding lands, and ecological communities.

Goals and Objectives: Goal 1, Objective 1.1, Strategy 1.1.1 – TBR will integrate firebreak maintenance with other program elements by developing site-specific maintenance plans, including necessary BMPs, for each target; manage conditions at firebreaks, and adapt management as necessary to avoid and minimize potential adverse effects.

Goal 1, Objective 1.2, Strategy 1.2.1 – TBR will integrate the maintenance of forest buffers with other program elements by developing site-specific maintenance plans, including necessary BMPs, in and around each target; manage conditions in the forest buffers, and adapt management as necessary to avoid and minimize potential adverse effects.

Goal 1, Objective 1.3, Strategy 1.3.1 – TBR will avoid adverse effects of wildland fires as described in the INWFP through constructing and maintaining firebreaks, controlling fuel loads, maintaining readiness to respond, and developing partnerships. Integrate wildland fire management with other program elements by using an ecosystem management approach that mimics natural fire regimes; routinely monitor habitat conditions, and adapt management as necessary to avoid and minimize potential adverse effects from wildfire.

Location: TBR-wide.

Description: This project will delineate areas to be maintained as firebreaks and areas around infrastructure to be maintained with reduced fuel loads to reduce fire risk to infrastructure for the expanded TBR lands. Firebreaks are a necessary part of a fire management program. Existing features such as roads and streams may be used as firebreaks, but oftentimes such features are not present. Where existing features do not occur, man-made firebreaks must be established and maintained. Construction of additional firebreaks may be deemed necessary to subdivide stands into manageable burn units. Firebreaks are established prior to prescribed burning; or, in areas that will not be burned during a given year, firebreaks may be necessary to establish and maintain as a protection against spread of wildfires. Plowed firebreaks will be disked and leveled to prevent soil erosion and interruption of boundaries and hydrology. Permanent firebreaks may later be used for forest access.

Baseline: Established and expanded from existing firebreaks.

Monitoring: None.

Legal Driver(s): Natural Resources Management Program, 32 Code of Federal Regulations (CFR) 190.

Related Legal: National Fire Protection Association (NFPA) 1143: Standard for Wildland Fire Management. Marine Corps Order (MCO) MCO-P5090.2A, par 11203; Military Construction Authorization Act – Sale of Certain Interest in Lands, Logs, 10 United States Code (U.S.C.) 2665. Federal Land Assistance, Management and Enhancement Act of 2009 (The FLAME Act); the National Cohesive Wildland Fire Management Strategy; and Camp Lejeune Order 5090.113, USMC Wildland Fire Management Program.

Project No. 02 **Wildland Fire Management Plan**

Purpose: To ensure that the wildland fire management activities on TBR are integrated and consistent with Federal stewardship requirements. As a result, the Integrated Wildland Fire Management Plan would serve as the comprehensive plan for deliberately managing fire-related activities to attain and sustain stewardship requirements while optimizing primary activities on TBR and, where compatible, conducting secondary (recreational) activities.

Goals and Objectives: Goal 1, Objective 1.3, Strategy 1.3.1 – TBR will avoid adverse effects of wildland fires as described in the INWFP through constructing and maintaining firebreaks, controlling fuel loads, maintaining readiness to respond, and developing partnerships. Integrate wildland fire management with other program elements by using an ecosystem management approach that mimics natural fire regimes; routinely monitor habitat conditions, and adapt management as necessary to avoid and minimize potential adverse effects from wildland fires.

Location: TBR-wide.

Description: Due to a recent acquisition, 28,630 acres of additional land have been added to the TBR. This project will maintain firebreaks and areas of reduced fuel load for the expanded TBR lands, maintain readiness to respond to wildland fires, and respond to wildland fires as they occur. The project will also evaluate firebreaks and buffers for effectiveness as often as practicable and adapt design and location as necessary, evaluate wildland fire hazard potential to prescribe and adapt management as necessary, and develop partnerships and opportunities for collaboration in the management of wildfire.

Baseline: 10-Year Forest Management Plan and McIntosh County Timber Activity Summary.

Monitoring: None.

Legal Driver(s): Natural Resources Management Program, 32 CFR 190.

Related Legal: NFPA 1143: Standard for Wildland Fire Management. MCO P5090.2A, par 11203; Military Construction Authorization Act – Sale of Certain Interest in Lands, Logs, 10 U.S.C. 2665. Federal Land Assistance, Management and Enhancement Act of 2009 (The FLAME Act); the National Cohesive Wildland Fire Management Strategy; and Camp Lejeune Order 5090.113, USMC Wildland Fire Management Program.

Project No. 03 **Wetlands Delineation Surveys**

Purpose: To perform a range-wide delineation of wetlands by implementing a planning level survey (aerial photo interpretation with limited ground truthing) and delineating at a jurisdictional determination level for the target areas.

Goals and Objectives: Goal 2, Objective 2.1, Strategy 2.1.1 – Use the preliminary jurisdictional determination to help identify areas of likely wetlands impact during preliminary planning of development projects.

Goal 2, Objective 2.1, Strategy 2.1.2 – Maintain no net loss of wetlands, promote 50-foot buffers for all wetlands, and ensure land use and land management practices will not adversely affect wetlands.

Location: TBR-wide.

Description: Due to a recent acquisition, 28,630 acres of additional land have been added to TBR. Perform and maintain a current wetland delineation and jurisdictional determination for the expanded TBR lands. The areas of likely development should be verified by the USACE as often as necessary to maintain the USACE's jurisdictional determination; other areas will only require a planning level delineation. Complete jurisdictional wetlands determination for the remainder of the Range as soon as practical and have the USACE evaluate the wetland map and re-approve if feasible; otherwise, redo wetlands map. Review the extent and quality of wetlands every 5 years and adapt management properly. Update the GIS layer of wetlands boundaries as maps are revised.

Baseline: 2007 former Range-wide delineation.

Monitoring: Annual assessment of completed wetland delineations.

Legal Drivers: Section 404 of the Federal Water Pollution Control Act (Clean Water Act), as amended, 33 U.S.C. 1251; North American Wetlands Conservation Act, 16 U.S.C. 4808; and Executive Order (EO) 11990 – Protection of Wetlands, Section 5.

Related Legal: Endangered Species Act (ESA), 16 U.S.C. 1531 et seq.; Clean Water Act: Section 401 Water Quality Certification, 1986, 33 U.S.C. 1341; MCO P5090.2A, par 1104.2a.

Project No. 04 **Invasive Species Management**

Purpose: To develop and implement invasive and exotic species control management via the eradication and control of invasive and exotic plant species.

Goals and Objectives: Goal 2, Objective 2.4, Strategy 2.4.1 – Implement strategies for the control and removal of invasive and exotic species on TBR.

Location: TBR-wide.

Description: Maintain a register of existing and potential invasive species infestations that includes species' locations, appearance, habitats and ecology, and control methods. Identify and delineate areas vulnerable to infestation (e.g., target areas, roadways, firebreaks, and other disturbed areas) for monitoring and control. Survey vulnerable areas as needed to monitor occurrence, distribution, and abundance of invasive species; high-priority species include those plants classified as Category 1 or Category 2 by the Georgia Exotic Pest Plant Council. Continue to develop and implement control recommendations identified in the 2004 Invasive Species Report. Identify opportunities to partner with local and regional agencies and landowners in the development of effective control methods and the identification of new threats in the region. Review data annually, adapt management as necessary, participate in regional control efforts, and ensure integration with the management of other program elements.

Baseline: Baseline will be established during the survey phase of the project.

Monitoring: Previously treated areas will be monitored annually to determine the effectiveness of the implemented removal methods. A TBR-wide inventory will be conducted every 3 years to ensure no new establishment of invasive and exotic species and to determine new areas requiring treatment.

Legal Drivers: Federal Noxious Weed Act of 1974, 7 U.S.C. 2801, Sec. 2814 (a); EO 13112 – Invasive Species.

Related Legal: Department of Defense (DOD) Pest Management Program; ESA, 16 U.S.C. 1531 et seq.; Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. 136; MCO P5090.2A, par 11104.1g.

Project No. 05 **Frosted Flatwoods Salamander Management**

Purpose: To protect, survey, and monitor for frosted flatwoods salamander populations.

Goals and Objectives: Goal 2, Objective 2.6, Strategy 2.6.1 – Manage frosted flatwoods salamander populations and suitable habitats at TBR.

Location: TBR-wide.

Description: Monitor for known and suspected frosted flatwoods salamander populations in accordance with the 2001 Biological Assessment, the Draft Flatwoods Salamander Recovery Plan, and the March 28 through April 8, 2011, protected species surveys. Survey suitable habitats on TBR for the occurrence of unknown potential frosted flatwoods salamander breeding sites on a recurring basis. Use prescribed burns to maintain suitability of habitats for frosted flatwoods salamanders. Identify and implement measures to reduce predatory fish access to frosted flatwoods salamander breeding sites. Review results of surveys and prescribed burns with cooperating agencies and adapt management as necessary.

Baseline: Existing Frosted Flatwoods Salamander inventories and management activities.

Monitoring: Results of specific projects will be monitored as needed. Formal monitoring will be conducted through Projects 06 and 07.

Legal Drivers: 74 FR 6700 6774: Determination of Endangered Status for Reticulated Flatwoods Salamander; Designation of Critical Habitat for Frosted Flatwoods Salamander and Reticulated Flatwoods Salamander; Final Rule; 74 FR 6699: Flatwoods Salamander 5-Year Review.

Related Legal: 16 U.S.C. 1531-1543; Endangered Species; and 16 U.S.C. 670; Cooperative Plan for Conservation and Rehabilitation; Fish and Wildlife Conservation Act, 16 U.S.C. 2901; MCO P5090.2A, par 11104.3a and 11104.3b.

Project No. 06 **Threatened, Endangered, Candidate, and Rare Species Management**

Purpose: Conduct management and implement projects to protect and sustain habitat for rare, threatened, candidate, and endangered species, as well as other wildlife and natural communities.

Goals and Objectives: Goal 2, Objective 2.6, Strategy 2.6.2 – Avoid impacts on threatened, endangered, candidate, and rare species at TBR.

Location: TBR-wide.

Description: Survey for potentially occurring rare, candidate, threatened, and endangered species listed in Table 2-4 of this INRMP as Likely or Possible Residents or Migrants. Review results of surveys and monitoring with cooperating agencies on an annual basis and improve management as necessary. Numerous natural community and habitats improvements are included in this project, including prescribed burning in pitcher plant and longleaf pine habitats, non-fire brush removal, and limiting access to sensitive areas, among others. Institute informative programs to educate users on TBR about rare and listed species on TBR, and their habitat requirements. Work with adjacent land-owning agencies to maximize conservation benefits to rare and listed species.

Baseline: Existing biological inventories and management activities.

Monitoring: Results of specific projects will be monitored as needed. Formal monitoring will be conducted through Projects 05 and 07.

Legal Drivers: 16 U.S.C. 1531-1543; Endangered Species; and 16 U.S.C. 670; Cooperative Plan for Conservation and Rehabilitation; Natural Resources Management Program, 32 CFR 190.

Related Legal: Fish and Wildlife Conservation Act, 16 U.S.C. 2901; Conservation Programs on Military Installations (Sikes Act) as amended, 16 U.S.C. 670 (a) et seq; EO 11990 – Wetlands Protection; EO 13112 – Invasive Species; MCO P5090.2A, par 11104.3a and 11104.3b.

Project No. 07 **Neotropical Migratory Bird Surveys**

Purpose: Determine neotropical migratory bird species at TBR and potential migratory bird management practices. Neotropical migratory birds are those species that breed in North America and winter in the Neotropics (Central and South America).

Goals and Objectives: Goal 2, Objective 2.7, Strategy 2.7.1 – Ensure adherence to the Migratory Bird Treaty Act (MBTA).

Location: TBR-wide.

Description: Monitor and conduct surveys (utilizing Federal or local biologists) during the spring and fall migrations for neotropical migratory birds annually, as well as any particular breeding season, with an emphasis on painted buntings and grassland sparrows. Provide data to the Eastern Painted Bunting Working Group. Conduct searches for winter grassland sparrows the year following burns in open pine stands with a grass/forb ground cover. Identify and count (to the extent practicable) any migratory birds that are unavoidably taken during military readiness activities. Report these takes up the chain of command. (Note that *take* is defined as kill, harm, or harass.).

Baseline: Existing Neotropical Migratory Bird inventories and management activities.

Monitoring: Results of specific projects will be monitored as needed. Formal monitoring will be conducted through Projects 05 and 07.

Legal Drivers: MBTA, 16 U.S.C. 703; Natural Resources Management Program, 32 CFR 190.

Related Legal: Fish and Wildlife Conservation Act, 16 U.S.C. 2901; ESA, 16 U.S.C. 1531 et seq.; DoD 4715, Sikes Act, as amended, 16 U.S.C. 670 a-o; MCO P5090.2A, par 11104.3d; MBTA, 16 U.S.C. 703-712.

Project No. 08 **Prescribed Burn**

Purpose: Develop a Prescribed Burn program identifying management priorities, schedule, target fuel loads, typical burn plans, and BMPs.

Goals and Objectives: Goal 2, Objective 2.8, Strategy 2.8.1 – Use prescribed burns to sustain and restore regionally important habitats by mimicking natural fire regimes that control invasive species and promote establishment and maintenance of desirable species composition and structure.

Location: See Appendix VI of the 2006 TBR INRMP for specific areas and acreages of the former TBR lands to be burned. Recently expanded lands will require an assessment to determine specific areas and acreages to be burned. Urban forest prescription precautions will be in effect when burning close to administrative areas, and training areas. Wildfire control will be administered where needed.

Description: Conduct prescribed burns to mimic natural fire regimes to the extent practical, while controlling fuel loads and invasive species, promoting vegetation composition and structure suitable for target species, and creating a diversity of conditions across the landscape. Evaluate effectiveness of individual prescribed burns for controlling invasive species, establishing and maintaining desirable species and vegetation structure, and avoiding unintended or unanticipated effects to natural resources. Review prescribed burn data annually, assess program adequacy, schedule and adapt management prescriptions as appropriate, and ensure integration with other program elements.

Prescribed burns will be conducted in forest stands on a 3-year rotation or as needed to support the military mission. On pine sites, burns will be hot enough to kill invasive hardwoods. Burns will be scheduled in the winter to reduce fuel loads to allow growing season burns in subsequent years. Prescribed burns will also be scheduled in wetlands for habitat management. Dormant season burns can be alternated with growing season burns as long as fuel loading is reduced first. Prescribed burning is dependent upon weather conditions and mission-related activities. Wildfire control will be administered as needed.

Baseline: TBR, in coordination with MCAS Beaufort and Naval Facilities Engineering Command (NAVFAC) Southeast (SE), will update stand data and GIS information to serve as the baseline for all forestry work.

Monitoring: Annual review of Forest Management to determine necessary program changes.

Legal Driver(s): Natural Resources Management Program, 32 CFR 190.

Related Legal: NFPA 1143: Standard for Wildland Fire Management. MCO P5090.2A, par 11203; Military Construction Authorization Act – Sale of Certain Interest in Lands, Logs, 10 U.S.C. 2665. Federal Land Assistance, Management and Enhancement Act of 2009 (The FLAME Act); the National Cohesive Wildland Fire Management Strategy; and Camp Lejeune Order 5090.113, USMC Wildland Fire Management Program. ESA, 16 U.S.C. 1531 et seq.; Federal Noxious Weed Act of 1974, 7 U.S.C. 2801; EO 13112 – Invasive Species; Sikes Act, as amended 16 U.S.C. 670 a-o; DODINST 7310.5; Military Construction Authorization Act – Sale of Certain Interest in Lands, Logs, 10 U.S.C. 2665.

Project No. 09 **Geographic Information System (GIS) Database Maintenance**

Purpose: Develop and maintain a GIS framework and database that is compatible with the system employed by MCAS Beaufort and inventory all natural resources data for incorporation into the GIS database.

Goals and Objectives: Goal 2, Objective 2.1, Strategy 2.1.1 – Use the preliminary jurisdictional determination to help identify areas of likely wetlands impact during preliminary planning of development projects.

Goal 2, Objective 2.1, Strategy 2.1.2 – Maintain no net loss of wetlands, promote 50-foot buffers for all wetlands, and ensure land use and land management practices will not adversely affect wetlands..

Goal 2, Objective 2.2, Strategy 2.2.1 – Continue reviewing and monitoring proposed activities to avoid impacts to the attenuation capacity of the 100-year floodplain. If development is necessary within the 100-year floodplain to support the military mission, it shall be confined to previously disturbed areas of the floodplain whenever practicable.

Goal 2, Objective 2.3, Strategy 2.3.2 – Apply soil erosion management to the preservation of sensitive habitats and species.

Goal 2, Objective 2.6, Strategy 2.6.1 – Manage frosted flatwoods salamander populations and suitable habitats at TBR.

Goal 2, Objective 2.6, Strategy 2.6.2 – Avoid impacts to threatened, endangered, candidate, and rare species at TBR.

Goal 2, Objective 2.7, Strategy 2.7.1 – Ensure adherence to the MBTA.

Goal 2, Objective 2.8, Strategy 2.8.1 – Use prescribed burns to mimic natural fire regimes that control invasive species and promote establishment and maintenance of desirable species composition and structure.

Goal 2, Objective 2.9, Strategy 2.9.1 – Attain, store, and access qualitative and quantitative data pertinent to the assessment and adaptation of natural resources management.

Goal 3, Objective 3.1, Strategy 3.1.1 – Utilize sound, proven forest management techniques to support other program elements and enhance ecosystem benefits.

Goal 3, Objective 3.2, Strategy 3.2.1 – Enhance white-tailed deer, turkey, and small game habitats, monitor harvest, and adapt management as necessary.

Location: TBR-wide.

Description: Develop and maintain a GIS framework and database that is compatible with the system employed by MCAS Beaufort. Inventory all natural resources data for incorporation into the GIS database with continuous maintenance and updates.

Baseline: Existing GIS inventories and management activities.

Monitoring: Annual review of GIS inventories to determine necessary program changes.

Legal Drivers: None.

Related Legal: Natural Resources Management Program, 32 CFR 190; Cooperative Plan for Conservation and Rehabilitation, 16 U.S.C. 670; and Natural Resources Conservation Program, DoD Directive 4715.3.

Project No. 10 **Forest Management**

Purpose: Compliance with and enforcement of the TBR Forest Management Plan guidelines in order to maintain TBR's healthy and vigorous forested areas as excellent opportunities for multiple-use, rotational pine forest management and the production of sawtimber, chip/n/saw, and fiber.

Goals and Objectives: Goal 3, Objective 3.1, Strategy 3.1.1 – Utilize sound, proven forest management techniques to support other program elements and enhance ecosystem benefits.

Goal 3, Objective 3.2, Strategy 3.2.1 – Enhance white-tailed deer, turkey, and small game habitats, monitor harvest, and adapt management as necessary.

Location: TBR-wide.

Description: This project will establish an effective controlled burning program to reduce fuel buildup and wildfire potential; prepare adequate means for quick response and effective wildfire suppression; thin stands to reduce overstocked conditions; maintain productive growth rates and tree vigor; conduct sanitation cuts for removal of high risk and diseased stems; and initiate final harvests with appropriate reforestation activity to balance the age class distribution and increase species composition diversity.

This project will also provide forest protection including surveillance for insect and disease problems; evaluation of those problems, and treatment when necessary. The normal treatment for such problems is the harvest of affected trees along with a buffer area. Forest protection also includes the protection of scenic values during harvesting of trees.

Baseline: TBR, in coordination with MCAS Beaufort and NAVFAC will update stand data and GIS information to serve as the baseline for all forestry work.

Monitoring: Reference the 10-Year Forest Management Plan and McIntosh County Timber Activity Summary.

Legal Drivers: Natural Resources Management Program, 32 CFR 190; Cooperative Plan for Conservation and Rehabilitation, 16 U.S.C. 670; and Natural Resources Conservation Program, DoD Directive 4715.3.

Related Legal: NFPA 1143: Standard for Wildland Fire Management. This standard provides minimum requirements to fire protection organizations on the management of wildland fire, including prevention, mitigation, preparation, and suppression. MCO P5090.2A, par 11203; Military Construction Authorization Act – Sale of Certain Interest in Lands, Logs, 10 U.S.C. 2665. Federal Land Assistance, Management and Enhancement Act of 2009 (The FLAME Act); the National Cohesive Wildland Fire Management Strategy; and Camp Lejeune Order 5090.113, USMC Wildland Fire Management Program.

Project No. 11 **Forest Inventory**

Purpose: Update the forest management inventory system with measurements of the forest such as species, acreage, size class, basal area, volume, etc.

Goals and Objectives: Goal 3, Objective 3.1, Strategy 3.1.1 – Utilize sound, proven forest management techniques to support other program elements and enhance ecosystem benefits.

Location: TBR-wide.

Description: This project will provide periodic monitoring of forest stands to obtain measurements on health, species composition, size, basal area, and volume; thin stands to reduce overstocked conditions; maintain productive growth rates and tree vigor; conduct sanitation cuts for removal of high risk and diseased stems; and initiate final harvests with appropriate reforestation activity to balance the age class distribution and increase species composition diversity.

This project will also provide forest protection including surveillance for insect and disease problems, evaluation of those problems, and treatment when necessary. The normal treatment for such problems is the harvest of affected trees along with a buffer area. Forest protection also includes the protection of scenic values during harvesting of trees.

Baseline: TBR, in coordination with MCAS Beaufort and NAVFAC will update stand data and GIS information to serve as the baseline for all forestry work.

Monitoring: Reference the 10-Year Forest Management Plan and McIntosh County Timber Activity Summary.

Legal Drivers: Natural Resources Management Program, 32 CFR 190; Cooperative Plan for Conservation and Rehabilitation, 16 U.S.C. 670; and Natural Resources Conservation Program, DoD Directive 4715.3.

Related Legal: NFPA 1143: Standard for Wildland Fire Management. This standard provides minimum requirements to fire protection organizations on the management of wildland fire, including prevention, mitigation, preparation, and suppression. MCO P5090.2A, par 11203; Military Construction Authorization Act – Sale of Certain Interest in Lands, Logs, 10 U.S.C. 2665. Federal Land Assistance, Management and Enhancement Act of 2009 (The FLAME Act); the National Cohesive Wildland Fire Management Strategy; and Camp Lejeune Order 5090.113, USMC Wildland Fire Management Program.

Project No. 12 **Pest Management**

Purpose: Manage forest pests in accordance with the IPM guidelines of the Forest Management Plan.

Goals and Objectives: Goal 3, Objective 3.1, Strategy 3.1.1 – Utilize sound, proven forest management techniques to support other program elements and enhance ecosystem benefits.

Location: TBR-wide.

Description: This project will provide forest protection including surveillance for insect and disease problems, evaluation of those problems, and treatment when necessary. The normal treatment for such problems is the harvest of affected trees along with a buffer area. Forest protection also includes the protection of scenic values during harvesting of trees.

Baseline: The TBR, in coordination with MCAS Beaufort and NAVFAC SE, will update the FMIS to serve as the baseline for all forestry work.

Monitoring: Reference the 10-Year Forest Management Plan and McIntosh County Timber Activity Summary.

Legal Drivers: OPNAVINST 6250.4B, 27 August 1998, DOD Pest Management Programs; Natural Resources Management Program, 32 CFR 190; Federal Insecticide, Fungicide and Rodenticide Act, FIFRA; 7 U.S.C. 136

Related Legal: ESA, 16 U.S.C. 1531 et seq.; Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. 136; MCO P5090.2A, par 11203.

Project No. 13 **Update/Revise INRMP**

Purpose: Ensure the TBR INRMP is kept current reflecting: Installation and Region management direction, current projects, new natural resources information, current regulatory concerns and policies, and mission requirements.

Goals and Objectives: All Goals, Objectives, and Strategies.

Location: TBR-wide.

Description: This INRMP was last revised in FY06. The INRMP must be reviewed on an annual basis and regularly revised to address species management to prevent impacts on the mission or delays to target area construction projects. Data from species surveys will be incorporated into this INRMP as soon as possible upon acquisition. INRMP updates will document survey results and add newly listed species and their habitat requirements, as well as management actions herein that benefit and conserve the species and their habitats.

Baseline: Existing TBR INRMP; current surveys, and species inventories.

Monitoring: None.

Legal Drivers: Conservation Programs on Military Installations (Sikes Act) as amended, 16 U.S.C. 670 (a) et seq.

Related Legal: DODINST 7310.5; OPNAV M-5090.1, par 12-3.4; USMC-MCO P5090.2A, par 11200.4; National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. 4321 et seq.

APPENDIX B

FOREST MANAGEMENT PLAN

TEN YEAR FOREST MANAGEMENT PLAN (1997 – 2006)

1.0
Purpose of Section

This section is intended for use by natural resource managers and other responsible parties to use as a planning tool and guidance for conducting sound forest management practices at the Townsend Bombing Range. The proposed planning period for this management is for the ten year period beginning January 1,1997 through December 30, 2006.

The forest management program is administered by the MCAS Beaufort Natural Resources & Environmental Affairs Officer, NREAO, with technical assistance from SOUTHNAVFACENGCOM. Plan implementation and oversight will be coordinated by NREAO and/or SOUTHNAVFACENGCOM utilizing available personnel, contracts and local installation assistance as available. Forest product markets, manpower availability, funding constraints and training requirements will most certainly influence the intensity and timing of management activities. In order to be practical and functional, this plan is intended to provide flexibility to accommodate these conditions while insuring that it meets, supports and enhances the Range mission.

The proposed activities described herein are intended to provide a framework for orderly and scientific management of the installation woodlands using an integrated multiple-use approach. Its objective and goal is to; assure sustained flow of quality forest products and other benefits related to the maintenance of a viable and healthy forest; protect real estate value and improvements; enhance and protect other natural resources associated with the forest environment and finally to facilitate military missions.

1.a
INTRODUCTION AND FOREST MANAGEMENT HISTORY

The bombing range lands encompass some 5,183 acres historically a portion of Sapelo Forest owned and intensively managed for pine fiber and timber products by Union Camp Corporation. The bombing range lands were initially leased from Union Camp who continued to manage the property until 1992 when the Navy purchased the land in fee. Timber rights were assigned to McIntosh county on about 50% of the land area not directly adjacent to the active aerial gunnery range, buffer zones and range facilities. No active forest management has been conducted on the range lands since acquisition. However, previous ownership management activities have resulted in a pine forest predominated by pine plantations, approximately 61% of the total acreage, ranging in age from 5-30 years of age.

1.2
Timber Markets
Range lands are located in the Southern Georgia Coastal Plain and local demand for fiber, chip-n-saw and quality saw logs is high. The regional timber markets are excellent with several mills located within hauling radius of the Range lands. Markets for installation forest products are expected to remain strong providing good competition for the quality products and highly operable lands found at the bombing range. Timber sales offered through sealed bids should easily meet or exceed fair market values for non metal contaminated timber. Markets for contaminated timber are difficult to predict and are unreliable. Acceptance by area mills and stumpage values depend heavily upon the level and type of contamination, finished product requirements, seasonal demand and the anticipated mill downtime/increased operating costs to process contaminated material and repair damaged equipment. Markets for these materials can only be established through advertisement and harvest.

1.3
Estimated Volume of Forest Products
The following summary of Timber volumes presented is the result of a field cruise conducted by the Savannah District US Army Corps of Engineers Forest Resources personnel in the spring of 1996. A systematic stratified sample system was used with variable plot radius 10 BASF prism plots being located

on a 5 chain by 10 chain grid in all high value strata. A total of 673 plots were taken yielding a 2.5% cruise on the 2,644 acres of merchantable timber. For the purposes of this cruise five merchantable strata were delineated on aerial photos and prior ownership stand maps. The delineated merchantable strata identified were; pine plantations over 30 years old, pine plantations 12-29 years old, natural mixed pine, natural longleaf pine and hardwood. Timber stands with probable metal contamination were recorded separately and unless considered pole quality were tallied as pulpwood. The metal contaminated areas along with the hardwood strata were sampled on a 5 chain by 10 chain grid.

Timber volumes were calculated using TVAs INFORM 3 computer program. Pine sawtimber and Chip-n-saw volumes were calculated using the Scribner Log Rule form class 78. The inform program has converted Chip-n-saw volumes to standard cords using cubic foot conversion factors . Pole quality pine stems were calculated using Scribner form class 80. Hardwood sawtimber volumes were calculated using Scribner form class 76. Pulpwood is presented in standard cords and estimated pine sawtimber topwood has been added to the pine pulpwood volumes.

TABLE A. MERCHANTABLE TIMBER VOLUME includes metal contaminated timber.
ANNUAL ALLOWABLE CUT (AAC)
PLANNED ANNUAL CUT (PAC)
AVERAGE ANNUAL COST (AVG. COST)
AVERAGE ANNUAL HARVEST VALUE (AVG HARVEST)

Note: The timber rights assigned to McIntosh County, GA are currently in the process of being procured and for the purposes of this plan are considered indistinguishable from the remaining bombing range lands.

PRODUCT	VOLUME	AAC	PAC	AVG. COST	AVG. HARVEST VALUE
Pine Sawtimber	1.098 MMbf	53 Mbf	20 Mbf	$ 23,950	$ 82,836
Pole Quality Pine	1.824 MMbf	91 Mbf	48 Mbf		
Pine Chip-n-saw	5,237 Cds	183 Cds	83 Cds		
Pine Pulpwood	38,417 Cds	1345 Cds	1130Cds		
Hard Hardwood Saw.	126 Mbf	N/A			
Soft Hardwood Saw.	171 Mbf	N/A			
Cypress Sawtimber	313 Mbf	N/A			
Hardwood Pulpwood	5,927 Cds	N/A			

1.3.6
FOREST FIRE and CONTROLLED BURNING

The installation fire department periodically burns the cleared portions of the aerial gunnery range and maintains the installation dirt roads with a road grader removing grasses and other flashy herbaceous fuels. This program has been quite effective in keeping the wildfire incidence at the installation to a minimum. Union Camp has long been active in controlled burning and much of the range woodlands have been burned prior to Navy acquisition. The woodland areas at installation have varying buildup of fuels and some areas are becoming very hazardous should a fire escape cleared range areas under severe fire conditions. Union Camp continues to actively manage forest fuels in adjoining pine forests and this program should help wildfire control efforts if a woodland wildfire ignited on the range spreads beyond Navy ownership. This program has been key to reduction of fuel buildup, associated wildfire hazards and wildfire control. Control burning should be considered a high priority to prevent future wildfire losses that

can result from the active range firing mission. Historically, eight to ten wildfires have been ignited annually from range activity. Some of these have escaped the cleared range firelines requiring control by installation personnel, the GA Forestry Commission and/or assistance from Union Camp. Young pine plantations on range lands pose a significant wildfire hazard, in order to prevent uncontrolled wildfires with resulting resource losses, hazard reduction burns should be conducted within these stands at the earliest possible age.

2.0
DESCRIPTION of FOREST LAND

Upland stands are predominated by pine plantations 5-30 years old and are composed of slash pine (Pinus elliottii) and loblolly pine (Pinus taeda). A small number of natural pine stands approximately 50 years old are also present and fall into one of two categories; those composed of high value longleaf pine (Pinus palustris) and a second category being composed of natural mixed pine with pockets of low grade hardwoods. Low-lying drainage's and wetland areas are predominated by miscellaneous hardwoods including black gum (Nyssa sylvatica), pondcypress (Taxodium disticum), sweetgum (Liquidambar styraciflua), yellow poplar (Liriodendron tulipifera), red and white oak (Quercus sps.), other miscellaneous hardwood species and scattered pockets of slash and loblolly pine. None of the hardwood timber located along drainage's (hardwood runs) is considered to be high quality and the primary benefits associated with these forest areas include; providing erosion control, vegetative diversity and wildlife habitat.

2.1
Forest Types and Land Classes

For the purposes of this plan there are four forest types;

Planted Pine- Either loblolly or slash pine ranging from three to thirty years old.
Natural Mixed Pine- Mixtures of natural origin loblolly, slash and longleaf pine approximately 50 years old with small pockets low grade upland hardwood.
Natural Longleaf Pine- High value predominately sawtimber size longleaf pine stands of natural origin approximately fifty years old.
Hardwood Runs or Stringers- Low-lying drainage's dominated by misc. hardwoods and cypress with some scattered pine components ranging in age.

Forest Types and Land Classes Cont.

and two broad categories of land class type;

Commercial Forest Lands and Non-Commercial Forest Lands.
Land classes are sub-divided and defined as follows;

Commercial Forest Lands (CFL)- Land capable of producing at least 20 cubic feet/ acre/year of commercial forest products.
Regulated CFL- Commercial forest lands available for management and planning on a rotational basis with minimal restrictions.
Modified CFL- Commercial forest lands that cannot be managed on a rotational basis due to recreational or aesthetic considerations, military requirements, etc., but that are harvestable through salvage or silvicultural operations applied for other than timber production purposes.
Restricted CFL- Commercial forest lands that are currently unavailable for timber production due to inaccessibility, impact areas, cleared ranges, etc.

Non-Commercial Forest Lands (NCF)- Land not capable of producing at least 20 cubic feet/acre/year of commercial forest products or land permanently removed from productive status for natural areas, inaccessibility, etc.

Non-productive- Non commercial forest lands including man made and natural wetlands.
Non Forest- Unimproved, semi-improved and developed non-commercial forest lands.

2.2
Table B. FOREST VEGETATION TYPE by LAND CLASSIFICATION

Vegetation Type	Impact Area (Restricted)	Within Fan (Modified)	NonDanger (Regulated)	Forest Under Management
Planted Pine	-	538.9	2,637.9	3,176.8
Natural Pine Mixed	-	53.0	163.0	216.0
Natural Longleaf Pine	-	-	29.1	29.1
Hardwood	-	88.7	805.8	894.5
Non Stocked	-	39.9	353.6	393.5
Non Forest - Roads, Ranges, Ditches	383.2	-	90.3	
Totals	383.2	720.5	4,079.7	4,709.9

3.0
FOREST MANAGEMENT

The forested areas of Townsend bombing range provide excellent opportunities for multiple-use, rotational pine forest management and the production of sawtimber, chip/n/saw and fiber. The intensity of the prior landowners forest management activity has ultimately decreased the natural plant diversity in both species composition and age class which is normally expected in the coastal plain region. Reduction in diversity has consequently impacted the diversity in cover types available for wildlife habitat. This management strategy has resulted in a forest best characterized by well defined even- aged pine monocultures that are uniformly stocked and exhibit vigorous growth rates. Removal of diversity and competition has not only created a highly productive forest but has also created a forest less resistant to insect infestation, disease and wildfire damage which are commonly associated with large acreage's of even aged pine plantation.

3.1
General
Managing the existing forest for healthy, vigorous, high value forest products on a sawtimber rotation will require: establishing an effective control burning program to reduce fuel buildup and wildfire potential; preparing adequate means for quick response and effective wildfire suppression; thinning to reduce overstocked conditions; maintaining productive growth rates and tree vigor; conducting sanitation cuts for removal of high risk and diseased stems and initiating final harvests with appropriate reforestation activity to balance the age class distribution and increase species composition diversity. This goal cannot be accomplished during this planning cycle and will likely require several cutting cycles to accomplish.

Breaking up large even aged pine stands into smaller stands will sometimes result in removal of a portion of the stand prior to its attaining its full economic potential or the identified rotational age. Priority in identifying these reforestation areas will be based on spatial distribution and feasibility of operation. Revenues from these thinnings and final harvests will be used to offset costs of management during

creation of a more diverse woodland. Associated benefits of management include; increased wildlife habitat diversity, a forest better suited to survive periodic insect and disease infestations, healthy forest conditions capable of supporting the military mission and sustainable flow of forest products and other natural resources well into the future.

Older natural stands and hardwood runs are scarce not only on the bombing range itself but within the adjacent geographical region that they require special consideration and will not being considered for rotational management during this planning cycle.

3.2
Managed Species
The predominate existing pine plantation species at the bombing range are loblolly pine (Pinus taeda) and slash pine (Pinus elliottii). These species will be managed for high quality sawtimber production with stands yielding significant quantities of pulpwood and chip/n/saw from intermediate thinnings and sanitation cuts. Upon selection of stands or portions of stands for final harvest consideration will be given to regeneration with suitable species for the site conditions with longleaf pine (Pinus palustris) receiving the highest priority whenever practical and subject to suitable planting stock availability. Longleaf pine will be favored for its superior fire and disease resistance and to increase pine species diversity. Current pine volumes are estimated by species in the following table:

Table C.
ESTIMATED PINE VOLUMES by SPECIES

Species	Cords Pulpwood	Cords CNS	MBF Sawtimber	Poles
Loblolly Pine	15395	2042	403.4	464.5
Slash Pine	220902	3038	599.9	1192
Longleaf Pine	120	157	94.7	167.5
Hard Hardwood			126.2	
Soft Hardwood			170.9	
Cypress			312.7	
Miscellaneous Hardwood	5927			

3.3
Rotation Age
A rotation age of 70 years is set for loblolly and slash pine and 100 years for longleaf pine. No rotation age is set for the hardwood acreage located on the bombing range as these stands are to managed for long-term wildlife management, wetland benefits, erosion control and vegetation diversity.

3.4
Cutting Cycle
A ten year cutting cycle has been established for the five identified forest compartments with periodic harvests planned on a biannual basis. This regime was selected due to the limited size of the managed area and the recognition that entering compartments on a more frequent basis is outweighed by economies of scale. Larger sales typically are more economical to advertise and administer, they generate more competition and consequently result in higher timber revenues. An added benefit to biannual harvesting during this cycle allows for flexibility in implementing control burning without adversely affecting planned sale areas.

3.5
Timber Compartments and Stands

The forested area has been subdivided into five compartments for the purpose of record keeping and scheduling of silvicultural activities. They range in size from 675 - 1454 acres with an average of approximately one thousand acres each. Compartment boundaries follow existing definable land features and roads whenever possible. Ideally these areas would be of equal size, however on a small acreage the cost of identification and maintenance of artificial boundaries is outweighed by convenience of existing definable features which offer a superior means of long term delineation and record keeping.

3.51
Harvest Schedules
One compartment will be harvested biannually during the ten year cutting cycle. During this initial planning cycle, in order to even out the harvest volume on smaller compartments or those with fewer treatment needs portions of the harvests proposed for Comp 2 and 4 will be cut in more than one period. The deferred treatments are 1st thinnings using the Operator Select Thinning Method. Scheduling late in the planning period has the added advantage of adding needed volumes per acre and improving marketability.

3.52
Cutting Units
No cutting units are being defined and they are impractical for the uniform topography and limited acreage involved. Compartments are divided into stands ranging in size from 1-308 acres. A stand is an aggregation of trees occupying a specific area which are sufficiently uniform in composition, age and condition as to be distinguishable from adjoining areas. To accomplish our management goals and simplify record keeping an optimal stand size is about twenty acres. This will be the target size for future reforestation efforts as stands or portions thereof are identified for final harvest.

Some of our existing pine plantations are extremely large due to the prior landowners management practices. In fact the entire installation was included as just a portion of one of their management compartments. Through delineation of new management compartment boundaries some of these large stands have been artificially reduced in size by including them in more than one compartment. This phenomenon makes the average stand size appear to be about thirty acres. It is in fact much larger. A 20 acre target stand size will help us improve diversity while balancing the age class distribution. To prevent misinterpretation associated with artificial redrawing of stand boundaries and inadvertent distortion of actual ground vegetation conditions, a code for forest type is followed by the stand origination date on the timber stand map. Adjacent compartment vegetation types and ages will be considered while selecting final harvest stands or stand portions. New stand numbers will be assigned as portions of larger stands are reforested and cut-over areas are planted. Please refer to Appendix A for compartment and stand boundaries.

TABLE D.
STAND PRESCRIPTIONS
Note: Use the following codes to use presciption tables.

Harvest Type********T Selective Thinning**

OST Operator Select Thinning
SC Sanitation Cut
C Clearcut
ST Seed Tree Harvest
SR Seed Tree Removal
Marking Codes********MT Mark Selective Thinning**
MCT Selective Thin Metal Contaminated
MB Mark Boundaries and Cruise
Site Preparation******SB Site Prep Burn**
BD Bed or Heavy Disc Only

DC Drum Chop
WB Sheer, Window & Bed
Reforestation********LL Plant Longleaf Pine**
LB Plant Loblolly Pine
SL Plant Slash Pine
Hazard Reduction Burn**X Burn**
No Treatment********NT**

Stand Prescriptions

Compartment 1

Stand	Acres	Type	Year of Origin	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	Remarks
1	23.5	PSL	84				X	MB	OST					
2	36	H												NT
3	124	PSL	84				X	MB	OST					
4	6.2	PL	84				X	MB	OST					
5	4.1	CO			DC/SB	BD/LB								
6	14	PSL	82				X	MB	OST					
7	9.4	PL	88				X	MB	OST					
8	9.1	PL	88				X	MB	OST					
9	60.5	PL	88				X	MB	OST					
10	39	H												NT
11	15.5	CO			DC/SB	BD/LL								
12	4.1	PL	88				X	MB	OST					
13	17.2	H												NT
14	125.3	PL	88				X	MB	OST					
15	3.2	H												NT
16	12	NMP	46		X					X				
17	12.1	PL	74		X			MCT	T	X				
18	214.1	PSL	66		X			MCT	T	X				NT Metal 73a.
19	7	NMP	46		X					X				
20	10.3	PL	74		X					X				NT Metal
21	17.5	CO			DC/SB	BD/LL								
22	15.8	CO			DC/SB	BD/LL								
23	295.7	PL	91											NT
24	0.8	H												NT
25	207.5	PL	88				X	MB	OST					
26	12.7	PL	91											NT
27	4.3	H												NT
28	35.5	PL	87				X	MB	OST					
29	5.6	H												NT
30	9.1	PL	88				X	MB	OST					
31	34.2	H												NT
32	61.3	PSL	85				X	MB	OST					
33	7.1	PL	88				X	MB	OST					

Stand Prescriptions

Compartment 2

Stand	Acres	Type	Year of Origin	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	Remarks
1	1.4	PSL	82			X					X			
2	31.8	H												NT
3	138.5	PSL	82	MB	OST				X					
4	2.5	H												NT
5	8.4	PL	74	MT	T	X					X			
6	13.8	CO			DC/SB	BD/LL								
7	11	PL	74	MT	T	X					X			
8	32.1	PL	74	MT	T	X					X			
9	2.7	NMP	46	MT	T	X					X			
10	9.1	CO			DC/SB	BD/LL								
11	59.5	PL	88						X	MB	OST			
12	62.9	H												NT
13	2.7	PL	89						X	MB	OST			
14	23.2	PL	90								X			
15	12.8	PL	90								X			
16	1	PL	90								X			
17	15.3	PL	90								X			
18	134.6	PSL	66	MCT	T	X					X			NT Metal 88a.
19	5.4	PL	74	MCT	T	X					X			
20	3	PSL	82	MB	OST				X					
21	20.2	H												NT
22	19.8	PSL	66			X					X			NT Metal
23	5.6	NMP	46			X					X			NT Metal
24	5.4	CO			DC/SB	BD/LL								
25	24.8	NMP	46			X					X			
26	10.6	PL	74	MT	T	X					X			
27	3.1	H												NT
28	92.6	PSL	82	MB	OST				X					
29	11	PL	89						X	MB	OST			
30	76.5	PL	87						X	MB	OST			
31	0.5	H												NT
32	2.6	H												NT
33	9.4	H												NT
34	5.6	H												NT
35	3.9	NMP	46			X					X			
36	7.1	CO												Non Forest

Stand Prescriptions

Compartment 3

Stand	Acres	Type	Year of Origin	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	Remarks
1	106.6	PL	90								X	MB	OST	
2, 2.1, 2.2, 2.3	9.1	H												NT
3	16.6	PL	90								X	MB	OST	
4	306.7	H												NT
5	19.1	PL	90								X	MB	OST	
6	8	CO			DC/SB	BD/LB								
7	30.3	PL	93										X	
8	2.5	H												NT
9	37.5	PL	90								X	MB	OST	
10	1.8	H												NT
11	19.4	PL	90								X	MB	OST	
12	76.9	PL	90								X	MB	OST	
13	17.3	PL	90								X	MB	OST	
14	6	CO			DC/SB	BD/LL								
15	9.3	PL	90								X	MB	OST	
16	28	CO			DC/SB	BD/LL								
17	19.4	PL	76				X					MT	T	
18	11	PL	90								X	MB	OST	
19	20	PL	90								X	MB	OST	
20	14.6	PL	76				X				X	MT	T	
21	8	CO			DC/SB	BD/LL								
22	11.1	PL	90								X	MB	OST	
23	15.2	PL	90								X	MB	OST	
24	3.7	PL	90								X	MB	OST	
25	3.7	PL	74				X					X		
26	9.6	PL	74				X					X		
27	36.4	CO			DC/SB	BD/LB								
28	3.1	PL	74				X					X		
29	14	CO			DC/SB	BD/LB								
30	22.6	PL	74				X					MT	T	
31	45.5	AGR												Non Forest
32	12.2	PL	90								X	MB	OST	
33	4.9	PL	74				X					MT	T	
34	39.9	NMP	46				X					MT	T	
35	3.6	CO			DC/SB	BD/LB								
36	46.1	PL	74				X					MT	T	
37	37	PL	71				X					MT	T	
38	1.4	PL	74				X					X		

Stand Prescriptions

Compartment 4

Stand	Acres	Type	Year of Origin	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	Remarks
1	81.6	PL	74	X		MT	T		X					
2	6.2	PL	87						X	MB	OST			
3	6.6	PL	92											
4	19.4	PL	74	X		MT	T		X					
5	9.5	NLL	46	X		MT	T		X					
6	82.2	NMP	46	X		MT	T		X					
7	21.9	CO				DC/SB	BD/LB							
8	3.1	CO				DC/SB	BD/LB							
9	26.8	PSL	71	X		MB	CC	WB	LB					
10	68.4	H												NT
11	12.6	PL	90						X	MB	OST			
12	44	PL	89						X	MB	OST			
13	2.7	PL	74	X		MT	T		X					
14	32.7	CO				DC/SB	BD/LB							
15	19.6	MLL	46	X					X					
16	71.8	PSL	71	X		MT	CC/T	WB	LB/X					CC 39a. T32.8a
17	21	CO				DC/SB	BD/LB							
18	17	H												NT
19	14	NMP	46	X					X					
20	8.1	CO				DC/SB	BD/LB							
21	18.4	H												NT
22	33.1	CO				DC/SB	BD/LB							
23	3	H												NT
24	31.2	CO				DC/SB	BD/LB							
25	42.9	CO												NT Metal
26	82.3	H												NT
27	21.1	CO				DC/SB	BD/LB							
28	7.8	CO				DC/SB	BD/LB							
29	23.5	PL	89						X	MB	OST			
30	6.6	CO				DC/SB	BD/LB							
31	12	PL	89						X	MB	OST			
32	23.7	PL	87						X	MB	OST			
33	37.3	PL	74	X		MT	T		X					
34	0.7	PL	89						X	MB	OST			
35	7.6	H												NT
36	29	PSL	71	X					X					NT Metal
37	102.8	AGR												Active Range
38	1	O												Non Forest

Stand Prescriptions

Compartment 5

Stand	Acres	Type	Year of Origin	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	Remarks
1	41.4	H												NT
2	17.4	PL	74					X		MT	T		X	
3	1.9	PL	89						X	MB	OST			
4	3.7	PL	89						X	MB	OST			
5	91.4	PL	89						X	MB	OST			
6	8.4	NMP	46											NT Metal
7	14.7	PL	74					X		MCT	T		X	
8	47.4	PSL	66					X		MCT	T		X	
9	12.4	NMP	46					X					X	NT Metal
10	98	PSL	66					X					X	NT Metal
11	21.4	PL	74					X					X	NT Metal
12	3.7	NMP	46					X					X	NT Metal
13	16.7	H												NT
14	12.9	PSL	71					X					X	NT Metal
15	234.1	AGR												Active Range

3.53
TABLE E.
COMPARTMENT FOREST ACREAGE

Compartment Number	Managed Forest Area (Acres)	Forested Impact Area (Acres)	Total (Acres)	Date 1st and Subsequent Harvests		
1	1153.4	300.8	1454.2			
2	679	191.4	870.4			
3	1031	45.5 NF	1076.5			
4	916.8	33.7/102.8 NF	1053.3			
5	246	194.6/234.9 NF	675.5			

3.6
Silvicultural System
An even-aged management system will be implemented to grow and reproduce the existing pine forest with a rotation age of 70 years for loblolly and slash pine and 100 years for longleaf pine. The range fan for the aerial gunnery range covers about 750 acres of forested woodlands which have been included in the Modified Land Use Classification. Many of these stands will not be treated at this time as their best use is to act as a buffer zone by blocking downrange projectiles. Approximately 500 acres of these areas have been set aside as buffer zones and no treatment is proposed during this cycle even though stocking levels in these stands would normally warrant intermediate thinning. Portions of these areas are so contaminated as to be of limited marketability even if available and scheduled for harvest. The remaining 250 acres where contamination is considered less severe are being proposed for thinnings and some limited reforestation efforts due to overstocking and the likelihood of losing these resources to insect attacks. No management or conversion of hardwood runs/stringers is proposed and natural succession will eventually lead to natural uneven aged stands with a variety of mixed hardwood species.

3.6.1
General Practice Use
Reforestation of cut-over lands to the appropriate suitable pine species is being proposed on about 400 acres and is considered a top priority. To enhance stand age-class distribution, reforestation areas should

be selected when possible with a target stand size of approximately twenty acres. This acreage will accommodate wildfire pre-suppression and hazard reduction concerns, increase stand diversity while maintaining stand operability. Ideally under this management scheme approximately 50 acres of the existing pine plantations would be reforested annually. As appropriate stands are selected and converted to longleaf pine the annual reforestation figure will be reduced to approximately 40 acres per year. Final harvest cuts will be required to balance the age class distribution by replacing existing pine plantation acreage's in surplus age classes. To balance the pine age class distribution approximately 520 acres of pine forest should be represented in each 10 year age class. Currently all pine stands are in the first five 10 year classes with surplus acreage only in the first three classes. Regeneration planned this cycle will include reforestation of about 400 acres of cutover lands and about 66 acres of the desired 120 acres needed to provide the 520 target acreage during this ten year cycle. The 66 acres identified for clearcut and reforestation is being drawn from surplus acreage in the 21-30 year age class (26 year old slash pine plantation) and will be distributed in three separate sites.

The clear-cut method followed by appropriate site preparation and machine planting will be implemented for most reforestation cuts and is exclusively required for conversion to longleaf where suitable site conditions exist. Site preparation including controlled burning, drum chopping and bedding or disking or combinations thereof will be utilized as necessary to properly prepare areas targeted for reforestation efforts. In planting both existing cut over lands or new reforestation areas with loblolly, slash or longleaf pine, stocking levels will range from 500-700 seedlings per acre.

In stands suited to natural regeneration the SEEDTREE or SHELTERWOOD harvest method may be utilized depending upon site conditions and adequate seed source. When this method is employed 8-25 quality seedtrees /acre will be retained with the final removal cuts being conducted once full stocking levels are achieved. Often times this method will yield dense regeneration requiring some form of pre-commercial stocking regulation. Mechanical treatment, usually one or more treatments using drum choppers, may be required to reduce the growing stock to an acceptable level.

Intermediate thinnings or sanitation cuts will be scheduled for most merchantable pine stands. These treatments are aimed at improving forest health by relieving overcrowded conditions, removing diseased and surplus growing stock. In doing so, they help maintain desirable growth rates and increase tree vigor by making available site nutrients, light, soil moisture and other resources available to the selected residual crop trees retained. Stimulating ground cover diversity and herbaceous layer growth is a spin off benefit to wildlife.

Intermediate thinnings are treatments scheduled during the stand rotation with the objective of removing a portion of the growing stock considered surplus to the management strategy. Since our plan calls for production of high quality sawtimber we want to regulate the regenerated stand growing stock to fully occupy the available growing space and site potential by placing available growth on our selected crop trees. This means that once a regenerated stand with the desirable stocking level 500-700 trees per acre has closed canopy and begun to self prune, we must monitor growth rates and time our thinnings to prevent growth rates becoming stagnant. Usually with plantations the first

General Practice Use Cont.

thinning is a commercial "operator select" thinning where we specify a desired distribution and stem spacing and allow a harvesting contractor to select the residual trees . This method has proven to work very well in plantations with uniform stocking and little difference in individual tree quality, as is the condition on most of the range land plantations. Operator select thinning is very cost effective and efficient in reducing stand density while generating income in otherwise marginally merchantable first thinnings. Sometimes and particularly with naturally regenerated stands, a pre-commercial or timber stand improvement thinning is required to reduce stocking to prevent stand stagnation. First thinnings are critical in plantation forests and must be scheduled as early as practical, usually between the ages of 15-20 years.

Subsequent thinnings will be selectively marked with individual tree selections made based on retention of the highest quality crop trees consisting of dominates and codominates thinned from below with target residual density ranging from 60-90 square feet of basal area per acre. The natural mixed stands and natural

longleaf stands will be either thinned from below or crown thinned through sanitation cuts whereby inferior and diseased or suppressed trees are removed.

3.62
HARVEST SCHEDULE
TABLE F.

FY	97	98	99	2000	1	2	3	4	5	6
Acres Cut by										
Select Thin		64.8		264.6				17.4		183.9
Operator Select Thin		234.1				696.6		368.7		379.5
Clearcut				65.8						
Thin metal Contaminated		52				153.2		62.1		
Est Volume Removals										
pine pulp		1833 cds		1714 cds		3483 cds		1932 cds		2965 cds
pine poles		94 Mbf		10 Mbf		282 Mbf		95 Mbf		
pine saw				157 Mbf						39.3 Mbf
pine c-n-s				834 cds						
metal cont pulp		596 cds				1692 cds		643 cds		
Estimated # Contracts		2		1		3		2		2
Estimated Income		$118,770		$182,490		$273,270		$124,230		$129,604

3.6.2.1
Biannual harvests in one compartment have been modified for compartments two and four to allow approximately even sales activity within each of the five periods in this ten year cycle. Multiple products are scheduled for harvest and will be specified in sale prospectives advertised.

3.6.2.2
Sales Volumes and Products
Sale size will depend on the quantity of treatment scheduled within the given compartment, but generally no more than two contracts will be advertised during a given harvesting period. Several stands with suspected metal contamination have been included in the proposed treatment plans and will be marketed as separate items with probable metal contaminated material. Contract clauses should provide for removing material specified unless contamination is too excessive to permit marketability. Operator select thinning operations will be separated from selective thinning and reforestation harvests so that appropriate crews are utilized to effectively accomplish the sale objectives. Sale layout will not only take harvesting and equipment requirements into consideration but will be tailored to accommodate military training issues.

3.6.3
Timber Sale Planning
Sales will be marketed as either lump sum or unit price solicitations based upon the level of competition anticipated and on the products being sold. Generally lump sum sales require adequate competition to

assure that prices obtained for the products being sold are at fair market value. Cruised blocks and areas with possible metal contamination should be marketed on a per ton basis with products and merchantability standards specified accordingly. Sales planning will address ingress/egress, loading area and skid trail requirements, range safety and new road construction and will be guided by optimizing the proposed treatment plan for maximum revenue generation while accomplishing the desired management goals. Sales advertisement should be timed to take advantage of market demand and to allow for maximum competition. Contract invitations will include a complete and clearly written set of contract clauses to assure protection of the Governments' interests and regulatory requirements backed by an appropriate Contractor provided performance deposit. Contract term completion should be set to allow for adequate logging conditions and scheduling of any required site preparation subsequent to harvests.

3.6.4
Timber Marking
No on-site forestry personnel are available for the timber marking and contracted services or borrowed in-house labor will be required to perform timber marking and sales boundary layout. Selective thinning timber marking should be accomplished under the direct supervision of a qualified forester whether done under contract or in-house. The end result of any marked wood thinning starts with the marking plan and consideration of logging plans, sale boundaries and treatment objectives. These issues should be carefully studied and understood by field employees in the marking crew.

3.6.4.2
Field Procedures
Marking crews of two - three qualified marking technicians or foresters should first mark cutting unit boundaries with quality boundary marking paint. Special treatment zones or buffers (i.e. streamside management zones, cultural resources sites, metal contaminated areas etc.) should also be identified and marked on the ground in addition to being placed on the marking map. Trees marked by vertical slashes of a standard color (ORANGE Paint if available) should be placed at about 30'-50' intervals facing the sale area. Volumes should be tallied by each marker on standard tally cards clearly identified with the markers name, date marked, tract stand number, product and % tally. High value products (sawtimber, chip-n-saw and poles) should be recorded using a 100% tally. Pulpwood should be recorded using a 10-20% tally. Two inch
diameter classes should be used to record all tallies and merchantable height measured in 16 foot logs or five foot intervals as specified in the merchantability standards for the specified products. Marking will be started along the back boundaries with subsequent drifts following previously marked paint until the entire area is completed. Timber should be marked with paint facing proposed loading areas, skid trails, etc. Trees to be removed in selective thinnings and sanitation cuts will be marked with Blue or Yellow paint at Dbh and stump marked at the root collar. When multiple products are to be removed in the same operation pulpwood trees will be marked with one spot of paint at breast height, sawtimber with two spots of paint at breast height and chip-n-saw with an X at breast height. Poles will be marked with one, two, three, four or five horizontal slashes at breast height according to the markers estimated merchantable height. Suspected metal contaminated areas will be marked using the same procedure except that RED PAINT will be used to mark removal trees. Only two products will be identified in suspected metal contaminated areas including pole quality material and pulpwood to a four inch upper stem diameter. The following table will be used for determination of tree products marked or cruised for removal;

TABLE G.
Product Merchantability Standards

Product	Dbh Limits Inside Bark	Top Dia.	Min.Height	Bolt Lengths
Pine pulpwood	5" - 24"	4"	20'	5' bolts
Pine Chip-n-saw	9" - 14"	5"	1.5 16' log	8' 1/2 logs
Pine Sawtimber	15" +	8"	1.0 16' log	8' 1/2 logs
Pine Poles	9" +	6"	2.0 16' log	8' 1/2 logs
Hardwood pulp	6" - 24"	4"	20'	5' bolts
Hardwood Saw	12" +	10"	1.0 16' log	8' 1/2 logs

Cypress	Sawtimber	10” +	8”	20’	5’ bolts

Notes:
Poles are trees above average straightness and quality that have 3 times their Dbh in clear straight stem and a minimum of 25 years of age. Trees with >4 branches in 4 ft section and excessive taper stems should be excluded. The pole height should be cruised to the minimum top diameter in 1/2 logs regardless of where pole stops. Pole height marking will be 1 slash 32’, 2 slashes 33-40’, 3 slashes 41-50’, 4 slashes 51-60’ and 5 slashes over 60’.

Pine Sawtimber must have a minimum of one clear log and merchantability shown in 1/2 logs to min. top diameter or at point where limbs equal 1/3 of diameter. or there is , 8’of clear material above whorl. Defects less than 4’ of the stem warrant no deduction, defects > 4’ should be rounded to the nearest 1/2 log.

Hardwood Sawtimber must be free of rotten branches, holes at the stump, excessive sweep or crook and cruise grade of 2 logs and better.

3.6.5
Timber Cruising and Seedtree Marking
Operator select thinnings, clearcuts and seedtree areas will be cruised for removal estimates rather than marked. Depending on stand uniformity a 5-10% line plot cruise using a 10 or 20 BAF prism will be implemented. While conducting Seedtree harvests, marking the recommended number of high quality dominant or codominate trees with well developed crowns will precede timber cruising. Eight to twenty-five evenly distributed seed trees will be identified per acre and marked by a band of BLUE Paint at breast height and
one spot on the root collar. Acreage for cruised timber areas will be calculated with a closed traverse program or by using GPS equipment. Volume calculation on cruised timber sales will be accompanied by a statistical analysis of estimated removal volumes per acre.

3.6.6
Timber Harvesting
The harvests presented within this plan have been selected and identified to compliment management strategy through utilization of proven techniques while remaining cost effective and operational. As with any plan, implementation may require modification or adjustments to address budgetary or manpower constraints, changes in the forest, market conditions or the military mission.

3.6.6.1
Mission Compatibility
All proposed harvests for biannual harvest periods will be presented for review by the installation command and training officer prior to marking or advertisement to insure mission compatibility and that all safety requirements are met.

3.6.6.2
Reports of Availability
These statements are not required for Navy installations and will be substituted with a copy of the sales invitation presented to the command for final concurrence prior to advertisement.

3.6.6.3
Inspection of Sales Progress
Sales inspections are critical to assure contract quality control, safety, payment adequacy and contract term compliance. Whether performed in-house or through contract by qualified consultants or the USACE area Resident Forester, adequate oversight must be performed at a frequency required to protect the Governments interests. Funds collected will be deposited in the appropriate forestry account and periodic harvest progress reports submitted to document harvesting and funds accountability.

3.6.6.4
Contract Clearance

Joint inspections with the command element forestry representative should be accomplished immediately following completion of contract harvesting. Any additional Contractor work required or proposed penalties including site degradation, damages to Government property, failure to utilize marketable material, etc. identified will be noted. Noted deficiencies will be discussed with the Contractor and if required, remedial action or penalties will be recommended to the Contracting Officer prior to Contractor release.

3.6.6.5
Timber Required for Installation Use
No installation plans for local use harvests are known to exist. If any local use need is identified the request will be submitted in accordance with NAVFAC Instruction 11015.9A/MCO P11000.8.

3.6.7
Other Silvicultural Treatment
Initiating a cycle of controlled burning installation woodlands for hazard reduction on about 3,400 acres and site preparation burning on about 400 acres of cut-over areas prior to replanting is considered a high priority.
Other Silvicultural Treatments Cont.
Plantations planted after 1987 will only be burned once in this initial burning cycle. The proposed annual burning including site preparation burns during this cycle is 457 acres. Hazard reduction burning on a five year cycle has been proposed in the plan and accomplishment is largely reliant upon funds availability and weather. This program is considered to be critical for the prevention of potential catastrophic losses or liability associated with wildfires that can result from the military live fire training mission. Young pine plantations should be burned at the earliest age practical and burned only during winter months when predictable winds and cool burning conditions can be expected. The ambient air temperature should be about 40 degrees F or less with a relative humidity of 25-35%. Winds should be steady at about 5-15 Mph and accompanied by favorable upper atmosphere transport winds from a direction to prevent drift smoke from settling in smoke sensitive areas. Growing season burns will be used whenever possible for site preparation to more effectively control competing vegetation. All controlled burning operations should be performed by certified control burning professionals and be coordinated with adjacent landowners and GA State Forestry Commission. The existing road system is well maintained and will provide good wildfire breaks but additional fireline establishment will be required prior to woodland control burns. Young stands may require plowing out and internal burn lines are usually required prior to conducting woodlands burning. All fireline construction required will be identified in the burn plans submitted with annual work plans for funding approval. Fire plow standby while performing control burn operations will likely be required during the initial cycle of burning due to heavy accumulations of fuel and possible spotovers.

3.6.8
Planting
Reforestation on about 400 acres of commercial forest lands currently cutover will be accomplished by machine planting 500-700 seedlings per acre using 1/0 growing stock. Superior bare root or containerized seedlings will be procured from either State nurseries or local industry depending upon availability. Either loblolly, slash or longleaf will be selected according to appropriate site conditions with longleaf receiving priority whenever possible and subject to availability. Drum chopping and site prep burns followed by bedding will be required in low-lying sites and bedding or heavy disking upland sites to control competition prior to planting will be required. A combination of windrowing, rootraking, site prep burns, drum chopping, bedding or disking will be required in areas to be clearcut and planted this cycle. Specific site plans for individual areas will be prepared subsequent to final harvests and the type and intensity of treatment will be selected to adequately prepare the areas for planting.

TABLE H.
Reforestation Program Summary

FY	Acres to be Site Prepared	Acres to be Planted	Acres Seeded	Species	Total Acres Reforested
97					
98	185.2				
99	257.8	185.2		LB/LL	185.2
0		229.5		LB	229.5
1	65.8				
2		65.8		LB	65.8
3					
4					
5					
6					

3.6.9
Annual Work Plans
Work plans and budget requests will be prepared for submission each March for the activities proposed during the following fiscal year. See Appendix I.???

TABLE I. Ten Year Management & Cost Planning Summary

Activity	Treatment	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06
Reforestation	Sheer & Windrow					65.8 acres					
	Drum Chop		185.2 acres	257.8 acres							
	Bed or Disk			185.2 acres	229.5 acres	65.8 acres					
	Site Prep Burn		185.2 acres	257.8 acres							
	Seedlings			99KLL 50KLB	175 K LB		50K LB				
	Machine Plant			185.2 acres	229.5 acres		65.8 acres				
	Cost Est		9K	34K	22K	14K	4.25K				
Burning for Hazard Reduction	Acres	355	256	265.7	898.3	227	932	256	697.5	48.1	227
	Cost Est	5K	3.5K	3.5K	11K	3K	11.5K	3.5K	9.5K	1K	3K
Sales	Mark Thins	117		246.6				79.5		184	
	Mark Stand Boundaries & Cruise	234		329		697		369		380	
	Inspect and Advertise		25		15		35		25		25
	Cost Est	8.5K	5K	17.5K	3K	2K	7.75K	6.5K	5K	13K	5K
Overhead		2.5K	3.5K	5K	3K	1K	4K	2K	3K	3K	1.5K
Total Estimated Annual Cost		16K	21K	60K	39K	20K	27.5K	12K	17.5K	17K	9.5K

Update for INRMP, Townsend Bombing Range
McIntosh County Easement

2000 Site prepared and planted 264 acres in loblolly and slash pine.
(This acreage was cutover by Union Camp prior to deeding the timber to McIntosh County in 1993.)

Timber Sales and Regeneration:

1999 125 acres clearcut Income from sale: $379,779

Volumes removed:	Pine pulpwood	4994 tons
	Pine Chip-N-Saw	5371 tons
	Pine Sawtimber	3090 tons
	Total:	13,455 tons

125 acres site prepared and replanted in loblolly and slash pine in 2000.

2000 130 acre clearcut, 8 acres (longleaf) thinned Income from sale: $401,208

Volumes removed:	Pine pulpwood	4445 tons
	Pine Chip-N-Saw	3867 tons
	Pine Sawtimber & Poles	2926 tons
	Total:	11,238 tons

130 acres site prepared and planted in loblolly pine.

2001 109 acres clearcut Income from sale: $249,261

Volume removed:	Pine Pulpwood:	6748 tons
	Pine Chip-N-Saw	4043 tons
	Pine Sawtimber & Poles	1594 tons
	Total:	12,385 tons

109 acres site prepared and planted in loblolly pine.

91 acres planted pine 5th row thinned to residual BA=80 sq. ft/ac
Income from sale: $49,039

Volume removed:	Pine Pulpwood:	3090 tons
	Pine Chip-N-Saw	811 tons
	Total:	3901 tons

2002 96 acre clearcut Income from sale: $295,979

Pine pulpwood	4377 tons
Pine Chip-N-Saw	6433 tons
Pine Sawtimber & Poles	1841 tons
Total:	12,651 tons

96 acres site prepared and planted in loblolly pine.

2003	115 acres clearcut	Income from sale: $382,850	
		Pine pulpwood:	4715 tons
		Pine Chip-N-Saw	6097 tons
		Pine Sawtimber & Poles	3152 tons
		Total:	13,964 tons

115 acres site prepared and replanted in loblolly pine.

APPENDIX C

HUNTING, FISHING AND BOATING REGULATIONS FOR MARINE CORPS AIR STATION BEAUFORT, LAUREL BAY HOUSING AREAS, AND TOWNSEND BOMBING RANGE, GEORGIA

UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
BEAUFORT, SOUTH CAROLINA 29904-5001

ASO 1700.2E
NREAO

02 MAR 2009

AIR STATION ORDER 1700.2E

From: Commanding Officer
To: Distribution List

Subj: HUNTING, FISHING AND BOATING REGULATIONS FOR MARINE CORPS AIR STATION BEAUFORT, LAUREL BAY HOUSING AREAS AND TOWNSEND BOMBING RANGE, GEORGIA (SHORT TITLE: HUNTING, FISHING AND BOATING REGS)

Ref: (a) South Carolina Department of Natural Resources Hunting and Fishing Regulations (NOTAL)
(b) South Carolina Department of Natural Resources Boating Regulations (NOTAL)
(c) MCO 5500.6G
(d) MCO P5090.2A
(e) ASO 5512.5L
(f) ASO P11101.4F
(g) ASO 10570.1A
(h) Georgia Hunting Season and Regulations

Encl: (1) Hunting, Fishing, and Boating Regulations Procedural Guidance

1. Situation. References (a) and (b) establish South Carolina state hunting, fishing and boating regulations. Reference (c) establishes regulations involving the use of deadly force. Reference (d) promulgates to Marine Corps commands the environmental and natural resources responsibilities. References (e) and (f) establish specific regulations regarding the possession, use, carrying, registration and storage of privately owned firearms and weapons onboard this Air Station in accordance with this Order and applicable federal, state and county laws and regulations. Reference (g) establishes control and treatment of pets and wild animals. Reference (h) establishes Georgia hunting season and regulations.

2. Cancellation. ASO P1700.2D.

3. Mission. To establish regulations governing hunting, fishing and boating aboard MCAS Beaufort, Laurel Bay Housing area and Townsend Bombing Range, Georgia.

4. Execution. All personnel, military and civilian, will comply with the regulations contained in this Order.

5. Administration and Logistics. Changes to this Order are invited and should be submitted to the Natural Resources Environmental Affairs Office (NREAO) via the appropriate chain of command.

6. Command and Signal

a. Signal. This Order is effective the date signed.

b. Command. This Order is applicable to all tenant commands and staff sections.

J. R. SNIDER

DISTRIBUTION: B

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CHAPTER 1

GENERAL INFORMATION (MCAS AND LAUREL BAY)

1. Application of Regulations. The regulations in this document are provided for MCAS Beaufort, Laurel Bay Housing and Townsend Bombing Range (TBR), Georgia. Chapters 1 through 6 and appendix A-I are applicable to MCAS Beaufort and Laurel Bay Housing unless specified otherwise. Hunting regulations for TBR are addressed in Chapter 7 and appendix J-P.

2. Enforcement of Regulations. The Chief Game Warden and the Provost Marshall's Office (PMO) will enforce hunting, fishing, and boating regulations and manage the issuance of hunting and fishing permits. Violator's base permits/game permits will be confiscated and privileges suspended until the case is resolved. The Chief Game Warden and PMO will review each violation and make recommendations to the Logistics Officer on a course of action (Appendix A).

3. Personnel Authorized to Hunt, Fish and Boat Aboard the Air Station and Laurel Bay. The following categories of personnel specified in this paragraph are authorized to hunt, fish or boat within the boundaries of this Air Station. Persons under the age of 16 must be accompanied by a licensed adult who is authorized by this paragraph to hunt, fish or boat. All requests for exceptions will be submitted in writing to the Chief Game Warden for approval. Authorized personnel include:

a. Active duty and retired military personnel and their dependents.

b. Civilian government and retired employees and their dependents.

c. Sponsored guests of personnel authorized to hunt, fish or boat, who are 16 years of age or older. The civilian government employee and the active duty or retired military member is responsible for the conduct of their guest(s) at all times. Sponsored guests must have a safety brief conducted by the Chief Game Warden prior to hunting aboard the Air Station.

d. Sponsored civilians will be limited to organized MCAS Sportsman Club hunts (large or small game) within MCAS areas.

4. Licensing

a. All persons, 16 years of age and older, hunting aboard MCAS Beaufort will carry a MCAS Hunting Permit, a valid South Carolina Hunting License and have attended the hunter's safety brief given by the Chief Game Warden or other individuals designated in writing by the Chief Game Warden.

b. All persons, 16 years of age or older, fishing in freshwater aboard MCAS Beaufort will have in their possession a MCAS Fishing Permit and a South Carolina Freshwater Fishing License. Temporary permits are available from the Chief Game Warden or at the Provost Marshal's Office (state fishing license or temporary license required).

c. All persons under 16 years of age must attend the hunter's safety brief and be accompanied by a licensed parent or Guardian to hunt. To fish in freshwater, persons under 16 years of age must be accompanied by a licensed adult 18 years of age or older. No state hunting/fishing license or base permit is needed if under 16 years of age.

d. The MCAS hunting/fishing permits will be valid until 30 June of each year. All permits will be requested utilizing Appendix B. All hunting/fishing permits are free to authorized personnel. Annual fishing permits can be obtained from the Chief Game Warden. Temporary fishing permits are available from the Chief Game Warden or the PMO Desk Sergeant. Hunting permits can only be obtained from the Chief Game Warden.

e. Prior to the issue of a permit to hunt/fish, the applicant will present applicable state licenses and appropriate identification.

f. Civilian and military dependent applicants will execute a Certificate of Release of the Government (Appendix C) releasing the government from all responsibility in case of accident or injury while hunting, fishing or boating. The completed certificate will be retained on file by the Chief Game Warden.

g. The applicant will certify familiarity with applicable current federal, state, and Air Station regulations and execute the Certificate of Understanding (Appendix D) attesting to same.

h. The applicant will present evidence of having attended a hunter's safety brief sponsored by the Chief Game Warden, during the current hunting season. There are no exceptions to this requirement. The safety lecture will be conducted at the Sportsman's Club or other location designated by the Chief Game Warden. Times and dates of the lecture will be determined during the hunting season.

i. The applicant will present evidence of having registered all firearms/weapons used for hunting in accordance with reference (e). Weapons registration is to be verified by the Chief Game Warden or individuals administering the safety brief by his/her signature on the permit application. Weapon registration must have the signature of the Pass and Identification Clerk. Only weapons used for hunting will be on the application for a permit. If at a later date a new weapon is purchased for hunting, it is the hunter's responsibility to have the weapon added to the hunting application, which is held on file by the Chief Game Warden. When a hunter borrows a weapon to hunt aboard the Air Station, they must possess a letter from the owner stating that the weapon is borrowed and must have a copy of the weapon's registration. The letter must also include the weapon owner's contact information.

j. Persons convicted of or against whom official administrative action has or is being taken for offense(s) involving use of drugs or Driving Under the Influence of intoxicating liquor or drugs will have all hunting privileges revoked. Privileges will not be reinstated unless installation drug/alcohol treatment/rehabilitation authorities consider the individual sufficiently rehabilitated and no longer a safety risk. If a person is PNG (Persona non grata) from base they are not authorized to hunt aboard the installation.

5. General Weapons/Firearms Regulations and Safety Precautions

a. Hunting aboard MCAS Beaufort is limited to shotguns of ten gauge or smaller bore, or archery. The use of .410 gauge shotguns for deer hunting is prohibited. The use of any other hunting means such as rifles, black powder guns, crossbows, nets, snares, or bait poisons is strictly prohibited.

b. Shotgun slugs will not be used due to safety because of the size of MCAS Beaufort and the close proximity of military family housing. Buck shot, number 3, up to and including number 000, will be used for deer hunting. Any device which makes a solid mass of shot in flight is prohibited. This restriction is not intended to restrict the use of choke devices on shotgun barrels.

c. No devices to muffle or minimize the report will be attached to a weapon or carried at any time.

d. Hunters will wear patches of international orange colored material, not less than one square foot in size, on both the front and rear portions of the upper body at all times.

e. All hunters shall strictly observe safety precautions in the use of shotguns and archery. Also, hunters should be aware of the noise hazards of firing a weapon.

f. All personal firearms/weapons used, possessed, or introduced aboard MCAS Beaufort or Laurel Bay Housing area will be registered with the MCAS Provost Marshal's Office. All persons will possess the appropriate registration card when using or transporting any firearm/weapon aboard MCAS Beaufort or Laurel Bay.

g. All personal firearms and weapons will be transported in the trunk of a vehicle, or bed of a truck, when not contained within a proper firearm/weapon case. All personal firearms and weapons will be transported unloaded with the action open. Ammunition will be separated from weapons. Under no circumstances will a firearm or weapon be transported or stored underneath a seat of a vehicle. The transportation of a firearm or weapon in a window rack as to be openly visible from outside the vehicle is prohibited.

h. Hunting/fishing knives and like instruments may be carried openly by a hunter while he is proceeding to the hunting/fishing area, while engaged in the sport and returning to quarters. Hunting/ fishing knives will not be routinely stored within a vehicle being operated aboard MCAS Beaufort.

6. Control and Treatment of Pets and Wildlife. Dogs which have attained the age of three months must be registered and have received the rabies inoculation as required by South Carolina law. A quarterly review by a licensed veterinarian will be turned into PMO, and a heartworm vaccination is strongly recommended. This applies to all dogs utilized for hunting aboard the Air Station. All dogs used for hunting aboard MCAS Beaufort will either be leashed at all times or will be outfitted with electronic tracking collars. In the event of Hurricane Condition II, the Sportsman's Club will be responsible for relocating the hunting dogs to a safe haven off MCAS Beaufort.

7. Miscellaneous

a. DO NOT FEED, molest or trap wildlife. Baiting for deer hunting is only permitted in areas 1A, 2, 4, 5, 6, 9, and 11 with approval from the Chief Game Warden. Feeding or trapping of wildlife aboard MCAS Beaufort or Laurel Bay Housing area is prohibited, except by persons designated by the Commanding Officer while in the performance of their assigned duties.

b. The trapping, feeding, killing or molesting of alligators is prohibited by law.

c. The killing or molesting of any non-game bird, e.g., eagles, ospreys, owls, hawks, or non-game wading bird, such as song birds, cardinals, and mockingbirds is prohibited and is a violation of federal law.

d. ONLY PORTABLE TREE STANDS ARE AUTHORIZED and must be removed at the conclusion of the day's hunt. Tree stands may be placed the evening or day before a hunt at the hunter's own risk. All personnel in a tree stand are required to use a safety strap. Unauthorized tree stands will be reported immediately to the Chief Game Warden for removal.

e. All illegally/accidentally-killed game (collision with motor vehicle, aircraft accident, poaching, etc.) will be immediately turned over to the Chief Game Warden. The Chief Game Warden will be notified directly or via the Military Police Desk Sergeant. In those instances where deer are inadvertently killed as the result of collision with a motor vehicle, the owner of the private vehicle may request that the deer be given to him for his personal use. The disposition of all deer or other game killed illegally or accidentally will be determined by the Chief Game Warden.

f. All night hunting for small game (example; raccoon hunting) will be approved by the Chief Game Warden and PMO.

g. The shining of hand-held or vehicle mounted lights or spotlights upon deer or other game during the hours of darkness for hunting, observing or harassing purposes is prohibited.

h. DO NOT LITTER. Hunters will pick up expended ammo casings.

i. Four wheeling/off-road driving by any type of motor vehicle is prohibited. All vehicles must be parked within 20 feet of perimeter road. No one will drive off an asphalt road or in a marked food plot at any time.

j. Area Use by Non-Hunters. Any person(s), unit, club, etc., desiring to use a designated hunting area or unassigned area is required to coordinate their request through the Chief Game Warden and PMO three (3) working days prior to the date requested. Requests for area use will be submitted in the form of a written request to the Chief Game Warden and PMO for specific areas to be used. The request will contain area to be reserved, points of contact and phone numbers. Mission essential use of an area will be considered a priority. Area #2 is used for training by the Corporal's School. Area #4 is used by MCCS paintball range. Hunters need to be aware of this, and that possible confrontations could occur if either party fails to properly sign in for these areas.

k. Hunters who checkout to go hunting an hour before daybreak must return the hunting-area pass and/or doe pass to PMO prior to reporting to their work section for duty. The hunter will not take the area pass or doe pass to his/her work section or keep it all day. In the same respect, no hunter will keep an area pass or doe pass overnight in order to hunt in the morning.

l. Non-sponsored civilian MCAS Sportsman's club members do not have exclusive rights to hunt aboard the Air Station

CHAPTER 2

CONSERVATION LAW ENFORCEMENT PROGRAM

1. Conservation Law Enforcement Program

a. The Natural Resources and Environmental Affairs Office (NREAO) shall supervise the Conservation Law Enforcement Program.

b. MCO 5090.4 establishes the policy and direction for the administration of the Conservation Law Enforcement Program on Marine Corps installations.

c. The Conservation Law Enforcement Program shall consist of a Chief Game Warden who will be selected in accordance with MCO 5090.4 and must maintain the standards set forth in that MCO. The Chief Game Warden will be a civilian employee.

d. The Chief Game Warden shall be assisted in the performance of his law enforcement duties by such other persons as may be approved by the PMO. These individuals will be referred to as Deputy Game Wardens, and shall be nominated by the PMO and approved by the Chief Game Warden and the Commanding Officer. Deputy Game Wardens shall be active duty personnel assigned to PMO and shall be selected on the basis of interest, maturity, and integrity.

e. The Chief Game Warden shall be assisted in the performance of his non-law enforcement duties by such other persons as may be approved by NREAO. These individuals will be referred to as Volunteer Game Wardens and can be active duty, retired, or civilian personnel. Volunteer Game Wardens shall be selected on the basis of interest, maturity, and integrity.

f. All personnel acting in the capacity of Deputy or Volunteer Game Warden will be thoroughly familiar with the provisions of references (a), (c), and (e), federal hunting regulations, and the contents of this Order. Deputy and Volunteer Game Wardens, while in performance of their duties, will come under the direct control of the Chief Game Warden. The duties as Deputy or Volunteer Game Warden will at no time conflict with normal work duties.

CHAPTER 3

HUNTING (INDIVIDUAL)

1. Individual Hunters. Each hunter must obtain a hunting area clearance by personally appearing before the Duty Game Warden/PMO Desk Sergeant. Hunters must adhere to check-out/check-in procedures as dictated by this Order. Hunters may check-out to a hunting area no earlier than one hour prior to sunrise and must check in from the hunting area no later than one hour after sunset. Individual hunters may check-out to only ONE area at a time and area changes will be accomplished only by personal appearance at the PMO Desk Sergeant's post. Dogs may be used for small game hunting. Individual hunters may not hunt areas where organized hunts are scheduled until after the organized hunt has been secured. Hunting areas and secondary roads leading to such areas are off-limits to privately owned vehicle traffic unless retrieving deer, which have already been located. Driving in a food plot or any off-road area is prohibited.

2. Hunting Areas. Individual hunting for all legal game is authorized in all hunting areas except Area 4. Area 5 is available for individual bow hunting during weekdays (excluding holidays) only. Areas 3, 7, 8, and 12 will be restricted during air operations when safety becomes a consideration. Area 2 will be restricted when in use by the Corporal's School. Hunting is prohibited within 200 yards of any inhabited area and the Air Station Ordnance bunker areas. Hunters will not enter any area in which troops are training. Shooting across perimeter road, aircraft runways, and aircraft parking ramps or taxiways is prohibited. Hunters shall not discharge weapons towards an inhabited area, runway or perimeter road, if within 200 yards of same. Hunters may not hunt closer than 100 feet to any active runway/taxiway/perimeter road. Organized hunts may request an exception for active paved roadways on a case-by-case basis. The Commanding Officer may from time-to-time authorize special hunts in other areas of MCAS Beaufort.

3. Archery Hunting

a. Archery hunting will be in accordance with reference (a) and the provisions of this Order.

b. All license and identification requirements applicable to other types of hunting apply to archery hunting.

c. Hunting with a bow and arrow for all legal game is permitted during the regular hunting season in all approved hunting areas.

d. The minimum head width of arrows and rated pull will be in accordance with reference (a).

e. Poison, explosive, or barbed arrows are prohibited. A barbed arrow is defined as an arrow, which has points or barbs protruding in such a manner as to prevent the arrow from being removed from the point of penetration without tearing the flesh of the bird or animal.

f. All arrows used for hunting on MCAS Beaufort will have the name of the owner clearly labeled on the shaft of the arrow.

g. The "flu-flu" type arrow will be used for elevated shots. These arrows are the same as those used in bird or squirrel hunting.

h. The use of crossbows is prohibited.

i. Individuals engaged in archery hunting are prohibited from using or carrying firearms.

j. Areas 1A, and 9 are reserved for archery hunting only.

k. Area 4 is reserved for organized hunts only.

l. Area 5 is reserved for organized hunts only on weekends and holidays. It is available for archery hunting only on all other days.

4. Seasons And Limits

a. Open seasons and bag limits are established by reference (a) and applicable Federal regulations.

b. The issuance of "doe tags" will be the responsibility of the Duty Game Warden/PMO.

c. Bear, duck, and turkey WILL NOT be hunted.

5. Deer Hunting

a. Hunting deer is authorized only during the regular deer hunting season as established by the state wildlife department.

b. Deer may only be taken during organized hunts or by individual gun and archery hunting, subject to the following special regulations:

(1) Only male deer with plainly visible two inch antlers may be taken unless the hunter has been issued a "doe tag."

(2) Spotted deer (fawns) will not be harvested.

(3) No one shall, at any time, take any deer while it is in the water. Also, deer will not be taken while a hunter is in a boat.

(4) No deer taken will be field dressed. A disposal site, located at the Sportsman's Club, is available to all hunters for deer harvested at MCAS. Rules regarding use of the site are posted at the Club and must be followed in order to use it. Failure to follow the rules will result in the site being closed and possible administrative action. All deer taken on MCAS must have the weight and sex recorded prior to being cleaned. One-half of each deer lower jaw bone will be removed and turned in to the Chief Game Warden for storage and later released to the South Carolina State Biologist's Office

at the conclusion of the hunting season. At such times as state game biologists are working with Air Station officials, hunters may be required to surrender parts of the deer for scientific study.

6. Harvest Report. All individual hunters or the Hunt master will initiate the Harvest Report (Appendix F) when checking in with the Duty Game Warden/PMO Desk Sergeant after concluding the hunt for the day. Harvest reports will be completed when game is taken.

CHAPTER 4

HUNTING (ORGANIZED)

1. Organized Hunts

a. Organized hunting is authorized in all areas except area 1A, with the approval of the Chief Game Warden. Area 4 is reserved for organized hunts only. Area 5 is reserved for organized hunts during weekends and holidays only. Bow hunting is authorized in Area 5 during non-holiday weekdays.

b. During organized hunts, hunters are to be placed on designated stands near roadways/paths routinely used by pedestrians. The Hunt Master will ensure the following safety precautions are accomplished:

(1) Prior to the commencement of the hunt, a sign not less than 24 inches by 18 inches, with a red background and white lettering not less than two inches in height stating: "CAUTION DEER HUNT IN PROGRESS," will be conspicuously placed on all roads/paths approaching the area to be hunted.

(2) Prior to commencement of a hunt in area 1, a sign not less than 24 inches by 18 inches, with a red background and white lettering not less than two inches in height stating: "FISH POND SECURED FOR ORGANIZED DEER HUNT BY ORDER OF THE COMMANDING OFFICER (ASO P1700.2)," will be conspicuously placed at the entrance to Round Island Pond. Scout Pond will not be secured from fishing due to the facilities belonging to MWR.

(3) Immediately upon termination of the hunt, the hunt signs will be removed from the roads/paths.

(4) In the event that an intruder is observed, the first hunter observing the intruder will, by voice command, secure the hunt. Intruders, regardless of grade, should be fully identified and referred to the Chief Game Warden for violation of this Manual.

a. Hunting in any area or place other than described above is prohibited. The Commanding Officer may from time to time authorize special hunts in other areas of MCAS Beaufort.

(1) According to NAVSEA OP-5 (p.2-6, para 2.1 6.3b), all hunters in areas 2 and 3 will not venture beyond a 200 yard inboard boundary surrounding the Air Station Ordnance and Missile Facility. As a caution, these areas are prominently marked with yellow paint on the outboard side of trees.

(2) The sounding of a vehicle horn or PA system will be used to contact hunters in an area. Once heard, hunters must leave the hunting area and go to the Hunt Master, Game Warden or PMO representative for instructions.

b. All organized hunts will be managed and controlled by a designated Hunt Master. Designated Hunt Masters will be responsible for the organization, proper conduct and safety of the hunt and will be guided in the

performance of their duties by the special orders for Hunt Masters contained in Appendix G.

c. Organized hunts may be conducted each Saturday, Sunday and holiday during the regular hunting season, subject to the written approval of the Chief Game Warden. Hunt requests will be submitted no later than 0900, on the Wednesday prior to the hunt. Special organized hunts may be conducted during the week upon approval of the Chief Game Warden and the Commanding Officer.

d. When organized hunts are conducted in a particular hunting area, only those persons participating as Hunt Masters or Game Wardens in the performance of their duties will be allowed to use secondary dirt roads in the hunting area. All other open hunting areas will be available for individual hunting for all legal game.

e. Organized hunters will comply with Chapter 3, paragraphs 4, 5 and 6.

2. Small And Big Game Organized Hunts. The representative of an organized hunt will submit a written request to the Chief Game Warden for specific area(s) to be hunted. The request will contain the type of game to be hunted, time(s), date(s) and area(s) to be reserved, the names, addresses, duty and home phone numbers of the Hunt Master and Assistant Hunt Master and the approximate number of hunters expected to participate. No more than two hunting areas will be reserved for an organized hunt on any given day. Hunt Masters may check out a hunting area one hour prior to sunrise and must clear the hunting area prior to one hour after sunset, except raccoon hunts authorized by NREAO. The Hunt Master must personally check in with the Duty Game Warden/PMO Desk Sergeant and provide him a complete roster of persons attending the hunt. This roster will contain the name, social security number and Air Station hunting permit number of each hunter involved. At the conclusion of the hunt, the Hunt Master will personally check out with the Duty Game Warden or the PMO Desk Sergeant.

3. Coordinating Activities. The MCAS Sportsman's Club has agreed to and will accomplish the following:

a. The Club President and all members may be requested to assist the Provost Marshal, Chief Game Warden or Officer of the Day in coordinating and conducting searches for missing persons.

b. Coordinate with S-4/NREAO and PMO in matters pertaining to conservation of natural resources.

c. Cooperate with the S-4/NREAO to promote good wildlife management and conservation practices.

d. Individual and hunting parties will be responsible for securing dogs at the conclusion of the hunt.

CHAPTER 5

FISHING

1. Fishing. Fishing will be in accordance with the regulations contained in reference (a) and the provisions of this Order.

a. In addition, users of the fishponds will comply with the following instructions:

(1) Swimming and wading are not permitted in the fishponds.

(2) Boats less than 18 feet long may be used. Boats will be equipped with at least one oar and at least one life preserver or Coast Guard approved flotation device per occupant. Electric trolling motors may be used. Use of gasoline motors is prohibited. Boats with gas motors may be used in the ponds but the motor must be raised. Inflatable crafts, and belly boats are not authorized, due to alligators in the ponds.

(3) Live fish will not be used as bait. Possession of live fish in areas adjacent to the ponds is strictly prohibited. This helps to prevent unauthorized stocking of undesirable types of fish. This includes all fish: minnows, crappie, shiners, etc.

(4) No firearms, pellet, air guns, bows, crossbows, arrows or other dangerous weapons are permitted on or around the ponds except as authorized for organized hunts.

(5) Open fires are prohibited without written approval from the Commanding Officer. Portable grills are allowed for picnics in the immediate area of the ponds.

(6) Fishing is permitted with rods or poles only, with a limit of two rods or poles per person. Nets, seines and trot lines are prohibited.

(7) Limits per person per day:

1. All limits are subject to change at the discretion of the Chief Game Warden. Changes will be posted on boards at all station ponds and piers.

2. Bass: three per day per person, minimum length of 16 inches. Return undersize bass to water immediately.

3. Bream (Blue gill/Sunfish): Unlimited. Do not return to pond regardless of size.

4. Catfish: three per day per person, minimum length of 16 inches. Return undersize catfish to water immediately.

5. Grass Carp: Return all to pond unharmed.

(8) Night fishing at the base ponds is authorized and all participating personnel will check in and out with PMO, via phone. The night fishing period spans between half an hour after sunset and half an hour before sunrise.

b. The following regulations pertaining to size, limit, equipment and methods of taking saltwater fish, crabs and shrimp coincide with South Carolina state regulations and will be enforced throughout the Air Station. These regulations particularly apply to the areas known as the Air Station Marina, Laurel Bay Boat Ramp, Laurel Bay Pier, SAR Pond, Shady Point Picnic Area, and the pier near the Sportsman's Club. The Fuel Pier is not an authorized fishing or shrimping area.

(1) No state saltwater fishing license or stamp is required to fish from the above areas.

(2) Shrimping will be allowed only with hoop or cast nets. Baiting for shrimp within 50 yards of a fixed structure or from a fixed structure is not permitted. Properly licensed personnel are permitted to bait for shrimp from the shore or from a boat.

(3) Giggers must have a valid South Carolina Gigging License in their possession.

(4) Crab pots are limited to two pots per person and are subject to applicable South Carolina state regulations. Crabs less than five inches, measured from tip of point across the back of the shell, must be returned to the water immediately. Female crabs bearing eggs from which the egg pouch has been removed may not be kept and must be returned to the water immediately. One claw may be taken from stone crabs. All stone crabs must be immediately returned to the water so long as one claw remains.

(5) All game fish caught must be in accordance with South Carolina state regulations regarding size and limits.

(6) Catches may not be sold or bartered.

c. All personnel will adhere to safety rules while aboard MCAS Beaufort and at Laurel Bay Pier, boat ramps and docks. All children ages 12 and under are required to wear life jackets while on or near the Laurel Bay Pier and all boat ramps, docks, and will be under parental supervision.

CHAPTER 6

BOATING

1. Boating

a. All boating in the waters under the jurisdiction of the Commanding Officer will be in accordance with reference (b).

b. Person(s) are considered to be boating when operating boats in any waters under the jurisdiction of the Commanding Officer, to include the use of launching and docking facilities and/or the use of any land or excursion there from.

c. South Carolina has adopted the U.S. Coast Guard navigation rules concerning boating safety.

d. All boaters are encouraged to take a boating safety course sponsored by the U.S. Coast Guard Auxiliary.

2. Registration Of Boats. Without exception, all vessels with propulsion machinery installed or attached must be registered. Vessels having valid registrations from other states may use South Carolina waters for 90 consecutive days before they are required to have South Carolina registration.

3. Equipment Requirement For Boats

a. Under 16 feet:

(1) Coast Guard approved personal flotation device (PFD), type 1, 2, 3 or 5 for each person aboard with proper fit and serviceability.

(2) Valid South Carolina registration or see paragraph 2 of this chapter.

(3) Navigation lights between sunset and sunrise.

(4) Horn or whistle.

(5) If equipped with enclosed fuel tanks or inboard engine, must have one fire extinguisher and ventilation system.

b. 16 feet or greater, but under 26 feet:

(1) Valid South Carolina registration.

(2) Wearable Coast Guard approved PFD for each person, type 1, 2, 3, or 5. Type 5 PFDs may not be substituted on children weighing less than 90lbs.

(3) One Coast Guard type 4 (throwable) PFD onboard.

(4) Navigation lights between sunset and sunrise.

(5) Horn or whistle.

(6) If equipped with enclosed fuel tanks or inboard engine, must have one fire extinguisher and ventilation system.

c. 26 feet but under 65 feet, see reference (b).

4. Types of Personal Flotation Devices

a. Classification

(1) Type 1 PFD's (off-shore devices) have the most buoyancy and are designed to turn most unconscious persons in the face down positions to vertical or slightly backward positions. The type 1 device provides the greatest protection to its wearer and is the most effective PFD.

(2) Type 2 PFD's (near-shore devices) are wearable devices designed to turn some persons to vertical or slightly backward positions in the water. The turning action is not as pronounced as that of the type 1.

(3) Type 3 PFD's (flotation aids) are wearable devices designed to keep conscious persons floating in vertical or slightly backward positions with their heads above water. The type 3 PFD has little or no turning ability and may not turn an unconscious person upright in the water.

(4) Type 4 PFD's (throwable devices) is a device designed to be thrown to a person in the water and grasped and held by the user until rescued. IT IS NOT DESIGNED TO BE WORN.

(5) Type 5 PFD's (special use devices) are designed for use only when engaged in the activities specified on their labels.

b. To be acceptable, every flotation device must meet the following conditions:

(1) Be U.S. Coast Guard approved.

(2) Be of an appropriate size for the intended wearer (except type 4).

(3) Be in serviceable condition.

(4) Wearable PFD's must be readily accessible. Throwable devices must be immediately available.

(5) Type 5 PFD's must be used according to the instructions.

c. Legal requirements for PFD's

(6) A boat 16 feet or longer in length must be equipped with one type 1, 2, 3, or 5 (wearable) PFD for each person in the boat in addition to one type 4 (throwable) PFD in case someone falls overboard.

(7) A boat less then 16 feet in length or any canoe or kayak must be equipped with one type 1, 2, 3, or 5 PFD for each person on board. Children under 12 years of age are required to wear a Type 1, 2, 3, or 5 PFD. The PFD must be fastened and of the proper size for the child.

(8) Each person riding on a personal watercraft or being towed behind a vessel must wear a US Coast Guard approved Type 1, 2, 3, or 5 PFD.

5. Safety Tips

a. Before leaving:

(1) Tell someone where you are going and when you expect to return.

(2) Check the weather forecast.

(3) Ventilate engine compartment before starting engine.

(4) Ensure your boat has all required safety equipment.

b. Persons aboard:

(1) Do not overload.

(2) Avoid horseplay.

(3) Have PFD's readily available for everyone.

(4) Small children, non-swimmers and handicapped persons should always wear PFD's when boating.

(5) Remain seated in small boats.

c. While underway:

(1) Know and obey the navigation rules.

(2) Keep a proper lookout.

(3) Proceed at a slow speed in harbors and confined areas.

(4) Avoid excessive speeds.

(5) Watch your wake; you are responsible for any injury or damage caused by your wake.

(6) In rough waters, stay low in the boat and meet waves head-on or at a slight angle.

(7) Pass red buoys on your right when traveling upstream or when heading south on the intercoastal waterway.

(8) Tying to buoys or anchoring in channels is forbidden.

(9) Carry tools for minor repairs.

d. Weather:

(1) Observe cloud formations.

(2) Play it safe and head for shore if the wind increases.

e. NOAA weather service radio frequencies are:

(1) WX-1: 162.55 MHz

(2) WX-2: 162.400 MHz

(3) WX-3: 162.475 MHz

CHAPTER 7

HUNTING, TOWNSEND BOMBING RANGE, GEORGIA

1. General. TBR is under the jurisdiction of the Commanding Officer, MCAS Beaufort. This document provides guidance on the implementation of the hunting program at TBR. It applies to all hunters at TBR. All state and federal game laws will be enforced at TBR by the MCAS Beaufort Chief Game Warden, Georgia Department of Natural Resources (GADNR), and other personnel having enforcement authority. Any person entering onto TBR must obey all laws, rules, regulations, schedules, permits, or other written or oral directives issued by the Commanding Officer, MCAS Beaufort. Failure to comply with this written instruction will result in forfeiture of future privileges and written notification being sent to the appropriate authorities. All disciplinary action for a violation will be based on the appropriate local, state, or federal laws. Military personnel assigned to TBR will be responsible for the overall execution of the TBR Hunting Program and will be referred to as Hunt Managers. All activities and instructions in this document are subject to change without notice in order to support the military training mission.

a. Only hunting from an elevated (minimum 10' high) tree stand is permitted under strict supervision of professional wildlife management by county, state, and federal personnel. Public hunting is permitted in areas not contained within military training areas (impact zone, target sites, endangered species primary zones, etc.). The Chief Hunt Manager will not be allowed to hunt during scheduled public hunts, but may accrue one hour of hunt time for every hour spent on duty as Chief Hunt Manager as approved by the TBR Range Control Officer (RCO). Assistant Hunt Managers can also accrue one hour of hunt time for every hour spent on duty as an Assistant Hunt Manager. The RCO must approve hunting areas before hunting is allowed. Shotgun (slugs only - buckshot is prohibited), muzzleloader, rifles (.22-cal. or larger centerfires with expanding bullets), and archery hunting is permitted on the dates established and authorized by the RCO. All other weapons are prohibited.

b. Final approval for specific hunting dates for all seasons will be set through coordination between TBR natural resources personnel and the RCO. The seasons will fall within the dates established by the GADNR. All hunts are subject to change or cancellation at any time.

c. The frequency of hunts will be determined by the RCO in coordination with natural resource personnel.

d. Proposed hunting dates and application procedures will be published in the local county newspaper prior to each seasonal drawing.

e. Permit applications will be made available prior to the hunting season. Applications will be received until a specified published date prior to each seasonal drawing.

f. Applications will be randomly drawn for approved hunt areas. This system will allow an adult and one guest (who may be a minor child) to hunt the same area. Guest information will be disclosed on the permit application. Applications with names (either hunter or guest) showing-up twice on different applications will be disqualified and may be excluded from

future hunts for two (2) years. False information will disqualify an applicant and guest for two (2) years. Additional applications will be drawn for alternate hunt permits in case of a no-show.

g. Once drawn, the applicants will be notified and given specific hunting instructions. If an applicant is not drawn after two consecutive seasons of applying to hunt, that applicant will be automatically given priority to hunt the third (3rd) consecutive season based on available space and will be given specific written hunting regulations and instructions.

h. Hunting permits will be issued to successful applicants at no cost. Permits will be issued for deer only; however, wild hogs and coyotes may be harvested according to GADNR regulations.

i. Hunters are encouraged to participate in the "Hunters for the Hungry Program."

2. Responsibilities

a. Military personnel assigned to TBR will be responsible for the overall execution of the TBR Hunting Program and will be referred to as Hunt Managers.

b. In order to avoid conflicts with the military training mission, hunting dates for the season will be set by the RCO and fully coordinated with TBR Natural Resources Personnel.

c. The Commanding Officer, MCAS Beaufort is responsible for establishing TBR hunting regulations. The MCAS Beaufort Game Warden, GADNR and other federal wildlife law enforcement officers may enforce laws and instructions. All activities and instructions in this document are subject to change based on the current military training mission.

d. The Chief Hunt Manager will:

(1) Conduct hunt drawings to include registering all hunters, issuing hunt and vehicle permits.

(2) Ensure that every hunter completes an emergency data card and signs a "hold harmless agreement."

(3) Record alleged violations of this policy and forward alleged violations along with the report to the MCAS Game Warden and the RCO for appropriate action.

(4) Contact law enforcement personnel as necessary to enforce state and federal game laws. All citations will only be written by the MCAS Beaufort Game Warden, GADNR, and/or other federal wildlife law enforcement officers. These officers will be called to TBR as needed and available.

(5) Check hunters in and out and open and close range security gates as needed or specified by this document.

(6) Be available at range control at all times during an approved hunt in order to support hunter emergencies and other needs.

(7) Receive special instructions from the RCO as necessary.

(8) Check sign-in/out register prior to terminating the hunt to ensure everyone has returned safely from hunting.

(9) Conduct range safety briefings for all hunters.

e. TBR Hunt Managers, the Chief Game Warden, and/or MCAS Beaufort natural resources personnel will conduct threatened and endangered species briefings for all hunters as well as any other relevant natural resources issues.

3. Policy

a. Safety of individuals, protection of property, security and resource-based management are the primary concerns at TBR. Therefore, this policy must be complied with in every aspect to have a safe hunting program.

b. Permits will be issued by TBR or its authorized representative. Any person may submit a permit application to hunt at TBR provided that they are 21 years of age or older, possess a valid GADNR Hunting License to include a big game permit if applicable, have an acceptable hunter safety course certificate, have no prior GADNR violations, and have accomplished all other requirements within this document. Eligible hunters may bring a guest; the guest must meet all requirements for hunting as stated in the current "Georgia Hunting Seasons & Regulations" to include an approved hunter safety course. The eligible hunter assumes total responsibility of their guest. Guests must adhere to all requirements in this document. An under-aged guest (less than 21 years old) must stay within sight and voice contact and no more than 100 yards away from the eligible hunter. Guests carrying a weapon must have an acceptable hunter safety course certificate. All hunters and guest will comply with the instructions given by the Chief Game Warden and the Chief Hunt Manager at all times.

c. The killing of animals not authorized in this document or the destruction of plants will not be tolerated. Violators will be prosecuted to the fullest extent of the law.

d. Individuals hunting will be issued a parking permit. The parking permit will be placed inside of the windshield so that it may be read from outside the vehicle.

e. Individuals desiring to hunt at TBR must complete an application package to include a "hold harmless agreement."

f. The season limit on deer will follow Georgia State Law with exceptions as stated next: one of the two antlered deer must have a minimum of 4 points, one inch or larger, on one side of the antlers with the exceptions being that the other antlered deer must have a minimum of 3 points on one side of the antlers and only one deer per hunter taken per day. Killing of fawns (spotted deer) is prohibited. In order to ensure that deer are being properly managed, at least one jawbone will be extracted for GADNR analysis. Hunters will also properly record the killas stated in he current "Georgia Hunting Seasons & Regulations."

g. All hunting will be done from an elevated (minimum 10′ high) stand furnished by the hunter. Stalking is not permitted.

h. In the event that a hunter is mobility-impaired, the hunter may hunt from a ground blind.

i. Hunters must wear at least 500 square inches of hunter orange as an outer garment above the waist at all times. In addition, a hunter orange hat must be worn to and from the stand.

j. Hunters will not drive spikes, nails, screws or any other device into trees for any reason. Climbing tree stands must be designed not to cut into or damage tree bark. Climbing tree stands will be approved by Natural Resources Personnel before climbing any tree. All stands will be securely fastened to a tree. Additionally, hunters will be securely fastened to the stand and/or tree with an approved manufactured hunter safety harness.

k. Hunters are not permitted to carry handguns at any time on TBR.

l. Hunters will sign-in/out and enter/exit TBR only at the range gate located on Georgia Highway 57.

m. Hunt dates and sign-in/out times will be set prior to each season to correspond with state hunting seasons and military training needs. After the daily sign-in time the gate will be locked until the daily sign-out time. Late arrivals may not be allowed to hunt for that day. In case of an emergency or a need to leave such as to process an early kill, hunters must contact the Chief Hunt Manager at the check station in order to exit outside of that days prescribed exit time. All daily hunting will commence and cease according to the current "Georgia Hunting Seasons and Regulations," and all hunters will report back to the check station no later than one hour after official sunset.

n. While hunting, hunters must remain within the assigned hunting area. Before proceeding into another hunt area to recover game, hunters will contact TBR personnel to verify that no other hunters are present, or scheduled to be in the area you intend to enter. Use common sense and courtesy when searching for downed deer or hogs.

o. All weapons will remain unloaded with actions open until the hunter is secured on the stand.

p. Hunters will be allowed time to scout and set stands prior to the hunt as determined by the RCO. Once stands are set in place, hunters must annotate the locations on a map provide by TBR.

q. Hunters will check deer and hogs at the designated TBR check station. The Chief Hunt Manager will collect physiological data such as weights, ages, sex, jawbone extraction, and antler dimensions.

r. All empty shells and/or litter will be removed from the stand area.

s. No field dressing deer or hogs. Persons handling wild hogs will use gloves due to the possible transmission of diseases. All animals taken must be transported to the game check station for biological data collection.

t. Absolutely no baiting, feeding, and/or trapping any wildlife.

u. Hunter all terrain vehicle (ATV) use on TBR is prohibited.

v. Use of alcohol and/or illegal drugs is prohibited.

w. Hunters must have in their possession during the hunt a flashlight, compass or Geographic Position System (GPS), and a whistle. A cellular telephone is encouraged but is optional.

4. Hunting Penalities

Offense	Citation
Firing a weapon indiscriminately endangering personal life	Withdraw privileges permanently
Permitting another to use hunting license or permit	Withdraw privileges permanently, notifying DNR
Killing, transporting, or possessing game taken illegally	Withdraw privileges permanently, notifying DNR
Unauthorized hunting at night	Withdraw privileges permanently, notifying DNR
Hunting out of	Withdraw privileges season permanently, notifying DNR
Shooting from vehicle	Withdraw privileges permanently, notifying DNR
Unauthorized use, carrying or transporting of weapon	Withdraw privileges permanently
Unauthorized use of dogs	Withdraw privileges permanently
Hunting without required licenses & permit in possession	Withdraw privileges to 2 years, notifying DNR
Hunting or scouting in a closed or unassigned area	Withdraw privileges for 1 year
Other violations of state, federal, or installations regulation covered in this policy	Withdraw privileges permanently, notifying DNR
Failure to sign out or in before or after hunting	Withdraw privileges for the season
Selling, offering to sell, or buying game taken from TBR	Withdraw privileges permanently, notifying DNR
Use of alcoholic beverage or under influence of alcohol or drugs while hunting	Withdraw privileges permanently

Offense	Citation
Use of traps, snares, nets or any other devices to catch game	Withdraw privileges permanently
Failure to check in deer taken on TBR for biological data collection	Withdraw privileges permanently, notifying DNR
Taking any game animal not specifically authorized in this policy	Withdraw privileges permanently and prosecuting to fullest extend of the law
Failure to display parking permit for the season	Withdraw privileges
Failure to update application current information	Withdraw privileges with for the season
Failure to show for a permitted hunt without a five day notification	Disqualified from applying for future hunts for 2 years
Taking spotted deer (fawns)	Withdraw privileges permanently

APPENDIX A

VIOLATION CODES (MCAS)

1. ENFORCEMENT PROCEDURES. Violators will have all hunting and fishing privileges suspended aboard MCAS Beaufort and the Laurel Bay Housing Area until the cited violations have been adjudicated.

a. Referral to State or Federal Law Enforcement Authorities. In cases where administrative sanctions do not adequately address the serious nature of the misconduct, violations may be reported to State and Federal law enforcement authorities for possible criminal prosecution in State or Federal court. It will be at the discretion of the Chief or Deputy Game Warden as whether to make an arrest or to address a violation administratively.

b. Other. Hunting/Fishing violations committed by civilians or guests not affiliated with MCAS Beaufort will be cited by means of a DD Form 1805 violation notice. Violators may have to appear in Federal Magistrate Court and/or forfeit a collateral amount of money. Violations of State and Federal regulations relating to hunting and fishing occurring on MCAS Beaufort or the Laurel Bay Housing Area will be acted upon by the Logistics Officer as follows:

CODE	VIOLATION	FIRST OFFENSE	SECOND OFFENSE	THIRD OFFENSE
(1)	Taking threatened or endangered species	Revoke		
(2)	Taking protected birds or animals	Revoke		
(3)	Taking deer with aid of artificial light	Revoke		
(4)	Taking wild turkey	Revoke		
(5)	Taking wild birds by placement of salt, grain, fruit or other food (baiting for game)	Revoke		
(6)	Hunting out of season	Revoke		
(7)	Unlawfully taking birds or animals by the use of traps, nets, snares or other prohibited device	Revoke		
(8)	Hunting while under the influence of any intoxicating beverage or narcotic drug	Revoke		

CODE	VIOLATION	FIRST OFFENSE	SECOND OFFENSE	THIRD OFFENSE
(9)	Hunting while under suspension for violation of any hunting regulation	Revoke		
(10)	Unlawfully buying, selling bartering, or offering to sell game	Revoke		
(11)	Shooting signs or other government property	Revoke		
(12)	Hunting without state hunting license/big game permit	Revoke		
(13)	Hunting without obtaining an Air Station hunting permit	Revoke		
(14)	Unauthorized taking of fish with drugs, chemicals, or poisoned bait	Revoke		
(15)	Taking fish with explosives	Revoke		
(16)	Taking of freshwater game fish with nets or traps	Revoke		
(17)	Introducing any species of exotic fish into Air Station ponds	Revoke		
(18)	Deliberately introducing any physical or chemical pollutant into any Air Station pond	Revoke		
(19)	Buying or selling gamefish	Revoke		
(20)	Firing any firearm into or near Air Station ponds	Revoke		
(21)	Possessing or transporting loaded firearms in vehicle	Suspend 6 months	Revoke	
(22)	Hunting in closed or unauthorized areas	Suspend 6 months	Revoke	

CODE	VIOLATION	FIRST OFFENSE	SECOND OFFENSE	THIRD OFFENSE
(23)	Littering	Suspend 6 months	Revoke	
(24)	Failure to check-out area pass prior to hunting	Suspend 6 months	Revoke	
(25)	Taking animals by placement of salt, grain, fruit, etc. baiting for game)	Suspend 6 months	Revoke	
(26)	Baiting for shrimp	Suspend 6 months	Revoke	
(27)	Fishing without state freshwater fishing license	Suspend 3 months	Revoke	
(28)	Failure to wear international orange	Suspend 3 months	Suspend 6 months	Revoke
(29)	Failure to check in area pass one hour after sunset	Suspend 3 months	Suspend 6 months	Revoke
(30)	Exceeding the daily possession limit	Suspend 3 months	Suspend 6 months	Revoke
(31)	Fishing with live bait (excluding worms, crickets, mudpuppies, etc..)	Suspend 3 months	Suspend 6 months	Revoke
(32)	Taking freshwater game with spears, harpoons, gigs or bow and arrow	Suspend 3 months	Suspend 6 months	Revoke
(33)	Possession of undersize fish or crabs (salt or freshwater)	Suspend 3 months	Suspend 6 months	Revoke
(34)	Exceeding catch limit on fish 3 months (salt or freshwater)	Suspend 6 months	Suspend	Revoke
(35)	Violation of any other fishing regulations not	Suspend 3 months	Suspend 6 months	Revoke
(36)	Violation of any other hunting regulation of this Order not specifically listed above	Suspend 3 months	Suspend 6 months	Revoke

CODE	VIOLATION	FIRST OFFENSE	SECOND OFFENSE	THIRD OFFENSE
(37)	Fishing without proper Air Station fishing permit	Suspend 1 month	Suspend 3 months	Revoke
(38)	Fishing with trout lines or set hooks in freshwater	Suspend 1 month	Suspend 3 months	Revoke
(39)	Grabbing for game fish	Suspend 1 month	Suspend 3 months	
(40)	Driving in an Unauthorized Area: i.e. Food Plot, Marsh, or any off Road Area.	Traffic Court	Traffic Court	

APENDIX B

APPLICATION FOR HUNTING/FISHING PERMIT

THIS APPLICATION IS FOR (Check One):

**HUNTING ___ FISHING ___ **COMBO ___ MCAS PERMIT# _____

NAME: _____ SC LIC#: _____

RANK/GRADE/CIV: _____ SSN: _____ UNIT/SPONSOR: _____

TELEPHONE: Daytime: _____ Alternate: _____

HOME ADDRESS: _____

DOB: _____ WT: _____ HT: _____

HAIR: _____ EYES: _____ BLOOD TYPE: _____

VEHICLE: Make: _____ Model: _____ License Plate: _____

IN CASE OF EMERGENCY NOTIFY:

NAME: _____ RELATIONSHIP: _____

ADDRESS: _____
TELEPHONE: Daytime: _____ Alternate: _____

MANDATORY SAFETY LECTURE GIVEN ON THE FOLLOWING DATE BY THE BELOW NAME INSTRUCTOR:

DATE: _____ INSTRUCTOR: _____

** NOTE: WITHOUT THE SIGNATURE OF THE HUNTING SAFETY INSTRUCTOR, THE PERMIT CANNOT BE ISSUED (ASO P1700.2).

ORDNANCE SAFETY LECTURE GIVEN ON THE FOLLOWING DATE BY THE BELOW NAMED INSTRUCTOR:

DATE: _____ INSTRUCTOR: _____

NOTE: ORDNANCE SAFETY BRIEF REQUIRED TO HUNT AREAS 2 AND 3.

THE BELOW LISTED FIREARMS/WEAPONS HAVE BEEN REGISTERED WITH MCAS MILITARY POLICE (INCLUDE MAKE, MODEL AND SERIAL NUMBER):

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

DATE: _____ VERIFIED BY _____

I hereby certify that I have read and understand the provisions of ASO P1700.2D, which pertain to the rules and regulations for hunting and fishing aboard MCAS Beaufort and Laurel Bay, South Carolina. I understand that all firearms/weapons I bring on to MCAS Beaufort or Laurel Bay must be registered with the Pass and Identification Office, and when not secured within the trunk of my vehicle, contained within the appropriate case. I further understand all firearms will be transported unloaded with the action open.

DATE: _____ SIGNATURE OF APPLICANT _____

APPENDIX C

CERTIFICATE OF RELEASE OF THE GOVERNMENT

DATE_____

1. In consideration for permission granted to me to enter upon the United States Marine Corps Air Station Beaufort, South Carolina, and the Laurel Bay Housing Area, Laurel Bay, South Carolina, and there engage in hunting, fishing or boating, the undersigned, _____, does hereby agree as follows:

a. I will indemnify and hold harmless the United States Government, including all its subdivisions, its officers, agents, military personnel and employees from all liability under the Federal Torts Claims Act (28 U. S. C. Section 1346(b), 267 et seq.) or otherwise, for death or injury to all persons, or loss or damage to the property of all persons resulting from any use of the premises.

b. I hereby waive any and all claims from injuries which may be suffered by me in the course of such use of Federal property, including but not limited to any injury suffered by reason of accidental shooting by others, and/or by accidental discharge of firearms, explosives, etc., which may be caused by the negligence or fault of any other person, whether employed by the Federal Government or not, or any other injury, of any nature whatsoever, which may be suffered by me while on Marine Corps Air Station Beaufort, South Carolina, and/or Laurel Bay Housing Area, Laurel Bay, South Carolina as a result of the permission which is cited herein above.

SIGNATURE _____

PRINT NAME _____

HOME ADDRESS _____

WITNESS _____

APPENDIX D

CERTIFICATE OF UNDERSTANDING

Date _____

1. I have read, understand and will comply with Air Station Order P1700.2D. I further understand that any violation thereof subjects me to possible disciplinary, civil and/or administrative action as appropriate, and may prohibit me from hunting, fishing or boating on the Marine Corps Air Station Beaufort, South Carolina, and on the Laurel Bay Housing Area, Laurel Bay, South Carolina in the future.

SIGNATURE _____

PRINT NAME _____

ADDRESS _____

_____
WITNESS

APPENDIX E

SAFETY LECTURE PLAN

1. PERSONNEL AUTHORIZED TO HUNT

a. Active Duty and Dependents (Dependents over 16 years of age must have a hunting/fishing license).

b. Retired Military and Dependents.

c. Bona fide House Guests (Must have temporary hunting/ fishing pass).

d. Civilian Employees and Dependents.

e. Authorized non-sponsored civilians (up to 20) as part of MCAS Sportsman Club organized hunts.

2. TYPES OF HUNTING

a. Organized hunts: Small game and deer.

b. Individual: Small game and deer

c. Bow/Shotgun Hunting: Small game and deer

3. TYPES OF FIREARMS/WEAPONS TO BE REGISTERED WITH PMO

a. Deer Hunting: Shotgun with buckshot and bows with broad heads.

b. Small Game: Shotgun with bird shot and bows with flu-flu type arrows.

4. SEASONS AS PRESCRIBED BY SOUTH CAROLINA LAW

a. Bow Hunting: All areas.

b. Small Game Hunting: All areas.

c. Organized Hunts: All hunting areas within MCAS.

5. HUNT RESTRICTIONS/REQUIREMENTS

a. No hunting out-of-season game.

b. Hunters will obtain two area passes from the PMO Desk Sergeant or Duty Game Warden. One pass will be displayed on the vehicle dashboard, and one pass will be carried on the hunter's person.

c. All hunters will wear international orange while hunting at all times.

d. All hunters will use a safety restraint while in a tree stand.

6. SAFETY

a. Hunting near roads, runways and buildings.

b. Shooting across runways and paved roads.

c. Sound shots.

d. Ten Commandments of Safety.

e. Hunter should be aware of the noise hazards of firing weapons.

APPENDIX F

HARVEST REPORT

MCAS 1700/11 (Rev 11-07)

Note When exiting a hunting area for any reason, hunters, must check back into the Duty Game Warden/PMO Desk Sgt to return all area passes.

DATE_____

AREA(S) HUNTED: _____ TIME OUT: _____ TIME BACK: _____
_____ _____ _____
_____ _____ _____

NUMBER OF HUNTERS: _____

GAME HUNTED (Circle Applicable Game):

DEER SQUIRREL RABBIT OTHER:_____

GAME HARVESTED (Number): _____

DEER	SQUIRREL	RABBIT	OTHER
BUCK _____	____	____	____
DOE _____			

WEIGHT_____ ANTLERLESS DEER TAG NUMBER _____
POINTS_____

GAME WOUNDED NOT FOUND:
TYPE: _____ NUMBER: _____

NAME: _____ _____
RANK: _____ _____
UNIT: _____ _____
TELEPHONE NO. _____ _____
MCAS PERMIT:_____ _____

Signature:_____ Signature:_____ Signature_____

APPENDIX G

PREREQUISTITES FOR ASSIGMENT AND SPECIAL ORDERS FOR HUNT MASTERS (MCAS)

1. PREREQUISITES FOR ASSIGNMENT AS HUNT MASTERS

a. Hunt Masters and Assistant Hunt Masters must be on active duty, be retired members of the U.S. Armed Forces, or be a qualified civilian employee selected on the basis of maturity and integrity.

b. Hunt Masters and Assistant Hunt Masters must show that they possess a thorough knowledge of the physical terrain of each area to be hunted and are fully familiar with, and understand the current rules and regulations established by the South Carolina Department of Natural Resources.

c. MCAS Sportsman's Club Hunt Masters will be designated in writing to Chief Game Warden by the Club President annually, prior to the start of hunting season. Non-Sportsman Club Hunt Masters will be designated by the Chief Game Warden.

2. SPECIAL ORDERS FOR HUNT MASTERS AND ASSISTANT HUNT MASTERS

a. The Hunt Master will be the direct representative of the Commanding Officer on all organized hunts conducted aboard this Air Station, regardless of the Hunt Master's grade or the grade of other participating hunters. Officers and SNCO's will be shown due courtesy commensurate with their grade.

b. The Hunt Master will be responsible for the organization, proper conduct and safety of the hunt, and assume the duties which include, but are not limited to, the following:

(1) Ensure that all participants of the hunt are eligible to hunt and possess all appropriate licenses/permits as required by the South Carolina Wildlife and Marine Resources Commission Hunting and Fishing Regulations and this Order. Restrict the number of hunt participants as dictated by prudence and safety.

(2) Prior to the start of the day's hunt, report in person to the Duty Game Warden/PMO Desk Sergeant. Provide the PMO Desk Sergeant/Duty Game Warden with a complete legible roster of participants, to include: name, grade, social security number and Air Station Hunting Permit number for each hunter. Upon submission of the above, the PMO Desk Sergeant will issue the Hunt Master a radio and grant final area clearance for the hunt.

(3) Prior to commencement of the actual hunt, the Hunt Master will personally ensure that the safety signs required by this Order have been appropriately placed.

(4) The Hunt Master will ensure that, when placing hunters on stands/firing positions, an individual field of fire is assigned.

(5) Hunt Masters will ensure that all antlerless deer harvested are properly tagged, that one half of all deer jawbones are saved and that their weight and sex are recorded. This information will be furnished to the Chief Game Warden within three (3) working days after the hunt.

(6) Upon completion of the hunt in an area, the Hunt Master will notify PMO, via radio, that the hunt has been secured. This will enable the Desk Sergeant to open the area for individual hunters.

(7) Hunt Masters will ensure that the Duty Game Warden/PMO is advised as soon as possible of the termination of the hunt and certify the accountability of all hunters.

(8) Hunt Masters are authorized and directed to suspend the hunting privileges of any hunter participating in that hunt, for any violations of the rules and regulations contained in the South Carolina Hunting and Fishing Regulations or this Order. All violations will be reported to the Chief Game Warden for preparation of an Incident/Complaint Report for referral to the Air Station Commanding Officer.

(9) Hunt Masters and all participating hunters will be watchful for persons engaged in illegal or dangerous acts. Violators, military or civilian, shall be reasonably detained and a Game Warden summoned to the scene. If reasonable detention is not feasible, identifying information will be provided to the Chief Game Warden.

c. Assistant Hunt Masters. The Hunt Master may delegate to an Assistant Hunt Master any reasonable authority to ensure the organization, conduct and security of the hunt.

APPENDIX H

TEN COMMANDMENTS OF HUNTING SAFETY

(MCAS)

1. Treat every gun as if it were loaded.

2. Watch that muzzle, carry your gun safely; keep the safety on until ready to shoot.

3. Unload gun when not in use; break down or have chamber open; guns should be carried in cases to the shooting areas.

4. Be sure barrel is clear of obstructions and that you have only ammunition of the proper size for the gun you carry.

5. Be sure of the target before you pull the trigger; know identifying features of the game you hunt.

6. Never point a gun at anything you do not intend to shoot.

7. Never climb a tree or fence or jump a ditch with a loaded gun; never pull a gun toward you by the muzzle.

8. Never shoot at a flat, hard surface or water; and always be sure your backstop is adequate.

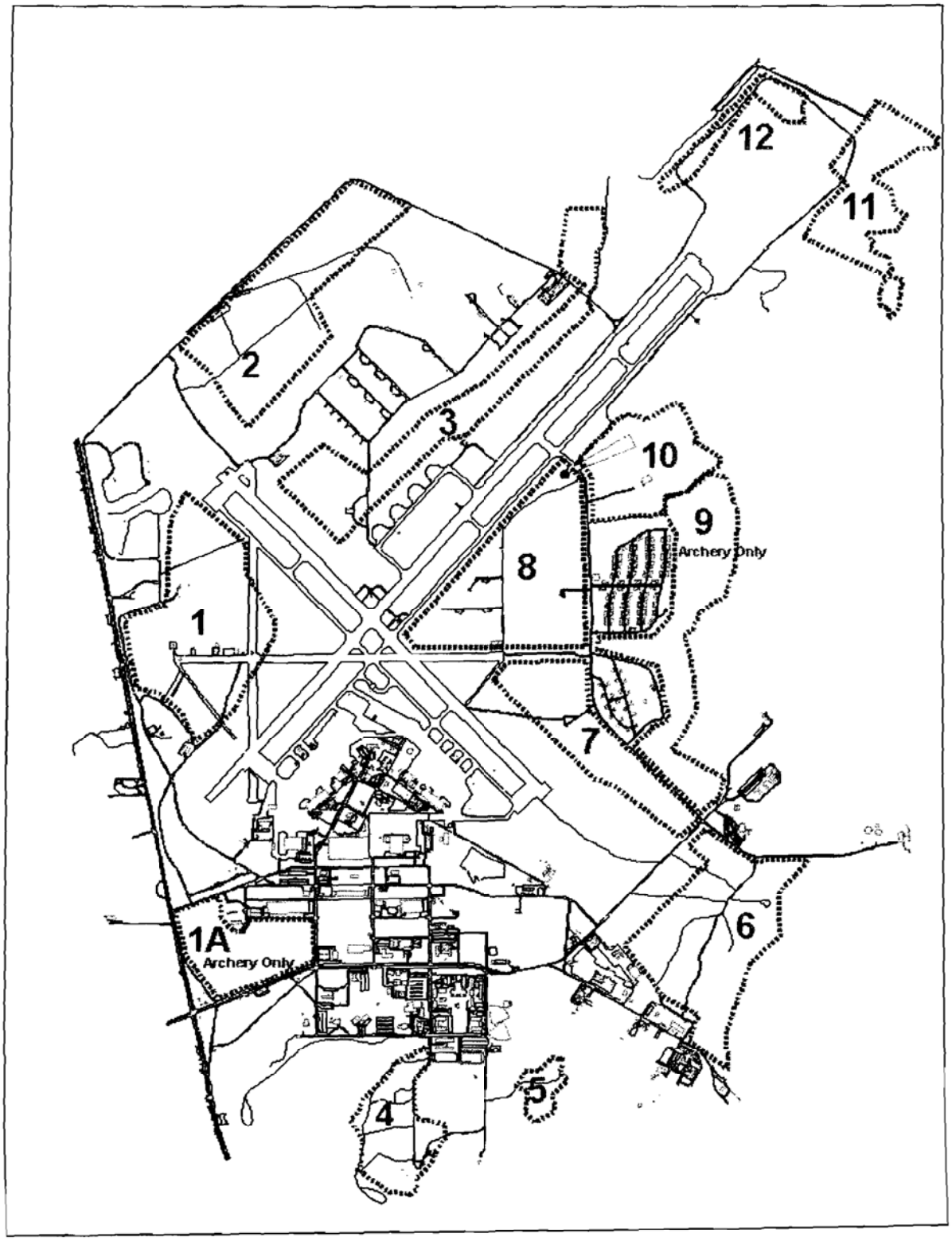
9. Store guns and ammunition separately; well beyond the reach of children.

10. Abstain from the use of alcoholic beverages before and during shooting.

KEEP SHOOTING A SAFE SPORT

APPENDIX I

MCAS BEAUFORT HUNTING MAP



APPENDIX J

TOWNSEND BOMBING RANG (TBR) HUNTING
APPLICATION/HOLD HARMLESS AGREEMENT

Townsend Bombing Range Hunting Application			
Applicant Information			
Name:			
Date of Birth:	Daytime Phone:	Home Phone:	
Current Address:			
City:	State:	ZIP:	
Hunters Safety Course (circle one)	Yes	No	
Guest Information			
Name:			
Date of Birth:	Related?	(if so state relation):	
Daytime Phone:	Home Phone:		
City:	State:	ZIP:	
Hunters Safety Course (circle one)	Yes	No	
Emergency Contact Information			
Name:			
Address:			
City:	State:	ZIP:	Phone:
Relationship:			
Vehicle Information			
Make/Model			
License Plate #	Insurance Policy#:	Color:	
Emergency Contact Information (Guest)			
Name:			
Address:		Phone:	
City:	State:	Zip:	
Relationship:			
Hunt Preferences (circle one or all)			
1: Archery (date's)	3: Rifle (date's)		
2: Black Powder (date's)	4: Rifle (date's)		
Prioritize: (example 3,4,2,1,)			
Mobility Impaired			
Wheelchair:	Other:		

Georgia Hunting License Number:_____ ; Do you have any GADNR hunting violations? Yes__ No__

Privacy Act Statement	The purpose of this information is intended to determine the status of personnel at the time of their application for permission to hunt at Townsend Bombing Range, GA. It will be used to maintain accountability of all persons authorized to hunt at Townsend Bombing Range, GA. Disclosure is voluntary; however, you may be denied authority to hunt at Townsend Bombing Range, GA if the requested information is not provided. I certify the information provided on this form is current. I also certify that I have read and understand the Townsend Bombing Range Hunting regulations
Date:	Signature of Applicant:

HOLD HARMLESS AGREEMENT

(RELEASE OF CLAIMS & WAIVER OF LIABILITY)

I am about to participate in activities associated with hunting to be held in military training areas at Townsend Bombing Range, Georgia.

SITE SPECIFIC DANGERS: I understand that the designated hunting area to which I will be assigned is located within an active military training complex which includes training areas and a live fire range. I understand the following cautions with regard to this range and training areas. First, the range and training areas have been designed for and used by the armed forces for training its personnel in the deadly art of individual and unit combat. Second, this entire range and all training areas, to include my assigned hunting area, have been subject to countless live fire exercises and may well contain a variety of unexploded ordnance which, if triggered by or during my presence, could result in serious bodily injury or death to me (NOTE: STAY WELL CLEAR OF ANY AND ALL VISIBLE ORDNANCES). Third, this active weapons range has designated but unmarked safety zones known as Surface Danger Zones (SDZ) within which the projectiles from a given weapons system should be contained. While the specific hunting area to which I am assigned on a given hunting day will not be within an active SDZ, I understand that it may be immediately adjacent to an active SDZ. I understand that if I leave my assigned hunting area by other than an authorized route, I may enter an active SDZ and expose myself to serious bodily injury or death. Finally, this range and training areas contain manmade and natural obstacles, some of which may be hidden, which could cause me to stumble, fall, and otherwise suffer serious bodily injury or death.

HUNTING DANGERS: I understand the following are hazards inherent in the activity of hunting: hunters are equipped with weapons to include firearms and archery equipment that fire projectiles designed to cause death; hunting exposes me to the hazards of these projectiles through my own actions and the actions of other hunters in handling the weapons, identifying game, and making decisions when and where to shoot; the climbing of trees, use of tree stands and associated climbing devices exposes me to serious bodily injury or death from falling; accessing hunting areas and retrieval of game is a rigorous outdoor activity which may expose me to hazards to include, but not limited to weather extremes, physical exertion, catastrophic illness, hypothermia, drowning, falling debris from trees, toxins from plants and animals, disease transmitted by ticks and rabid animals.

In consideration of the privilege to participate in hunting, I, the undersigned, intending to be legally bound, waive and release for myself, my heirs, executors, administrators and assigns, all liability for damages or injury that I may incur from participation in hunting and any and all rights, claims, demands and other actions which would otherwise have as a result of my participation in hunting. This waiver of liability and release of claims extends to the I following entities, their agents, employees, staff, representatives, successors, assigns and individuals, including such individuals when acting in either their official or personal capacities: the United States Government, the Department of Defense and of the Navy, the United States Marine Corps, the State of Georgia, the County of McIntosh, Georgia, the State of South Carolina, the United States Air Force, the Georgia Air National Guard, and any other agency or personnel associated

hunting at Townsend Bombing Range, Georgia. This release and waiver extends to any and all property damage, bodily injury or death I may suffer as a hunting participant due to the actions or decisions of such entities and individuals, whether made in good faith or through negligence. This waiver does not extend to intentional misconduct or actions taken with reckless disregard for human life and safety.

I understand that by signing this Agreement, I have abandoned any rights I may have, or any rights anyone associated with me may have, through legal or friendship or family ties, to sue the federal government for any injury I may sustain because of my participation in hunting that results in any damage whatsoever to my property, my person or in my death. By signing this document, I acknowledge that the federal government, or any agency or employee thereof, is not liable for any injury I may sustain, to include death, as a result of my participation in hunting. This document shall remain in effect and be held until the Range Operations Officer, Townsend Bombing Range, Georgia receives written notice of cancellation.

_____ _____
Initials Date

I ACKNOWLEDGE THAT I HAVE READ THIS AGREEMENT, THAT I AM FULLY AWARE OF THE RISKS INVOLVED IN THIS EVENT, AND THAT I VOLUNTARILY ACCEPT AND ASSUME THE RISKS ASSOCIATED WITH PARTICIPATION IN THIS EVENT.

I understand that should I decline to execute this release of claim and waiver of liability, I will not be permitted to participate in hunting at Townsend Bombing Range, Georgia.

PARTICIPANT PRINTED NAME	PARTICIPANT SIGNATURE	DATE
GUEST PRINTED NAME	GUEST SIGNATURE	DATE
WITNESS PRINTED NAME	WITNESS SIGNATURE	DATE

If the guest is under 18 years of age:

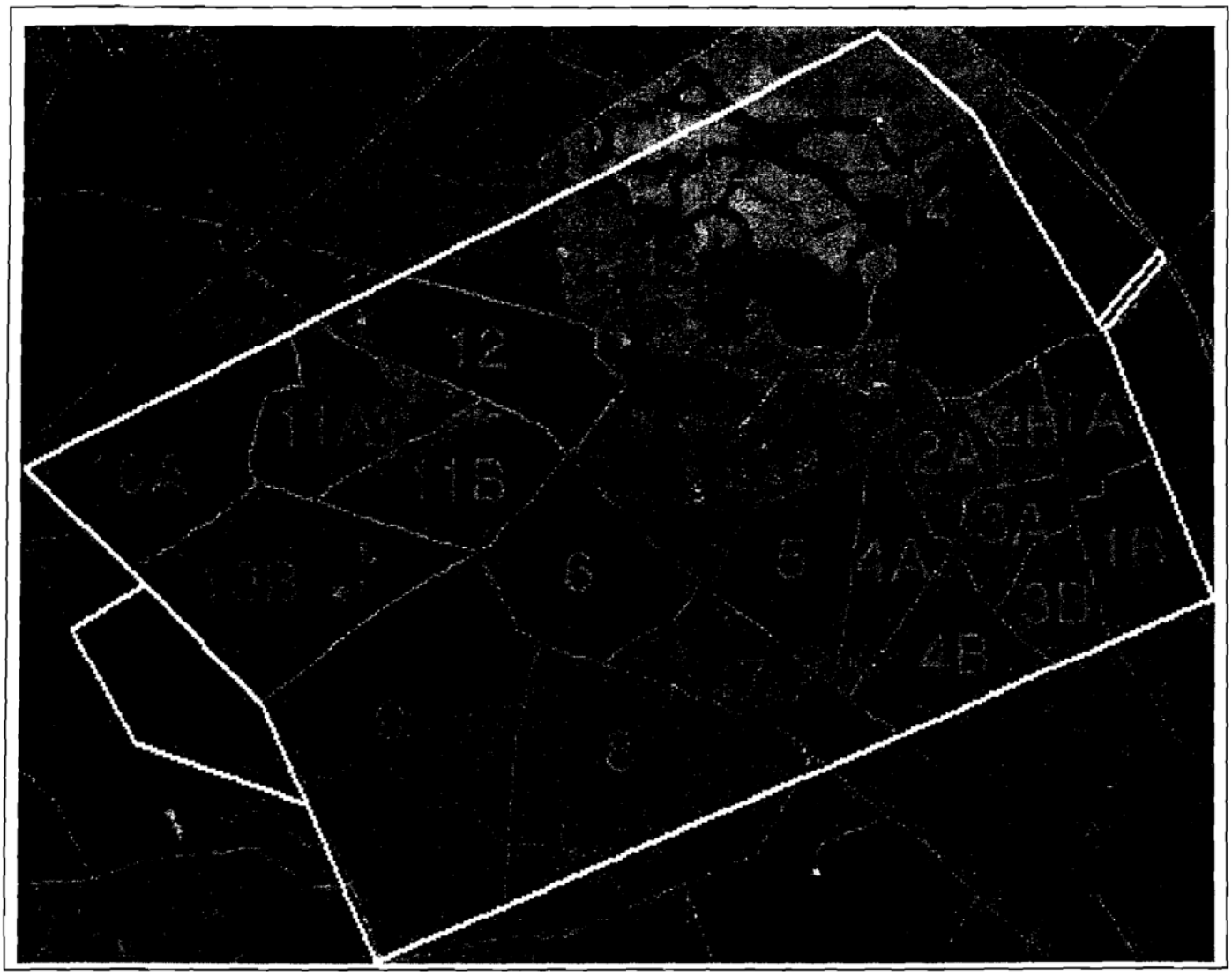
_____
SIGNATURE OF PARENT/GUARDIAN

on behalf of

_____ _____
PRINTED NAME OF MINOR DATE

APPENDIX K

TBR HUNTING MAP



HUNTERS SAFETY BRIEF (TBR)

APPENDIX L

Townsend Range Hunters Safety Briefing

1. All hunters must read and completely understand everything stated in this document. Sign and return to range Hunt Manager prior to hunt.

2. Purpose: To establish a safe hunt program and to make aware all personnel involved the hazards associated with this program.

3. Hazards to Hunters: This is a military training range where weapons are used to train our military fighting forces. The following will list some of the hazards associated with this installation.

a. Spent ordinance will not be handled by anyone at anytime. Just because it has been used does not mean it is safe. Avoid all spent ordinance at all times. It does not have to be marked or identified by anyone associated with the hunt.

b. Be careful of all holes in the ground and stay clear as they could possibly cave in. Walk way around any thing that looks suspicious and be aware of your surroundings and footings at all times.

c. Inspect any tree thoroughly before climbing look for any damage that may have been caused by ordinance or any knots in trees that could cause the tree to break while climbing.

d. Be aware of where you are. The Range boundary lines are properly marked with signs. We have hunting clubs for neighbors and they could possibly be hunting the property lines. Do not leave the property if you trail a wounded deer to the property line. Mark the spot and notify Range Control immediately. We will notify the appropriate people and help to retrieve your deer.

e. Do not wander into areas that you are not assigned. You may not know where other hunters are and there are areas you do not need to be in for your safety.

f. Be aware that we have venomous snakes. Protect yourself against tick bites and the possibility of getting Lime Disease.

g. Know your equipment. Inspect it thoroughly and always use a Climbing Safety Harness.

h. Make sure your weapon is in good working order and never use non-approved ammo for your weapon.

i. Know your target, and what's behind your target.

j. If you wound or kill an animal and cannot retrieve it on your own, contact Range Control and we will assist you to make every effort to retrieve

the animal. Leaving a dead animal on the range will cause buzzard activity, which can cause severe damage to the aircraft that trains here.

k. Make all check-in times. If you are looking for a wounded animal mark the spot and notify Range Control. After everyone has checked in we will be glad to assist you in retrieving your animal. If you do not check-in for any reason we will assume that something went wrong and immediately start searching for you. Remember that the check-in is for your safety.

4. Souvenirs: Under no circumstance can you take a souvenir from the range! We hope that taking a good hunting memory and possibly a trophy is the greatest souvenir. Good hunting and good luck.

Print name: _____

Sign name: _____

APPENDIX M

LOST HUNTER RECOVERY PLAN

LOST HUNTER RECOEVER PLAN TOWNSEND RANGE

1. SCOPE. This Range Operating Instruction (ROI) establishes procedures for ensuring that all hunters are accounted for after a hunt and to ensure that the range is safe to resume flying operations. These procedures shall become effective immediately and shall remain effective until this letter is rescinded or updated.

2. PURPOSE. The purpose of this directive is to assign responsibilities in case someone has not returned safely.

3. RESPONSIBILITIES

a. Volunteer personnel working at TBR during a hunt day are responsible for ensuring that all hunters and personnel have checked in at Range Control prior to closing up for the days hunting activity.

b. In the event of someone not checking in at the designated time the Senior most TBR personnel will be designated as "in charge" and will determine the appropriate actions that will follow.

4. ACTIONS FOR LOST HUNTER RECOVERY

a. Determine who is not accounted for and the designated areas that they were assigned.

b. Instruct all personnel managing the hunt not leave until released and ask for hunters to volunteer to stay in case needed.

c. Send a TBR person to the designated area with communications to locate and determine the status of the hunter's vehicle and post that person there. If the hunter's vehicle is missing or cannot be located call the contact phone numbers provided by the hunter. The person posted should try to make contact by audible means such as blowing a horn, whistle orby calling out there name.

d. Determine if a search party is required and assemble party at Range Control to ensure that people are paired up with knowledgeable people of the area and issue communications.

e. The person "in charge" will direct search party to appropriate areas to conduct a methodical ground search in case the missing person is injured and cannot communicate by any means.

f. The person "in charge" will notify the following authorities for further instruction:

Range Commander: Col Stuart Strickland
Cell: 912-327-2888
Cell: 912-247-1703

Range NCOIC: MSgt Brian Leverette
Cell: 912-399-3424
Cell: 912-210-9298

MCAS Beaufort Game Warden: Gary Herndon
Cell: 843-321-6453
Cell: 843-866-3369
GA DNR: 1-800-241-4113

5. DEFINITIONS

a. TBR - Townsend Bombing Range.

b. RCO - Range Control Officer/Range Commander

c. GADNR- Georgia Department of Natural Resources

d. NCOIC- Non Commissioned Officer In Charge

APPENDIX N

TBR HUNTING ROSTER

HUNTER ROSTER

TOWNSEND BOMBING RANGE

DATE:_____

NAME	AREA NO.	SIGN IN MILITARY TIME	SIGN OUT MILITARY TIME	REMARKS

APPENDIX O

TBR DEER HARVEST RECORD

DEER HARVEST RECORD

TOWNSEND BOMBING RANGE

2007-2008 SEASON

DEER #	DATE KILLED	WEAPON	SEX (M-F)	LIVE WT.	# PTS. 1" +	OUTSIDE SPREAD	AGE	LACTATION YES/NO	HUNTER NAME

APPENDIX P

CERTIFICATE OF UNDERSTANDING

Date _____

1. I have read, understand and will comply with ASO 1700.2D, as it applies to Chapter 7 HUNTING, TOWNSEND BOMBING RANGE, GEORGIA. I further understand that any violation thereof subjects me to possible disciplinary, civil and/or administrative action as appropriate, and may prohibit me from hunting on Townsend Bombing Range, Georgia in the future.

_____
SIGNATURE

_____
PRINT NAME

_____
ADDRESS

_____
WITNESS

APPENDIX D

TOWNSEND BOMBING RANGE SOIL RESOURCES

Townsend Bombing Range Soil Resources	
Soils Type	**Description**
Albany Loamy Fine Sand	• 0 to 2% slopes. • Very deep, somewhat poorly drained soil occurs on low-lying uplands. • Seasonal high water table that ranges from 1 to 2.5 feet below the surface for 4 months of the year. • Slightly to moderately susceptible to erosion by water. • Very highly susceptible to wind erosion.
Bayboro Clay Loam	• Very deep, very poorly drained soil occurs on low-lying uplands and in depressions. • Seasonal high water table at the surface for 7 months of the year (frequently ponded). • Slightly to moderately susceptible to erosion by water. • Very slightly susceptible to wind erosion.
Bayboro Loam	• Very deep, very poorly drained soil occurs on low-lying uplands and in depressions. • Seasonal high water table that ranges from 0 to 1 foot below the surface for 7 months of the year. • Slightly to moderately susceptible to erosion by water. • Very slightly susceptible to wind erosion.
Bladen Fine Sandy Loam	• Very deep, poorly drained soil on fluvial or marine terraces. • Seasonal high water table ranges from 0 to 1 foot below the surface for 6 months of the year. • Moderately susceptible to erosion by water. • Highly susceptible to wind erosion.
Bladen Loam and Clay Loam	• Very deep, poorly drained soil on fluvial or marine terraces. • Seasonal high water table at the surface for 6 months of the year (frequently ponded). • Moderately susceptible to erosion by water. • Very slightly susceptible to wind erosion.
Bladen-Coxville Fine Sandy Loams	• Intermingled soils; 40% Coxville, 60% Bladen. • Very deep, poorly drained soils on flats. • Seasonal high water table that ranges from 0 to 1 foot below the surface for 6 months of the year. • Slightly to moderately susceptible to erosion by water. • Highly susceptible to wind erosion.
Blanton Sand	• 0 to 3% slopes. • Very deep, moderately well drained soil that occurs on uplands. • Seasonal high water table that ranges from 2.5 to 4 feet below the surface for 4 months of the year. • Slightly susceptible to erosion by water. • Extremely susceptible to wind erosion.
Cape Fear Fine Sandy Loam	• Very deep, very poorly drained soil occurs on stream terraces. • Seasonal high water table that ranges from 0 to 1 foot below the surface for 7 months of the year. • Slightly to moderately susceptible to erosion by water. • Highly susceptible to wind erosion.
Chipley Sand	• 0 to 4% slopes. • Very deep, moderately well drained soil on low-lying uplands. • Seasonal high water table that ranges from 2 to 3 feet below the surface for 5 months of the year. • Slightly susceptible to erosion by water. • Extremely susceptible to wind erosion.

Townsend Bombing Range Soil Resources	
Soils Type	**Description**
Dunbar Fine Sandy Loam	• 0 to 2% slopes. • Very deep, somewhat poorly drained soil occurs on broad low-lying uplands. • Seasonal high water table that ranges from 1 to 2.5 feet below the surface for 7 months of the year. • Moderately susceptible to erosion by water. • Highly susceptible to wind erosion.
Echaw and Centenary Fine Sands	• Intermingled soils; 60% Echaw, 35% Centenary, 5% Minor Components. • Very deep, moderately well to well drained soils on low-lying uplands, broad ridges and flats. • Seasonal high water table that ranges from 2.5 to 5 feet below the surface for 4 to 6 months of the year. • Slightly susceptible to erosion by water. • Extremely susceptible to wind erosion.
Ellabelle Loamy Sand	• Very deep, very poorly drained soil occurs on along small drainage ways and in depressions. • Seasonal high water table occurs in this soil at the surface for 6 months of the year (frequently ponded or flooded). • Slightly susceptible to erosion by water. • Very highly susceptible to wind erosion.
Eulonia Fine Sandy Loam	• Very deep, moderately well drained soil occurs on uplands and stream terraces. • Seasonal high water table that ranges from 1.5 to 3.5 feet below the surface for 6 months of the year. • Moderately susceptible to erosion by water. • Highly susceptible to wind erosion. • Prime Farmland (Long County).
Eulonia-Fairhope Fine Sandy Loams	• 0 to 2% slopes. • Intermingled soils; 75% Eulonia, 25% Fairhope. • Very deep, moderately well drained soils on uplands and stream terraces. • Seasonal high water table that ranges from 1.5 to 3.5 feet below the surface for 6 months of the year. • Moderately susceptible to erosion by water. • Highly susceptible to wind erosion. • Prime Farmland (McIntosh County).
Eulonia-Fairhope Fine Sandy Loams (Thick Surfaces- 0 to 2% Slopes)	• 0 to 2% slopes. • Intermingled soils; 60% Eulonia, 40% Fairhope. • Very deep, somewhat poorly drained soils on stream terraces and broad flats. • Seasonal high water table that ranges from 1 to 2.5 feet below the surface for 5 months of the year. • Slightly to moderately susceptible to erosion by water. • Very highly susceptible to wind erosion. • Farmland of statewide importance (McIntosh County).
Eulonia-Fairhope Fine Sandy Loams (Thick Surfaces- 2 to 5% Slopes)	• 0 to 2% slopes. • Intermingled soils; 60% Eulonia, 40% Fairhope. • Very deep, somewhat poorly drained soils on stream terraces and broad flats. • Seasonal high water table that ranges from 1 to 2.5 feet below the surface for 5 months of the year. • Slightly to moderately susceptible to erosion by water. • Very highly susceptible to wind erosion. • Farmland of statewide importance (McIntosh County).

Townsend Bombing Range Soil Resources	
Soils Type	**Description**
Johnston and Bibb Soils	• Intermingled soils; 60% Johnston, 40% Bibb. • Very deep, very poorly drained soils on floodplains. • Seasonal high water table at the surface for 8 months of the year, frequently flooded (Johnston). • Seasonal high water table that ranges from 0.5 to 1 foot below the surface for 5 months of the year, frequently flooded (Bibb). • Slightly to moderately susceptible to erosion by water. • Highly susceptible to wind erosion.
Lakeland Sand	• 0 to 2% slopes. • Very deep, moderately well drained soil that occurs on uplands. • Seasonal high water table that ranges from 4 to greater than 6 feet below the surface for 3 months of the year. • Slightly susceptible to erosion by water. • Extremely susceptible to wind erosion.
Leon Fine Sand	• Very deep, poorly drained soil occurs on low uplands and upland flats. • Seasonal high water table that ranges from 0.5 to 1.5 feet below the surface for 7 months of the year. • Slightly susceptible to erosion by water. • Extremely susceptible to wind erosion.
Lynchburg Loamy Fine Sand (Thick Surface, Clayey Substratum)	• 0 to 2% slopes. • Very deep, somewhat poorly drained soil that occurs on stream terraces and broad flats. • Seasonal high water table that ranges from 1 to 2.5 feet below the surface for 5 months of the year. • Slightly to moderately susceptible to erosion by water. • Very highly susceptible to wind erosion.
Mandarin Fine Sand	• Very deep, poorly drained soil that occurs on ridges and knolls. • Seasonal high water table that ranges from 1.5 to 3.5 feet below the surface for 7 months of the year. • Slightly susceptible to erosion by water. • Very highly susceptible to wind erosion.
Mascotte Fine Sand	• Very deep, poorly drained soil that occurs on broad low-lying areas, on low stream terraces and in depressions. • Seasonal high water table occurs in this soil at a depth ranging from 0.5 to 1.5 feet for 7 months of the year. • Slightly to moderately susceptible to erosion by water. • Extremely susceptible to wind erosion. • Farmland of statewide importance (Long County).
Meggett Fine Sandy Loam	• Very deep, poorly drained soil occurs on floodplains and low terraces. • Seasonal high water table that ranges from 0 to 1 foot below the surface for 6 months of the year. • Moderately susceptible to erosion by water. • Highly susceptible to wind erosion.
Meggett Loam	• Same information as Meggett Fine Sandy Loam with the exception that Meggett Loam is very slightly susceptible to wind erosion.
Ocilla Loamy Fine Sand	• Very deep, somewhat poorly drained soil occurs on stream terraces and on broad flats. • Seasonal high water table occurs in this soil at a depth ranging from 1 to 2.5 feet for 5 months of the year. • Slightly to moderately susceptible to erosion by water. • Very highly susceptible to wind erosion.

Townsend Bombing Range Soil Resources	
Soils Type	**Description**
	• Farmland of statewide importance (Long County).
Ona Fine Sand	• Very deep, poorly drained soil occurs on broad low-lying areas. • Seasonal high water table that ranges from 0.5 to 1.5 feet below the surface for 7 months of the year. • Slightly to moderately susceptible to erosion by water. • Extremely susceptible to wind erosion.
Plummer Sands	• Very deep, poorly drained soil occurs on low flats, in depressions and along drainage ways. • Seasonal high water table that ranges from 0 to 1 foot below the surface for 8 months of the year. • Slightly susceptible to erosion by water. • Extremely susceptible to wind erosion.
Pooler Fine Sandy Loam	• Very deep, poorly drained soil occurs on broad flats and in depressions. • Seasonal high water table occurs in this soil a depth ranging from 0 to 1 foot for 6 months of the year. • Slightly to moderately susceptible to erosion by water. • Highly susceptible to wind erosion.
Pooler-Bladen Complex	• Intermingled soils; 60% Pooler, 40% Bladen. • Very deep, poorly drained soils on flats. • Seasonal high water table that ranges from 0 to 1 foot below the surface for 6 months of the year. • Slightly to moderately susceptible to erosion by water. • Highly susceptible to wind erosion.
Portsmouth Loam	• Very deep, very poorly drained soil occurs along small drainage ways and in • depressions. • Seasonal high water table occurs in this soil at the surface for 6 months of the year • (frequently flooded/ponded). • Slightly susceptible to erosion by water. • Very highly susceptible to wind erosion.
Riceboro Loamy Fine Sand	• Very deep, poorly drained soil occurs on broad flats and in slight depressions. • Seasonal high water table that ranges from 0 to 1 foot below the surface for 5 months of the year (frequently flooded). • Slightly to moderately susceptible to erosion by water. • Extremely susceptible to wind erosion.
Wahee Sandy Loam	• Very deep, somewhat poorly drained soil occurs on fluvial or marine terraces. • Seasonal high water table that ranges from 0.5 to 1.5 feet below the surface for 4 months of the year (frequently flooded). • Moderately susceptible to erosion by water. • Highly susceptible to wind erosion.
Weston Loamy Fine Sand	• Very deep, poorly drained soil occurs on broad flats, in depressions and along drainage ways. • Seasonal high water table that ranges from 0 to 1 foot below the surface for 6 months of the year. • Slightly susceptible to erosion by water. • Very highly susceptible to wind erosion.
Weston Loamy Sand (Thick Surface)	• Very deep, poorly drained soil occurs on broad flats and in slight depressions. • Seasonal high water table that ranges from 0 to 1 foot below the surface for 5 months of the year (occasionally flooded). • Slightly to moderately susceptible to erosion by water. • Extremely susceptible to wind erosion.

Townsend Bombing Range Soil Resources	
Soils Type	**Description**
Weston Very Coarse Sand	• Very deep, poorly drained soil occurs on broad flats, in depressions and along drainage ways. • Seasonal high water table that ranges from 0 to 1 foot below the surface for 6 months of the year. • Slightly susceptible to erosion by water. • Very highly susceptible to wind erosion.
Not Surveyed	• Areas where no soil survey has been conducted.

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APPENDIX E

USFWS INFORMAL CONSULTATION 2011

Appendix G

Threatened and Endangered Species

G.1 U.S. Fish and Wildlife Service

Survey Methodology
Survey Findings
Determination of Effects

G.2 Georgia Department of Natural Resources

Survey Methodology
Survey Findings

Note: During the public comment process conducted for the Draft Environmental Impact Statement (EIS), a commenter pointed out that the habitat description for the hairy rattleweed was inaccurate. The Draft EIS states that the hairy rattleweed occurs in shallow pools in Piedmont granite outcrops when, in fact, the plant's native habitat is sandy soils in open pine flatwoods, intensively managed slash pine plantations, and along road and power line rights-of-way. The habitat description in Section 3.8 of the Final EIS has been updated; however, the historical records of consultation provided in this appendix cannot be changed.

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Appendix G
Threatened and Endangered Species

Appendix G.1
U.S. Fish and Wildlife Service

Survey Methodology

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ecology and environment, inc.
Global Environmental Specialists
1974 Commonwealth Lane
Tallahassee, Florida 32303
Tel: (850) 574-1400, Fax: (850) 574-1400

December 17, 2010

Mr. Robert Brooks
United States Fish and Wildlife Service
Coastal Ecological Services Field Office
4980 Wildlife Drive NE
Townsend, Georgia 31331

Re: Proposed Use of Habitat-Based Flatwoods Salamander and Striped Newt Survey Methodology for the Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia

Dear Mr. Brooks:

As a follow-up to the informal consultation meeting conducted between personnel from the United States Fish and Wildlife Service (USFWS), Coastal Ecological Services Field Office, Naval Facilities Engineering Command Southeast (NAVFAC SE), Marine Corps Air Station Beaufort (MCAS Beaufort), and Ecology and Environment, Inc. (E & E) on November 30, 2010, and a subsequent teleconference between you and E & E representatives on December 13, 2010, we request the USFWS review and provide concurrence with the following proposed survey methodology for the federally threatened flatwoods salamander (*Ambystoma cingulatum*) and the striped newt (*Notophthalmus perstriatus*), a candidate species for federal listing, that would be used if surveys for these species are necessary. Such surveys would be conducted to determine impact to these species and would be utilized for Section 7 consultation, as necessary, to complete the Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia (referred to herein as the TBR EIS).

During the meeting on November 30, 2010, your agency expressed concern with the ability to conduct dip net surveys, if warranted, in the winter of 2011 due to a lack of rainfall in the geographic area of the Proposed Action, which includes Long and McIntosh Counties, Georgia. Therefore, on behalf of NAVFAC SE, E & E has conducted research on established survey methodologies for flatwoods salamanders. The findings of this research are summarized below. The striped newt utilizes similar habitat and has a similar life history as the flatwoods salamander. Therefore one survey methodology is proposed for the assessment of both species.

Currently, there is no set protocol for determining presence or absence of flatwoods salamanders in a particular breeding pond. The general study consensus is that a survey with drift net fences surrounding a breeding pond for two consecutive "normal" weather years will indicate an affirmative result on the determination of the pond as a breeding pond. For dip net surveys, multiple years of breeding pond surveys are required to definitively determine the presence or absence of flatwoods salamanders.[1] The drought conditions present in the project area during the recent past and the timeframe for completing the TBR EIS would make these survey methodologies infeasible for this project.

[1] USFWS, 2005a. *Biological Opinion for the Relocation of Panama City-Bay County International Airport (West Bay Site Alternative)*, Dated October 3, 2005, Prepared by USFWS, 1601 Balboa Avenue Panama City, Florida.

Habitat-based survey methods have been applied in the past for projects potentially impacting flatwoods salamanders.[1, 2] Two biological opinions issued by the USFWS Panama City, Florida office are provided as Attachments A and B for your review. Both of these studies utilized habitat-based surveys.

Habitat-based surveys examine existing habitats to determine if they are likely to be utilized as flatwoods salamander breeding ponds. These surveys typically examine ephemeral or depressional wetlands that are geographically isolated from larger water bodies. To determine if these areas serve as potential breeding ponds, a thorough assessment of the pond, ectone, and adjacent upland is conducted. Positive indicators are absence of deep water, a treeless ecotone, and adjacency to open pine savannas or pine flatwoods. Areas that maintain appropriate habitat within the pond, adjacent upland, and treeless ecotone are then assumed to be potentially utilized as a flatwoods salamander breeding pond.[2]

The proposed acquisition areas (Areas 1 and 3) are primarily composed of planted pine stands and deep forested wetlands. As such, your agency has indicated that little habitat for the flatwoods salamander or striped newt is expected to be found within the proposed target areas. In the winter of 2011, E & E will conduct wetland delineations and upland habitat classifications for the proposed target areas. Following this preliminary field effort, a detailed wetland delineation and habitat assessment report, identifying potential flatwoods salamander habitat, will be provided to USFWS.

If any areas are identified as suitable habitat for flatwoods salamanders or striped newts during the winter 2011 surveys, E & E would propose additional targeted field surveys be conducted during April and May 2011 to determine if the habitat is a potential breeding pond. These surveys would be conducted by appropriately educated botanists and/or biologists familiar with southeastern flora. For these follow-up surveys, E & E would propose to use a variation (e.g., modified slightly to include plant species found in Georgia) of the "Potential Breeding Pond Description Data Sheet for Flatwoods Salamander (*Ambystoma cingulatum*) and Striped Newt (*Notophthalmus perstriatus*)" provided in Appendix II of the *Biological Opinion for U.S. Army Corps of Engineers Regional General Permit 86 (RGP-86)*.[2] The modified data sheet proposed for follow-up habitat based surveys is provided herein as Attachment C. A list of proposed follow-up survey locations and rationale for why the area requires follow-up surveys (e.g., based on the winter 2011 survey findings, results of recent infrared aerial photo-interpretation, and review of Natural Resources Conservation Service soils datum) would be provided to the USFWS prior to the commencement of any necessary follow-up field surveys. The results of any targeted follow-up surveys would also be provided to the USFWS in report format.

Please review the methodologies herein that would be used in the event that flatwoods salamander and striped newt surveys are necessary. We respectfully request that you provide concurrence, within 30 days of receipt of this letter, with the use of habitat-based follow-up surveys as opposed to conducting dip net surveys over multiple years to confirm the presence of flatwoods salamander and striped newt breeding ponds within proposed impact areas.

---

[2] USFWS 2005b. *Biological Opinion for U.S. Army Corps of Engineers Regional General Permit 86 (RGP-86)*, Dated March 3, 2005, Prepared by USFWS, 1601 Balboa Avenue Panama City, Florida.

Please feel free to contact me (bpowell@ene.com; 850-574-1400, ext. 3911) or Jonathan Oravetz (joravetz@ene.com; 850-574-1400, ext. 3928) if you have any questions regarding this submittal or require any additional information to process this request.

Sincerely,

ECOLOGY & ENVIRONMENT, INC.

Brenda A. Powell

Brenda A. Powell
Project Biologist

Attachments

cc: Jered Jackson, NAVFAC SE
John Conway, NAVFAC SE
Billy Drawdy, MCAS Beaufort
Alice Howard, MCAS Beaufort

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ATTACHMENT A

Relocation of Panama City-Bay County International Airport (West Bay Site Alternative), Bay County, Florida Biological Opinion, October 3, 2005

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Relocation of Panama City-Bay County International Airport (West Bay Site Alternative), Bay County, Florida

Biological Opinion
October 3, 2005

Prepared by:
U.S. Fish and Wildlife Service
1601 Balboa Avenue
Panama City, Florida

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IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Field Office
1601 Balboa Avenue
Panama City, FL 32405-3721

Tel: (850) 769-0552
Fax: (850) 763-2177

October 3, 2005

Ms. Virginia Lane
Federal Aviation Administration
5950 Hazeltine National Drive
Suite 400
Orlando, Florida 32822

Re: FWS Log No. 4-P-06-006
Biological Opinion
Relocation of the Panama City-Bay County International Airport
(West Bay Site Alternative)
Bay County, Florida

Dear Ms. Lane:

This document transmits the Fish and Wildlife Service's (Service) biological opinion (BO) for the Federal Aviation Administration (FAA) proposed action of relocating the Panama City-Bay County International Airport, Bay County, Florida, and its effects on listed species per section 7 of the Endangered Species Act of 1973, as amended (Act), (16 U.S.C. 1531 et seq.). Your August 29, 2005, request for formal consultation was received on August 30, 2005.

This biological opinion is based on information provided in the final biological assessment (BA) which was received on August 30, 2005. A complete administrative record of this consultation is on file in the Service's Panama City, Florida Field Office.

Consultation History

December 21, 2001 through present and continuing - Ongoing consultation has been continuing during preparation of the Panama City-Bay County International Airport Environmental Impact Statement. The US Fish and Wildlife Service (USFWS) provided scoping comments and responded to FAA's Notice of Intent to prepare an Environmental Assessment for the proposed relocation of the Panama City-Bay County International Airport in a letter dated December 21, 2001.

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February 6, 2002	Meeting conducted with USFWS to discuss the potential listed species issues on the proposed West Bay Site, the proposed survey methodology, the proposed survey schedule and the results of the spring, summer and fall surveys.
April 23, 2003	A Notice of Intent to prepare the Environmental Impact Statement was published in the *Federal Register*.
November 26, 2004	Notice of Availability of Draft Environmental Impact Statement (EIS) issued in *Federal Register*.
January 27, 2005	The Service provided comments on the Draft EIS. Based on discussions with the Service, it was determined that a biological assessment would be required.
May 23, 2005	The FAA transmitted a draft biological assessment which focused primarily on the flatwoods salamander and eastern indigo snake.
June 20, 2005	The Service provided comments on draft BA. It was determined that additional information was needed for bald eagle, American alligator, Gulf moccasinshell mussel, oval pigtoe mussel, Gulf sturgeon, red cockaded woodpecker, and piping plover.
June 28, 2005	Teleconference with FAA and the Service to discuss draft BA comments.
July 13, 2005	The National Marine Fisheries Service (NMFS) determined that there are no EFH recommendations for conservation measures.
July 21, 2005	Teleconference with FAA, USFWS, and US Army Corps of Engineers to discuss approach for addressing the Service's comments and revisions to the BA. The Service confirmed in an e-mail dated July 29, 2005, the limits of the Action Area as discussed below, the West Bay Sector Plan property as the cumulative impact study area boundary, and the species to be addressed in the revised BA.
July 27, 2005	The FAA submitted a draft habitat suitability analysis for flatwoods salamander to the Service for review and comment.
August 2, 2005	The Service provided comments regarding the draft suitability analysis for flatwoods salamander.
August 5, 2005	The FAA submitted the revised draft BA to the Service.
August 30, 2005	The FAA submitted the final BA to the Service.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The project purpose is to relocate the Panama City-Bay County International Airport (PFN) to meet speculated future aviation needs as identified in the *Draft Environmental Impact Statement (DEIS) for the Proposed Relocation of the Panama City-Bay County International Airport*. The proposed project would relocate aviation facilities of the PFN and its operations to the West Bay Site, in Bay County (**Figure 1**). The project would consist of an airfield and terminal facilities, and include a primary air carrier runway 8,400 feet in length by 150 feet in width and a general aviation crosswind runway 5,000 feet in length by 100 feet wide. This system would be supported by the necessary ancillary facilities including taxiways, terminal area facilities, general aviation facilities, air traffic control and emergency facilities, lighting, and navigation facilities. The project would initially develop 1,378 acres of the 4,037-acre site. The project site is currently rural timberland used for the paper and wood products industry. Approximately 1,929 acres of the entire site are jurisdictional wetlands. The proposed project also includes three (3) additional parcels that would be used as mitigation for the impacts to the West Bay Site. These parcels are also presently rural timberlands and cover an area of 9,718 acres.

Conservation Measures

The Panama City Bay County Airport and Industrial District (Airport Sponsor) has developed a strategy for minimizing the impacts of the relocated airport. The measures will potentially contribute to the protection and recovery of the species under review.

1. Three mitigation parcels will be put under a conservation easement in perpetuity for mitigation of wetland, stream and wildlife impacts on the West Bay Site. These parcels cover an area of 9,718 acres of upland and wetland mosaic. The parcels will be enhanced by management including a more natural hydrologic and fire regime. This management includes thinning the density of timber, planting native species, returning to a more natural, frequent fire regime, exotic species control, hydrologic restoration and long-term conservation management. Hipes et al. (2000) and Palis (1997) recommend growing season fires to restore and maintain the mesic flatwoods habitat that the salamanders require. Within these 9,718 acres, potential salamander breeding ponds have been identified (*Appendix A*). Most of the ponds are presently in poor condition, with habitat quality scores of low to moderate, but should improve as the land recovers from years of intensive silviculture management. A mitigation synopsis has been developed for the parcels by the Airport Sponsor and is included in *Appendix B*.

2. Information concerning potential flatwoods salamander breeding ponds would be shared by the Airport Sponsor with the appropriate agencies that manage and survey salamander populations on public lands as well as the agencies that manage the lands themselves (FWS, FWC and Florida Department of Environmental Protection [FDEP]).

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Action Area

For purposes of the Endangered Species Act, the action area is defined as all areas affected directly or indirectly by a federal action, including interdependent and interrelated actions and proposed Conservation Measures. Although each potentially affected species will define a separate action area, the most inclusive geographic area is referenced for simplicity.

The Action Area for this analysis includes all the area within the boundaries of the Proposed Action, which includes the 4,000-acre West Bay Site, 37-acre access road, and the 9,718-acre proposed mitigation parcels. See ***Figure 1***.

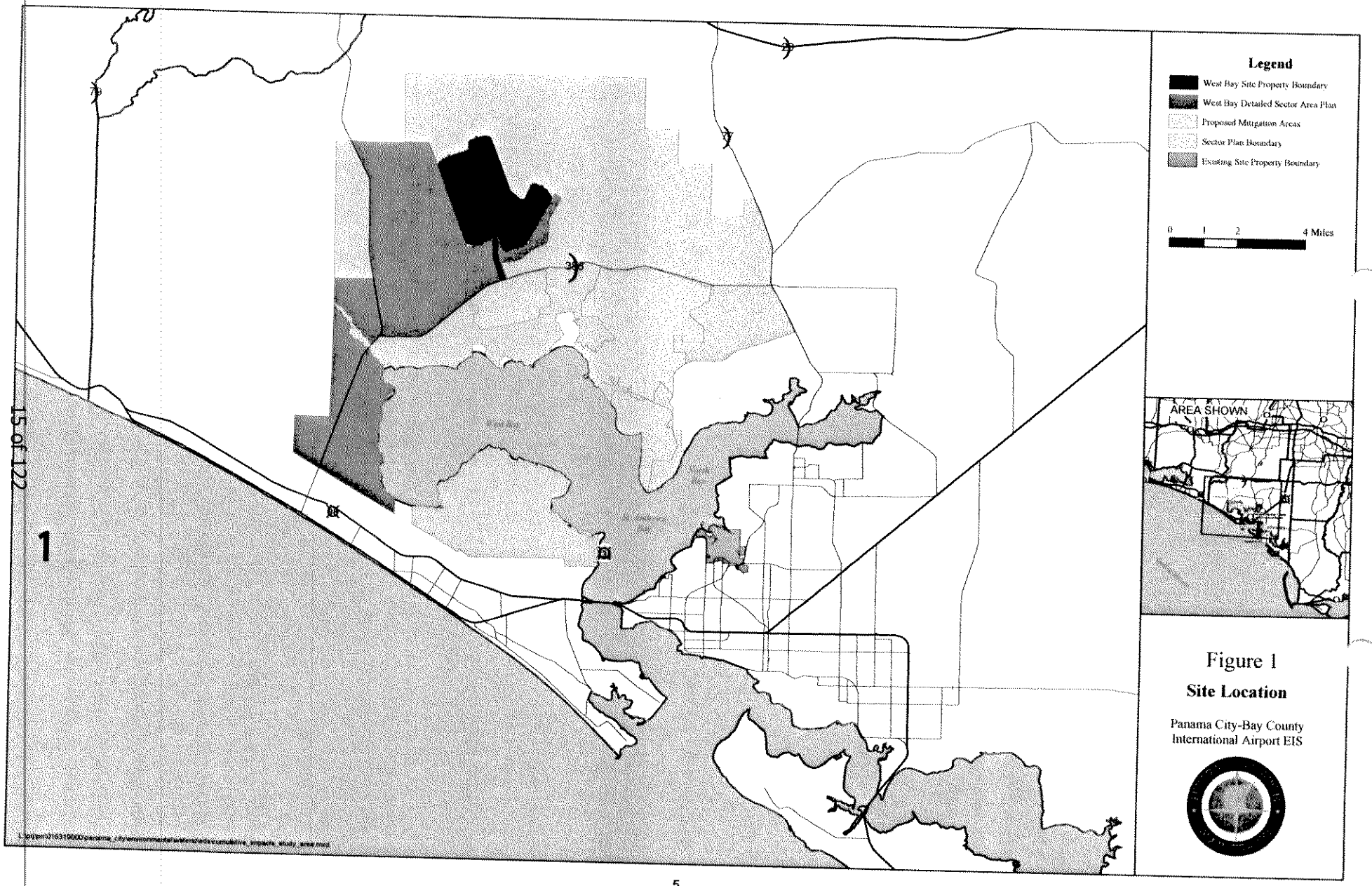


Figure 1
Site Location

Panama City-Bay County
International Airport EIS

Determination of effects

Based upon the low likelihood of direct or indirect impacts on these species as a result of the project, the Service concurs with the following determinations of effects. More detail regarding these species and potential effects of the project is found in the BA.

- **American alligator** (*Alligator mississippiensis*) - No Effect
  Confirmed on-site. American alligators are listed due to the similarity of appearance with the American crocodile. The project is not located within the range of the crocodile.

- **Eastern indigo snakes** (Drymarchon corais couperi) - No Effect
  No Eastern indigo snakes were observed during the field surveys of the West Bay Site or the mitigation parcels, and limited gopher tortoise habitat exists in the Action Area. Occurrences of this species are rare in northwest Florida.

- **Gulf moccasinshell mussel** (*Medionidas penicillatus*) - No Effect
  No Gulf moccansinshell mussels were observed during the field surveys of the West Bay Site and habitat does not exist for this species on the West Bay Site. Habitat could potentially occur downstream but the Action Area is outside the known range of this species.

- **Gulf sturgeon** (*Acipenser oxyrinchus desotoi*) - No Effect
  The designated critical habitat is located outside of the Action Area of the proposed project, and sturgeon are considered to be a transient species in West Bay. Additionally the proposed action would not directly or indirectly impact the West Bay estuary or the coastal rivers.

- **Oval pigtoe mussel** (*Pluerbema pyriforme*) - No Effect
  No oval pigtoe mussels were observed during the field surveys of the West Bay site and no habitat occurs on the West Bay site. Habitat could potentially occur downstream but the Action Area is outside the known range.

- **Piping plover** (*Charadrius melodus*) - No Effect
  The piping plover occurs on the non-breeding grounds from July 15-May 15. The habitats used by non-breeding piping plovers include beaches, mud flats, sand flats, algal flats, and washover passes. No suitable habitat occurs on the proposed airport site, therefore this project would not affect piping plover or any designated critical habitat. Mud and sand flats do occur along the proposed West Bay conservation area during periods of medium to low tide. There has been an incidental report of a piping plover using the area known as Marifarms which occurs within the proposed mitigation area. Protection of habitat adjacent to West Bay within the designated conservation area will have a beneficial impact to the species should they appear.

- **Red-cockaded woodpecker** (*Picoides borealis*) - No Effect
  Florida Natural Areas Inventory data contains a historical occurrence record located directly to the north of the mitigation parcels. No red-cockaded woodpeckers or cavity trees were seen during wildlife surveys in the Action Area. Almost all upland habitats have been converted to

silviculture and it has been determined that habitats were not suitable for the occurrence of the species.

- **Bald eagle** (*Haliaeetus leucocephalus*) - No Effect
  The Florida Fish and Wildlife Conservation Commission (FWC) Eagle Nest data base indicates there is an eagle nest (BA 007) located on Burnt Mill Creek. The data indicated the nest was active as late as 2003. Recent discussions with FWC indicate that the nest was also active in the 2004 and 2005 nesting seasons.

  No bald eagles or eagle nests were observed during the field surveys of the West Bay Site. Bald eagles were observed foraging in the salt marsh habitat of the proposed mitigation parcels by FAA consultants, and the Airport Sponsor's consultant has observed bald eagles flying over the mitigation parcels. No bald eagle nests have been identified on the mitigation parcels.

  The documented nest is located between two of the proposed mitigation parcels. The mitigation parcels are located outside the standard primary and secondary nest protection zones (1,500 feet) as defined in the *Habitat Management Guidelines for the Bald Eagle in the Southeast Region*. The nest is located approximately 2.5 miles from the West Bay Site, and FAA has determined in discussions with other experts that the flights to and from the airport will not create a significant disturbance to nesting activities.

- **Flatwoods salamander** (*Ambystoma cingulatum*) - Likely to Adversely Affect
  Intensive surveys for flatwoods salamanders were not feasible given the size of the action area and the extreme drought that occurred during most of the study period. Potential habitats have been assessed for their quality for both the West Bay Site and the proposed mitigation parcels. Interviews and discussions have resulted in the conclusion that the likelihood of a flatwoods salamander population occurring on the West Bay site is low-to-moderate. No flatwoods salamanders have been collected on site. Since multiple years of breeding pond surveys are required to definitively determine the absence of flatwoods salamanders, and because of the recently re-confirmed presence of flatwoods salamander larvae at nearby Pine Log State Forest, the possibility remains that the ponds on-site could potentially be used by flatwoods salamander. The pond site within Pine Log State Forest is approximately 2 miles from the West Bay Site. The Service concurs with this determination, which is the focus of the remaining analysis in this biological opinion.

FLATWOODS SALAMANDER

STATUS OF THE SPECIES/CRITICAL HABITAT

This section summarizes the biology and ecology of the flatwoods salamander. The Service uses this information to assess whether a Federal action is likely to jeopardize the continued existence of this species. The Environmental Baseline section summarizes information on status and trends of the species specifically within the action area. These summaries provide the foundation for the Service's assessment of the effects of the proposed action, as presented in the Effects of Action section, and to make the Conservation Recommendations listed at the end of this opinion.

The flatwoods salamander (*Ambystoma cingulatum*) is listed as a threatened species under the authority of the Endangered Species Act of 1973, as amended (Act). The flatwoods salamander was designated as threatened in the *Federal Register*, April 1, 1999 (64 FR 15691), and became effective on May 3, 1999. No critical habitat has been designated for this species. Recovery planning is underway, but no recovery plan has been adopted.

Species description

The flatwoods salamander is a slender, small-headed mole salamander that is seldom greater than 5 inches in length. Adult dorsal color ranges from black to chocolate-black with highly variable, fine, light gray lines forming a net-like or cross-banded pattern across the back. Undersurface is plain gray to black with a few creamy or pearl gray blotches or spots. Flatwoods salamander larvae are long and slender, broad-headed and bushy-gilled, with white bellies and striped sides (Ashton, 1992; Palis, 1995). Flatwoods salamanders are known to occur in isolated populations across the lower southeastern Coastal Plain, with the majority of the remaining known populations located in Florida.

Life history

Adult and sub-adult flatwoods salamanders live in underground burrows. Adult flatwoods salamanders move above ground to their wetland breeding sites during rainy weather, in association with cold fronts, from October to December (Palis, 1997). Typical breeding sites are isolated pond cypress *(Taxodium ascendens*), blackgum (*Nyssa sylvatica* var. *biflora*), or slash pine (*Pinus elliottii*) dominated depressions which dry completely on a cyclic basis. They are generally shallow and relatively small, and have a marsh-like appearance with sedges often growing throughout, and wiregrass (*Aristida* sp.), panic grasses (*Panicum* spp.), and other herbaceous species concentrated in the shallow water edges. After breeding, adult flatwoods salamanders leave the pond.

Optimum adult habitat for the flatwoods salamander is an open, mesic (moderate moisture) woodland of longleaf/slash pine (*Pinus palustris/P. elliottii*) flatwoods maintained by frequent fires, with a dominant ground cover of wiregrass (*Aristida spp.*). The ground cover supports a rich herbivorous invertebrate community that serves as a food source for the species (64 FR 15692).

In a study by Ashton (1992), flatwoods salamanders were found greater than 1,859 yards from their breeding pond. However, based on more recent data (Semlitsch, 1998) and additional peer review, the final listing rule recommends a 1,476-feet "buffer" around breeding ponds to protect the majority of a flatwoods salamander population from the adverse effect of certain specified, silvicultural practices. This buffer extends 1,476 feet out from the wetland edge.

Since they may disperse long distances from their breeding ponds to upland sites, desiccation can be a limiting factor. Thus, it is important that areas connecting their wetland and terrestrial habitats are conserved in order to provide cover and appropriate moisture regimes during their migration. High quality habitat for the flatwoods salamander includes a number of isolated wetland breeding sites within a fire maintained landscape of longleaf pine/slash pine flatwoods

having an abundant herbaceous ground cover (Sekerak, 1994). In Florida, Palis (1997) found that 70 percent of the active breeding sites were surrounded by second-growth longleaf or slash pine flatwoods with nearly undisturbed wiregrass ground cover.

Population dynamics

A flatwoods salamander population has been defined as those salamanders using breeding sites within 2 miles of each other, barring an impassable barrier such as a perennial stream (Palis, 1997). Since temporary ponds are not likely permanent fixtures of the landscape due to succession, there would be inevitable extinctions of local populations (Semlitsch, 1998). By maintaining a mosaic of ponds with varying hydrologies, and by providing terrestrial habitats for adult life stages and colonization corridors, some prevention of local population extinction can be achieved. A mosaic of ponds would ensure that appropriate breeding conditions would be achieved under different climate regimes. Colonization corridors would allow movement of salamanders to new breeding sites or previously occupied ones (Semlitsch, 1998).

Fire is needed to maintain the natural pine flatwoods community. The disruption of the natural fire cycle has led to an increase of slash pine on areas previously dominated by longleaf pine, increases in hardwood understory and canopy, and subsequent decreases in herbaceous ground cover (64 FR 15701). Isolated ponds that are surrounded with pine plantations and are protected from fire may become unsuitable breeding sites for the flatwoods salamander. This is a result of canopy closure and the reduction in herbaceous vegetation necessary for egg deposition and larval development (Palis, 1993).

Status and distribution

Historical records for the flatwoods salamanders in its range are limited. Longleaf pine/slash pine flatwoods historically occurred in a broad band across the lower southeastern Coastal Plain. The flatwoods salamander likely occurred in appropriate habitat throughout this area (64 FR 15691). Range-wide surveys in Alabama, Florida, Georgia, and South Carolina have been ongoing since 1990 in an effort to locate new populations. Most surveys were searches for the presence of larvae in the grassy edges of ponds.

The combined data from the surveys completed since 1990 indicate that 59 populations of flatwoods salamanders are known from across the historical range. Most of these occur in Florida (47 populations or 80 percent). Eight populations have been found in Georgia, four in South Carolina, and none have been found in Alabama. Some of these populations are inferred from the capture of a single individual. Slightly more than half the known populations for the flatwoods salamander occur on public land (40 of 59, or 68 percent).

ENVIRONMENTAL BASELINE

Status of the species within the action area

Historical data on flatwoods salamanders in the action area is limited. Most of the area is privately owned and has been intensively managed for silviculture for many years. Little

remains of the natural terrestrial landscape. Almost all uplands and most wetlands were converted to pine plantations with site preparation that included clear cutting, roller chopping, herbicide application, and bedding. In addition, pine flatwoods are not considered wetlands under State of Florida best management practices for silviculture; therefore, this habitat type receives no special consideration when converted and managed for industrial forestry.

There is one documented occurrence of flatwoods salamanders in nearby Washington County in Pine Log State Forest and one recent record in Walton County. The Walton County record is for one individual at one location in Point Washington State Forest. The documented occurrence within the State Forest is approximately 2 miles from the Action Area.

West Bay Site

Listed species surveys were conducted by FAA in November 2001 and February 2003 on the initial 8,000-acre study area, which includes the West Bay Site. During the February 2003 surveys, twenty-two potential breeding ponds were sampled for flatwoods salamander larvae (***Table 1***). Pond locations are illustrated on ***Figure 2***. Only 10 sites are located within the West Bay Site and only 4 sites (D, F, I and W) are located within the initial development phase of the proposed action. Subsequent to the listed species surveys, the Service and John Palis observed an additional pond just south of Pond W. Although this pond was not sampled by the Service or John Palis, it was noted that the habitat appeared to be potentially suitable for flatwoods salamander breeding. During both the November 2001 and February 2003 listed species surveys conducted by FAA, conditions were not suitable (little to no water) within this potential breeding pond to sample. Thus, this pond was not included in the habitat suitability analysis.

Sampling conditions were considered good for most pond sites; however, the survey was conducted towards the end of a severe drought in the area. A total of six hours of dip netting was completed as part of the survey of the twenty-two potential breeding ponds. No flatwoods salamander larvae were found during the surveys; however, larvae of the mole salamander (*Ambystoma talpoideum*) were collected. Additionally, adults were searched for opportunistically during the fall and winter wildlife surveys (November 2001 and February 2003).

The potential habitats on the West Bay Site are not known to support flatwoods salamanders. The potential breeding ponds that are on the site are located in pine plantations presently managed for silviculture. The decline of flatwoods salamander populations in association with silviculture activities has been well documented. The suppression of a routine fire regime results in a dense forested condition that excludes the herbaceous ground cover which is the primary habitat for sub-adult and adult flatwoods salamanders. In addition, silviculture activities include intensive site preparation. Therefore, the lands are not optimally suited for supporting flatwoods salamanders. However, there are recorded occurrences of flatwoods salamander in similar areas where the upland and wetland habitats have been impacted by silviculture.

The surveyed ponds were evaluated after-the-fact utilizing field notes and the habitat suitability method that was developed by HDR, Inc., USFWS, FWC, and FDOT to evaluate potential habitats surrounding the widening of US Highway 98 project. The method uses a scoring system

to evaluate the quality of potential salamander breeding ponds. Scores are developed (1 to 3) for the quality of the pond, the graminaceous ecotone (grassy area surrounding the pond), and the upland around the pond. Scores are only given for the upland if the pond and ecotone scores add up to 3. The total score rates the ponds for their quality and the potential to be used by salamanders as: None, Low, Low-Moderate, Moderate, Moderate-High, and High.

Using the field descriptions completed during the February 2003 listed species surveys, scores were assigned to the potential breeding ponds on the West Bay Site. It was assumed that the upland score correlated to the standard score for pine plantation unless the field notes indicated that conditions were different.

Of the pond sites located within the Action Area, six sites received a score of low, one site a score of low-moderate and three sites a score of moderate. The pond observed by the Service, which is located near Pond W in an area of hydric pine flatwoods, was noted as being dry during field sampling conducted by FAA during fall 2001 and winter 2003 listed surveys. This pond was not included in the analysis, but appeared to be of moderate-high condition according to the Service biologist and contained sufficient water to support breeding activity at the time of the survey by the Service.

Table 1 West Bay Site Flatwoods Salamander Potential Breeding Pond Evaluations [1]

Pond Label	Pond	Ecotone	Upland	Total score (Quality)	Description/Field Notes
A	2	1	1	4 (Low-Mod)	Cypress pond with water depths up to one foot, featuring no aquatic vegetation
B	1	1		Low	Myrtle-leafed holly wetland that had no standing water.
C	1	1		Low	A historic cypress pond that had been logged and burned. The water depth in the pond was up to two feet deep. Vegetation in the pond included: broom sedge, dog fennel, and St. John's wort. Minimal cypress regeneration had occurred and the area had been replanted with slash pine.
*D	1	0		Low	A mixed hardwood and cypress swamp with titi. Described as not suitable flatwoods salamander habitat.
*F	3	1	0	4 (Low-Mod)	Cypress pond surrounded by intensively bedded pine plantation. The pond was described as excellent larval habitat, but the surrounding habitat has been highly disturbed.
G	2	2	0	4 (Low-Mod)	No cypress, sedge dominated ground cover under a slash pine overstory.
H	1	1		Low	Titi dominated shrub swamp with a few scattered cypress. No submerged or emergent aquatic vegetation present within the pond.
*I	1	1		Low	A small titi swamp with a few cypress and sweet bays. The pond was surrounded by newly clearcut pine plantation. There was no wire grass present at the site.
*J	1	1		Low	This cypress dome had recently been clearcut and all of the cypress had been removed.
*K	1	1		Low	This cypress dome had also recently been clearcut and all of the cypress had been removed.
*L	1	1		Low	A deep pond surrounded by mesic to xeric clearcut pine.
M	1	1		Low	A cypress and pine bog that had no water.
N	1	1		Low	A bay, slash pine and cypress drained swamp. A one meter deep ditch drains the swamp. The swamp was dry.
O	1	0		Low	A dense titi thicket with scattered cypress. Little water present.
*P	2	2	1	5 (Mod)	Cypress swamp with St. John's wort fringe. The pond was deep.
*Q	2	2	1	5 (Mod)	A slash pine and cypress swamp with less than 18 inches of water.
*R	1	1		Low	A myrtle-leafed holly wetland that was dry.
S	1	1		Low	A former cypress pond that had been logged. The pond is now titi dominated.
T	1	1		Low	A titi wetland that had very little water.
U	2	2	1	5 (Mod)	A cypress, slash pine, and titi wetland with wiregrass in the littoral zone. Described as good flatwoods salamander habitat.
V	1	1		Low	A cypress, titi, and slash pine seep with one foot of water. No wiregrass was present.
*W	2	2	1.5	5.5 (Mod)	A cypress and black gum swamp described as the best flatwoods salamander habitat that had been observed. There was also titi and myrtle-leafed holly. Mole salamander larvae and eggs were collected in this pond.

Source: Kimley-Horn and Associates, Inc. 2005

[1]Evaluation based on field data collected during listed species surveys conducted in February 2003.

*Pond sites located within Action Area.

Figure 2

Location of Flatwood Salamander Ponds

West Bay Site

Panama City-Bay County International Airport EIS

Proposed Mitigation Parcels

Through field reviews, the Airport Sponsor evaluated 120 wetlands on the mitigation parcels for their likelihood of being suitable flatwoods salamander breeding ponds. The wetland locations are illustrated on ***Figure 3***. These wetlands were also evaluated using the HDR method. Results indicate that there were 50 ponds considered Low, 27 considered Low- Moderate, 6 Moderate, and 37 with no potential. The scores and pond descriptions are attached as *Appendix A*.

The Florida Fish and Wildlife Conservation Commission (FWC) surveys potential habitats on public lands for the presence of flatwoods salamanders. An evaluation of salamander populations indicates that small localized populations are present throughout northwest Florida with one known breeding pond within approximately 2 miles of the project site. Airport Sponsor discussions with FWC biologists as described in the biological assessment indicate that the habitats on the West Bay Site are not optimal to support populations of flatwoods salamanders. These discussions indicate that habitats on the site have been extensively altered for silviculture. FWC comments are based on generalized observations of the Action Area through windshield surveys and local knowledge of the area. Specific sampling of the Action Area has not been conducted by the FWC biologists.

There is no set protocol at this time for providing reasonable assurance that salamanders do not occur at a particular location. However, the consensus among herpetologists is that a reasonable effort would consist of drift fence surveys surrounding a potential breeding pond to be conducted in two consecutive "normal" weather years. There has not been an opportunity to adequately survey for the presence or absence of flatwoods salamanders in any of the potentially suitable habitats. However, based on the remote sensing analysis, site inspections, and the proximity to known locations, the Federal Aviation Administration presumes presence of flatwoods salamanders at four potential locations that were scored as moderate quality. This appears to be a reasonable approach given the size of the project area and the limited timeframe to conduct surveys. Positive results from any future surveys would require re-initiation of section 7 consultation if there is a potential to affect suitable habitat not addressed in the incidental take section of this opinion.

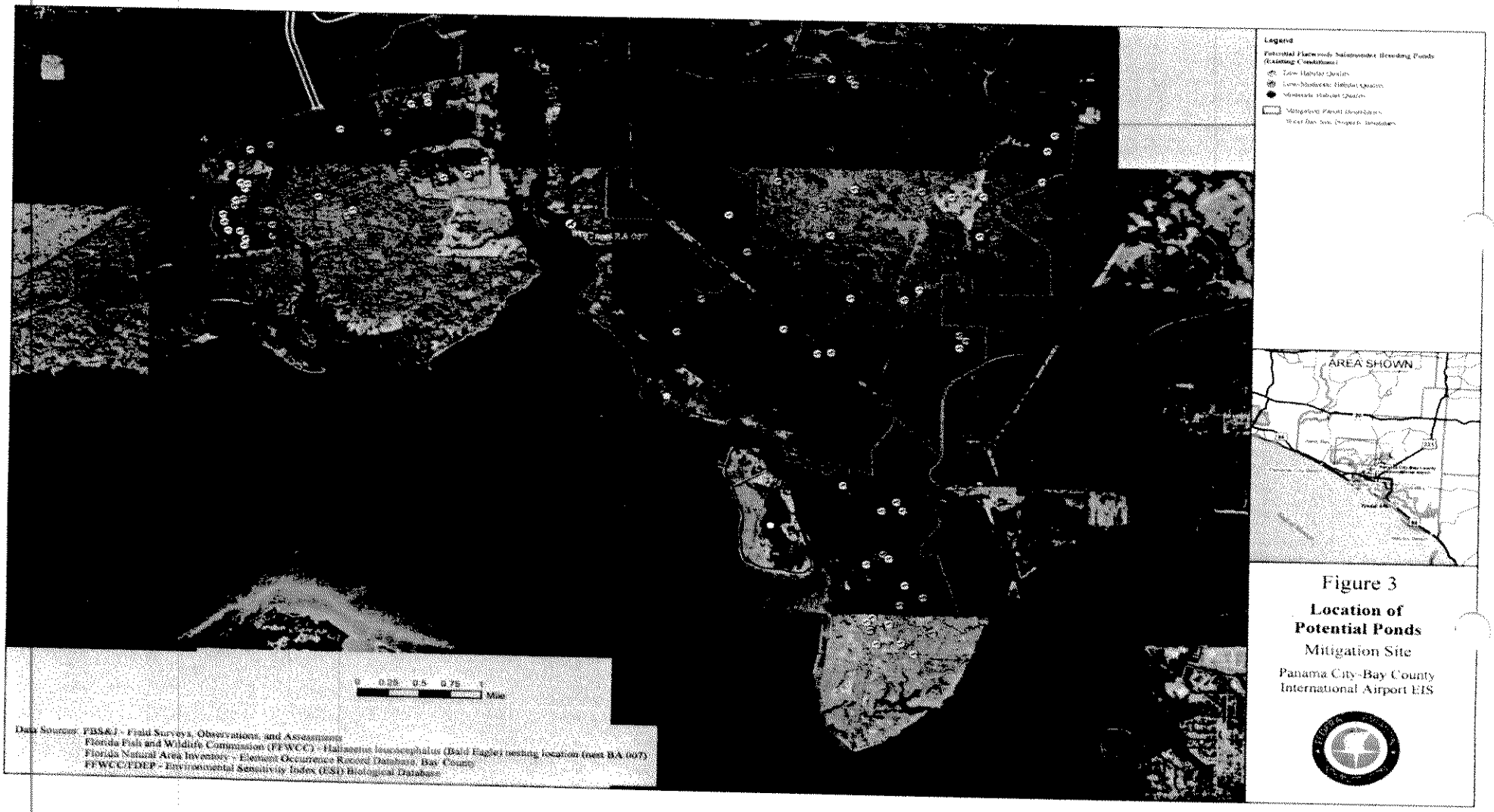


Figure 3

Location of Potential Ponds

Mitigation Site

Panama City-Bay County International Airport EIS

Factors affecting species environment within the action area

West Bay Sector Plan - Bay County officials recently conducted a special planning effort for an area totaling approximately 75,000 acres. This area is the boundary for the Cumulative Impacts Analysis Section of this opinion. The West Bay Sector Plan (Sector Plan) identifies potential development and conservation strategies for the area, and is dependent on relocation of the Panama City/Bay County International Airport. Although the Sector Plan may encourage and accelerate development, it could reduce adverse effects in comparison to existing land use regulations. There are no known flatwoods salamander records within the sector planning area. Potential habitat occurs in a proposed sector conservation area that coincides with the Breakfast Point mitigation bank and in the approximately 30,000 acres identified as the West Bay Preservation Area.

Public Lands - Pine Log State Forest is in proximity to the proposed airport location immediately adjacent to the sector planning area, but not located within the project area. The forest is actively managed in a manner that should improve salamander populations. There is one documented occurrence of flatwoods salamanders in the State Forest approximately 2 miles from the West Bay Site.

EFFECTS OF THE ACTION

The relocation of the Panama City-Bay County International Airport (PFN) is designed to meet projected future aviation needs within the Panama City-Bay County region. It has also been promoted by local officials as a key element in future economic growth for the area. The proposed project would relocate aviation facilities of the PFN and its operations to the West Bay Site. The project would consist of an airfield and terminal facilities, and include a primary air carrier runway 8,400 feet in length by 150 feet in width and a general aviation crosswind runway 5,000 feet in length by 100 feet wide. This system would be supported by the necessary ancillary facilities including taxiways, terminal area facilities, general aviation facilities, air traffic control and emergency facilities, lighting, and navigation facilities. The project would initially develop 1,378 acres of the 4,037-acre site. The project site is currently rural timberland used for the paper and wood products industry. Approximately 1,929 acres of the entire site are jurisdictional wetlands. The proposed project also includes three (3) parcels that would be used as mitigation for wetland impacts at the West Bay Site. These parcels are also presently rural timberlands and cover an area of 9,718 acres.

Direct effects

Effects of the project on salamander habitat are based on two important premises: 1) best available methods were used to identify potential habitat, and 2) presence of salamanders is presumed for these areas although none have been documented. The BA identifies specific direct effects of the project which include development of any potential flatwoods salamander habitats within the 4,037 acres of the West Bay relocation site. The BA identifies ten ponds (D, F, I, J, K, L, P, Q, R and W) that would be lost during the development of the airport parcel. Seven of these ponds were rated as low or low to moderate quality as potential flatwoods salamander habitat. The remaining three ponds were rated as moderate quality. These three

ponds and their associated upland buffer are approximately 475.5 acres in size. If the depressional wetland noted by the Service, but not sampled by FAA due to poor sampling conditions, is included, the four ponds and the associated buffer are a total of 584.3 acres in size.

Potential benefits may be gained on the mitigation parcels where 50 ponds considered Low, 27 considered Low – Moderate, and 6 considered Moderate quality will be enhanced by the more natural management of fire and hydrology. The management of the mitigation parcels may return these lands to a natural flatwoods condition after years of intensive silviculture. Although beneficial effects are encouraged and acknowledged, they are not considered as an offset to direct effects.

Indirect effects

Flatwoods salamanders are thought to be sensitive to soil and groundcover disturbing activities, especially when that disturbance creates an impediment to movement from upland habitat to the ephemeral wetlands they use for breeding and larval development. For this project, however, all of the potential breeding areas on site will be eliminated; therefore movement to and from, and among, wetlands is a moot point. Soil disturbance can also result in potential sedimentation and erosion affecting nearby wetlands habitat. Again, all potential wetland habitat on site eventually will be eliminated. In addition, because most of the perimeter of the project site will be maintained with minimal soil disturbance as "cleared areas" with little construction, the potential for sedimentation and erosion off-site is limited.

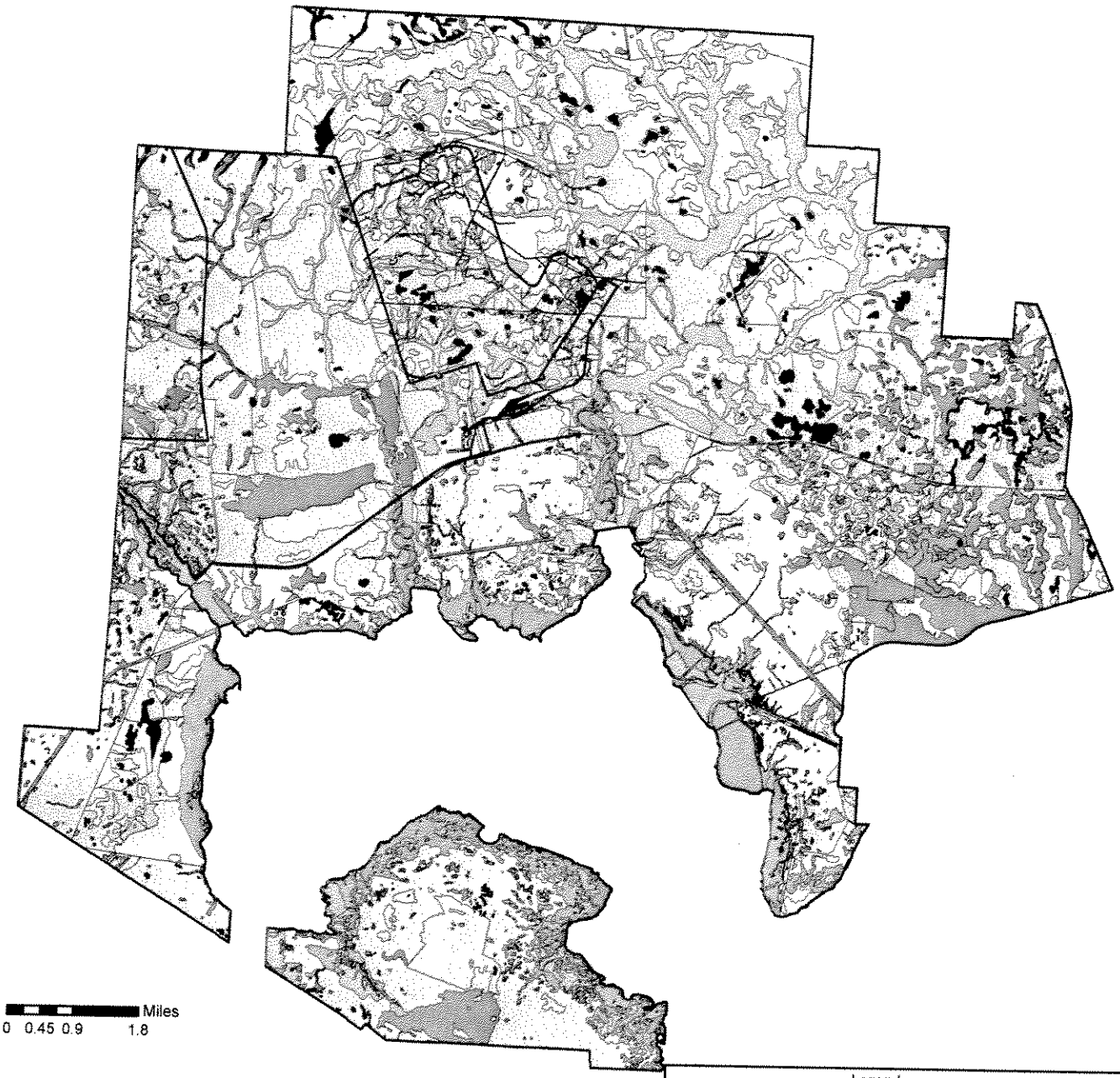
The Florida Department of Environmental Protection identified potential indirect effects to the regional water table which, if realized, could alter the hydrology of surrounding wetlands. This effect is still uncertain and according to the Airport Sponsor, it would be difficult to detect due to the intense monitoring scheme that would be required.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Private development would likely be accelerated outside of the project area. A state/local planning process for potential future development in the region has resulted in the development of the West Bay Area Sector Plan. This boundary is being used to evaluate the cumulative effects of the proposed action. Future Federal actions that are unrelated to the proposed project are not considered in this opinion because they require separate consultation pursuant to section 7 of the Endangered Species Act.

Analysis of Potential Flatwoods Salamander Habitat

The habitats of the Sector Plan area were calculated using GIS analysis. The current land use coverage from the Northwest Water Management District was employed to describe the wetland vegetative cover types within the Sector Plan area (***Figure 4***). Additional habitat information was included for the West Bay Site and the mitigation parcels. These habitats are assumed to be present on the ground currently. *Figure 4* can be compared to Bay County's future land use graphic and the Sector Plan (***Figures 5 and 6***).



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Legend

- 1000 Urban
- 1500 Industrial
- 1720 Religious
- 2100 Cropland and Pastures
- 2540 Aquaculture
- 3200 Shrub and Brushland
- 3220 Coastal Shrub
- 4100 Upland Coniferous Forest
- 4230 Oak-Pine-Hickory
- 4270 Live Oak
- 4340 Hardwood-Conifer Mixed
- 4360 Upland Scrub, Pine and Hardwoods
- 4410 Coniferous Plantations
- 4430 Forest Regeneration Areas
- 5000 Water
- 6001 Wet Planted Pine
- 6100 Wetland Hardwood Forest
- 6130 Gum Swamps
- 6140 Tilt Swamps
- 6150 Stream and Lake Swamps
- 6200 Wetland Coniferous Forests
- 6210 Cypress
- 6250 Hydric Pine Flatwoods
- 6251 Hydric Pine Flatwoods
- 6300 Wetland Forested Mix
- 6310 Wetland Shrub
- 6400 Vegetated Non-Forested Wetlands
- 6410 Freshwater Marshes
- 6420 Saltwater Marshes
- 6430 Wet Prairies
- 6440 Emergent Aquatic Vegetation
- 6470 Herbaceous Depression
- 6480 Hillside Seep
- 6510 Tidal Flats
- 6520 Shorelines
- 6560 Tidal Marshes
- 6900 Shrub Wetland
- 7100 Beaches other the Swimming
- 7200 Sand other than Beaches
- 8000 Man-made Infrastructure
- West Bay Area Sector Plan

Notes:
1. Land Use Data from the Northwest Florida Water Management District (NWFWMD) and on-site surveys.
2. Future land use is defined in the Bay County Comprehensive Plan.

Figure 4

Bay County Land Cover

Panama City-Bay County International Airport EIS

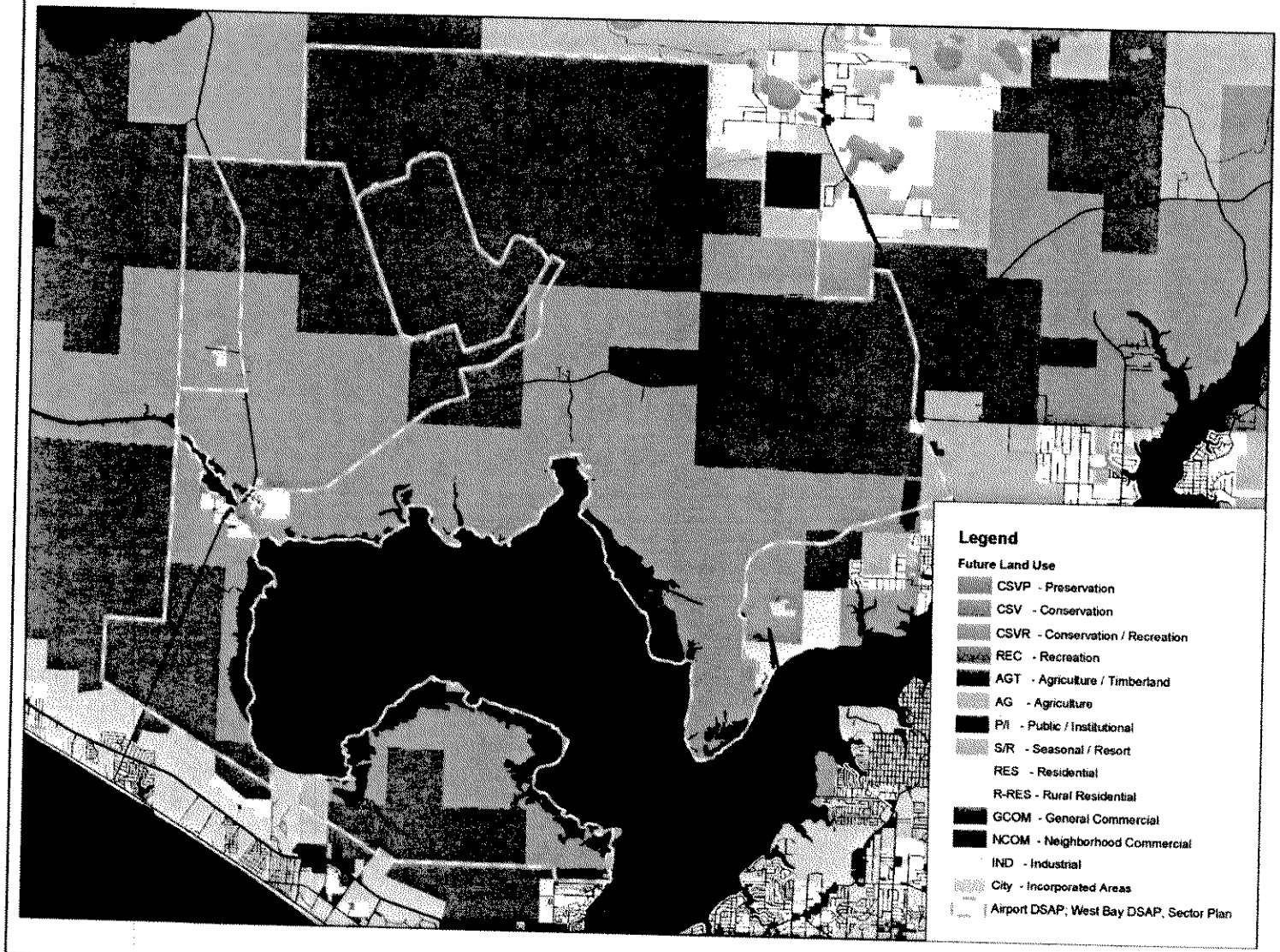

Figure 5

Future Land Use

Panama City-Bay County
International Airport EIS

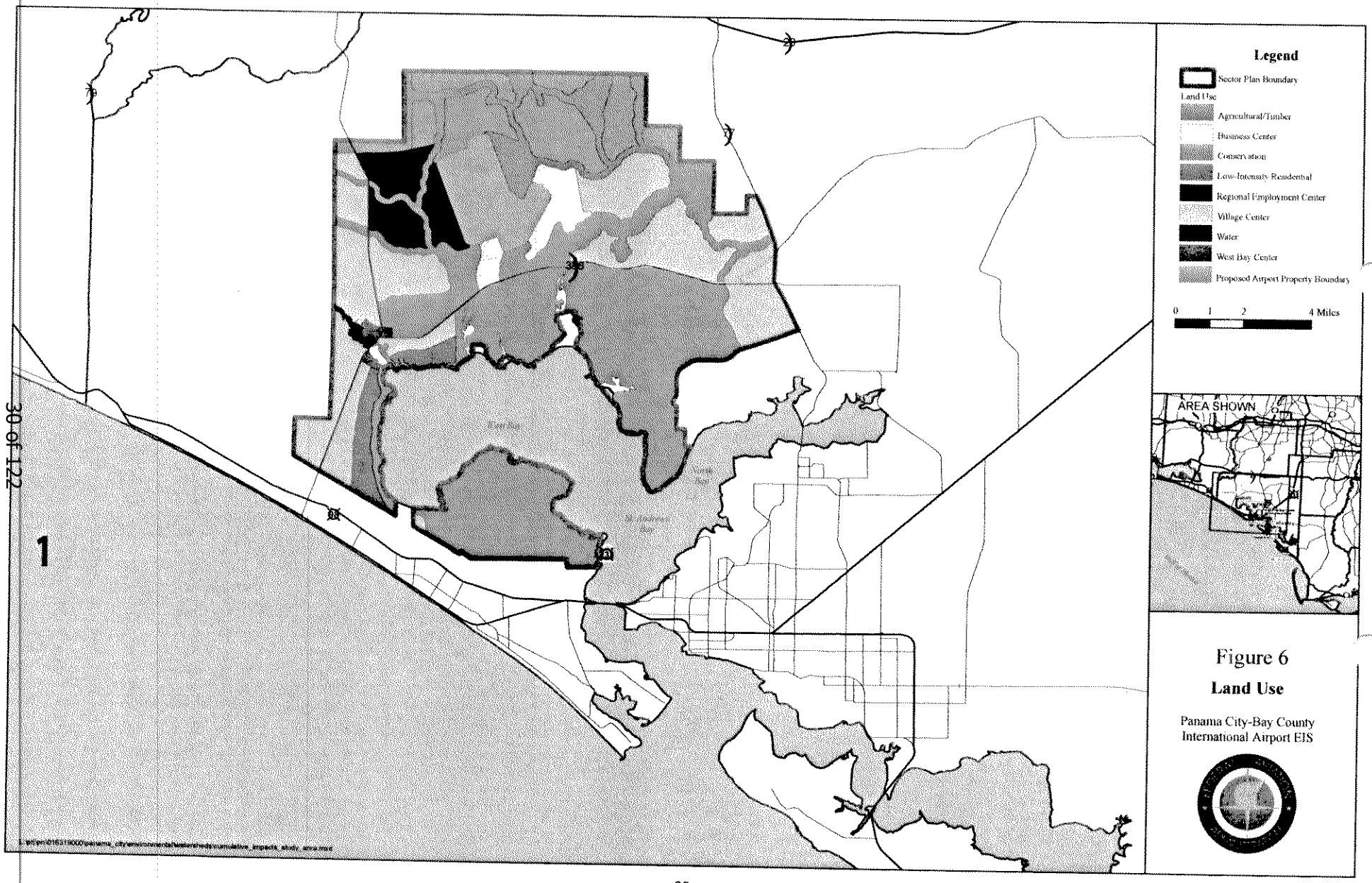

Figure 6

Land Use

Panama City-Bay County International Airport EIS

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The Sector Plan area land uses described as wetlands are summarized in ***Table 2***. The potential use of the wetland types by flatwoods salamanders is noted as the FS Potential Association.

These FS Potential Association classifications are different than the breeding pond quality descriptions. Within the Sector Plan area, 33,396 acres are described as wetlands. This summation suggests that there are 1,048 acres that have a "good" potential to support flatwoods salamander reproduction. This analysis over estimates the potential habitat because of the difficulty in estimating appropriate microhabitats for the salamander based on regional geographic analysis (although it is the only way to assess these habitats on such a large regional scale).

Table 2 Wetland Habitats within the Sector Planning Area

FLUCFCS CODE	DESCRIPTION	ACREAGE	FS POTENTIAL ASSOCIATION
6001	Wet Planted Pine	13,409.92	Medium
6100	Wetland Hardwood Forests	3.03	Medium
6130	Gum Swamps	55.05	Medium
6140	Titi Swamps	7,355.53	Poor
6150	Streams and Lake Swamps (Bottomland)	29.84	Poor
6200	Wetland Coniferous Forests	497.75	Medium
6210	Cypress	864.07	Good
6250	Hydric Pine Flatwoods	175.84	Good
6300	Wetland Mixed Forests	6,107.52	Poor
6310	Wetland Scrub	4.91	Poor
6400	Vegetated Non-Forested Wetlands	60.14	Medium
6410	Freshwater Marshes	345.70	Poor
6420	Saltwater Marshes	3,987.99	None
6430	Wet Prairies	2.82	Good
6440	Emergent Aquatic Vegetation	4.22	Poor
6470	Herbaceous Depression	6.01	Good
6480	Hillside Seep	3.66	Poor
6510	Tidal Flats	306.23	None
6520	Shorelines	3.13	None
6900	Shrub wetland	173.07	Medium
	Total Wetlands in Sector Plan Area	33,396.43	

In order to evaluate potential cumulative effects in the study area, two scenarios of future development were utilized. The acreages of wetlands and the predicted future land use of the study area are summarized in ***Table 3***. The predicted land use is based on the existing Future Land Use Map (FLUM) from the Bay County Comprehensive Plan (Updated 5/4/2005) for 2010. The existing FLUM is used because any development projects within the study area which are less than 1,000 acres are not required to adhere to the principles of the Sector Plan. These calculations give insight into which wetland types would be conserved (potentially restored), left in agricultural and silviculture activities, and potentially destroyed by development.

Table 3 Wetland Habitats Based on Bay County Future Land Use Map			
FLUCFCS CODE	DESCRIPTION	ACREAGE	FS POTENTIAL ASSOCIATION
Agriculture			
6001	Wet Planted Pine	81.77	Medium
6140	Titi Swamps	81.16	Poor
6200	Wetland Coniferous Forests	1.57	Medium
6210	Cypress	9.17	Good
6300	Wetland Mixed Forests	111.45	Poor
6310	Wetland Shrub	7.94	Medium
6410	Freshwater Marshes	1.23	Poor
6420	Saltwater Marshes	7.02	None
6510	Tidal Flats	3.90	None
	Total Wetlands	305.21	
Silviculture			
6001	Wet Planted Pine	6,019.39	Medium
6100	Wetland Hardwood Forests	0.15	Medium
6140	Titi Swamps	4,386.58	Poor
6141	Titi-Bay-Pine Swamp	441.06	Poor
6200	Wetland Coniferous Forests	409.17	Medium
6210	Cypress	611.54	Good
6300	Wetland Mixed Forests	2,801.97	Poor
6310	Wetland Shrub	23.29	Medium
6400	Vegetated Non-Forested Wetlands	13.65	Medium
6410	Freshwater Marshes	72.33	Poor
6420	Saltwater Marshes	88.49	None
6510	Tidal Flats	2.10	None
6560	Shorelines	0.53	None
	Total Wetlands	14,870.25	
City			
6200	Wetland Coniferous Forests	0.11	Medium
6300	Wetland Mixed Forests	0.03	Poor
6310	Wetland Shrub	0.69	Medium
6410	Freshwater Marshes	1.02	Poor
6510	Tidal Flats	0.01	None
	Total Wetlands	1.86	
Conservation			
6001	Wet Planted Pine	7,252.37	Medium
6100	Wetland Hardwood Forests	2.54	Medium
6130	Gum Swamps	39.89	
6140	Titi Swamps	1586.61	Poor
6141	Titi-Bay-Pine Swamp	60.33	Poor
6150	Streams and Lake Swamps (Bottomland)	29.86	Poor
6200	Wetland Coniferous Forests	86.11	Medium
6210	Cypress	175.16	Good
6250	Hydric Pine Flatwoods	129.14	Good
6300	Wetland Mixed Forests	3,113.77	Poor
6310	Wetland Shrub	103.48	Poor
6400	Vegetated Non-Forested Wetlands	46.54	Medium
6410	Freshwater Marshes	267.97	Poor
6420	Saltwater Marshes	1,756.12	None
6430	Wet Prairies	2.82	Good
6440	Emergent Aquatic Vegetation	7.05	Poor
6470	Herbaceous Depression	3.58	Medium
6510	Tidal Flats	41.23	None
6520	Shorelines	2.82	None
	Total Wetlands	14,707.39	

Preservation			
6001	Wet Planted Pine	0.23	Medium
6140	Titi Swamps	34.0	Poor
6141	Titi-Bay-Pine Swamp	0.05	Poor
6300	Wetland Mixed Forests	0.11	Poor
6420	Saltwater Marshes	33.71	None
6520	Shorelines	0.50	None
	Total Wetlands	68.60	
General Commercial			
6001	Wet Planted Pine	0.02	Medium
	Total Wetlands	0.02	
Industrial			
6001	Wet Planted Pine	0.13	Medium
6300	Wetland Mixed Forests	0.87	Poor
6410	Freshwater Marshes	0.18	Poor
	Total Wetlands	1.18	
Public Institutional			
6001	Wet Planted Pine	4.97	Medium
6210	Cypress	8.41	Good
6300	Wetland Mixed Forests	7.31	Poor
	Total Wetlands	20.69	
Residential			
6001	Wet Planted Pine	52.14	Medium
	Total Wetlands	52.14	

Source: Kimley-Horn and Associates, Inc. 2005, based on Bay County Future Land Use Geographic Information System (GIS) data.

Future land use data indicates that of the approximately 33,000 acres of wetlands in the study area, 14,775 acres of wetlands would be on conservation lands, which actually allow up to two residential density units per acre depending on the special treatment zone in which they occur. The largest portion, 14,870 acres, would still be managed intensively for silviculture under the FLUM. The potential impacts to wetlands within general commercial, industrial, public institutional and residential land uses (including "conservation") are difficult to predict. However, the majority of those wetland types described as good are projected to be in "conservation" or remain in silviculture according to the existing FLUM. All wetlands in Table 3 would be subject to either state or federal regulatory requirements or both.

The second scenario for evaluating potential future cumulative impacts uses the Sector Plan overlay. The acreages of wetlands and the predicted Sector Plan land use are summarized in ***Table 4.*** These calculations give insight into which wetland types would be conserved (potentially restored), left in agricultural and silviculture activities, and potentially destroyed by development.

Table 4 Wetland Habitats Based on Sector Plan Land Use			
FLUCFCS CODE	**DESCRIPTION**	**ACREAGE**	**FS POTENTIAL ASSOCIATION**
Agriculture/Timber			
6001	Wet Planted Pine	1,121.88	Medium
6140	Titi Swamps	1,278.25	Poor
6141	Titi-Bay-Pine Swamp	38.01	Poor
6200	Wetland Coniferous Forests	99.91	Medium
6210	Cypress	147.30	Good
6300	Wetland Mixed Forests	64.13	Poor
6310	Wetland Shrub	16.98	Medium
6410	Freshwater Marshes	1.08	Poor
6560	Shorelines	0.53	None
	Total Wetlands	2,768.07	
Airport			
6001	Wet Planted Pine	953.01	Medium
6140	Titi Swamps	556.18	Poor
6141	Titi-Bay-Pine Swamp	216.51	Poor
6210	Cypress	59.24	Good
6250	Hydric Pine Flatwoods	46.43	Good
6300	Wetland Mixed Forests	42.17	Poor
6310	Wetland Shrub	1.41	Poor
6410	Freshwater Marshes	2.23	Poor
6470	Herbaceous Depression	2.44	Good
6480	Hillside Seep	2.63	Poor
	Total Wetlands	1,882.25	
Business Center			
6001	Wet Planted Pine	444.61	Medium
6140	Titi Swamps	243.07	Poor
6141	Titi-Bay-Pine Swamp	199.75	Poor
6210	Cypress	36.39	Good
6300	Wetland Mixed Forests	13.78	Poor
6310	Wetland Shrub	1.22	Poor
6400	Vegetated Non-Forested Wetlands	8.93	Poor
6410	Freshwater Marshes	0.60	Poor
6470	Herbaceous Depression	2.92	Good
	Total Wetlands	951.27	
Conservation			
6001	Wet Planted Pine	8,533.02	Medium
6100	Wetland Hardwood Forests	2.54	Medium
6130	Gum Swamps	55.1	Medium
6140	Titi Swamps	3,756.50	Poor
6141	Titi-Bay-Pine Swamp	249.74	Poor
6150	Streams and Lake Swamps (Bottomland)	29.86	None
6200	Wetland Coniferous Forests	229.57	Medium
6210	Cypress	111.687	Good
6250	Hydric Pine Flatwoods	129.55	Good
6300	Wetland Mixed Forests	3,652.28	Poor
6310	Wetland Shrub	0.44	Poor
6400	Vegetated Non-Forested Wetlands	38.29	Poor
6410	Freshwater Marshes	240.70	Poor
6420	Saltwater Marshes	3,598.82	None
6430	Wet Prairies	2.82	Good
6440	Emergent Aquatic Vegetation	4.23	Poor
6470	Herbaceous Depression	0.66	Good
6510	Tidal Flats	292.50	None
6520	Shorelines	3.13	None
6900	Shrub wetland	88.55	Medium

	Total Wetlands	21,058.24	
Low Intensity Residential			
6001	Wet Planted Pine	718.45	Medium
6200	Wetland Coniferous Forests	4.88	Medium
6210	Cypress	73.02	Good
6300	Wetland Mixed Forests	10.08	Poor
6410	Freshwater Marshes	8.31	Poor
6420	Saltwater Marshes	215.81	None
6900	Shrub wetland	0.423	Medium
	Total Wetlands	1,030.97	
Regional Employment Center			
6001	Wet Planted Pine	197.98	Medium
6140	Titi Swamps	232.935	Poor
6141	Titi-Bay-Pine Swamp	14.69	Poor
6200	Wetland Coniferous Forests	3.34	Medium
6210	Cypress	15.71	Good
6300	Wetland Mixed Forests	106.10	Poor
6310	Wetland Shrub	1.85	Poor
6480	Hillside Seep	1.03	None
6900	Shrub wetland	0.412	Medium
	Total Wetlands	574.05	
Roads			
6001	Wet Planted Pine	90.22	Medium
6140	Titi Swamps	8.93	Poor
6200	Wetland Coniferous Forests	7.24	Medium
6210	Cypress	2.57	Good
6300	Wetland Mixed Forests	28.09	Poor
6420	Saltwater Marshes	1.00	None
6900	Shrub wetland	0.34	Medium
	Total Wetlands	138.39	
Village Center			
6001	Wet Planted Pine	1,444.03	Medium
6100	Wetland Hardwood Forests	0.49	Medium
6140	Titi Swamps	567.67	Poor
6200	Wetland Coniferous Forests	152.76	Medium
6210	Cypress	419.60	Good
6300	Wetland Mixed Forests	2,176.65	Poor
6400	Vegetated Non-Forested Wetlands	12.98	Poor
6410	Freshwater Marshes	94.61	Poor
6420	Saltwater Marshes	30.41	None
6900	Shrub wetland	58.39	Medium
	Total Wetlands	4,957.59	
Water			
6300	Wetland Mixed Forests	29.70	Poor
6420	Saltwater Marshes	36.74	None
6510	Tidal Flats	1.18	None
	Total Wetlands	67.62	
West Bay Center			
6001	Wet Planted Pine	2.70	Medium
6300	Wetland Mixed Forests	23.10	Poor
6410	Freshwater Marshes	1.05	Poor
6420	Saltwater Marshes	0.43	None
6900	Shrub wetland	8.92	Medium
	Total Wetlands	36.20	

Source: Kimley-Horn and Associates, Inc. 2005, based on Bay County Sector Plan (GIS) data.

Within the region, large-scale mitigation parcels are proposed for up to 25,066 acres. These would be comprised of the mitigation parcels for the proposed action (9,718 acres),

West Bay to East Walton Regional General Permit conservation units (10,700 acres), and Breakfast Point Mitigation Bank (4,648 acres). These lands would be managed with a much more natural fire regime, thinned timber, and potential restoration of the historic hydrology. This would benefit approximately 25,066 acres of natural habitat, much of which is within the 74,706 acres of the Sector Plan.

The Sector Plan land use data indicates that of the approximately 33,000 acres of wetlands in the study area, approximately 21,000 acres of wetlands would be on conservation lands, which, unlike the existing FLUM, are not allowed any residential density units. The second largest portion of wetlands, 2,768 acres, would still be managed intensively for agriculture/silviculture. The potential impacts to wetlands within the other land use categories are difficult to predict, but it should be helpful that approximately 64 percent of the wetlands will be in conservation if the plan is carried forward. However, these lands include only 243 of the 6048 acres that are considered potential breeding habitats in the sector planning area. Therefore, approximately 75% of the total potential habitat could be subject to future 404 actions outside of this project. The proposed action includes the loss of four potential flatwoods salamander ponds totaling 13.1 acres. This acreage represents approximately 1% of the available 1,048 acres of potential breeding wetlands within the sector planning area.

CONCLUSION

After reviewing the current status of the flatwoods salamander, the environmental baseline for the Panama City-Bay County International Airport (PFN) action area, the effects of the proposed activities, proposed protective, avoidance, and minimization measures, and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the flatwoods salamander. Within the project area, eleven wetlands were identified as potential suitable habitat for the flatwoods salamander. No documented breeding habitat for flatwoods salamander will be affected. As conditions of issuing the permit for the project, mitigation lands totaling 9,718 acres will be established to compensate for loss of wetland values. Of the eleven wetlands, only four were considered moderate quality. The combined acreage of the four wetlands and their associated upland buffer totals 584.3 acres. Loss of 584.30 acres of potential habitat will not appreciably reduce the survival and recovery of the flatwoods salamander. No documented breeding pond habitat will be affected. No critical habitat has been designated for the flatwoods salamander; therefore, none would be affected.

There are approximately 160 known flatwoods salamander ponds in Florida with a conservative estimate of 34,720 acres of pond and buffer habitat in the State (average 5-acre pond size plus 1,476-ft. buffer). Therefore, the amount of take could be viewed as 1.68% of the known habitat in the State of Florida. This proportion would be even lower if an analysis of potential habitat, similar to the BA, were done for the entire state.

INCIDENTAL TAKE STATEMENT

Section 9 of the Endangered Species Act and Federal regulation pursuant to Section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to

include major habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to noticeably disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the Airport Sponsor for the exemption in Section 7(o)(2) to apply. The FAA has a continuing duty to regulate the activity covered by this incidental take statement. If the FAA (1) fails to assume and assure implementation of the terms and conditions, or (2) fail to require the Airport Sponsor to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms, the protective coverage of Section 7(o)(2) may lapse. To monitor the impact of incidental take, the FAA must report the progress of the project and its impacts on the species to the Service as specified in the incidental take statement [50 CFR §402.14(I)(3)].

AMOUNT OR EXTENT OF TAKE

The Service has determined that incidental take of individual flatwoods salamanders is difficult to detect for the following reasons: (1) adult flatwoods salamanders are difficult to locate and observe. (2) Individuals killed during construction would likely be buried under dirt and debris, and/or, (3) losses may be masked by natural fluctuations in numbers of individuals. Although mortality of individuals is difficult to document, the level of take of this species was determined as follows: An estimated 584.3 acres of potential breeding pond and buffer habitat is presumed to be taken by development activities.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that the level of anticipated take is not likely to result in jeopardy to the species. The amount of take is for **presumed occupied** habitat and is small when compared to potential habitat that will remain in the mitigation parcels, which will eventually be restored to more suitable habitat and managed in perpetuity. No critical habitat has been designated for the flatwoods salamander; therefore, none will be affected.

REASONABLE AND PRUDENT MEASURES

The Service believes that the following reasonable and prudent measure (RPM) is necessary and appropriate to minimize take of flatwoods salamanders in the action area.

- The mitigation plan will be implemented as defined in the project description.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Endangered Species Act, the FAA and applicant must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline the reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. The FAA will ensure that the mitigation plan as proposed will be implemented in its entirety and in perpetuity.[1]

2. The FAA will monitor the progress of the action. The monitoring must be sufficient to determine if the amount or extent of take is approached or exceeded, and the reporting must assure that the Service will know when that happens.

CONSERVATION RECOMMENDATIONS FOR FLATWOODS SALAMANDERS

Section 7(a)(1) of the Endangered Species Act (Act) directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We request that the following conservation recommendations be implemented.

1. Develop in cooperation with USFWS a long-term conservation strategy for flatwoods salamanders on lands within the cumulative effects study area.
2. The FAA should continue to monitor and report to the Service and other agencies cumulative effects that result from accelerated development in the study area.
3. The FAA should encourage and financially support continued flatwoods salamander surveys in the area.
4. The FAA should monitor the implementation of the mitigation plan, including the financial assurances to continue management in perpetuity.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

[1]The FAA will ensure that the mitigation measures included in the FEIS for the proposed project are implemented through the issuance of its Record of Decision (ROD). The mitigation measures will become an official part of the ROD thus requiring the Airport Sponsor to comply with Federal grant assurances in order to receive and to continue to receive federal funding for the proposed project. Implementation of mitigation measures included in the FEIS and ROD is a legally binding requirement in order to receive federal funds. Violation of federal grant assurances can result in the FAA withholding federal funds or reimbursement by the Airport Sponsor of federal funds received.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in this biological opinion. As provided in 50 CFR 402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation.

If you have any questions about this opinion or consultation, please contact staff biologist Hildreth Cooper of our Panama City Field Office at (850) 769-0552, extension 221.

Sincerely yours,

Gail A. Carmody
Project Leader

cc:
USACE, (Panama City, FL) Don Hambrick
USFWS, ES, Jackson, MS (Linda LaClaire)
USFWS, Habitat Conservation/section 7, Atlanta, GA (e-mail copy to Joe Johnston)
FWCC, Tallahassee, FL (Ted Hoehn)
USEPA, Atlanta, GA (Haynes Johnson)
FDEP, Pensacola, FL (Dick Fancher)

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Appendix A- Flatwoods Salamander Pond Habitat Evaluation – Proposed Mitigation Parcels

Pond	Code	Pond	Eco	UP	total	Quality	Description/Field Notes
1A-FSBP1	621	1	0.5			low	Pond has open cypress canopy but dense shrub and subcanopy of Lyonia lucida, Ilex myrtifolia, Nyssa biflora, and titi. Ecotone present over about 50% of perimeter, low diversity, no ecotone (all titi) elsewhere. Logging slash pushed into pond.
1A-FSBP2	621	1	1.5			low	Small 621 dome. Dense shrubs in pond, no groundcover. Decent ecotone with Rhynchospora (wiry), Panicum, Andropogon, other sedges, Xyris, Hypericum, red root, young cypress recruits, good cover and diversity. Uplands, young planted pine and andropogon, with a little bit of wiregrass (not much). Sarracenia flava in ecotone. Good cypress recruitment.
1A-S2	630	1	1			low	This is a 614 on map but has cypress, sweetbay, etc. mixed with titi. Potential FSBP but would require restoration. Perimeter is bermed. Need to regrade and burn. Hand clear titi.
1A-S5	621	1	1.5			low	Pond lacks groundcover. Has logging debris covering ground. More open than FSBP4. Salamander obs. in pond - unknown spp.
1A-S8	621	1	1			low	Ecotone shrubby with titi and Lyonia lucida. A few narrow with ok ecotone. Pond has large cypress and open density, but no groundcover. Dense shrub and subcanopy of titi. Bedding or rutting into pond. Hog rooting in ecotone.
1B-FSBP1	630	1	1			low	Formerly flowing?, not now. No special action required.
1C-FSBP1	630	1	1	0	2	low	Burn uplands, allow pond to mature. Pond made up of Cyrilla, Nyssa, Ilex myrtifolia, some slash pine. Titi fringe around pond.
1D-FSBP1	630	1	1.5			low	Ecotone: corkwood, Carex, Lyonia lucida, Cliftonia Pond: >70% crown closure; no tufted or grass species; groundcover is 100% leaf litter/shrubs. No standing water, but shows signs of periodic innundation: watermarks, hummucking, buttressed trunks. Upland: 441/600, no wiregrass, cliftonia subcanopy Is more 630 than 621. Some cypress, but <15%
1D-FSBP2	621	1	1.5			low	Pond has no herbaceous groundcover; leaf litter and hummocked shrubs. Cypress present but patchy. Mostly Cliftonia.Ecotone: Andropogon, hypericum, carex. Upland: 441/600 with cyrilla understory, no wiregrass.
1D-FSBP3	630	1	1.5			low	Pond: very overgrown in shrub layer (I. coriacea, Clethra, Lyonia lucida, Magnolia virginiana), needs a fire. Some cypress towards center but sparse. Ecotone: Area of Andropogon, Rhynchospora, Hypericum; no wiregrass Upland: Planted pine, no wiregrass Overall very poor FSBP, no water.
1E-FSBP1	621	1	0.5			low	Open but no graminaceous cover. Not sure why. Is mixture of 630/621. Cypress healthy here. Lots of Nyssa biflora also. No graminaceous groundcover in ecotone or upland.
1E-FSBP2	640	1	0.5			low	Part 640 (Lyonia lucida, cyrilla) and part 630 (Nyssa biflora, Acer rubrum, button bush). No graminaceous cover, not FSBP habitat. Ecotone is thick and woody.
1E-FSBP3	630	1.5	0.5			low	Change FLUCFCS to 630. Nyssa biflora and Cypress and Magnolia virginiana. Open pond is ephemeral, but lacks graminaceous cover. No Aristida around, but has carex, rhyncospora, mystery ludwigia in some areas, ecotone and upland same as FSBP2 and FSBP1. Pots and turpentine scars found.
1E-FSBP4	613	1	1.5			low	West half is gum swamp, east half is cypress. Pond is ephemeral but lacks graminaceous cover. Ecotone has patches where Andropogon and Rhynchospora spp. Provide some "bunch grasses" habitat but no Aristida. Upland is 441/600.
1E-FSBP5	621	1	0.5			low	Similar to FSBP6 except less peat and lots of Lyonia lucida within pond. Numerous cypress dead. Some recruitment. Fire evidence around.
1E-FSBP6	621	1	0.5			low	Similar to FSBP7 except most cypress are dead and no groundcover. Ecotone overgrown. Lots of slash in wetland. Excessive peat, at least 7". Turpentine evidence.
1G-FSBP1	630	1.5	1			low	Upland: clearcut with small population of wiregrass in southeast corner only. Ecotone: clearcut with small population of wiregrass/pitcher plants in southeast corner only. Pond: 630 with overstory of Magnolia virginiana, Cypress, tupelo, Pop ash. Some standing water despite the drought. Pickerelweed and Panicum rigidulum growing in water. Overstory moderately thick. Has some open areas. No wiregrass.

1G-FSBP3	640	1	1			low	Depressional area where planted pines have died due to wetness. Now comprised of Andropogon virgnianus, mystery Ludwigia, and Panicum scab. Pond: no water, some wiregrass <10%, Ilex myrtifolia, Panicum scab., redroot Ecotone: 441/600 with thick understory of Myrica cerifera, Ilex glabra, Magnolia virginiana, Ilex corrieacea, Upland is clearcut
1I-FSBP3		0.5	0.5			low	441/600 with Cyrilla understory. No potential for FS. Signature on aerial is anomaly.
1I-FSBP4	630	1	1			low	No wiregrass, No cypress. Upland is 441/600. Ecotone is Carex and corkwood. System is very thick and has greater than 70% crown closure with Carex groundcover.
1I-FSBP5	621	1	1			low	Pond 621. Large mature cypress but understory thick with cyrilla and carex clumps. Dry at time of inspection. Ecotone is Cyrilla and Andropogon virginicus. Numerous cypress recruits. Uplands are 441/600 with 12' high slash pine and Cyrilla understory.
2D-FSBP1	621	1	0.5			low	Dense subcanopy of shrubs; dark and no to little ecotone, mostly titi; upland on side toward road sucks, titi jungle; 441 and 441/600 upland witout wiregrass. Possible old firebreak evident along portions of pond edge. Logging slash piled up along margin in places, with dense vine/shrub cover over debris. Needs fire, hand or mechanical thinning of ecotone and remove slash pile and firebreak if large enough, not around entire pond.
2F-FSBP1	621	1.5	1			low	Pond: Nice little cypress pond but not salamander habitat. No herbaceous graminaceous component in pond or ecotone. Made up of Taxodium ascendens, Cyrilla, Lyonia lucida, Itea virginiana Ecotone: Cyrilla, Ilex coriacea, Aronia, Andropogon virginicus, Pinus elliottii Upland: Serenoa repens, bracken, Lyonia lucida, Cyrilla and slash pine
2F-FSBP2	630	1.5	1			low	Same as FSBP3 Except pond is 630 instead of 621. Potential champion Ilex myrtifolia at S2
2F-FSBP4	621	1	1			low	Pond has thick woody cover. No graminaceous component. Is a mixture of 630/621.
2G-FSBP1	621	1.5	1			low	Pond made up of several cypress, Ilex myrtifolia and Cyrilla; canopy closure may be about 70% and some sedges are present Ecotone is overgrown with titi; no water in system but 8" waterline. Uplands cleared to the west side of pond down to ecotone.
2G-HQW2	630	1	1			low	Mixed wetland with Cyrilla, cypress, Ilex myrtifolia and Nyssa biflora. Some sedges and open canopy in some areas. Clethra dominant ground cover. Some Cyrilla large with DBH of 10-12". System dry at this time. Parrot pitcher plants northwest of point within HQW2. Some limited wiregrass on northwestern ecotone, otherwise ecotone is overgrown with Cyrilla.
2G-S1	630	1	0.5			low	Small cypress, Ilex myrtifolia and Nyssa depression. Very shrubby inside with 90-100% canopy closure. Ecotone almost non-exsitent since dominated by titi and Clethra. Needs hand clearing and possible burn.
2K-FSBP1	630	0.5	0.5			low	Pond is Titi/Bay swamp. Very little graminaceous habitat. No uplands. Part of Jackson Titi.
2L-FSBP1	630	1	1			low	Mixed forested wetland with Taxodium ascendens, Magnolia virginiana as canopy and Cyrilla, Acer rubrum, Myrica cerifera as subcanopy. Interior is fairly shruby with no herbaceous ground cover. Ecotone is all titi. Several stumps from old slash pine are present. Stumps at least 30" in diameter
2L-FSBP3	630	1	1			low	Some cypress and bay with lots of Cyrilla and Lyonia lucida. Pond interior is extremely shrubby and dense with no groundcover; ecotone is overgrown with shrubs.
2L-FSBP5	613	1	1.5			low	FSBP 5, 4, and 6 part of same system. FSBP 6 may serve as some ecotone for other two ponds. FSBP 5 is mostly shrubby and made up of Nyssa, Cyrilla, Lyonia lucida, and Myrica cerifera. Some large Magnolia virginiana in system. Little to no groundcover in pond.
2N-FSBP3	621	1	1			low	Shrubby; similar to FSBP2 except more overgrown w/ Cyrilla; more ecotone except some clumps of wiregrass
2O-FSBP1	614	0.5	0.5			low	Is not salamander habitat, is all Cyrilla racemiflora/Cliftonia monophylla
2Q-FSBP1	630	1	1			low	Pond large 630; pop ash, gum, bay; no herbaceous due to shading; Ecotone thick Cliftonia, no wiregrass

2Q-FSBP3	630	0.5	0.5			low	Not suitable; cypress but also a lot of Cliftonia; also has some Nyssa biflora, however has no grass species and is not open enough; it is ephemeral; Ecotone: no grass species all Cliftonia monophylla, Cyrilla; dense upland not present, is surrounded by wetland and powerline which does have some wiregrass but no canopy
2T-FSBP2	630	0.5	0			low	Cypress and maple dominate, pickerelweed and lizardtail groundcover, not much herb grasses, does appear ephemeral; Ecotone is wax myrtle and yaupon, very thick, unsuitable for FS, upland same as ecotone
2W-FSBP1	630	1	1.5			low	Cypress, Nyssa biflora, Magnolia virginiana; canopy is 90% closure; ecotone along powerline is decent but opposite side is very shrubby, adjacent uplands have been clear cut; apparent use of herbicide on pond within powerline easement Ecotone along powerline has Panicum scab., xyris, corkwood
2W-S1	630	1	1			low	Cypress, sweet bay, Nyssa 630 system part of much larger historic system; cypress recruitment, but titi encroachment; lots of logging slash and damage from logging opperations; saw broad winged hawk
3C-FSBP2	641	1	1.5			low	Pond: Nice little open water pond lined with pickerelweed, may have water year round. Ecotone: wide marsh area comprised of pickerelweed, mystery ludwigia, Rhynchospora spp., Juncus effusus, Pluchea. Good diversity. Upland: 441/600 so gets low score, no wiregrass. Site may be too wet for Flatwoods salamanders.
3C-FSBP4	441/600	1	1			low	Same as FSBP6. Obligate species include mystery ludwigia, mermaid weed, Juncus. No wiregrass or cypress. Florida box turtle noted.
3C-FSBP5	626	1	1			low	Nice wet pine savanna despite silviculture. Very thick herbaceous cover throughout. No real pond area, some pockets of standing water with minnows, so probably not ephemeral. Planted pine has died off in center due to being too wet. Good diversity in groundcover, no wiregrass.
3C-FSBP6	441/600	1	1			low	441/600 pines have been thinned due to wetness (mortality). Is savanna like beneath with good groundcover. Too wet for wiregrass. Mostly obligate species. Should be changed from 641 to 441/600.
3E-FSBP6	613	1	1.5			low	Very similar to FSBP4. Larger Nyssa area but more shaded canopy. Also a few large pines in "Pond". Pond was bedded through at some point as was ecotone. Ecotone similar to FSBP4. Possibly narrower. Same species. Possibly some Spartina patens in some of ecotone.
3E-FSBP7	641	1	1.5			low	Probably wet year round, not ephemeral. Also likely connects to road ditch and has fish. Well flooded now to at least 1-2 feet deep. Vegetation in pond and ecotone is Carex spp., corkwood, mystery ludwigia, Pluchea. Also has fish. This is a nice flatwoods pond, but probably not ephmeral, so not a FSBP. Pond margin has Nyssa and planted pine.
3F-FSBP6	641	1	1			low	Logging ruts with standing water. Poor ecotone. Pond species include Rhynchospora, Centella, wiry Rhynchospora, Scattered Nyssa, Panicum virgatum and Juncus.
3F-FSBP7	641	1	1			low	Marsh area dominated by Rhynchospora, Spartina. Logging slash and ruts within pond. No canopy. Presently standing water in pond. Little or no ecotone. Pond goes right to uplands.
3G-FSBP11	641	1	1			low	Pond has no standing water comprised of mystery ludwigia, Nyssa biflora, Juncus effusus, corkwood; Ecotone is the same, no real ecotone. Goes from pond to 441/600. Upland is 441/600 with Nyssa biflora in understory.
3G-FSBP7	641	0.5	0.5			low	Pond is full of Cladium, Juncus, Spartina patens with Nyssa biflora around perimeter. Standing water so not ephemeral.
3G-FSBP8	641	0.5	1			low	Pond is 90% Juncus effusus. Does have some Nyssa biflora. Ecotone has a few clumps of wiregrass under Nyssa biflora. Upland: Pinus elliottii with serenoa repens. Lots of vitus. Very little herbaceous cover. No wiregrass noted.
3G-FSBP9	621	1	1.5			low	Cypress dominated wetland, however many cypress are dead or dying. Not sure why. Seems to have plenty of water. Pond is cypress with sawgrass groundcover. Ecotone is Nyssa biflora, Myrica cerifera, royal fern, some patches of wiregrass and other grasses/sedges. Upland is 441/600 with Ilex vomitoria and glabra. Sparse groundcover.

1A-FSBP3	621	2	1.5	1	4.5	low-moderate	Open canopy, dense groundcover with Rhynchospora, redrood, Xyris, mystery ludwigia, Andropogon, Cliftonia, and corkwood.
1A-FSBP4	621	2	1.5	1	4.5	low-moderate	Interior has rutting and ditching, but doesn't leave pond. Carex, Hypericum, and cypress recruits.
1B-FSBP2	640	2	1	1	4	low-moderate	Shrub bog with titi; ditched and possibly rutted. Could fill. Good groundcover patches, very open.
1B-S1	640	2	1	1	4	low-moderate	Good groundcover and open canopy 640 with 621 fringe and small seedlings within pond. 2 water moccasins and fish present. Potential new Low water crossing and or 441w restoration could affect this site. No vegetation planting needed because cypress recruits. Fire and possible hydrological restoration close to road ditch. And default low water crossing of highwater. Unclear if road ditch is draining site; road bisecting larger wetland.
1D-FSBP4	614	1	2	1	4	low-moderate	Pond actually 614 with wide open ecotone: Hypericum, Lacnanthes, Andropogon, and some sporabolus.
1E-FSBP10	641	2	1.5	1	4.5	low-moderate	Similar to FSBP12 with more mystery ludwigia and Nyssa, Some Myrica cerifera. Ecotone is shrubbier.
1E-FSBP7	621	2	1	1	4	low-moderate	Cypress and tupelo system with open understory and strong sedge groundcover. Many cypress and older slash pine are dead, unsure why. Turpentine and cypress logging evidence noted. Find out why trees are dying.
1G-FSBP2	621	2	1.5	1	4.5	low-moderate	Is a combination of 640/621. Cypress trees present but lots of open areas as well with mystery Ludwigia, corkwood, Pan. Scab., Sagittaria graminea. Pond groundcover thick with Ludwigia. Also some Nyssa, no standing water at time. Ecotone is shrubby with Vaccinium myrsinites, Clethra alnifolia, some limited pockets of Panicum virgatum, Scleria, Wiry Rhyncospora but probably only 30% cover due to Clethra and Nyssa. Some areas open with Panicum ridgidulum and Andropogon virginiana, Wiry Rhyncospora. Upland: 441/600 with Cyrilla understory. Viry little wiregrass.
1I-FSBP1	621	1.5	1.5	1	4	low-moderate	Similar to FSBP2 but his site has more cypress. May have potential?
1I-FSBP2	630	1.5	1.5	1	4	low-moderate	Pond has standing water with some large open areas. Groundcover is mystery ludwigia. 1/3 of area has thick canopy closure of Magnolia virginiana, Nyssa biflora, Ilex spp., but some potential for FS in open areas. Corkwood and mystery ludwigia dominant. Ecotone is Andropogon virginicus, Cliftonia, young pine. Some area of Andropogon virginicus may provide suitable habitat. Selective cut 441/600 to improve "upland" although is 441/600.
1I-FSBP6	630	1.5	1.5	1	4	low-moderate	Upland is 441/600 with young trees, very open. Has decent groundcover but no wiregrass. Ecotone is Rhynchospora, mystery ludgwigia, Carex. Pond is Nyssa biflora, Cyrilla, Magnolia virgniana. Less than 50% crown closure but no herbaceous groundcover.
2D-FSBP2	621	1.5	1.5	1	4	low-moderate	Cypress canopy with somewhat large trees, appropriate crown closure of cypress, but dense midstory/subcanopy of Ilex myrtifolia, black gum, titi, and others. No groundcover in pond. Looks like it's been cleared (gyrotrac?) in past along ecotone, with some good ecotone and groundcover, other areas with logging slash pushed into ecotone, preventing shrub dominance, but no groundcover either. These 2 combined = about 50% of pond margin. The other 50% is somewhat dense titi and Ilex coriacea with no real ecotone. Surrounding upland is 441 with bracken, gallberry, and saw palmetto. Area is relatively high quality (HQW) 621 but low-mod FSBP. Use buffer when thinning around site. Let fire burn in. Hand clear ecotone where shrubs have invaded or invade in future, until fire controls. Some cypress recruits also. Note: shrubs (large) and subcanopy trees seem to be growing on old cypress stumps from past logging. Note: Hog rooting in ecotone observed.
2D-FSBP3	621	1.5	1.5	1.5	4.5	low-moderate	Very similar to FSBP2 in all regards except canopy more open and more light, some scattered groundcover in places within pond. Ecotone and upland similar to FSBP2, except upland has a good bit of wiregrass. Looks like it was cleared over about 75% and logging slash in even layer on ground (not piled up above grade). Also some fire scars on cypress stumps in FSBP3, not seen in 2. This HQ 621 buffer when thinning and do not push slash into pond/ecotone. Same prescription as FSBP2.

2E-HQW2	613	1.5	1.5	1	4	low-moderate	Vegetation similar to HQW1, but canopy closure greater with limited groundcover, some large ruts in ecotone and no wiregrass. Plant adjacent uplands in longleaf.
2F-FSBP3	621	1.5	1.5	1	4	low-moderate	Nice cypress dome but very little graminaceous cover; Pond: open with Taxodium ascendens, Ilex myrtifolia. Is ephemeral Ecotone: Andropogon virginicus, Hypericum chapmanii, Xyris, Rhynchospora spp. And a few patches of Aristida Upland: 441/600 with Cliftonia, no wiregrass.
2J-FSBP1	630	2	1	1	4	low-moderate	Pond is cypress, sweetbay, black gum and Cliftonia; some areas open with many sedges; Ecotone and surrounding upland is very overgrown with Cliftonia. System historically was part of Jackson Titi.
2J-FSBP2	630	1.5	1.5	1	4	low-moderate	Pond mainly cypress, sweetbay, and Cliftonia; some open areas dominated by sedges, but other areas overgrown with shrubs; Plenty of cypress recruitment; Ecotone is somewhat shrubby, but has sedges present; pond was historically part of a much larger system.
2N-FSBP1	621	1.5	2	1	4.5	low-moderate	Cypress pond, mostly shrubby with high crown cover inside with some open areas with sedges; ecotone covers about 75% of pond, also Xyris and Lachnanthes in ecotone; burn adjacent uplands and ecotone
2N-FSBP2	621	1	2	1	4	low-moderate	Similar to FSBP1 except interior has no open areas with little herbaceous cover; burn adjacent ecotone and upland
2O-FSBP2	641	1.5	2	1	4.5	low-moderate	Remove berm; Not much of a pond except in road, which is open and dominated by Xyris spp., Cladium jamaicense and Juncus repens/megacephalus; surrounding ecotone is excellent to the east, including wiregrass, Xyris, Lachnanthes, Pan. scab., Sarracenia flava/psittacina, Rhynchospora spp.; ecotone to the west is more shrubby with some Andropogon; a berm separates the pond from good ecotone.
2U-FSBP1	610	1.5	1.5	1	4	low-moderate	Uplands have been clearcut, with a return of groundcover vegetation, especially Andropogon, some titi encroaching ecotone, but mostly herbaceous with slash present, ecotone made up of Pan. scab, Andropogon and Hypericum; pond is somewhat shrubby and mostly Nyssa, I. myrtifolia, and some larger Magnolia virginiana, Cyrilla also present; canopy closure moslty 80-90%, but one open area supports Pan. scab. and Rhynchospora
3E-FSBP4	613	1.5	1.5	1	4	low-moderate	Similar to FSBP5 but pond has some wax myrtle and yaupon shrubs and small trees; Groundcover in pond and ecotone also seems more "weedy", and also contains lots of Rubus. Pond groundcover has rhynchospora, other sedges, Panicum virgatum. Ecotone narrower but has Panicum virgatum, mystery ludwigia, Rhynchospora, carex, Juncus effusus, Rubus and some maples and pines. Pond possibly a little smaller than FSBP5. Ecotone bedded and planted with poor survival. Standing water in beds. Pond is dry now. A few tallow in ecotone.
3F-FSBP8	641	1.5	1.5	1	4	low-moderate	Logging ruts present. Pond dominated by Rhynchospora and mystery Ludwigia and juncus. Some Nyssa present, including one with 12" DBH. Standing water in ruts. Some herbaceous ecotone present, but not very distinguishable from pond.
3G-FSBP3	630	1.5	1.5	1	4	low-moderate	System is mix of cypress and tupelo with Myrica cerifera understory. Sawgrass ground cover, some tufted grass in ecotone. Ecotone actually holds water while pond is mostly dry. System may be too large for FWS. There are also several dead trees in system.
3G-FSBP4	641	1.5	1.5	1	4	low-moderate	Marsh dominated by Spartina patens, Panicum virgatum, Carex spp. With Nyssa shrubs and Juncus. In other areas, corkwood also present. Standing water in ponds may indicate that system isn't ephemeral and wouldn't be appropriate for FWS. Burning adjacent ecotone would enhance system.
3G-FSBP5	630	1.5	1.5	1	4	low-moderate	System is cypress and tupelo depression, lots of cypress on north ecotone. South ecotone is non-existant. Some sabal palms in pond. Canopy is about 70% closed, and some sawgrass groundcover. Trees are mature. Good high quality system.

3G-FSBP6	613	1.5	1.5	1	4	low-moderate	Pond is low to moderate quality. Overstory of Black gum. High herbaceous vegetation including Juncus, Pluchea, mystery Ludwigia, Panicum virgaturm. No standing water. Ecotone. Good diverse herbaceous. Mesic to hydric. Similar species to pond, but topo higher. More vitus and juncus. 441/600 Diverse herbaceous but no wiregrass. Panicum virgatum, Rhynchospora spp. (3), Andropogon virginicus, Centella Upland. 441, saw palmetto, vitus, bracken fern, wax myrtle. Not much herbaceous cover.
1E-FSBP11	641	2	2	1	5	moderate	Same as FSBP11 but larger with some Pinus elliottii in pond and more Panicum virgatum. Some Acer rubrum as well.
1E-FSBP12	641	2	2	1	5	moderate	Open pond with some Aristida, Panicum virgatum, Panicum scabriuluscum, rhyncospora spp., mystery ludwigia, Pluchea, Juncus marginalis, several small Nyssa, Andropogon virginana. Wiregrass in ecotone and several bays surrounding pond.
1E-FSBP8	641	2	2	1	5	moderate	Similar to FSBP10 but less herbaceous diversity. Some cypress growing, more ludwigia, system is in transition from 641 to 630.
2E-HQW1	613	2.5	1.5	1	5	moderate	Excellent system. Canopy less than 30% closure made up of Nyssa biflora and Ilex myrtifolia. Lots of sedges in groundcover. Pond dry now. Ecotone is patchy, but good in some areas with Lachnanthes, Rhynchospora, Panicum virgatum, and even Aristida. Uplands have been clearcut, but have some wiregrass. Plant longleaf in uplands.
3E-FSBP5	613	2	2	1	5	moderate	Open water area with good groundcover surrounding a small Nyssa depression/pond, about 60' x 40' or maybe a little larger. Pond is ephemerally wet, dry now. Groundcover in pond is rhynchospora and carex. Large herbaceous ecotone around pond with rhynchospora, carex, Panicum scab., Panicum virgatum, etc. Some wax myrtle shrubs and small trees in marshy area, some pines as well. Surrounding ecotone bedded and planted with poor survival. Standing water in beds. Gums in pond are small and dense. Would need thinning. Upland score could be higher. Groundcover dominated at least 50% by Carex spp.
3F-FSBP1	641	2	2	1	5	moderate	Marshy pond with good diversity. Carex, rhynchosporas, Panicum virgatum, Andropogon, Panicum scab., Aristida stricta, mystery Ludwigia, Centella. Little overstory. Some Pinus elliottii, some Ilex vomitoria, Myrica cerifera, Baccharis. Hard to distinguish pond edge from ecotone.
2G-FSBP2	412	0	0	0	0	none	Not a wetland; turkey oak with longleaf recruitment. Most longleaf only a few years old. Cladonia, saw palmetto, and Aristida in ground cover. Sand live oak present as well. Prescribe thinning of oaks, especially sand live oak prior to fire.
2L-FSBP2	640	0	0	0	0	none	Pond not very depressional but dominated by various sedges, Hypericum, mystery Ludwigia, corkwood and has some small Nyssa and Cyrilla; Several small slash pines present and area was originally planted through but had high mortality due to wetness. Difficult to distinguish between ecotone and pond.
2L-FSBP4	625	0	0	0	0	none	Not pond but natural stand of slash pine about 12" dbh; understory is Nyssa and Cyrilla, Some Hypericum. Groundcover is largely Aristida with Andropogon, Lachnocaulon and Xyris. System needs to burn. DO NOT CUT!!
2L-FSBP6	640	0	0	0	0	none	Probably actually serves as ecotone for FSBP4 and 5 (see above). Pond is Hypericum, Nyssa, Cyrilla, Cliftonia, and corkwood with scattered pines. Groundcover is mostly Rhynchospora, Sagittaria, mystery Ludwigia, Xyris, and Andropogon. Most shrubs less than 8' tall.
2Q-FSBP2	441	0	0	0	0	none	Is an upland
2T-FSBP1	640	0	0	0	0	none	Sawgrass transitions into shrub marsh at data point, nice system but not suitable for salamanders. Has small Acer rubrum, Myrica cerifera in subcanopy; groundcover is Sagittaria latifolia, Juncus marginalis, Dichromea, Pluchea odorata, Rhynchospora
3B-FSBP1	641	0	0	0	0	none	is large juncus marsh with Sagittaria latifolia. No cypress, black gum, Ilex myrtifolia or wiregrass. Nice marsh but not FSBP habitat.

3B-FSBP2	441/600	0	0	0	0	none	Small sawgrass marsh within 441/600 opening. Needs fire and thinning in adjacent pine. Ilex vomitoria taking over.
3B-FSBP3	641	0	0	0	0	none	Pond has minnows, so probably not ephemeral. No overstory. Juncus effusus, Sagittaria lat., Spartina patens. Ecotone is Ilex vomitoria, Panicum scab, Centella, with planted pine up to pond edge. Upland is 441/600 with Myrica cerifera. Same as ecotone.
3B-FSBP4	641	0	0	0	0	none	No pond present. Is merely an open area along old logging trail. Has low areas with standing water and Sagittaria latifolia, Sagittaria graminea, corkwood. Note: logging deck in middle of point needs to be removed.
3B-FSBP5	641	0	0	0	0	none	Pond has no cypress, blackgum or Ilex myrtifolia. Has Sagittaria graminea in most wet portions. No wiregrass. Also no overstory. Ecotone is Rhynchospora spp., corkwood, and Pan. scab. Is savanna like. Uplands area 441 and 441/600. 441 areas have Ilex glabra, Serenoa repens and panicum. No wiregrass.
3B-FSBP6	441/600	0	0	0	0	none	Understory of Juncus. More like 441/600. Needs fire. Ilex and Myrica in opening surrounded by Pinus elliottii.
3B-FSBP7	641	0	0	0	0	none	Sawgrass marsh. Not suitable habitat.
3B-FSBP8	641	0	0	0	0	none	Pond - Juncus, Spartina patens thick. Ecotone - Myrica cerifera and Ilex vomitoria, Acer rubrum (no open water) but there is standing water in road adjacent to pond.
3C-FSBP1	641	0	0	0	0	none	Roadside ditch may drain. Need to change border of 641. Logging deck on west side gives illusion of being part of 641. Pond: No real "pond" present, is all 641 with no open water areas. Thick herbaceous cover of Juncus effusus, mystery ludwigia, Scleria spp., Rhynchospora spp., Carex spp., Panicum virgatum, Panicum scab., Very diverse but no wiregrass. No canopy of cypress or blackgum. Ecotone: much the same as pond but less wet. Upland 441/600, spotty patches of sedges and grasses.
3C-FSBP3	441/600	0	0	0	0	none	No pond, but wet savanna which bleeds out into planted pine. Good herbaceous cover: Panicum virgatum, Pluchea, Juncus, mystery Ludwigia, Rhynchospora ssp. Keep out heavy equipment.
3D-FSBP1	641	0	0	0	0	none	sawgrass marsh, no habitat
3D-FSBP2	641	0	0	0	0	none	sawgrass marsh
3D-FSBP3	641	0	0	0	0	none	sawgrass marsh
3D-FSBP4	641	0	0	0	0	none	sawgrass marsh
3D-FSBP5	641	0	0	0	0	none	sawgrass marsh
3E-FSBP1	641	0	0	0	0	none	Mainly Juncus effusus, mystery ludwigia, corkwood, Panicum virgatum. Very wet. Few small Nyssa trees, few Myrica cerifera shrubs/small trees. Partially bedded and planted, pines died. Few small pine recruits. Not sure really a pond or FSBP. Shrubs not bad now, very open. Small elevated island in middle with Nyssa large and small. More marsh-like and more dominated by juncus than previous two sites.
3E-FSBP2	641	0	0	0	0	none	Wet opening in 441/600, bedded through, with Pan. Scab. and corkwood primarily, rhynchospora, with some Andropogon, mystery Ludwigia, and a little Juncus effusus. No real pond, no cypress, a few pines within with poor growth. A little bit of titi and wax myrtle. Not really a FSBP or potential. Area is 641 maybe 643 which could trend towards a 640 shrub perhaps. When surrounding area converted to 626, would blend with that. Needs fire in the future to control pine invasion and shrubs. Shrubs not bad now. Pan. Scab. is by far the dominant species. Standing water in bedding furrows. Depression is irregularlly shaped and has scattered pines.
3E-FSBP3	641	0	0	0	0	none	Wet opening in 441/600 with mystery Ludwigia, Juncus effusus, Panicum virgatum, Panicum scab., and mix of Nyssa and Myrica cerifera as small trees. Area bedded and planted but only a few pines survived. Few pine and maple recruits also. Very little canopy cover. Not sure if really a pond or FSBP candidate. Very dense groundcover. No standing water now, unlike FSBP2. Burn to control shrub and pine invasion in future. Once converted to 625/626 would blend with that. Could qualify as 643 now perhaps?
3F-FSBP2	641	0	0	0	0	none	Very similar to FSBP4. Juncus, Spartina, Cladium. Standing water. North side of

							pond dominated by Cladium and Panicum virgatum, south by Juncus. 1 Tallow found.
3F-FSBP3	641	0	0	0	0	none	Similar to FSBP2 and FSBP4. Juncus dominated with standing water. Nyssa along edges. Some bunch grasses within ecotone. Vitus around edges. Pond not suitable for Flatwoods salamanders.
3F-FSBP4	641	0	0	0	0	none	Pond dominated by juncus and Cladium, some sagittaria, standing water present. No tufted grasses Also some Spartina patens. Not suitable for Flatwoods salamanders.
3F-FSBP5	641	0	0	0	0	none	Very similar to FSBP4. Saw grass on edge, juncus in middle. Not suitable for FWS. Year round water.
3F-FSBP9	641	0	0	0	0	none	Sawgrass marsh with permanent water. Not suitable for FWS. Some Nyssa around edges. Reconnect with marsh in 3G with pipes under road, or hard bottomed LWC.
3G-FSBP1	625	0	0	0	0	none	Area is actually a small natural stand of Slash pine, some large with 15" DBH and 70-80' tall. Some Nyssa mixed in, with Myrica cerifera as well. Juncus, Panicum scab. and Aristida in groundcover. In both FSBP1 and 2 possible bear signs present including scat and torn up logs with ants inside.
3G-FSBP10	8	0	0	0	0	none	No pond. Is a loading deck. Needs removal.
3G-FSBP12	8	0	0	0	0	none	Is not a pond but loading deck. Needs removal.
3G-FSBP2	641	0	0	0	0	none	Not suitable for FSBP since deep year round water and wetland approaching upper size limit. Very nice system though. Marsh dominated by carex with small nyssa, some juncus and Myrica cerifera, mystery Ludwigia. Some tallow is present and should be controlled before spreading.
3H-FSBP1	641	0	0	0	0	none	Sawgrass marsh
3H-FSBP2	641	0	0	0	0	none	Juncus/sawgrass marsh.
3H-FSBP3	641	0	0	0	0	none	Rhynchospora spp., mystery Ludwigia, mermaid weed, Juncus effusus.
3H-FSBP4	641	0	0	0	0	none	Juncus/Spartina/mystery ludwigia. Ditches and/or skidder trail draining the system to the east.

Source: PBS&J, 2005

APPENDIX B

Mitigation Synopsis: Panama City – Bay County International Airport Relocation (Draft March, 2005)

An approximately 10,000 acre mitigation area is proposed as compensation for wetland impacts at the proposed airport relocation site based on the potential 50-year full build-out scenario. The mitigation area is divided into three main parcels: Parcel 1 includes 1,734 acres directly south of CR 388 between Crooked Creek and Burnt Mill Creek and extending southward to the Gulf Power Company power line easement. Parcel 2 includes 6,388 acres directly south of CR 388 to the east of Burnt Mill Creek and extending southward to West Bay and the power plant discharge canal. CR 2300 forms the eastern boundary of the southern portion of Parcel 2. Parcel 3 includes 1,735 acres south of the power plant discharge canal, extending southward to West Bay Point. West Bay also forms the western boundary of Parcel 3. Each parcel has been further divided into management units based on existing landscape features (mainly unpaved forest roads). There are a total of 42 management units in the mitigation area, averaging 200-300 acres in size each.

Habitat types present in the mitigation area are dominated by planted pine wetlands and uplands. Other habitat types include titi wetlands, mixed forested wetlands, cypress wetlands, pine flatwoods, freshwater marsh/shrub wetlands, tidal marsh, and small streams. The main goal of the mitigation plan is to convert planted pine areas back to wet pine flatwoods, wet pine savanna, mesic flatwoods, and sandhill habitats that historically occurred in the area, via restoration and enhancement. Restoration, enhancement and preservation of the other habitat types listed above will also take place. Based on habitat acreages, the planned mitigation activities, and the estimated before and after condition of the various habitat types, a detailed WRAP analysis has been conducted that shows a surplus of mitigation lift relative to functional loss from wetland impacts (including direct and indirect impacts) for each development phase and for full build-out at the airport relocation site through 50 years. All mitigation areas will be placed in Conservation Easements to ensure their long-term protection.

The mitigation plan consists of a series of interrelated plans that address the following major mitigation activities: planted pine thinning; prescribed fire; longleaf pine planting; hydrologic restoration; exotic species control; wildlife management; dump site removal; monitoring; and long-term management.

Thinning

The planted pine thinning plan depicts planted pine stand ages, a thinning schedule, and prescribed thinning densities based on target ecological community types and whether or not longleaf pine will be planted in an area. Planted pine stands in the mitigation areas were planted between 1973 and 1999 (ranging in stand age from 6-32 years old in 2005). Final thinning to a prescribed basal area (BA) will initially take place for all stands that are 25 years old or older. Younger stands will enter mitigation and be thinned to the prescribed basal area as they reach 25 years old. Future wet pine savanna areas will primarily be thinned to a basal area of 20-30 square feet/acre. A few management units or portions of management units will be thinned to 10-20 square feet/acre for comparison/adaptive management purposes. Future pine flatwoods and

sandhill areas that will be planted with longleaf pine will also be thinned to a BA of 20-30. Future wet pine flatwoods that will not be planted with longleaf pine, mainly near West Bay in future coastal slash pine flatwoods, will be thinned to a BA of 40-50. All planted sand pine uplands (future longleaf pine sandhills) will be clear-cut. Natural stands of mixed longleaf and slash pine, and natural stands of coastal slash pine flatwoods will not be thinned under the initial thinning plan. Wetlands dominated by cypress and/or hardwoods will not be harvested or thinned. Also, incidental harvest of individual cypress, hardwood, and cabbage palm trees greater than 6 inches DBH growing in planted pine stands will be minimized during pine thinning operations. Standing dead trees and snags will also be retained whenever possible. The thinning plan includes voluntary 35-foot special management zones (SMZs) around cypress domes, gum ponds, flatwoods marshes, and small depressional mixed forested wetland areas; and 50-foot special management zones (SMZs) adjacent to tidal creeks, tidal marsh, and West Bay to provide additional protection to these areas during thinning operations. Standard SMZs along streams and creeks will also be observed, according to state forestry Best Management Practices (BMPs). Excessive rutting should be avoided by managing thinning operations in wetland areas outside the wet season and around periods when on-site soil moisture conditions are inappropriate. This will include onsite reconnaissance and direction of forestry crews and equipment by supervising foresters and mitigation ecologists. If excessive rutting does unexpectedly occur, thinning operations will be halted and relocated to drier areas until conditions improve, and excessively rutted areas will be rehabilitated.

Prescribed Fire

The prescribed fire plan addresses the use of fire as a restoration and management tool, primarily in pine flatwoods, savanna, and sandhill habitats. Following the thinning of planted pine stands, the prescribed fire plan calls for up to three initial dormant season burns per management unit on a 1-2 year rotation, followed by the implementation of growing season burns on a 3-5 year rotation into perpetuity. The goals of the dormant season burns are to modify and promote fuel characteristics favorable for growing season fire prescriptions while protecting large mature pines and encouraging the expansion of herbaceous ground cover. In addition, the dormant season burns will be aimed at reducing the height and volume of mid-story fuels. The goals of the growing season burns will be to reduce and control woody shrub cover, to promote and maintain natural herbaceous groundcover, and to keep fuel loads low enough to safely burn during the growing season in subsequent years. The roughly 200-300 acre management units described above will comprise the major burn units. In some cases, additional fire lines may be needed to augment the management unit boundaries, but use of such lines will be minimized, especially in wetland areas. Initial early growing season burns may be possible on some management units, and will be used preferentially in place of initial dormant season burns when appropriate. Occasional dormant season burns will also be mixed into the growing season burn rotation. Some variation on the timing of growing season burns will also occur within management units (e.g., an early growing season burn one year followed by a mid or late growing season burn during the next burn rotation, or vice versa, for a particular unit). The mixing of occasional dormant season fires into a growing season fire regime, and the variation of timing on growing season burns will mimic a more natural fire regime and promote more natural plant communities and wildlife habitat. Some use of dormant season fires may also be needed to protect planted longleaf pines once they leave the grass stage and before they reach heights

where fire mortality is less of a concern. Occasional dormant season burns will also promote natural longleaf recruitment and regeneration in the more distant future. Fire will be allowed to burn into non-pine dominated habitats such as cypress domes, flatwoods marshes, salt marshes, etc., when conditions allow and when it would not result in a catastrophic situation.

Planting

The planting plan depicts longleaf pine planting densities based on target ecological community types, soils, and elevation. Longleaf planting will take place after thinning operations and at least one application of prescribed fire have occurred. Containerized longleaf seedlings will be used, and all areas will be hand planted in an irregular pattern (not in rows or on precise spacing intervals). Roughly 1,800 acres of future pine flatwoods that have been thinned will be hand planted at densities of 50 seedlings per acre. Roughly 625 acres of future pine flatwoods and sandhill areas that have been clear-cut will be planted at densities of 100 seedlings per acre. Future wet savannas will have longleaf planted in scattered clusters on small slightly elevated "palmetto islands" identified using historic aerials. These "islands" will be hand planted with 1-5 longleaf seedlings depending on the size of the island. Roughly 2,300 of these "islands" will be planted in savanna areas spanning roughly 2,800 acres.

Hydrologic Restoration

The hydrologic restoration plan includes a number of related activities, including the installation or improvement of low water crossings and culverts, the re-routing of water from major interior ditches to historic flow ways, the restoration of former stream courses, removal of fill from historic floodplains, the reconnection of severed wetland systems, ditch back filling and plugging, and road removal. Each specific hydrologic restoration and road removal area will include survey work (profiles and cross-sections), engineering calculations and design, and the development of construction plans and specifications. Approximately 47 low water crossings are planned to restore more natural hydrologic conditions to streams and flowing wetlands (linear wetlands which typically have flowing surface waters). Overall, approximately 85,500 linear feet of stream and major ditch work is planned (roughly 56% directly related to stream and flowing wetland restoration). This linear estimate does not include enhancements resulting from road and roadside ditch removal, or the upstream and downstream effects of low water crossing installation and associated hydrologic improvements. Roughly 42,000 linear feet of road retirement and removal (upland to wetland restoration) is also planned. An additional 105,000 linear feet of stream and flowing wetland surface waters will be preserved and indirectly enhanced by surrounding mitigation activities and long-term ecosystem management including pine thinning, prescribed burning, installation of low water crossings, road removal, and cessation of timber management activities such as bedding, mechanical site preparation, row planting, and widespread fertilizer and herbicide applications. The extensive pine thinning planned for the site will also provide hydrologic enhancement to wetlands across the entire mitigation area, due to reduced evapotranspiration.

Exotic Control

Invasive exotic plant species of concern have been documented in roughly 30 sites across the mitigation areas. Most of these sites are locations with Chinese tallow. A few locations with cogon grass and camphor tree have also been documented. Chinese tallow is more widespread in Parcel 3, especially along the forest roads and ditches, including additional areas outside the 30 sites mentioned above. Elsewhere, tallow is mainly limited to individual plants found at a few dump sites throughout the mitigation area. Chinese tallow and camphor tree abundance will be reduced and controlled using Triclopyr herbicide (brand names such as Pathfinder and Garlon4 are examples). The trunks of larger seedlings, saplings, and trees will be slashed with a machete or saw and the herbicide applied directly to the slashed area. Herbicide will be directly applied to the foliage of smaller seedlings and saplings. All herbicide applications will be conducted in accordance with standard BMPs. Cogon grass has only been documented in a few limited sites, and these have already been treated by St. Joe Timberlands upon discovery. Cogon grass has also been reported growing along CR 388 on mowed roadsides, therefore, it is assumed that cogon grass has the potential to invade the mitigation areas in the future without regular preventive management. Cogon grass found in the mitigation areas will be treated with Glyphosate herbicide (brand names such as Roundup and Rodeo are examples). Coordination with County road maintenance officials will take place to discuss the proliferation and spread of cogon grass along CR 388. Japanese climbing fern has not been documented on the mitigation site, but one small occurrence (single stem that was removed) been located in one off-site location near the mitigation areas. Any climbing fern discovered on the mitigation site during regular reconnaissance and monitoring will be documented and treated immediately.

Wild (feral) pigs and pig sign (rooting disturbance) have been observed throughout the mitigation areas (all parcels). Rooting was particularly abundant in Parcel 1 in mid-2004. A professional shooting and trapping program will be employed to control hog populations, in coordination with all appropriate agencies and in accordance with pertinent regulations. Regular coordination with recreational hunters will also take place, to encourage hunters to take wild pigs whenever possible (within existing state hunting regulations) and to discourage activities that augment pig populations.

Wildlife Management

Wildlife management on the site will primarily consist of passive habitat enhancement and preservation achieved by thinning; prescribed fire; planting; retention of cypress, hardwoods, cabbage palms, and standing dead trees and snags; hydrologic restoration; road removal; exotic control; protection and enhancement of isolated wetlands and streams; etc. Wild hog management would additionally be considered a direct wildlife enhancement activity since hogs both prey upon and compete with native wildlife. Wildlife species expected to benefit from the mitigation activities described above include: gopher tortoise and various associated species including the Eastern indigo snake, Florida black bear, various wading birds, bald eagle, and flatwoods salamander.

Additional active management techniques that could be utilized would include installation of wood duck boxes in larger cypress, gum, and mixed forested wetland areas; installation of American kestrel and eastern bluebird nesting boxes in pine savanna areas; installation of osprey/bald eagle nesting platforms near the coast; and relocation of offsite gopher tortoises to restored/enhanced upland habitats. Finally, coordination will take place with Gulf Power Company to determine if vegetation plantings or other passive means can be used near the access roads/bridges that cross the power plant discharge canal to enhance wildlife crossings between Mitigation Parcels 2 and 3. See also long-term management, below, for additional future wildlife management opportunities.

Dump Site Removal

Approximately 40 small dump sites have been documented in the mitigation area, particularly along the forest roads and at forest road junctions. Dump materials consist mainly of "white goods" such as washers, dryers, refrigerators, as well as automobile scraps, old tires, construction debris, etc. These dump sites will be removed and properly disposed of at the onset of mitigation activities.

Monitoring

Baseline and post-mitigation implementation monitoring has been proposed. Qualitative baseline monitoring has already been conducted at roughly 200 randomly located field stations in planted pine areas. Another roughly 800 qualitative field stations associated with high quality wetlands, drainage structures, roads, ditches, streams, exotic species, listed species, dump sites, etc. have also been completed. Baseline and post-mitigation quantitative monitoring stations are proposed that would encompass roughly 10-20% of the random qualitative planted pine stations. Quantitative monitoring will entail the use of large fixed field plots (50m x 20m) or transects (100m) and repeated quantitative measures of: (1) canopy and subcanopy tree density, basal area, species composition, and individual tree size (diameter at breast height); (2) woody shrub percent cover, height, and species composition; and (3) groundcover percent cover, species composition, and species richness/diversity. Groundcover parameters will be assessed in a minimum of 10 1-m2 replicate quadrats within each larger field plot/transect. Repeated photo-points will also be recorded at each quantitative station. Peizometers or staff gauges will also be placed at strategic locations to record water table and surface water levels before and after mitigation implementation. Baseline quantitative vegetation monitoring will take place during fall (September-Nov) prior to the onset of mitigation activities across most of the site. Following mitigation implementation, quantitative monitoring is proposed annually for the first 5 years. After this period, monitoring will be staggered every 5 years. In addition to ground-based monitoring, vertical aerial photography will be acquired and photo-interpreted 5 years after the onset of mitigation (in fall), and every 10 years afterward, for comparison with pre-mitigation photography acquired in September 2003 and photo-interpreted to determine ecological community types (using FLUCFCS).

Long-term management

Long-term management of the site will include regular reconnaissance and site security. Site security will include maintenance of locked access gates, signage, and possible use of fencing in some areas, if needed. Conservation Easements will also provide for long-term legal protection of the mitigation area. The major long-term resource management activity will be continued use of prescribed fire, in perpetuity. This will include burning on a 3-5 year rotation, dominated by growing season burns, but allowing for a mix of timing on growing season burns and occasional dormant season burns. As longleaf pine plantings mature over time, some additional selective thinning of slash pine may also be performed periodically, on roughly a 10-year rotation within any particular management unit. Any thinning under long-term management would use passive or low impact methods and not result in severe rutting. Supplemental plantings of longleaf or cypress/mixed hardwoods to augment natural recruitment may also occur in selected areas as needed. Continued monitoring and reconnaissance on the site will also be performed to detect any exotic species problems that may arise over time. It is expected that periodic localized treatment of exotics such as Chinese tallow, cogon grass, and Japanese climbing fern will be performed under long-term management of the site. Sustained management of wild hogs will also continue. Maintenance of hydrologic structures such as low water crossings will take place periodically, as will forest road management activities (including additional potential road retirement and removal sites). Passive and active wildlife enhancement will continue under long-term management. In addition, opportunities will likely exist for enhancement/restoration of wild turkey and quail populations on the site once habitat restoration and enhancement activities are in effect. In the longer term, the mitigation area could also potentially contribute to restoration and management of red-cockaded woodpecker, in coordination with other existing and planned natural resource management areas in the region. Finally, management of passive recreation activities, such as hiking, will be incorporated into long-term management of the mitigation areas.

ATTACHMENT B

U.S. Army Corps of Engineers Regional General Permit 86
West Bay to East Walton Counties, Florida
Revised Biological Opinion, March 3, 2005

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Tel: (850) 769-0552
Fax: (850) 763-2177

March 3, 2005

Colonel Robert Carpenter, District Engineer
U.S. Army Corps of Engineers
Jacksonville District Office
475 Harrison Avenue, Suite 202
Panama City, Florida 32401

Attn: Don Hambrick

Re: FWS Log No. 4-P-04-054
Revised Biological Opinion
Regional General Permit 86 (RGP-86)
West Bay to East Walton Counties, Florida

Dear Colonel Carpenter:

Enclosed is the Fish and Wildlife Service's (Service) revised biological opinion (BO) for the U.S. Army Corps of Engineers (Corps) Regional General Permit 86 (RGP-86). This opinion is provided in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq*.).

The original BO for this project was transmitted to the Corps on May 19, 2004. RGP-86 was issued by the Corps on June 30, 2004. Since that time, we have received new information regarding actions that may affect listed species in a manner not considered in the original opinion. Specifically, a newly proposed construction project would impact the listed plant telephus spurge *(Euphorbia telephioides)*, and a new location for the plant has been documented within the RGP boundary. The original BO determined that RGP-86 may affect, but was not likely to adversely affect telephus spurge based on the stipulation that all impacts to known plant locations would be avoided. The new information reveals a more realistic scenario in that permit authorizations under RGP-86 will likely result in adverse effects to telephus spurge. The Service has determined in the revised biological opinion analysis that the permit would not jeopardize the continued existence of this species.

The analysis of impacts to flatwoods salamanders remains the same as the original BO with one minor modification to the salamander "checklist" as noted. There are no other changes to the Terms and Conditions to minimize the potential for incidental take of the flatwoods salamander. Implementation of these Terms and Conditions are non-discretionary in order to be exempt from

the prohibitions of Section 9 of the Act. According to the Act, Terms and Conditions are not applicable to plants; therefore, actions that avoid and minimize take are listed only in the Conservation Measures section of the BO for the telephus spurge.

The Service continues to concur with the previous determination in the Biological Assessment (BA) of "not likely to adversely affect" for red-cockaded woodpecker, bald eagle, manatee, Gulf sturgeon (including its critical habitat), eastern indigo snake, and Godfrey's butterwort. This concurrence is based upon implementation of the avoidance and minimization measures identified in the final BA and supplemental information provided on December 22, 2003. We have included the avoidance and minimization measures in the Conservation Measures section of the BO. If these protective, avoidance, and minimization measures as identified in your plan or the Terms and Conditions cannot be implemented, re-initiation of consultation may be required. Additional information on re-initiation is provided in the Re-initiation Notice of the biological opinion.

We have also provided Conservation Recommendations for each species that are actions that could be taken by the Corps to further the recovery of federally listed species and to help conserve other species that occur within the RGP area. While they are voluntary actions, we feel that many of the recommendations we have provided will help the Corps meet their responsibilities under Section 7(a)(1) of the Act and will also serve to improve future consultations under the RGP-86.

The following findings and recommendations constitute the report of the Department of the Interior. This concludes formal consultation. If you have any questions about this opinion or consultation, please contact staff biologist Hildreth Cooper of our Panama City Field Office at (850) 769-0552, extension 221.

Sincerely yours,

Gail A. Carmody
Project Leader

Enclosure:
Revised Biological Opinion

cc:
St. Joe Company, Jacksonville, FL (Dave Tillis)
USFWS, Atlanta, GA (ARD-ES)
USFWS, ES, Jackson, MS (Linda LaClaire)
USFWS, Habitat Conservation/section 7, Atlanta, GA (e-mail copy to Joe Johnston)
NMFS, Protected Species, St. Petersburg, FL
NMFS, Habitat Conservation, Panama City, FL (Mark Thompson)
NWFWMD, Havana, FL (Ron Bartel)
FWC, Office of Environmental Services, Tallahassee, FL (Rick McCann)
FWC, Non-game Program, Tallahassee, FL (Thomas Eason)
COE, Jacksonville, FL (Osvaldo Collazo))
USEPA, Atlanta, GA (Haynes Johnson)
FDEP, Pensacola, FL (Dick Fancher)

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U.S. Army Corps of Engineers
Regional General Permit 86
West Bay to East Walton Counties, Florida

Revised Biological Opinion
March 3, 2005

Prepared by:
U.S. Fish and Wildlife Service
1601 Balboa Avenue
Panama City, Florida

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INTRODUCTION

This document transmits the Fish and Wildlife Service's (Service) revised biological opinion (BO) for the U.S. Army Corps of Engineers (Corps) issuance of Regional General Permit (RGP-86). RGP-86 authorizes certain dredge and fill activities in non-navigable waters of the U.S. which are located in three large watersheds, including the Lake Powell watershed and various drainage basins of the Choctawhatchee Bay and West Bay watersheds within southeastern Walton County and southwestern Bay County, Florida. This opinion is in accordance with Section 7 of the Endangered Species Act of 1973, as amended (Act), (16 U.S.C. 1531 *et seq*.).

This biological opinion is based on information provided in the December 22, 2003, Biological Assessment (BA) and draft permit advertised on August 29, 2003. A complete administrative record of this consultation is on file in the Service's Panama City, Florida Field Office.

CONSULTATION HISTORY

May 1999	An interagency group met to review cumulative impacts to wetlands in the project area. The focus was primarily on specific projects being proposed by the St. Joe Company in the vicinity of Panama City Beach.
May 1999 through October 2001	The interagency group continued to meet with varying representatives of agencies, applicants, and consultants involved in development projects in the area. The group addressed ways to improve coordination and review of specific projects and approaches to evaluating cumulative impacts. On April 20, 2001, the group met at Disney Wilderness Preserve to learn more about the mitigation approach used by the Orlando Airport Authority and others.
October 2001	The Service presented a potential landscape approach of addressing build-out of the area and assessing impact and conservation needs to the group. The study area at that time was the southwestern quadrant of West Bay.
Winter 2002	The interagency group further explored regulatory mechanisms for assessing cumulative impacts and implementing a comprehensive conservation plan for the watersheds of southern West Bay, Lake Powell, and southeastern Choctawhatchee Bay.

Winter 2002 to present	The interagency teams continue to meet regularly to develop the "West Bay to East Walton Regional General Permit" (RGP-86) and the State equivalent regulatory mechanism, an "Ecosystem Management Agreement."
July 16, 2003	The interagency team discussed the consultation requirements. The consultant requested that the Service identify the species that should be addressed in the project analysis. The Service noted that this is the purpose of the BA, which should be prepared in conjunction with the Federal action agency, the Corps of Engineers. Species lists for the counties would be provided by the Service.
August 1, 2003	The Service provided a species list only for Walton County since a current list for Bay County was provided in 2001 before the project area was expanded.
August 22, 2003	All parties teleconferenced to discuss the BA.
August 26, 2003	The consultant provided a draft species list and proposed determinations of effects.
August 29, 2003	The Corps issues a public notice for RGP-86.
September 24, 2003	The Service participated in a Corps public workshop to discuss RGP-86.
September 29 – October 3, 2003	The St. Joe Company enlisted consulting herpetologist, John Palis, to evaluate potential flatwoods salamander habitat within the project area.
October 23, 2003	The Service provided written concurrence of the species lists used in the BA.
October 30, 2003	A draft BA was transmitted by the consultant to the Corps and to the Service.
November 13-14, 2003	The interagency team provided verbal comments on the BA.

December 4 and 9, 2003	The Service assisted the consultant and John Palis with field evaluations of potential flatwoods salamander habitat.
December 11, 2003	Another draft BA was transmitted to the Service.
December 16-17, 2003	The interagency team met to discuss the BA and other items related to RGP-86.
December 22, 2003	The consultant transmitted the final BA to the Service.
December 23, 2003	In a letter to the Service, the Corps concurs with the findings of the BA and requests initiation of formal consultation.
December 24, 2003	The Service transmitted an electronic copy of the draft BO to the Corps with copies as requested to WilsonMiller and the St. Joe Company.
January 12, 2004	The Service participated in a public workshop regarding DEP's Ecosystem Management Agreement.
January 27, 2004	WilsonMiller provided comments on the draft BO to the Service and to the Corps.
January 30, 2004	A revised draft of the BO was transmitted to the Corps.
February 5, 2004	At the request of the agencies, WilsonMiller provided a "salamander checklist" as an addition to the BA.
February 25, 2004	The Service and Corps met to discuss suggested revisions to the BO.
March 18, 2004	The Service faxed a memorandum to the Corps and WilsonMiller regarding telephus spurge conservation.
April 21, 2004	WilsonMiller conducted a survey for telephus spurge north of Highway 98.

April 30, 2004	WilsonMiller provided details of the telephus spurge survey and a memorandum describing revised Conservation Measures.
May 6, 2004	The Corps concurred with the Service that the additional information was sufficient to proceed with the final biological opinion.
May 19, 2004	The final BO was delivered to the Corps.
May 27, 2004	The Service and other agencies received preliminary materials describing the North Glades Development project.
June 9, 2004	The first RGP pre-application meeting and site visit to a newly documented telephus spurge location. The Service advised the North Glades applicant that more information would be needed regarding telephus spurge locations, impacts, and conservation.
June 18, 2004	The Service received a copy of a draft dredge and fill permit application for "North Glades Development." The packet included an evaluation of telephus spurge for the project.
June 30, 2004	RGP-86 was issued by the Corps.
July 28, 2004	An interagency meeting was convened to discuss pending projects for authorization under RGP-86, including North Glades and potential re-initiation for telephus spurge effects. The applicant was advised that additional information would be needed.
July 28, 2004	The Service received an e-mail from the Corps requesting re-initiation for the North Glades project.
August 3, 2004	The Service transmitted a draft list of additional information to the North Glades consultant and to the Corps.
August 10, 2004	The Service advised the North Glades consultant that the list of additional information should be considered final.

August 11, 2004	The Service and the consultant conducted a teleconference to discuss the technical details of the analysis.
September 9, 2004	The Service attended an interagency pre-application meeting for the Waterfall project within the RGP boundary. The meeting illustrated the need to modify the flatwoods salamander checklist for clarification. (Appendix 1)
October 18, 2004	The Service sent a reminder to the North Glades applicant that the consultation information has not been received.
October 29, 2004	The Service received via e-mail from the consultant the information necessary to proceed with consultation.
November 3, 2004	The Service proposed to the interagency group a modification to the flatwoods salamander checklist as suggested at the September 9, 2004, meeting regarding the Waterfall project.
December 2, 2004	The Service attended an interagency "RGP Team" meeting and clarified the consultation process. There was also discussion about the availability of "negative" survey data for the telephus spurge.
December 23, 2004	The Service again requested the "negative" survey data from the St. Joe Company.
December 29, 2004	The Service requested from the St. Joe Company additional telephus spurge survey information related to plants documented south of the Breakfast Point Mitigation Bank.
January 5, 2005	The consultant for the St. Joe Company responded with three documents that clarified survey information for the telephus spurge.
February 25, 2005	The Corps concurred with the draft BO which was delivered on February 11, 2005.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Regional General Permit #86 (RGP-86) was cooperatively developed by several State and Federal agencies to address the cumulative effects of existing and anticipated development pressures within a fast growing region of the Florida panhandle. A public notice for the permit was published on August 29, 2003. The area addressed by the permit is approximately 47,480 acres in southwest Bay County and southeast Walton County (Figure 1, page 8). Approximately 90 percent of the property is presently in silviculture (forestry) management and is owned by the St. Joe Company. However, as recent trends near the coastline indicate, forestry is giving way to more lucrative residential and commercial development. In addition, just outside the RGP area is the location for a proposed new regional airport, which is undergoing separate review by the Federal Aviation Administration (FAA).

Wetland regulatory agencies have been inundated with permit applications in the area, particularly along U.S. Highway 98 and in the vicinity of Lake Powell. These agencies, along with other Federal and State natural resource agencies, have recognized the need to develop an ecosystem approach to reviewing these permits and assessing the adequacy of mitigation sequencing. RGP-86 provides a mechanism for addressing the cumulative effects of many potential dredge and fill permits by influencing the extent and intensity of development across the landscape. It is accompanied by a State regulatory mechanism, which is known as an Ecosystem Management Agreement (EMA) and is administered by the Florida Department of Environmental Protection (FDEP).

RGP-86 does not directly control development in the area, but it provides an incentive for landowners to participate in the watershed plan that was developed by the agencies. Landowners may continue to submit applications for routine individual permits; however, it is recognized that agency review will require more time and may not be favorable unless ecosystem benefits similar to the principles of RGP-86 can be achieved. The basic principles of RGP-86 are that a maximum 20 percent of a watershed's low quality wetlands can be impacted; these wetland impacts must be fully compensated within the larger watershed; less than one percent of high quality wetlands will be impacted and fully compensated; the Lake Powell watershed wetland functions will not be diminished by any amount; large areas of wetlands and uplands (Conservation Units) will be set aside from future development; and compensatory mitigation will be consolidated in two large mitigation banks.

One recently proposed construction project within the RGP boundary is the cause for Section 7 re-initiation. This project, known as North Glades, will be constructed within the only previously known location of a federally listed plant, telephus spurge (*Euphorbia telephioides)* within the RGP boundary. The permit applicant has indicated that impacts to some of the plants cannot be avoided. In addition, a new location for the plant has been recently discovered nearby on other property owned by the applicant. This information will be discussed in more detail in the telephus spurge section of the BO.

Conservation Measures

The interagency working group developed the following Conservation Measures that will be incorporated within RGP-86. These measures will further the recovery of the species under review.

1. A maximum of 20 percent of low quality wetlands on a project site or within a watershed sub-basin can be impacted. Impacts will be compensated in a mitigation bank, on site, or within identified Conservation Units. The interagency team defined low quality wetlands as those planted for pine silviculture and ditches.

2. Impacts to high quality wetlands (wetlands not in silviculture) will be limited to necessary, minimized road crossings. Total fill of high quality wetlands in the entire 47,480-acre project area cannot exceed 125 acres.

3. Avoidance of impacts to wetlands could assist in the recovery of the flatwoods salamander, indigo snake, bald eagle, and Godfrey's butterwort, if these areas are managed appropriately.

4. Restoration and management of two mitigation banks will secure for conservation two large, strategically placed parcels totaling approximately 7,700 acres. These banks are currently used for industrial forestry, and without RGP-86 could be partially converted to development sites in the future. The mitigation banks could assist in the recovery of the flatwoods salamander, red-cockaded woodpecker, indigo snake, bald eagle, Godfrey's butterwort, telephus spurge, Gulf sturgeon, and manatee.

5. Approximately 10,665 acres of uplands and wetlands (27 percent of the project area) will be designated as Conservation Units (CU's). These areas will be removed from development potential and industrial forestry practices. They will eventually be restored in amounts relative to parcel sizes of future development projects. The interagency working group developed specific prescriptions for wildlife management that focus on listed species. The CU's include significant amounts of uplands, which do not normally receive direct attention in wetland regulatory programs. The CU's could eventually assist in the recovery of the flatwoods salamander, red-cockaded woodpecker, indigo snake, bald eagle, Godfrey's butterwort, telephus spurge, Gulf sturgeon, and manatee.

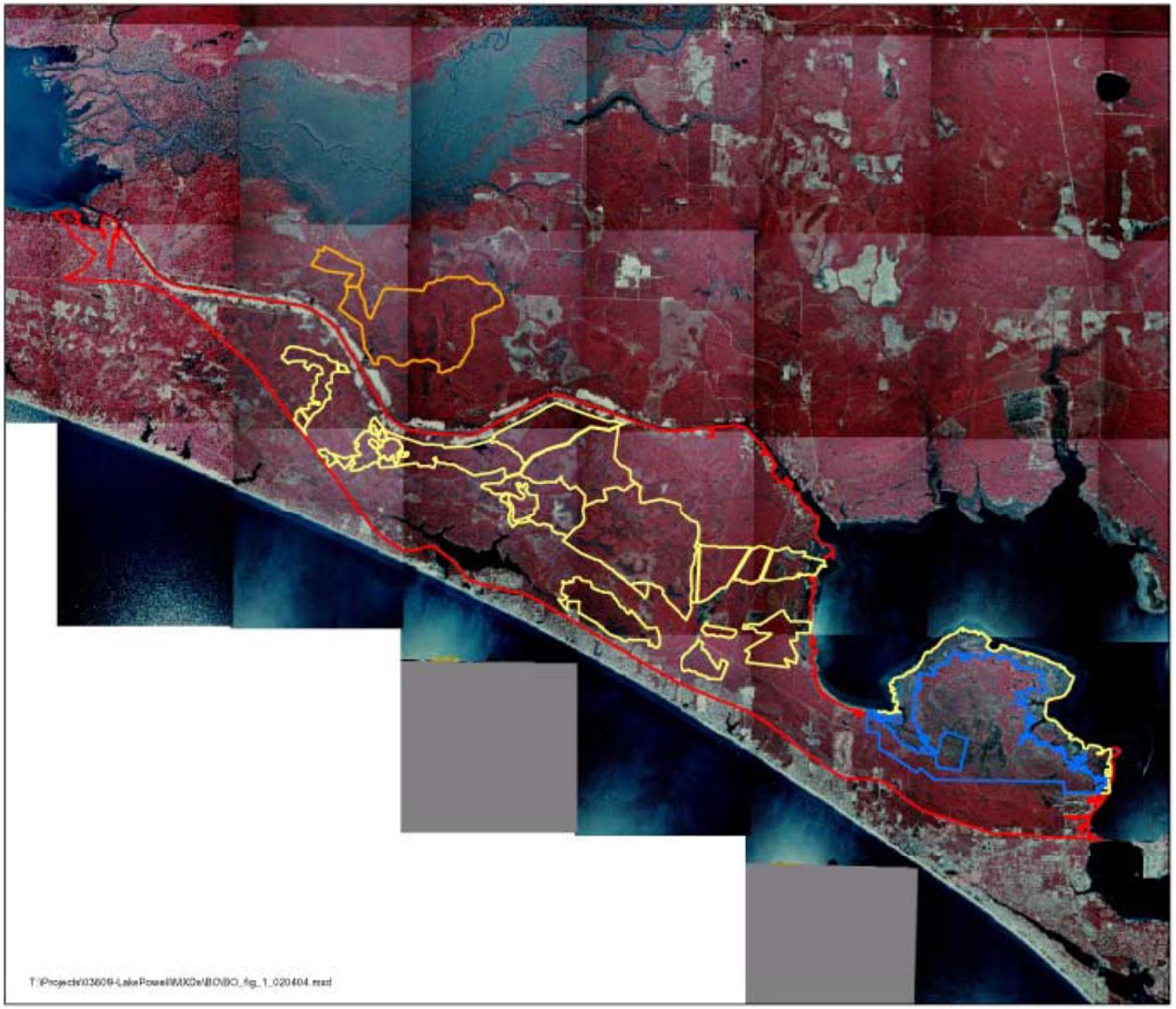

Figure 1

RGP Boundary Biological Opinion

West Bay to East Walton RGP

Legend

- Conservation Units
- Project Area (Including Tidal Soils)
- Devil's Swamp Mitigation Bank
- Breakfast Point Mitigation Bank

Disclaimer:
This exhibit was prepared utilizing GIS data provided by various sources that may include but not limited to federal, state, district and local agencies. Data provided by other sources are not warranted by WilsonMiller for accuracy or for any particular use that may require accurate information. This map is for informational purposes only and should not be substituted for a wetland jurisdictional determination, true title search, property appraisal, survey, or for zoning verification.

Map Date:
02/04/04

N

0 0.5 1 2 3 4 Miles

WilsonMiller
New Directions in Planning, Design & Engineering

6. In general, low quality wetlands provide somewhat of a buffer to high quality wetlands in the project area. For specific projects, buffers to high quality wetlands will be comprised of uplands and/or low quality wetlands, and will be on average not less than 50 feet with a minimum of 30 feet in some locations. The buffers will remain in a natural condition with no application of fertilizers and herbicides. Providing buffers where they are not currently required could assist in the recovery of the flatwoods salamander, red-cockaded woodpecker, indigo snake, bald eagle, Godfrey's butterwort, telephus spurge, Gulf sturgeon, and manatee.

7. A sub-basin watershed approach to wetlands avoidance is a priority over the larger watershed approach. Protection of sub-basins should provide better protection of water quality and quantity functions. This could assist in the recovery of species such as Gulf sturgeon and manatees, which may occur in receiving water bodies.

8. Environmental Resource Permitting (ERP) stormwater attenuation standards will be applied to all development projects. This is a higher standard than currently exists in the Northwest District of the Florida Department of Environmental Protection (FDEP). The increased protection could assist in the recovery of species such as Gulf sturgeon and manatees, which may occur in receiving water bodies.

9. Corps jurisdictional determinations (JD) will be applied to all development projects. The Corps JD is generally more encompassing than the FDEP method.

10. No fill in wetlands will be allowed for septic tanks or drainfields.

11. *Habitat Management Guidelines for the Bald Eagles in the Southeast Region* (USFWS, 1987) will be applied to all development sites, mitigation banks, and CU's.

12. Road construction at WaterSound North, a proposed project under RGP-86, will include wildlife crossings as identified in the project plans dated January 30, 2004.

13. The North Glades applicant has conducted additional surveys for telephus spurge within the RGP-86 Conservation Units (CU) in Bay County, Florida, and within the Breakfast Point mitigation bank (BPMB) (Appendix I). As a result, one new population of telephus spurge containing over 200 plants was located in the Breakfast Point mitigation area and adjacent lands to the south that have no conservation designation. The portion of the population within the BPMB will be managed and monitored in conjunction with the existing management requirements within the RGP-86 permit. [US. Fish and Wildlife Service (USFWS) recovery plan tasks 1.33, 3.1, 3.2, 3.3].

14. The North Glades applicant has agreed to place 2.33 acres (containing approximately 6,825 plants) of 6.43 acres (containing approximately 17,250 plants) of the telephus spurge population of the North Glades development parcel into a conservation easement to protect and manage into perpetuity. The applicant has provided a monitoring plan for the North Glades conservation easement area to assess success of restoration activities (Appendix II). [USFWS recovery plan tasks 3.1, 3.2, 3.3].

15. The North Glades applicant has agreed to transfer 500 plants of telephus spurge to an as yet undetermined location within the BPMB. These plants would otherwise be destroyed by the proposed development plan. The applicant will set up 5 monitoring plots with 100 plants transplanted within each plot. Each plot will be quantitatively monitored for 5 years to assess their overall survival and viability (ERC, 2004). [USFWS recovery plan task 5.0].

16. All proposed project sites within the RGP will be surveyed for presence or absence of telephus spurge according to the survey protocol (Appendix III).

Action area

For purposes of the Endangered Species Act, action area is defined as all areas affected directly or indirectly by a Federal action, including interdependent and interrelated actions and proposed Conservation Measures. Although each potentially affected species will define a separate action area, the most inclusive geographic area is referenced for simplicity.

The action area for this analysis is generally described as the proposed boundary of the RGP, including the mitigation banks. Receiving waters under consideration for aquatic or water-dependent species are West Bay, Lake Powell, the intracoastal waterway, and extreme southeast Choctawhatchee Bay. Adjacent wetlands and uplands were considered where development or conservation actions could potentially affect non-aquatic species.

Determination of effects

Based on the proposed protective, avoidance, and minimization measures and the analysis provided in the BA, the Service concurs with the following determinations of effects. More detail regarding these species and potential effects of the project is found in the BA.

-Piping plover (*Charadrius melodus*) – No Effect

- Only one historical record occurs near the project. The site is not within listed critical habitat for the species. There are no direct effects to the site, and indirect effects would be difficult to measure.

-Sea turtles – No Effect

- Beachfront habitat is located near the project site at Lake Powell inlet, but not within the RGP boundary. Almost all beachfront that is not presently developed at Lake Powell is within Camp Helen State Recreation Area. Based on the project description and location, the Service concurs with the determination that no effects to sea turtles will occur as a result of the proposed action.

-Wood storks (*Mycteria americana*) – No Effect

- No documented occurrences in vicinity.

-American alligator (*Alligator mississippiensis*) – No Effect

- Alligators were listed due to similarity of appearance with crocodiles; however, the project is not located within the range of the crocodile.

-Eastern indigo snake (Drymarchon corais couperi) - No Effect

- No documented occurrences in the vicinity.

-Plants (federally listed) – Six federally listed plant species were considered in the BA. These were selected from the Service's lists of plants that have the potential to occur in Bay and Walton counties. Additional plant surveys were conducted, although they were limited considering the size of the project area and the timeframe for RGP development. No federally listed plant species were observed within the project area during the initial surveys that were conducted as part of this project; however, subsequent surveys verified and expanded known locations of one plant, telephus spurge, in the project area.

1. Cooley's meadow rue (*Thalictrum cooleyi*) – No Effect
   - Only one known population of Cooley's meadow rue occurs in Florida, and it appears that suitable soils may not be present in the project area. This species does not tolerate disturbance, and most impacts of the permit would be in areas that are highly disturbed.

2. Crystal Lake nailwort (*Paronychia chartacea* ssp. *minima)* – No Effect
   - There are no recorded observations of this species within the project area; there is no suitable habitat (sandhill upland lakes and karst ponds); and the known species range is well northeast of the project area.

3. Florida skullcap (*Scutellaria floridana*) – No Effect
   - There are no recorded observations of this species within the project area. The only known record in Bay County occurs approximately 17 miles from the project, and all other records in its range are in counties even farther to the east. This species does not tolerate disturbance, and most impacts of the permit would be in areas that are highly disturbed.

4. White birds-in-a-nest (*Macbridea alba*) – No Effect
   - Within the project area, potentially suitable habitat for white birds-in-a-nest may be present in cleared or recently planted areas, in roadside ditches, or along the edges of pine plantations. However, this species has not been observed in the project area, and the nearest observations are in eastern Bay County in the vicinity of Sandy Creek and East Bay, approximately 17 miles from the project site.

5. Godfrey's butterwort (*Pinguicula ionantha*) – May Affect, Not Likely to Adversely Affect
    - There are no recorded observations of this species within the project area, but there are records in the vicinity to the southeast of the project. Suitable habitat may be present in small pockets within pine plantations that could be affected by the developments within the project area. The species could also be found in herbaceous ecotones of the more high quality wetlands that will be protected. Beneficial effects of the project include the following: protection of high quality wetlands and high quality ecotone habitat that may be adjacent to them; establishment of buffers around preserved wetlands; and protection of uplands and wetlands within conservation units and two mitigation banks. Without RGP-86, most of the suitable habitat would continue to be negatively affected by intense silviculture.

6. Telephus spurge (*Euphorbia telephioides*) - Likely to Adversely Affect
    - The Service concurs with the determination for this species.

-Manatees (*Trichechus manatus latirostris*) – May Affect, Not Likely to Adversely Affect

- There are few documented records of occurrence in the action area. The species is considered transitory in this area.

- Project could indirectly affect seagrass through hydrologic alterations and increased sediment, nutrient, and chemical loading. However, effects are expected to be of a scale that will not measurably alter the system's ecological balance due to the expanse of the receiving waterbody. Conservation Measures address water quality issues to the extent currently practicable by adopting ERP stormwater criteria.

- Note that the manatee key also leads to a May Affect, Not Likely to Adversely Affect determination, even though the project is not located in Section 10 waters. This determination is based on the fact that the potential indirect effects related to water quality are insignificant in consideration of the large geographic area covered by RGP-86, including extensive shoreline areas.

-Gulf sturgeon (*Acipenser oxyrinchus desotoi*) – May Affect, Not Likely to Adversely Affect

- The project could indirectly affect Gulf sturgeon habitat due to increased stormwater associated with development. The Service received concurrence from National Marine Fisheries Service (NMFS) that we should be the lead agency in this case because potential impacts are related to water quality (Bolton, August 2003). NMFS would be the lead agency only if there were proposed direct impacts to sturgeon habitat. There are few documented records of species occurrences in West Bay, where the species is transitory. Critical habitat is located near the action area in Choctawhatchee Bay; however, only a small portion of the Choctawhatchee Bay watershed occurs in the action area. Indirect

effects are expected to be of a scale that will not measurably alter the system's ecological balance due to the expanse of the receiving waterbody and the Conservation Measures provided that address water quality issues to the extent currently practicable. These measures are described in the BA. Furthermore, the influence of these hydrologic alterations and increased sediment, nutrient, and chemical loadings would be minor in comparison to large influence of nutrient and sediment inputs currently stemming from the Choctawhatchee River. However, if measurable impacts on any of the primary constituent elements essential for the conservation of the Gulf sturgeon are documented, re-initiation of consultation with the Service should occur. The primary constituent elements are those habitat components that support feeding, resting, sheltering, reproduction, migration, and physical features necessary for maintaining the natural processes that support these habitat components. Relevant to this project, any impacts that alter the abundance of prey items, disrupt aggregation areas, decrease water quality, or increase sediment quality would potentially affect the Gulf sturgeon. The added stormwater provisions of RGP-86 minimize adverse effects.

-Red-cockaded woodpeckers (*Picoides boralis*) – May Affect, Not Likely to Adversely Affect

- The action area has been surveyed on numerous occasions. No active cavities were recorded, including an evaluation of two historical cavity trees within the action area. Almost all upland habitats have been converted to silviculture, and most remaining unplanted wetlands are cypress/bayhead communities with dense shrub and mid-story layers. Wildlife surveys for projects will be conducted as they come into the planning stages. If active cavities are found, the landowner will notify the Corps, which will re-initiate consultation with the Service. Additional information on re-initiation is provided in the Re-initiation Notice of this BO.

-Bald eagles (Haliaeetus leicocephalus) – May Affect, Not Likely to Adversely Affect

- One documented bald eagle nest is located in the action area. The nest is located within the proposed Breakfast Point mitigation bank. The management plan for the bank incorporates the *Habitat Management Guidelines for the Bald Eagles in the Southeast Region* (USFWS, 1987). Other areas have been surveyed, but will be surveyed again when each proposed large project goes into the planning stages. If new nests are found, the *Habitat Management Guidelines for Bald Eagles* will be incorporated into the project. If the guidelines cannot be implemented, initiation of consultation for the bald eagle may be required.

-Flatwoods salamander (*Ambystoma cingulatum*) – Likely to Adversely Affect

- The Service concurs with the determination for this species.

Based on the information provided in the project BA and supplemental information, and with the implementation of the protective, avoidance, and minimization measures, we concur that

RGP-86 would likely adversely affect telephus spurge and flatwoods salamanders. These two species will be addressed further in the biological opinion.

FLATWOODS SALAMANDER

STATUS OF THE SPECIES/CRITICAL HABITAT

This section summarizes the biology and ecology of the flatwoods salamander. The Service uses this information to assess whether a Federal action is likely to jeopardize the continued existence of this species. The Environmental Baseline section summarizes information on status and trends of the species specifically within the action area. These summaries provide the foundation for the Service's assessment of the effects of the proposed action, as presented in the Effects of Action section, and to make the Conservation Recommendations listed at the end of this opinion.

The flatwoods salamander (*Ambystoma cingulatum*) is listed as a threatened species under the authority of the Endangered Species Act of 1973, as amended (Act). The flatwoods salamander was designated as threatened in the Federal Register, April 1, 1999 (64 FR 15691), and became effective on May 3, 1999. No critical habitat has been designated for this species. Recovery planning is underway, but no recovery plan has been adopted.

Species description

The flatwoods salamander is a slender, small-headed mole salamander that is seldom greater than 5 inches in length. Adult dorsal color ranges from black to chocolate-black with highly variable, fine, light gray lines forming a net-like or cross-banded pattern across the back. Undersurface is plain gray to black with a few creamy or pearl gray blotches or spots. Flatwoods salamander larvae are long and slender, broad-headed and bushy-gilled, with white bellies and striped sides (Ashton, 1992; Palis, 1995). Flatwoods salamanders are known to occur in isolated populations across the lower southeastern Coastal Plain, with the majority of the remaining known populations located in Florida.

Life history

Adult and sub-adult flatwoods salamanders live in underground burrows. Adult flatwoods salamanders move above ground to their wetland breeding sites during rainy weather, in association with cold fronts, from October to December (Palis, 1997). Typical breeding sites are isolated pond cypress *(Taxodium ascendens*), blackgum (*Nyssa sylvatica* var. *biflora*), or slash pine (*Pinus elliottii*) dominated depressions which dry completely on a cyclic basis. They are generally shallow and relatively small, and have a marsh-like appearance with sedges often growing throughout, and wiregrass (*Aristida* sp.), panic grasses (*Panicum* spp.), and other herbaceous species concentrated in the shallow water edges. After breeding, adult flatwoods salamanders leave the pond.

Optimum adult habitat for the flatwoods salamander is an open, mesic (moderate moisture) woodland of longleaf/slash pine (*Pinus palustris*/*P. elliottii*) flatwoods maintained by frequent fires, with a dominant ground cover of wiregrass (*Aristida spp.*). The ground cover supports a rich herbivorous invertebrate community that serves as a food source for the species (64 FR 15692).

In a study by Ashton (1992), flatwoods salamanders were found greater than 1,859 yards from their breeding pond. However, based on more recent data (Semlitsch, 1998) and additional peer review, the final listing rule recommends a 1,476-feet "buffer" around breeding ponds to protect the majority of a flatwoods salamander population from the adverse effect of certain specified, silvicultural practices. This buffer extends 1,476 feet out from the wetland edge.

Since they may disperse long distances from their breeding ponds to upland sites, desiccation can be a limiting factor. Thus, it is important that areas connecting their wetland and terrestrial habitats are conserved in order to provide cover and appropriate moisture regimes during their migration. High quality habitat for the flatwoods salamander includes a number of isolated wetland breeding sites within a fire maintained landscape of longleaf pine/slash pine flatwoods having an abundant herbaceous ground cover (Sekerak, 1994). In Florida, Palis (1997) found that 70 percent of the active breeding sites were surrounded by second-growth longleaf or slash pine flatwoods with nearly undisturbed wiregrass ground cover.

Population dynamics

A flatwoods salamander population has been defined as those salamanders using breeding sites within 2 miles of each other, barring an impassable barrier such as a perennial stream (Palis, 1997). Since temporary ponds are not likely permanent fixtures of the landscape due to succession, there would be inevitable extinctions of local populations (Semlitsch, 1998). By maintaining a mosaic of ponds with varying hydrologies, and by providing terrestrial habitats for adult life stages and colonization corridors, some prevention of local population extinction can be achieved. A mosaic of ponds would ensure that appropriate breeding conditions would be achieved under different climate regimes. Colonization corridors would allow movement of salamanders to new breeding sites or previously occupied ones (Semlitsch, 1998).

Fire is needed to maintain the natural pine flatwoods community. The disruption of the natural fire cycle has led to an increase of slash pine on areas previously dominated by longleaf pine, increases in hardwood understory and canopy, and subsequent decreases in herbaceous ground cover (64 FR 15701). Isolated ponds that are surrounded with pine plantations and are protected from fire may become unsuitable breeding sites for the flatwoods salamander. This is a result of canopy closure and the reduction in herbaceous vegetation necessary for egg deposition and larval development (Palis, 1993).

Status and distribution

Historical records for the flatwoods salamanders in its range are limited. Longleaf pine/slash pine flatwoods historically occurred in a broad band across the lower southeastern Coastal Plain. The flatwoods salamander likely occurred in appropriate habitat throughout this area (64 FR

15691). Range-wide surveys in Alabama, Florida, Georgia, and South Carolina have been ongoing since 1990 in an effort to locate new populations. Most surveys were searches for the presence of larvae in the grassy edges of ponds.

The combined data from the surveys completed since 1990 indicate that 59 populations of flatwoods salamanders are known from across the historical range. Most of these occur in Florida (47 populations or 80 percent). Eight populations have been found in Georgia, four in South Carolina, and none have been found in Alabama. Some of these populations are inferred from the capture of a single individual. Slightly more than half the known populations for the flatwoods salamander occur on public land (40 of 59, or 68 percent).

ENVIRONMENTAL BASELINE

Status of the species within the action area

Historical data on flatwoods salamanders in the action area is limited. Most of the area is privately owned and has been intensively managed for silviculture for many years. Little remains of the natural terrestrial landscape. Almost all uplands and most wetlands were converted to pine plantations with site preparation that included clearcutting, roller chopping, herbicide application, and bedding. In addition, pine flatwoods are not considered wetlands under State of Florida best management practices for silviculture; therefore, this habitat type receives no special consideration when converted and managed for industrial forestry.

There are no documented occurrences of flatwoods salamanders in Bay County and only one recent record in Walton County. The Walton County record is for one individual at one location in Point Washington State Forest, which is adjacent to the RGP-86 boundary but separated to a great extent by a four-lane highway. One large parcel of the State Forest bisects the RGP area at the western end, and other parcels are adjacent to the RGP boundary north of the highway in that vicinity. The known record for the flatwoods salamander at the State Forest is located south of the four-lane highway. Further field investigations were recommended for the RGP area due to the proximity to the known location and the absence of surveys across this vast expanse of private lands in the project area. There is also one other known occurrence approximately seven miles north of the project area in Pine Log State Forest in Washington County.

The St. Joe Company (St. Joe) owns the majority of lands in the action area. St. Joe has received assistance from the Service in recent years in an effort to develop a habitat suitability model for flatwoods salamanders. Such a model would provide useful information for salamander management and recovery, particularly in the Florida panhandle where St. Joe has much of its lands. Unusually dry conditions in recent years delayed progress on the model, but a fair amount of background data collection was conducted in the project area. The area also has been visited on several occasions by one of the foremost flatwoods salamander experts, John Palis. Mr. Palis was first contracted by St. Joe to visit the project area on March 8, 2000. This cursory visit identified potential habitat and that “flatwoods salamanders may occur at this site” (Palis, 2000). Subsequent field inspections were conducted by John Palis in the action area related to the habitat model and to Camp Creek Golf Course Phase II.

Mr. Palis was again contracted to evaluate potential flatwoods salamander habitat specifically in the RGP area. Details of his survey methods are described in the biological assessment. Approximately 300 potential sites were initially selected using aerial photography and GIS data. These sites were throughout the RGP area, not just on St. Joe Company lands (Figure 2, page 18). Upon further review of high resolution photography, historical photography, and soils maps, Palis selected 83 of the 300 sites "that merited a field visit to determine their potential as flatwoods salamander habitat" (WilsonMiller, 2003) (Figure 3, page 19). A team including Palis, the applicant, and consultants for the applicant inspected these sites, and any others that were noted in the field. Each site that was deemed to have at least a "small potential" for suitable habitat was re-visited by Palis. The final analysis concluded that only nine wetlands appeared to be suitable habitat (Figure 4, page 20).

There is no set protocol at this time for providing reasonable assurance that salamanders do <u>not</u> occur at a particular location. However, the consensus among herpetologists is that a reasonable effort would consist of drift fence surveys surrounding a potential breeding pond to be conducted in two consecutive "normal" weather years. There has not been an opportunity to adequately survey for the presence or absence of flatwoods salamanders in any of the potentially suitable habitats due to a recent drought. However, based on the remote sensing analysis, site inspections, and the proximity to at least two known locations, the Corps and the St. Joe Company have agreed to presume presence of flatwoods salamanders at the nine potential locations. This appears to be a reasonable approach given the size of the project area and the limited time frame to conduct surveys. Positive results from any future surveys would require re-initiation of Section 7 consultation if there is a potential to affect suitable habitat not addressed in the incidental take section of this opinion.

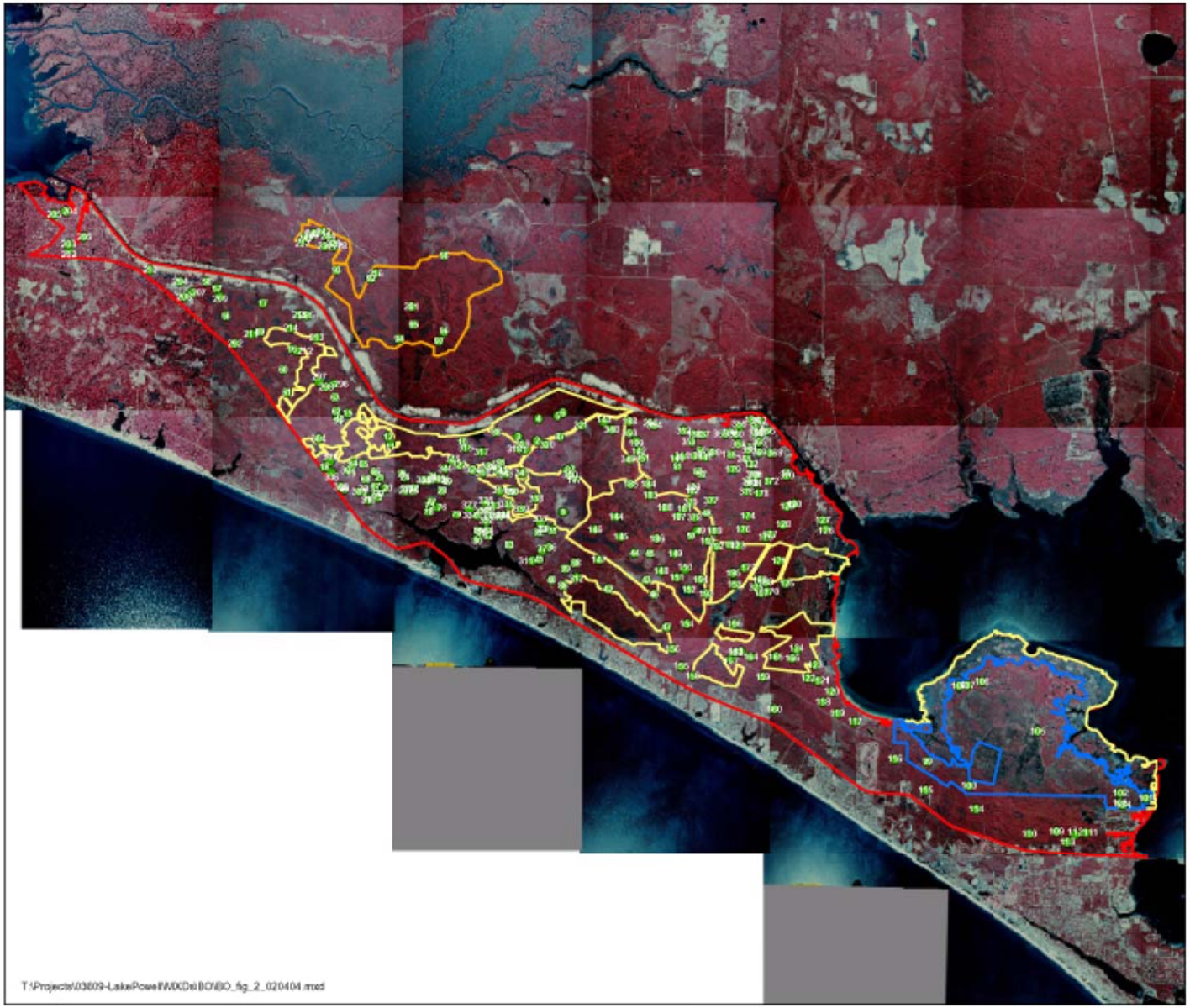

Figure 2

300+ Sites Selected for Analysis Biological Opinion

West Bay to East Walton RGP

Legend

- Conservation Units
- RGP Area (Including Tidal Soils)
- Devil's Swamp Mitigation Bank
- Breakfast Point Mitigation Bank
- Ponds Reviewed Prior to Field Surveys for Potential Flatwoods Salamander Habitat

203 Pond Identification Number

Disclaimer:
This exhibit was prepared utilizing GIS data provided by various sources that may include but not limited to federal, state, district and local agencies. Data provided by other sources are not warranted by WilsonMiller for accuracy or for any particular use that may require accurate information. This map is for informational purposes only and should not be substituted for a wetland jurisdictional determination, true title search, property appraisal, survey, or for zoning verification.

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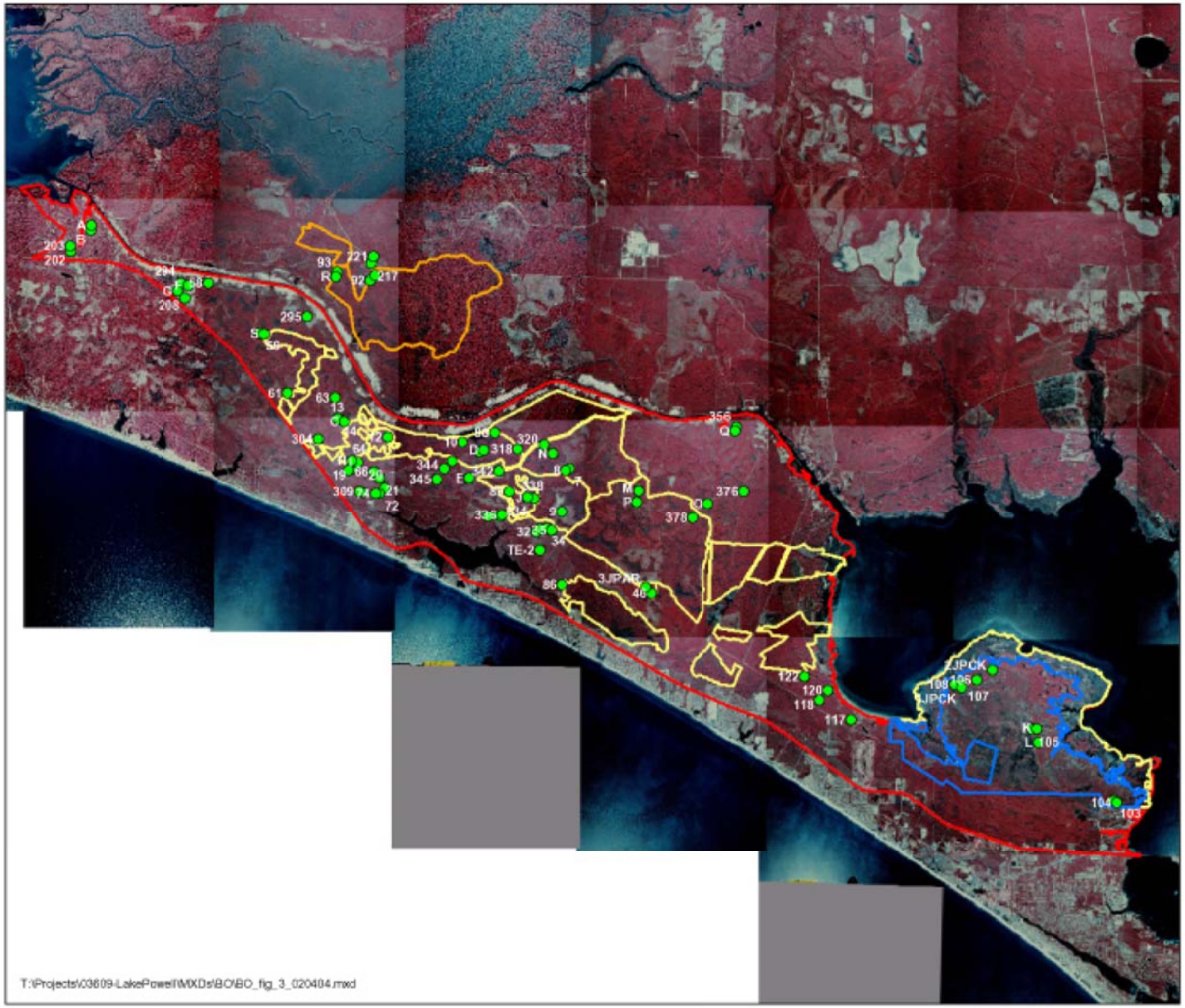

Figure 3

83 Sites Selected from 300+

West Bay to East Walton RGP

Legend

- Conservation Units
- RGP Area (Including Tidal Soils)
- Devil's Swamp Mitigation Bank
- Breakfast Point Mitigation Bank

- Ponds Surveyed for Potential Flatwoods Salamander Habitat

203 Pond Identification

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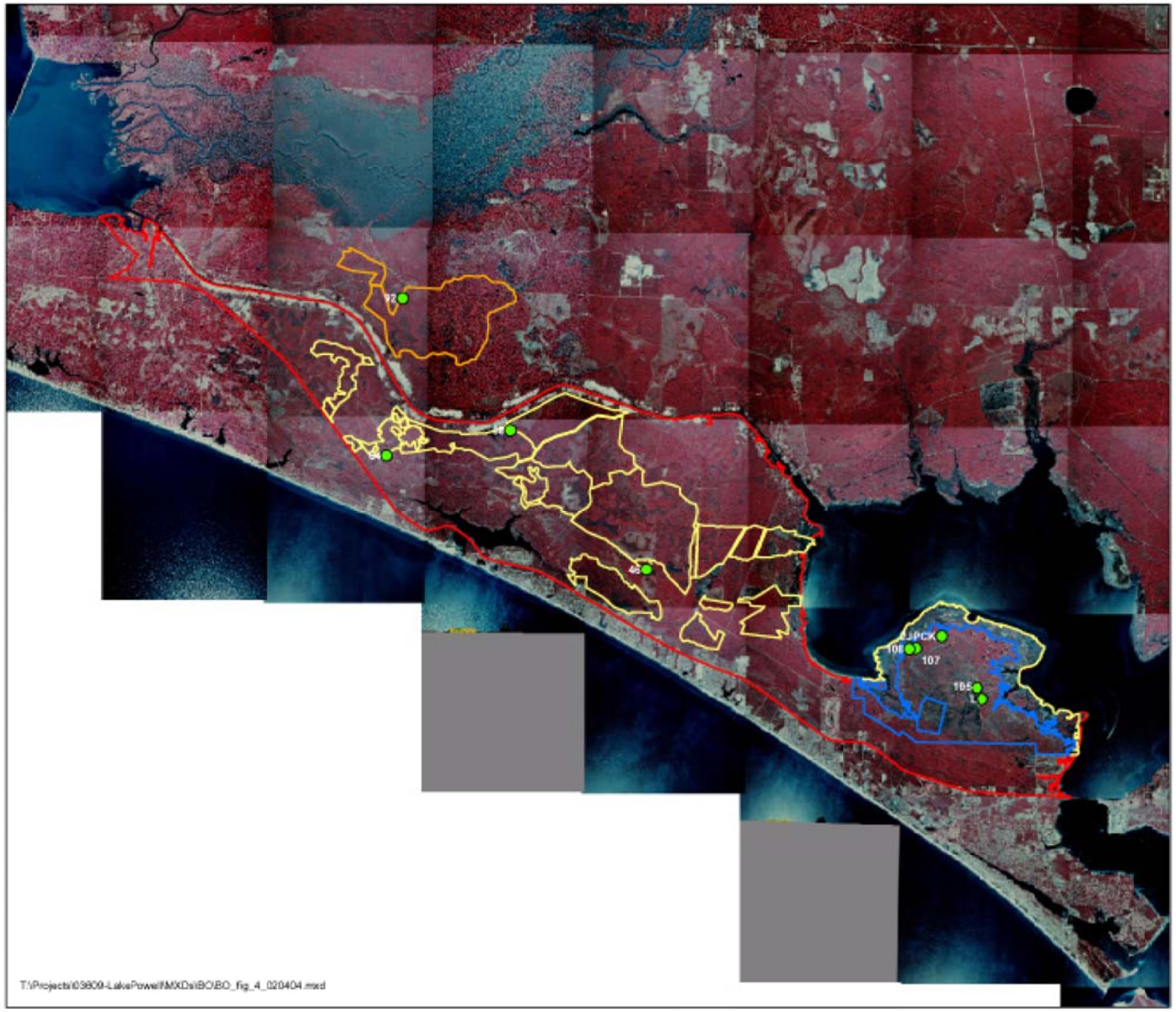

Figure 4

Nine Potential Salamander Locations

West Bay to East Walton RGP

Legend

- Conservation Units
- GP Area (Including Tidal Soils)
- Devils Swamp
- Breakfast Point

- Ponds Considered Potential Habitat Based on Field Survey Results
- 46 Pond Identification

Disclaimer:
This exhibit was prepared utilizing GIS data provided by various sources that may include but not limited to federal, state, district and local agencies. Data provided by other sources are not warranted by WilsonMiller for accuracy or for any particular use that may require accurate information. This map is for informational purposes only and should not be substituted for a wetland jurisdictional determination, true title search, property appraisal, survey, or for zoning verification.

Map Date:
02/04/04

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Factors affecting species environment within the action area

West Bay Sector Plan - Bay County officials recently conducted a special planning effort for a portion of the RGP and additional adjacent areas totaling approximately 75,000 acres. The "West Bay Sector Plan" identifies potential development and conservation strategies for the area, and is predicated on re-location of the Panama City/Bay County International Airport. Although the Sector Plan may encourage and accelerate development, it could reduce adverse effects in comparison to existing land use regulations. There are no known flatwoods salamander records within the sector planning area. Potential habitat occurs in a proposed sector conservation area that coincides with the Breakfast Point mitigation bank. It is likely that other habitat could be found in the approximately 30,000 acres identified as the West Bay Preservation Area.

Camp Creek Golf Course, Medallist, and Highway 98 - These three projects are within the RGP boundary. Each project required Corps permits and formal consultations for flatwoods salamanders. Similar to the approach agreed upon for the RGP, each project area was presumed to have salamanders based on the presence of suitable habitat and the proximity to known locations. The amount of presumed take from these three projects totals 606 acres of buffer habitat. There was no direct take of breeding pond habitat.

Public Lands - Point Washington State Forest occurs within the RGP boundary. There is one known location of a flatwoods salamander breeding pond in the forest, but it is a considerable distance from any potential development that could occur in the RGP. The forest is actively managed in a manner that should improve salamander populations. Pine Log State Forest is in proximity to the RGP boundary, but not located within the project area. As with Point Washington, there is one documented occurrence of flatwoods salamanders, and the forest is managed to improve habitat for the species. The Northwest Florida Water Management District (WMD) also owns large parcels adjacent to the project area. There are no known occurrences of flatwoods salamanders on WMD land, but there is good potential that active management will improve habitat. The RGP conservation units blend with the State forest and WMD lands to provide an opportunity for habitat improvement and connectivity across a large area of Bay and Walton counties.

EFFECTS OF THE ACTION

RGP-86 is designed to manage the cumulative effects of numerous potential Section 404 dredge and fill permits. The RGP guides development to specific areas allowing no more than 20 percent of low quality silviculture wetlands to be impacted within each sub-watershed in the RGP area. More than 99 percent of high quality, unplanted wetlands will remain. Two mitigation banks of 7,700 acres will compensate for the loss of wetland functional values to both low and high quality wetlands. Conservation units of 13,200 acres will be removed from development potential as a condition of the permit, but will be encumbered by conservation easements concurrently as future development projects receive permit authorization. The conservation units and mitigation banks establish large, contiguous blocks of manageable lands, wildlife corridors, and provide for reduction of potential stormwater and hydrological impacts. Effects of the project on salamander habitat are based on two important premises: 1) best available methods were used to identify potential habitat, and 2) presence of salamanders is presumed for these areas although none have been documented.

Direct effects

The BA identifies specific direct effects of the project to include development projects within two potential habitats identified as Ponds 64 and 46. Pond 64 is the only potential breeding habitat that is not located within a conservation unit or one of the two mitigation banks. Pond 46 was added to a conservation unit following its discovery and evaluation; however, some of the surrounding buffer habitat of Pond 46 falls outside the conservation unit and is therefore subject to future development plans. All other identified suitable habitat, including buffers, is located either within a conservation unit or a mitigation bank. Direct effects could occur in other locations if suitable habitat is discovered at a later time; however, this situation would constitute new information that would trigger re-initiation of consultation.

The BA describes the method by which John Palis and the consultants quantified the amount of suitable habitat that could be affected at Ponds 64 and 46. This is based on a draft project design for a residential/golf course development adjacent to Pond 64 and presumed future development within suitable buffer habitat of Pond 46 that is outside the conservation unit. The BA indicates that approximately 57 acres of fair to fairly good buffer habitat will be affected at Pond 64. Approximately 53.6 acres of potential buffer habitat will be affected at Pond 46.

Management of the conservation units and the mitigation banks should ultimately benefit flatwoods salamander habitat. The conservation units will be managed according to *Principles for Forest and Wildlife Management for Conservation Units Within the Regional General Permit Area* that is part of RGP-86. The banks will be managed according to their mitigation banking instruments. The ultimate goal in both conservation units and banks is to restore the habitat to historical natural condition.

Indirect effects

Flatwoods salamanders are thought to be sensitive to soil and groundcover disturbing activities, especially when that disturbance creates an impediment to movement from upland habitat to the ephemeral wetlands they use for breeding and larval development. Soil disturbance can also result in potential sedimentation and erosion affecting nearby wetlands habitat. However, construction that could occur within proximity to suitable habitat is limited by the boundaries of the conservation units and mitigation banks and by the proposed buffers. In addition, a proposed road near Pond 64 has been re-designed to include underpasses for reptiles, amphibians, and small mammals. This would maintain a connection between the pond and an area to the north that will be placed in a conservation easement within the development and which connects to a large conservation unit.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed project are not considered in this opinion because they require separate consultation pursuant to section 7 of the Endangered Species Act.

RGP-86 was specifically designed through 3 years of interagency coordination to address cumulative effects that could be expected from increased development pressure in the area. The Service has evaluated numerous development projects in the area in recent years, and has conducted formal consultation for flatwoods salamanders for three of these projects. The general permit provides a more coordinated ecosystem approach for implementation of the current dredge and fill program in the area. The cooperation of the largest landowner in the area has been instrumental in the process. Additional evaluation of flatwoods salamander habitat will occur on a project-by-project basis using the procedures described in Appendix IV.

CONCLUSION

After reviewing the current status of the flatwoods salamander, the environmental baseline for the RGP-86 action area, the effects of the proposed activities, proposed protective, avoidance, and minimization measures, and the cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of the flatwoods salamander. Within the RGP project area, nine wetlands were identified as potential suitable habitat for the flatwoods salamander. No known breeding habitat for flatwoods salamander will be affected. As conditions of issuing the permit for the project, mitigation banks totaling 7,692 acres will be established to compensate for loss of wetland values and conservation units totaling 13,200 acres will be removed from development potential. Seven of the nine potential flatwoods salamander ponds are located completely within a conservation unit or mitigation bank. Of the two ponds not included, only one is completely outside a conservation unit or mitigation bank. The combined acreage of affected buffer habitat in both ponds totals 110.6 acres. This acreage, which has been established as the amount of take for the affected potentially occupied habitat, is

very small when compared to the amount of suitable upland and wetland habitat (18,357 acres) that will be restored and managed in perpetuity within the conservation units and mitigation banks. Loss of 110.6 acres of potential suitable habitat will not appreciably reduce the survival and recovery of the flatwoods salamander. No potential breeding pond habitat will be affected. Less than 2.4 percent of the buffer habitat surrounding these ponds will be taken. The RGP project area will allow for protection and expansion of populations if any are eventually located at the site. The existing and future land uses without the RGP (silviculture and haphazard development) would be more of a threat to recovery of the species than issuance of the permit. No critical habitat has been designated for the flatwoods salamander; therefore, none would be affected.

There are approximately 160 ponds in Florida with a conservative estimate of 376,000 acres of pond and buffer habitat in the State (average 5-acre pond size plus 1,476-ft. buffer). Therefore, the amount of take could be viewed as 0.0003 of the amount of known habitat in the State of Florida. As a reminder, it should be pointed out that all effects are for habitat that is **presumed** to support flatwoods salamanders, and that a majority of the buffer habitat around the two affected ponds will remain and be improved.

INCIDENTAL TAKE STATEMENT

Section 9 of the Endangered Species Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include major habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to noticeably disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with the Terms and Conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the Corps of Engineers for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and assure implementation of the Terms and Conditions, or (2) fails to require applicants to adhere to the Terms and Conditions of the incidental take statement through enforceable terms, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the project and its impacts on the species to the Service as specified in the incidental take statement [50 CFR §402.14(I)(3)].

Amount or extent of take

The Service has determined that incidental take of individual flatwoods salamanders is difficult to detect for the following reasons: (1) adult flatwoods salamanders are difficult to locate and observe. Individuals killed during construction would likely be buried under dirt and debris, and/or, (2) losses may be masked by natural fluctuations in numbers of individuals. Although mortality of individuals is difficult to document, the level of take of this species was determined as follows: An estimated 110.6 acres of potential buffer habitat is presumed to be taken by development activities allowed under RGP-86.

Effect of the take

In the accompanying biological opinion, the Service determined that the level of anticipated take is not likely to result in jeopardy to the species. The amount of take is for **presumed occupied** habitat and is small when compared to potential habitat that will remain in conservation units and mitigation banks, both of which will eventually be restored to more suitable habitat and managed in perpetuity. The amount of take is also for buffer habitat only; no take is given for potential breeding ponds themselves. No critical habitat has been designated for the flatwoods salamander; therefore none will be affected.

Reasonable and prudent measures

The Service believes the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize take of flatwoods salamanders.

1. All applicants for development projects will receive information about flatwoods salamander habitat.

2. Future development proposals will include a verification that the ponds on the site have been evaluated for their suitability as flatwoods salamander breeding ponds, as described in the Terms and Conditions.

3. Future owners of the conservation units will receive information about the flatwoods salamander Conservation Measures of RGP-86.

Terms and conditions

In order to be exempt from the prohibitions of section 9 of the Endangered Species Act, the Corps and applicants for RGP-86 must comply with the following Terms and Conditions, which implement the reasonable and prudent measures, described above. These Terms and Conditions are non-discretionary.

1. The Conservation Measures as described in the BA and in the proposed action section of this BO will be implemented.

2. The 5-year review and renewal process will provide an evaluation of salamander effects and conservation.

3. As part of the pre-application process for RGP-86, project sites will be assessed using the *Flatwoods Salamander Pre-Application Evaluation* (Appendix IV). This requirement is addressed in Special Condition 19.a (8) of the permit.

4. As Special Condition 13.d of RGP-86, sale or transfer of conservation units requires that a copy of RGP-86 and this biological opinion be provided to the new owner.

CONSERVATION RECOMMENDATIONS FOR FLATWOODS SALAMANDERS

Section 7(a)(1) of the Endangered Species Act (Act) directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The following conservation recommendations will be implemented if possible:

1. The Corps recognizes that a joint effort is underway to develop a predictive model to determine habitat suitability for flatwoods salamander. The research to develop the model has been ongoing for 2 years and requires another year for completion. To the extent it is available for use, the Corps and the St. Joe Company should apply the model to the project area.

2. The Corps and the St. Joe Company should participate in conservation planning for telephus spurge in the RGP action area.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

TELEPHUS SPURGE

STATUS OF THE SPECIES/CRITICAL HABITAT

This section summarizes the biology and ecology of telephus spurge. The Service uses this information to assess whether a Federal action is likely to jeopardize the continued existence of the species. The Environmental Baseline summarizes information on status and trends of the species specifically within the action area. These summaries provide a foundation for the Service's assessment of the effects of the proposed action, as presented in the Effects of Action section, and to make the Conservation Recommendations listed at the end of this opinion.

Telephus spurge was listed as a threatened species under the authority of the Endangered Species Act of 1973, as amended (Act). The telephus spurge was designated as threatened in the Federal Register, May 8, 1992 (57 FR 19813-19819) and became effective on June 8, 1992. No critical habitat has been designated for this species. This species is endemic to Bay, Franklin, and Gulf counties, Florida. It is threatened by habitat degradation due to conversion of habitat to pine plantations with accompanying mechanical destruction and eventual shading, as well as real estate development within its habitat. Use of herbicides within powerline right-of-ways may also adversely affect telephus spurge. A recovery plan was approved on June 22, 1994 (USFWS 1994).

Species description

Telephus spurge is a perennial herb with a stout storage root and numerous, erect stems to 1 foot tall. Stems and leaves are smooth and fleshy with milky sap. The leaves are alternate, 1-2 inches long, without leaf stalks, obovate to oblanceolate, usually over 1 cm wide at the widest part, with maroon midribs and margins. The species flowers from April through July with flowers that are reddish-green cyanthia (cup-like structures). It produces one female flower and several male flowers on short stalks, surrounded by 4-5 minute, petal-like glands. The fruit is a 3-lobed capsule. Naturally occurring telephus spurge is found in a variety of habitat types including pine savannas and wet prairies to sandhills, scrubby and mesic flatwoods, and coastal scrub on low sand ridges within 4 miles of the Gulf of Mexico (Chafin 2000, WilsonMiller 2004). Biologists from Florida Natural Areas Inventory (FNAI) and WilsonMiller have documented populations of telephus spurge persisting under powerlines, pine plantations, and remnant pine flatwoods and coastal scrub (WilsonMiller 2004). Botanists at Historic Bok Sanctuary have had minimal success with greenhouse propagation by transplanting individual plants (Cheryl Peterson, personal communication, September 21, 2004).

Status and distribution

When the USFWS listed telephus spurge, there were 22 known locations of this species. Since listing, the number of known extant telephus spurge locations increased from 22 to approximately 42 known locations due to additional survey work (Moranz, et.al., 2001; ERC 2004). However, several locations may now be extirpated.

There are currently 41 occurrences of telephus spurge documented in the Florida Natural Areas Inventory database (Sept 2004). Thirty sites (FNAI 1, 3, 4, 6, 10-19, 23-25, 27-34, 36-39, 41) are concentrated in a 28 square mile area east and south of the town of Port St. Joe in Gulf County; however, FNAI 1, 10, and 17 are believed to be extirpated. Outside the main concentration area, three sites (FNAI 7, 8, and 9) are found 40 miles west in Bay County. FNAI 9 is believed extirpated also. Two sites (FNAI 26, 35) were documented 20 miles east in Franklin County but are both now believed extirpated due to development. Six sites (FNAI 2, 5, 20, 21, 22, 40) were scattered to the east of the main concentration, but FNAI 2 is now believed to be extirpated. Twelve occurrences (FNAI 3, 18, 24, 25, 28, 29, 30, 31, 32, 33, 36, and 41) within the main area of concentration are protected on the St. Joseph State Buffer Preserve

(SJBP). The SJBP sites range mostly from 3-30 in plant numbers with a few ranging from 30-100 and one with numbers in the 1000's. The remaining sites are on private lands with most having from 0-50 plants, a few having 50-300 plants, and 4 sites having plant numbers in the 1000's. Plant numbers from most sites in the 2001 survey have been reduced compared to 1988 survey data. This is attributed mostly to conversion to pine plantations or development as well as the exclusion of fire. No plants were found at seven sites during recent surveys, but it is difficult to say whether the plants are actually extirpated or were simply not visible due to the absence of recent fire or other disturbance.

Appropriate management is occurring on the SJBP and has created a positive stimulus for telephus spurge. Cursory surveys from a recent site visit (August 2004) by USFWS biologists as well as discussions with staff from SJBP lead us to believe that the SJBP houses the largest and best managed populations of telephus spurge to date.

The telephus spurge occurrence records in the proposed North Glades project area are documented as FNAI 7 and 8. Originally located in 1988, surveyors documented approximately 200 plants at each site. Upon more specific surveys, the applicant's contractors located approximately 17,250 plants within a 6.43 acre area. Based on individual plant count data, this is the second largest population documented to date and is located in the western most extent of the species range since FNAI 9 is believed extirpated.

The North Glades applicant has conducted additional surveys within the RGP-86 Conservation Units in Bay County, Florida, and within the BPMB. As a result, one new population of telephus spurge containing over 200 plants was located in the BPMB and on adjacent lands that have no conservation designation. These 200 plants within BPMP will be managed and monitored in conjunction with the existing management requirements of the RGP-86 permit. We refer to this site as FNAI 42, the designation it will be given once data is entered.

The Service's recovery plan for telephus spurge states a goal of 15 populations of telephus spurge that are distributed throughout the species' historical range and that are adequately managed and protected before the species can be delisted (USFWS 1994). To apply this criterion, we would have to determine how many populations exist. The number of occurrences is greater than the number of populations because more than one occurrence may be part of the same population. We estimate that St. Joe Buffer Preserve's 12 locations equate to 3 populations. Bay County sites located on Panama City Beach (FNAI 7 and 8) are one population, and FNAI 42 will be a separate population (once there is a complete build out within the RGP-86 permitted area). Due to the extensive area covered by the RGP-86 permit and associated mitigation bank areas, not all suitable habitat has been surveyed throughout the RGP-86 area nor the mitigation bank areas, but the potential for locating additional telephus spurge sites seems fairly high.

ENVIRONMENTAL BASELINE

Under Section 7(a)(2) of the Act, when considering the effects of the action on federally listed species, we are required to take into consideration the environmental baseline. The

environmental baseline includes past and ongoing natural factors and past and present impacts from all Federal, State, or private actions and other activities in the action area (50 CFR 402.02), including Federal actions in the area that have already undergone Section 7 consultation and the impacts from State and private actions that are contemporaneous with the consultation in progress.

Status of the Species Within the Action Area

This revision of the original BO focuses specifically on the North Glades development. The original BO identified several federally listed species known or presumed to occur within the project boundary. At the time it was determined that plant surveys within the RGP-86 project area were limited considering the size of the project area. A conservation measure incorporated into the permit stipulated that all impacts to telephus spurge would be avoided and that consultation would be re-initiated if impacts could be avoided. Since completion of the original BO, additional surveys for telephus spurge have occurred within the RGP-86 permit boundaries. This resulted in the location of one additional site of telephus spurge referred to above as FNAI 42. Also during that time, a landowner proposed the North Glades development project that would impact telephus spurge at FNAI 7 and 8. Upon realization that the North Glades development would adversely impact the telephus spurge, the Corps re-initiated consultation with the Service and will continue to do so should additional sites containing telephus spurge be located and impacted by future development plans within the RGP-86 permit area.

The proposed North Glades project area consists of 66.96 acres. Of this, 6.43 acres contains approximately 17,250 telephus spurge plants. The applicant estimates that 4.10 acres and approximately 10,425 plants will be adversely impacted by the proposed development. The remaining 2.33 acres with approximately 6,825 plants will be managed and conserved through a perpetual conservation easement. It is unlikely that if the population were left without management in its current location that it would persist over time due to habitat loss and degradation. There are no other Federal actions ongoing or proposed for the action area at the present time.

Factors Affecting Species Environment Within the Action Area

This analysis describes factors affecting the environment of the species in the action area. The baseline includes State, local, Tribal, and private actions within the action area already affecting the species or that will occur contemporaneously with the proposed action and would affect the environment of the telephus spurge. Unrelated Federal actions affecting the telephus spurge that have completed formal or informal consultation are also part of the environmental baseline, as are Federal and other actions within the action area that benefit the telephus spurge.

RGP-86 was cooperatively developed by several State and Federal agencies to address the cumulative effects of existing and anticipated development pressures within a fast growing region of the Florida panhandle. The area addressed by the permit is approximately 47,480 acres in southwest Bay County and southeast Walton County. Approximately 90 percent of the property is presently in silviculture (forestry) management and is owned by the St. Joe Company.

Current forestry practices are now giving way to more lucrative residential and commercial developments for which the RGP-86 permit was intended.

Several development projects have occurred or are proposed in the vicinity of telephus spurge sites FNAI 7 and 8. These include Hombre Golf Club, Wingate Motel, Bay Medical Center, Sonny's Bar-B-Q, Beckrich Office Complex, "Alf Coleman," Highlands West, and Home Depot. One of these sites, Wingate Motel, is known to have telephus spurge that will likely be impacted by the proposed project. Another project, Home Depot, was recently completed prior to telephus spurge being documented on the periphery. It is likely that plants were destroyed by the construction of businesses and access roads associated with Home Depot.

Within the RGP area, approximately 10,665 acres of uplands and wetlands will be designated as Conservation Units. These areas will be removed from development potential and industrial forestry practices. They will eventually be restored in accordance with specific prescriptions for wildlife management that focus on listed species. Restoration and management of two wetland mitigation banks will secure for conservation two large, strategically placed parcels totaling approximately 7,700 acres. The previous land use of the banks is industrial forestry. It was intended for these mitigation banks to assist in the recovery of several federally listed species, including telephus spurge. The majority of the BPMB is of the soil types suitable to telephus spurge.

Telephus spurge sites FNAI 7 and 8 occur in an area proposed for a development project that would be permitted under RGP-86. FNAI site 42 is located in the BPMB and adjacent lands to the south of the bank boundary. Surveys for telephus spurge were conducted in 15 different locations within the Conservation Unit areas of the RGP (ERC, 2004). No additional populations have been located but due to the amount of habitat covered under the RGP-86 permit and the availability of suitable habitat, we believe that additional telephus spurge locations may exist. The Corps will continue to re-initiate consultation if the species is located prior to development. Active management within the mitigation banks and the Conservation Unit areas will improve the habitat for telephus spurge.

EFFECTS OF THE ACTION

Direct Effects

An estimated count of 10,425 plants of telephus spurge will be lost due to the proposed project, with a corresponding loss of habitat (4.10 acres). However, viability of the remaining North Glades telephus spurge population (6,825 plants over 2.33 acres) in the action area will be maintained and managed.

Indirect Effects

The applicant owns the remaining portion of the population and has agreed to place it into a conservation easement and manage it, so the population is not subject to direct impacts from future development projects. However, given the location of the population and the proposed development, this population will be isolated from any other natural habitat thereby reducing the

chance for natural expansion or rescue effect should this population be inadvertently disturbed. This site will be managed in as natural a state as possible given that the location will become completely surrounded by urban development (highways, restaurants, commercial stores, etc.).

Private activities in the action area that may adversely impact the species indirectly include human trampling, increased exotic species invasion and competition, increased edge effect (i.e., increased sunlight, increased temperature), contaminant impacts from parking lot and highway runoff, as well as the proposed management attempts such as mowing and exotic species control.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require a separate consultation pursuant to section 7 of the Act.

Specifically for the North Glades project, the 6,825 plants located on the remaining 2.33 acres within the conservation easement area could potentially be impacted by future development plans. The applicant has agreed to protect and manage appropriately this remaining 2.33 acres of the telephus spurge habitat and population into perpetuity, therefore no other State, tribal, local, or private actions are reasonably certain to occur at this particular site that would affect the telephus spurge.

Future actions within the RGP boundary will include industrial, commercial, and private residential development, which in turn could lead to further fragmentation, fire suppression and/or direct impacts to unknown, yet existing, populations of telephus spurge. Additional evaluation of telephus spurge habitat will occur on a project-by project basis using the procedures described in Appendix III.

CONCLUSION

Transplanting endangered or threatened plant species from project impact areas, while minimizing impacts to individuals, is generally not recommended. The intent of the Act is to protect the ecosystems upon which these federally listed species depend. Thus, protecting habitat is considered to be a key factor for ensuring conservation of listed species. In this case, even if the entire plant population on North Glades was protected from direct impacts, the long-term plans for the surrounding area will eventually see this population further fragmented and eventually isolated from all natural corridors. This project will involve transplanting of telephus spurge individuals to a protected site that has yet to be identified, and will also include the long-term commitment of active management and monitoring of the parent population within the North Glades conservation easement. At a minimum, we will learn whether transplanting telephus spurge is a viable option to be used for future unavoidable impacts to the species. At

most, we will create a new population that resides in a more natural setting conducive for long-term protection, management and viability.

The USFWS has set a goal of 15 populations of telephus spurge that are distributed throughout the species' historical range and that are adequately managed and protected before the species can be delisted (USFWS 1994). Currently three centrally located populations are protected in the St. Joe Buffer Preserve. The total number of locations of this plant is not considered a limiting factor toward recovery of the species; rather, it is the protection of populations that is limiting the species' recovery. The Conservation Measures provided by the applicant will increase the number of protected populations from three to five or possibly, six. This includes the three on the SJBP, the North Glades population (FNAI 7 and 8), the BPMB population (FNAI 42) and possibly an additional population depending on placement and the results from the translocation efforts. The location of the transplanted plants will determine whether they will be considered a new population.

After reviewing the current status of telephus spurge, the environmental baseline for the action area, the effects of the proposed development, the cumulative effects, and the proposed conservation measures, it is our biological opinion that the proposed development is not likely to jeopardize the continued existence of telephus spurge. No critical habitat has been designated for this species; therefore none will be affected.

CONSERVATION RECOMMENDATIONS FOR TELEPHUS SPURGE

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretional agency activities to minimize or avoid the adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We request that the following conservation recommendations be implemented.

1. Place the translocation study area more than 3 kilometers from other known populations if connected by natural habitat or about 1 kilometer if permanently unsuitable habitat is in between the populations. If the translocation is deemed successful, the transplanted population would count as an additional protected population and will aid in reaching the recovery goal of 15 protected populations.

2. Develop in cooperation with USFWS a long-term conservation strategy for telephus spurge on St. Joe Company lands in Bay and Gulf counties.

In order for us to be kept informed about actions that minimize or avoid adverse effects or that benefit listed species or their habitats, we request notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in this biological opinion. As provided in 50 CFR 402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation.

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Appendix I - Memo Dated April 30, 2004 from WilsonMiller, Inc.

TO: Hildreth Cooper, USFWS
Gail Carmody, USFWS
Don Hambrick, USACE

FROM: Ann Redmond and Trina Mitchell

CC: Dave Tillis, Thomas Estes, St. Joe Company

SUBJECT: *Euphorbia telephioides* (Telephus Spurge) Populations in the Action and Project Area

DATE: April 30, 2004

On March 18, Hildreth Cooper informed WilsonMiller that the Service is concerned about the presence of telephus spurge populations in the Action and Project Areas. Patty Kelly, U.S. Fish and Wildlife Service (USFWS), had raised some questions about the impacts of the RGP on the species. Following the Biological Assessment of January 2004, a more detailed discussion of the telephus spurge has occurred. The content is related below.

The Telephus spurge was first listed in 1992 (USFWS 1994). Based on vouchered specimens, this plant is an endemic species that occurs in Bay, Gulf, and Franklin Counties, Florida (Institute for Systematic Botany 2002). The plant occurs from Panama City Beach east to the Ochlockonee River (USFWS 1994). It has been recorded in 41 locations, nearly half of which are on public land (Map 1).

All known occurrences of Telephus spurge are on sites within 4 miles of the Gulf of Mexico (USFWS 1994). Numerous populations are protected on St. Joseph Bay State Buffer Preserve and adjacent tracts of land (SJBBP); many occurrences are on private timberlands and utility right-of-ways (Chafin 2000, FNAI 2003, Hilsenbeck 2004, Willson 2004). Ed and Lisa Keppner have searched for the telephus spurge in Bay County and have found none (Keppner 2004). Hilsenbeck (2004) believes that the spurge's listing as a G1/S1 plant should be downgraded based on the abundance of the species in the SJBBP area.

Populations in Action Area

Two populations of Telephus spurge (*Euphorbia telephioides*) have been documented outside the Action Area, but near the Project Area, and one has been documented within the Project Area (FNAI 2003, 2004; Chafin 2004; Kindell 2004; WilsonMiller 2004)(Map 2). FNAI (2003) element occurrence (EO) data indicate that during the 2001 survey, no plants were observed in population EUPHTELE*0009 outside the Project Area (Table 1). The other two populations were re-confirmed in 2001 (Table 1), including the one within the Project Area.

WilsonMiller, Inc., resurveyed for the population within the Project Area (EUPHTELE*0007) on April 21, 2004, and found numerous individuals along US 98 within an area approximately 0.5 mile long (Map 3). Individuals were observed within the "beauty strip," a narrow strip (about 20 feet wide) of longleaf pine-false rosemary-saw palmetto habitat located on the north side of US 98, between the highway and the slash pine plantation.

Table 1. Recorded Locations of Telephus Spurge in Bay County, Florida

Location	Last Observation	EO Data	EO Data	FNAI Map Label
Project Area	2004-04-21	2004-04-21. In a ~0.5-mile-long, 20-ft-wide strip along the north side of U.S.98. 2001-08-01. Now only on north side of road (PNDKIN02FLUS). 1988-08-08: 1.9 MI W OF JCT US98 AND US98 BYP; BOTH SIDES OF ROAD.	2004-04-21. More than 600 plants observed by WilsonMiller ecologists in the “beauty strip” of longleaf pine, wiregrass, false rosemary, saw palmetto, and Sporobolus floridana. 2003-09-26: no plants seen in survey of north side of road - habitat intact; narrow strip of flatwoods between US98 to south and titi/baygall to north; mostly shrubby (Ilex glabra, I. coriacea) with a few patches of wiregrass (PNDJOH01FLUS); 2001-08-01: 100+ plants seen. Etiolating in dense duff, about 10% of them in fruit or flower. Most plants are small, with only a few leaves. (PNDKIN02FLUS). 1988-08-08:200+, FLOWERING, FRUITING IN LEAF; NICE POPULATION.	EUPHTELE*0007
Outside Project Area, South side of US Highway 98	2001-08-01	2001-08-01: Directions given in this field in 1988 do not match where EO is mapped in GIS database. 1988-08-08: 0.7 MI E OF 30D ON ALT 30, S SIDE OF ROAD.	2001-08-01: Approximately 30 plants seen only within road right-of way, at edge of the flatwoods. All plants were small, and about 10 of them had fruits and flowers, (PNDKIN02FLUS) 1988-08-08: 200, FLOWERING AND FRUITING.	EUPHTELE*0008
Outside Project Area, south of US Highway 98 on CR30H	1988-08-23	1988-08-23: 0.2 MI S OF US 98 BYP ON CR 30H, E SIDE.	2001-08-01: no plants seen, possibly due to very dense vegetation. (PNDKIN02FLUS). 1988-08-23: 200+ COMMON IN OPEN AREAS, IN LEAF, FRUIT, FLOWER	EUPHTELE*0009

Source: WilsonMiller 2004; FNAI 2003, 2004.

Additional populations of Telephus spurge may be located within the Project Area west of the area indicated on Map 2, in cleared or recently planted areas, along roads, or along the edges of pine plantations.

Species Habitat Requirements

This species occurs in dry habitats along the Gulf coast on both sides of the Apalachicola River (USFWS 1994). This species occurs in longleaf pine savannas, scrubby and mesic flatwoods,

and coastal scrub on low sand ridges near the Gulf of Mexico (Chafin 2000). The habitats for the population reconfirmed by WilsonMiller and for those recorded in the FNAI 2003 data are under power lines, in natural pinelands, and in remnant longleaf pine-saw palmetto-rosemary/wiregrass flatwoods. Hilsenbeck (2004) has observed the Telephus spurge in a wider variety of habitats in the SJBBP area than have been previously noted, from seasonally wet prairies to sandhills. In the wet prairies it co-occurred with *Rhynchospora oligantha* and a variety of sedges.

Habitat Conditions within the Project Area

Suitable habitat for Telephus spurge within the Project Area is almost entirely in planted pine and thus is typically in poor to very poor condition. However, the habitat in which the EUPHTELE*0007 population occurs is remnant longleaf pine-saw palmetto-rosemary/wiregrass flatwoods in a long, narrow strip along the north side of U.S. 98 (Map 2). This area is poor to good quality, lower quality resulting primarily from fire suppression.

Soils for the easternmost two populations are mapped as Leon Sand surrounded by Pottsburg Sand. Soils in the western population are mapped as Pamlico-Dorovan and Pottsburg Sand, although it occurs next to Leon Sand and it is unlikely that the spurge would occur in the wet Pamlico-Dorovan soils. These same types of soils complexes occur in the Breakfast Point Peninsula Conservation Unit and the Breakfast Point Mitigation Bank (Map 4; NRCS 1984).

Silviculture-associated activities that have been detrimental to this species include bedding, dense shading, and fire suppression (USFWS 1994). Coastal real estate and road development in the vicinity of Panama City Beach are known to have destroyed Telephus spurge habitat (USFWS 1994). Suitable habitat may already be protected where it occurs under power lines; however, herbicide use in these areas is a concern. Cooper (2004b) indicated that USFWS staff thought the EUPHTELE*0009 population may have been destroyed by the recent Pier Park development, but this site is 2.9 miles east of the Pier Park site and has not yet been cleared or developed.

Effects of the Proposed Action

A “may affect, not likely to adversely affect” determination was made for Telephus spurge in the Biological Assessment.

Where suitable habitat occurs under planted pine, it probably has been substantially degraded; where habitat occurs in the “beauty strip” and in power line and road right-of-ways, it likely has been somewhat protected and maintained. Power line right-of-ways and, to a lesser extent, road right-of-ways will continue to be somewhat protected and maintained as suitable habitat under the Proposed Action. One of the two populations verified in 2001 occurred in road right-of way; the other two populations (one verified and one not verified in 2001) occurred in longleaf-palmetto flatwoods.

Direct and indirect beneficial effects associated with the Proposed Action on potentially suitable habitat within the Project Area include the immediate preservation and eventual restoration of uplands within the conservation units and immediate protection and beginning restoration within the Devil’s Swamp and Breakfast Point Mitigation Banks.

Potentially suitable habitat may be negatively affected by eventual construction of roads, residential communities, and other developments. Negative effects would likely include loss of potential habitat within the Project Area, outside the conservation units.

General Conservation Measures of RGP 86

The Applicant will implement methods recommended by USFWS (1994) in suitable habitat in the conservation units and in the mitigation banks. Suitable habitats include sandhills, scrubby and mesic flatwoods, and powerline right-of-ways through these habitats.

- Reduction of canopy without compacting, mixing, and/or rutting soils or destroying ground cover;
- Burning appropriately, primarily during the growing season (generally April through September) and depending on habitat. For instance, natural fire regime in sandhills is more frequent than in scrub (2 to 5 years in sandhills; catastrophic fire every 20 to 80 years in scrub [FNAI and FDNR 1990]);
- Substituting mowing for use of herbicides;
- Preventing vehicles from driving through easily damaged scrub habitats.

Specific Conservation Measures for Telephus Spurge

Further discussion with Hildreth Cooper of the USFWS about the Telephus spurge population resulted in the drafting of this memorandum, which is intended to provide draft language for a conservation measure to be added to the biological opinion. Proposed language for this conservation measure follows:

> If the Applicant proposes a project that would impact the telephus spurge population indicated on Map 3 (WilsonMiller Observations of Telephus Spurge), impacts to this population should be avoided. If the proposed project cannot avoid impacts to this telephus spurge population, then re-initiation of consultation may be required. Consultation will take into consideration potential transplanting of individuals that would be impacted by a proposed project. Those individuals may be transplanted to appropriate areas of the Breakfast Point Mitigation Bank.
>
> To support this process, the specific location of this population (WilsonMiller Observations) is provided on Map 3 and on Figure 5 of the Biological Opinion (attached), and will also be recorded in the St. Joe Company's internal real estate database no later than May 1, 2004.

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Appendix II.

RGP-86 Flatwoods Salamander Pre-Application Evaluation

Endangered Species Act formal consultation was conducted between the U.S. Fish and Wildlife Service and the Corps of Engineers as part of the development of RGP-86. Consultation was based on presumed presence of salamanders due to the proximity of two known locations and the observance of suitable habitat in the action area. Best available methods were used to determine potential impacts to flatwoods salamanders that could be expected from implementation of the permit. However, it is reasonable to expect that with a project area covering more than 47,000 acres (about 1/3 of which is potentially developable) undetected habitat could be present. In order to avoid and minimize potential take of salamanders in these situations, the following habitat evaluation was developed. This evaluation must be completed by all applicants and performed by a qualified ecologist/biologist.

Step 1: Preliminary Project Site Review

1. Applicants and consultants shall obtain and review an informational brochure developed by the Florida Fish and Wildlife Conservation Commission. The brochure is available from Florida Fish and Wildlife Conservation Commission, Bureau of Wildlife Diversity Conservation, 620 South Meridian Street, Tallahassee, Florida 32399-1600.

2. Applicants and/or their consultants shall compare aerial photographs of their project site to Figures 2, 3 and 4 of the Biological Opinion. Note all data points located within the project site and within 450 meters (1,476 feet) of the project site or limits of construction.

3. If any data points of Figure 4 are located within the project site or within 450 meters of the project site or limits of construction, **re-initiation of consultation is required. Continue with Step 2.**

4. Other data points of Figures 2 and 3 that are within the project site action area (including 450 meters) do not need further evaluation. Previous work conducted as part of the biological opinion addressed these sites. **Continue with Step 2.**

Step 2: Procedures for Reviewing Other Data to Determine Whether Additional Field Surveys Should be Conducted (based on Palis 2003)

There is a potential that suitable habitat may have been overlooked during the analysis for the biological opinion. Therefore, specific project sites must be reviewed using the procedures outlined below to determine whether they need to be field surveyed.

1. Review project site using high-resolution recent infrared aerials (scale of 1 inch = 400 feet), NRCS soils data for Bay and Walton counties, and historical aerials of your project area that are of as high a resolution as is obtainable. Note any ponds[1] not depicted on Figures 2 or 3 with similarity of appearance to those of Figure 4 in the biological opinion.

2. Features to look for on the infrared aerials are as follows:

- Absence of a dense titi cover completely surrounding ponds. Absence is a positive indicator. Dense titi appears relatively dark red and smooth
- A graminaceous, treeless ecotone along part of the pond edges. Presence is a positive indicator. Wet, herbaceous edges appear as smooth grayish blue, greenish grayish blue, or as a light band along the edge.
- Absence of deep water. Absence of deep water is a positive indicator. Deep water appears dark blue or almost black.

[1] "Ponds" are not traditional open waterbodies, but are ephemeral wetlands that are ponded for a portion of the year.

3. On historical aerials, look for open savannahs or pine flatwoods around ponds. These are positive indicators and appear as smooth, light-colored areas with scattered-to-no-trees.

4. On soil maps, where ponds occur, look for hydric or mesic soils around pond; hydric or mesic soils are positive indicators of flatwoods salamander use.

5. The presence of all of the above positive indicators means that the pond(s) should be field surveyed.

- If yes, then you must conduct field surveys to determine whether the pond(s) is a potential flatwoods salamander pond. **Continue with Step 3.**
- If no here and no to Step 1. 3., then **you are finished with the flatwoods salamander evaluation - Go to Step 5** (Flatwoods Salamander Findings).
- If no here and yes to Step 1. 3., then **re-initiation of consultation is required.**

Step 3: Field Assessment of Potential Flatwoods Salamander (*Ambystoma cingulatum*) Ponds

The Description Data Sheet (next page) may be completed at the same time as other fieldwork, such as wetland delineation. The field data sheet that must be completed at the time of the field survey follows. Photographs must also be taken of the ecotone and pond, particularly noting the location of the most graminaceous portion of ecotone and wetland groundcover.

Potential Flatwoods Salamander *(Ambystoma cingulatum)* Pond
Description Data Sheet

Instructions: Circle the number of the most appropriate descriptor in each category. If no description option applies, circle "other" and describe. In some categories, such as ECOTONE VEGETATION DESCRIPTION, SPECIES COMPOSITION, and SURROUNDING UPLANDS, circle the number for all appropriate descriptors.

Pond# _____ Date _____ Observer(s) _____

ECOTONE VEGETATION DESCRIPTION
(If more than one descriptor applies, circle and estimate percentage of pond perimeter.
Also circle appropriate grass and shrub species)

1) undisturbed graminaceous (*Aristida stricta, Calamovilfa curtissii*)[1], few to no shrubs (*Clethra, Cliftonia, Cyrilla, Hypericum, Ilex myrtifolia, Lyonia*) _____%
2) disturbed graminaceous (*Aristida stricta, Calamovilfa curtissii*; bedded/rutted), few to no shrubs (*Clethra, Cliftonia, Cyrilla, Hypericum, Ilex myrtifolia, Lyonia*) _____%
3) undisturbed graminaceous (*Aristida stricta, Calamovilfa curtissii*) under thick *Clethra, Cliftonia, Cyrilla, Hypericum, Ilex myrtifolia, Lyonia*) _____%
4) weedy graminaceous (*Andropogon, Panicum verrucosum*, and/or *weedy Rhynchospora*), few to no shrubs (*Clethra, Cliftonia, Cyrilla, Hypericum, Ilex myrtifolia, Lyonia*) _____%
5) disturbed graminaceous (*Aristida stricta, Calamovilfa curtissii*; bedded/rutted), under thick *Clethra, Cliftonia, Cyrilla, Hypericum, Ilex myrtifolia, Lyonia* _____%
8) weedy graminaceous (*Andropogon, Panicum verrucosum*, weedy *Rhynchospora*) under thick *Clethra, Cliftonia, Cyrilla, Hypericum, Ilex myrtifolia, Lyonia* _____%
9) thick shrubs (*Clethra, Cliftonia, Cyrilla, Hypericum, Ilex myrtifolia, Lyonia*) over little to no graminaceous (*Aristida stricta, Calamovilfa curtissii, Andropogon, Panicum verrucosum*, weedy *Rhynchospora*) _____%
10) no ecotone _____%
11) other:_____ _____%

GRAMINACEOUS ECOTONE EXTENT DESCRIPTION

1) > 75 % of pond perimeter
2) 51-75% of pond perimeter
3) 26-50 % of pond perimeter
4) <25% of pond perimeter

GRAMINACEOUS ECOTONE WIDTH DESCRIPTION

1) > 0 m wide
2) 6-10 m wide
3) 3-5 m wide
4) 1-2m wide

POND GRAMINACEOUS GROUNDCOVER SPECIES COMPOSITION
(place asterisk adjacent to visually dominant species)

1 "Undisturbed graminaceous" and "disturbed graminaceous" mean that the appropriate ground cover species are present (*Aristida stricta, Calamovilfa curtissii*, wiry *Rhynchospora* spp., and *Sporobolus*). However, "disturbed graminaceous" indicates that the soil has been disturbed by human activities such as chopping, bedding, ATV or skidder tracks. "Weedy graminaceous" means that not only are the appropriate ground cover species absent, but that the soil has been disturbed.

1) *Aristida affinis*
2) *Carex*
3) *Dichanthelium (Panicum) erectifolium*
4) *Eriocaulon compressum*
5) *Panicum rigidulum*
6) *Rhynchospora inundata/corniculata*
7) *Rhynchospora* _____
8) *Sphagnum*
9) *Xyris*
10) other: _____

POND GRAMINACEOUS VEGETATION COVERAGE

1) extensive throughout basin, marsh-like
2) over most of basin (> 75 %)
3) scattered and local in basin (approx 25-74%)
4) limited to basin edge
5) sparse
6) none

POND CANOPY SPECIES COMPOSITION
(place asterisk adjacent to visually dominant species)

1) *Taxodium ascendens*
2) *Nyssa biflora*
3) *Pinus elliottii*
4) *Ilex myrtifolia*
5) other: _____

POND CANOPY COVERAGE

1) <25% 2) 26-50% 3) 51-75% 4) >75%

POND SUBSTRATE

1) relatively firm mud/sand with little to no leaf/needle litter
2) relatively firm mud/sand with abundant leaf/needle litter
3) soft and peaty (thick leaf/needle litter)

APPROXIMATE WATER DEPTH (_____ m)

If site dry, estimate using high water stains on trees: ____ m

WATER COLOR

1) clear to light stain 2) moderate stain (ice tea) 3) dark stain (coffee) 4) no water

SURROUNDING UPLANDS
(circle every applicable number and indicate relative percentage of area around pond)

1) undisturbed graminaceous (*Aristida stricta, Sporobolus*) dominated, few to no shrubs _____%
2) disturbed graminaceous (*Aristida stricta, Sporobolus*) dominated, few to no shrubs _____%
3) approximately 50/50 undisturbed graminaceous (*Aristida stricta, Sporobolus*)/shrubs _____%
4) approximately 50/50 disturbed graminaceous (*Aristida stricta, Sporobolus*)/shrubs _____%
5) disturbed with sparse vegetation (i.e., principally pine straw) _____%
6) shrub dominated (shrubs knee high or less), sparse graminaceous (*Aristida stricta, Sporobolus*) _____%

7) shrub dominated (shrubs between knee and head high), sparse graminaceous (*Aristida stricta, Sporobolus*) _____%
8) shrub dominated (shrubs head high or more), sparse graminaceous (*Aristida stricta, Sporobolus*) _____%
9) weedy graminaceous (e.g., *Andropogon*), few to no shrubs _____%
10) shrub dominated (shrubs knee high or less), sparse weedy graminaceous (*Andropogon*, etc.) _____%
11) shrub dominated (shrubs knee to head high), sparse weedy graminaceous (*Andropogon*, etc.) _____%
12) shrub dominated (shrubs head high or more), sparse weedy graminaceous (*Andropogon*, etc.) _____%
13) other _____ _____%

UPLANDS SPECIES PRESENT
(circle number and place asterisk by visually dominant species)

1) *Andropogon*
2) *Aristida stricta*
3) *Conradina canescens*
4) *Cyrilla racemiflora*
5) *Ilex glabra*
6) *Kalmia hirsuta*
7) *Licania michauxii*
8) *Lyonia lucida*
9) *Myrica cerifera*
10) *Pteridium aquilinum*
11) *Quercus minima/pumila*
12) *Serenoa repens*
13) *Vaccinium darrowi/myrsinites*
14) _____

General Notes: _____
_____
_____
_____

SKETCH WETLAND/UPLAND (North ↑)
(delineate locations of vegetational differences in ecotone and in wetland and uplands)
(**photograph** the ecotone and pond noting the location of the most graminaceous portion of ecotone and wetland ground cover, note photo points)

Step 4: Expert Review of Field Results

When Steps 2 and 3 have been completed, the completed field data sheets and photographs should be sent to a recognized flatwoods salamander expert. In addition, the current and historical aerials, soil data, and a map of the project site should also be forwarded to the expert. The expert will review all the information to determine whether the pond might be a potential flatwoods salamander pond.

The field data sheet used in Step 3 has been organized so that the descriptors under each category of interest are ordered from best to worst conditions for flatwoods salamanders. For example, under the category Ecotone Vegetation Description, the first descriptor [1) undisturbed graminaceous… few to no shrubs…] describes the best conditions for flatwoods salamanders and the last two descriptors [9) thick shrubs… and 10) no ecotone] describe the worst conditions.

The expert will evaluate the descriptors selected for each category of interest to determine whether the pond might be a potential flatwoods salamander breeding pond. If mostly low number descriptors were selected on the field data sheet, then the pond is more likely to be considered a potential breeding pond; conversely, if primarily high number descriptors were selected on the field data sheet, then the pond is less likely to be considered a potential breeding pond. However, no formula presently exists that encompasses all the possibilities that might eliminate or elect a pond for further consideration as a potential breeding pond.

If the expert cannot determine whether or not the pond should be considered a potential flatwoods salamander breeding pond, s/he may request additional information from the ecologist/biologist who visited the pond and/or the project applicant. If the request for additional information is not fulfilled within a reasonable time period or the response is not sufficiently helpful, the expert may also elect to visit the pond himself at the expense of the project applicant.

The expert will provide a written determination as to whether the surveyed pond(s) is likely to be a potential flatwoods salamander breeding pond.

Review Time Frames:

- Provide field data sheets to expert;
- Expert reviews field data sheets within 10 working days of receipt, and
    - Requests additional information, or
    - Provides[2] written determination;
- Project applicant or their consultant provides additional information to expert;
- Expert provides written determination to project applicant within 5 working days of receipt of sufficient additional information;
- Project applicant provides the expert's written determination and background documentation (prepared map of ponds, aerials, soil data, field data sheets, and photographs) to the agencies as part of the pre-application Item #8.

2 "Provides" implies postmarked, emailed or faxed.

Step 5: Flatwoods Salamander Findings

	Yes	No
1. The project site contains or is within 450 meters (1,476 feet) of one or more of the data points indicated in Figure 4 of the biological opinion. **If yes, re-initiation of consultation is required.**	____	____
2. The project site contains or is within 450 meters of potential habitat not evaluated in the biological opinion.	____	____
3. Field evaluations and expert review were necessary for additional habitat.	____	____
4. Expert review indicates that suitable habitat is located within the project action area. Name of flatwoods salamander expert _____. **If yes, re-initiation of consultation is required.**	____	____
5. Appropriate documentation is included to support these findings.	____	____

Signature _____ Date _____

Ecologist/Biologist who Performed the Evaluation

Appendix III

RGP-86 Telephus Spurge Pre-Application Evaluation

Endangered Species Act formal consultation was conducted between the U.S. Fish and Wildlife Service (Service) and the Corps of Engineers as part of the development of the RGP-86. Consultation was based on the presence of telephus spurge (*Euphorbia telephioides)* at three locations in Gulf and Bay counties and the observance of suitable habitat throughout the action area. Best available methods were used to determine potential impacts to telephus spurge that could be expected from implementation of the permit. However, it is reasonable to expect that with a project area covering more than 47,000 acres (about 1/3 of which is potentially developable) undetected habitat could be present. To avoid and minimize potential take of telephus spurge in these situations, the following survey protocol was developed. This evaluation must be completed by all applicants and performed by a qualified plant ecologist/field botanist.

Step 1: Preliminary Project Site Review

Applicants and/or their consultants shall contact the Service for the latest information on the telephus spurge. The proposed project site shall be reviewed to determine if any known occurrences of the telephus spurge are present in the vicinity.

Step 2: Procedures for Reviewing Other Data to Determine Whether Additional Field Surveys Should be Conducted:

The telephus spurge occurs in a variety of soil types and plant communities ranging from sandhill to mesic flatwoods to pine savannahs. Suitable soil types are primarily the drier Leon sand and Pottsburg sand, although the plant is sometimes found in mesic soils, particularly within the ecotone surrounding sandy soils. Most of the known locations have been impacted by silviculture. Telephus spurge has been found in pine plantations with bedding present. Specific project sites must be reviewed using the procedures outlined below to determine the presence or absence of the telephus spurge.

1. Review the project site using NRCS soils data for Bay and Walton Counties, high-resolution infrared and/or true color aerials (scale of 1 inch=400 feet), and historic aerials of your project area.

2. Look for the following positive indicators:

- Suitable soils. Suitable soil types include Leon sand, Pottsburg sand, and Hurricane sand.

- Open canopy. Features to look for on the infrared aerials include the absence of a dense, closed canopy cover. Absence is a positive indicator. Dense canopy cover like titi appears dark red and smooth. The absence of a dense canopy shows up lighter often with patchy red areas throughout.

3. The presence of one or more positive indicators means that the site is potential telephus spurge habitat.

- If yes, then you must conduct field surveys to determine whether telephus spurge is present. **Continue to step 3.**
- If no, then **you are finished with the telephus spurge evaluation. Go to step 4.**

Step 3: Field Assessment of Potential Telephus Spurge (*Euphorbia telephioides*) Habitat

Before beginning any field work, develop a search pattern recognition of *Euphorbia telephioides* by examining photographs or herbarium species or by visiting field locations. See www.plantatlas.usf.edu for a photo reference collection.

Select potential survey polygons based on presence of Leon sand or Pottsburg sand. After reviewing aerial photography and conducting preliminary site inspections, add those areas that have a relatively open canopy and

remnant native groundcover. Be sure to include roadsides, open trails, utility easements, burned areas, and wetland ecotones. Eliminate areas that are densely vegetated with shrubs and trees or are obviously wet most of the year.

Selected polygons should be field surveyed for presence or absence of telephus spurge using a qualitative transect method. The surveys should be supervised by a qualified botanist. Straight line transects at 20-foot intervals should be laid out to cover the entire polygon. Alternate on each side of the transect with 10-foot square quadrants. (Figure 1) The quadrant boundaries can be estimated and visually scanned for telephus spurge. Areas with extremely dense vegetation can be overlooked.

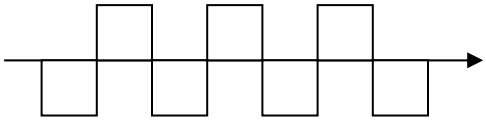

Fig. 1

Surveys can be conducted anytime from April through September. The plant generally dies back at the end of the growing season and does not re-grow to a noticeable height until several weeks after the last frost. Ideal survey months are July through September.

Step 4: Telephus Spurge Findings

	Yes	**No**
1. Positive indicators were detected in Step 2.	___	___
2. Field surveys detected presence of telephus spurge. **If yes, re-initiation of consultation is required.**	___	___
3. Appropriate documentation is included to support these findings. Negative and positive survey data are provided to USFWS in a GIS format.	___	___

Signature _____ Date_____

Ecologist/Botanist who performed the evaluation

ATTACHMENT C

Potential Breeding Pond Description Data Sheet for Flatwoods Salamander *(Ambystoma cingulatum)* or Striped Newt *(Notophthalmus perstriatus)*

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Potential Breeding Pond Description Data Sheet for Flatwoods Salamander *(Ambystoma cingulatum)* or Striped Newt *(Notophthalmus perstriatus)*

Instructions: ***Circle the number of the most appropriate descriptor in each category. If no description option applies, circle "other" and then describe. In some categories, such as ECOTONE VEGETATION, DESCRIPTION, SPECIES COMPOSITION, and SURROUNDING UPLANDS, more than one descriptor may apply; circle all appropriate numbers.***

Pond# _____ Date _____ Observer(s) _____

ECOTONE VEGETATION DESCRIPTION

If more than one descriptor applies, circle and estimate percentage of pond perimeter. Also write appropriate grass and shrub species.

1) Undisturbed graminaceous, few to no shrubs _____%
2) Disturbed graminaceous (bedded/rutted), few to no shrubs _____%
3) Undisturbed graminaceous under thick shrubs _____%
4) Weedy graminaceous (*Andropogon*, *Panicum*, and/or *weedy Rhynchospora*), few to no shrubs _____%
5) Disturbed graminaceous (bedded/rutted), under thick shrubs _____%
6) Weedy graminaceous (*Andropogon*, *Panicum*, weedy *Rhynchospora*) under thick shrubs _____%
7) Thick shrubs over little to no graminaceous _____%
8) No ecotone _____%
9) Other _____%

Describe:_____

_____

GRAMINACEOUS ECOTONE EXTENT DESCRIPTION

1) > 75 % of pond perimeter
2) 51-75% of pond perimeter
3) 26-50 % of pond perimeter
4) <25% of pond perimeter

GRAMINACEOUS ECOTONE WIDTH DESCRIPTION

1) > 0 m wide
2) 6-10 m wide
3) 3-5 m wide
4) 1-2m wide

POND GRAMINACEOUS GROUNDCOVER SPECIES COMPOSITION

Place asterisk adjacent to visually dominant species.

1) *Aristida*
2) *Carex*
3) *Panicum*
4) *Eriocaulon*
5) *Rh ynchospora*
6) *Sphagnum*
7) *Xyris*
8) Other: _____

POND GRAMINACEOUS VEGETATION COVERAGE

1) Extensive throughout basin, marsh-like
2) Over most of basin (> 75 %)
3) Scattered and local in basin (approx 25-74%)
4) Limited to basin edge
5) Sparse
6) None

POND CANOPY SPECIES COMPOSITION

Place asterisk adjacent to visually dominant species.

1) *Taxodium ascendens*
2) *Nyssa biflora*
3) *Pinus* _____
4) *Ilex* _____
5) Other: _____

POND CANOPY COVERAGE

1) <25% 2) 26-50% 3) 51-75% 4) >75%

POND SUBSTRATE

1) Relatively firm mud/sand with little to no leaf/needle litter
2) Relatively firm mud/sand with abundant leaf/needle litter
3) Soft and peaty (thick leaf/needle litter)

APPROXIMATE WATER DEPTH (_____ m)

If site dry, estimate using high water stains on trees (in meters).

WATER COLOR

1) Clear to light stain
2) Moderate stain (iced tea)
3) Dark stain (coffee)
4) No water

SURROUNDING UPLANDS

Circle every applicable number and indicate relative percentage of area around pond.

1) Undisturbed graminaceous dominated, few to no shrubs _____%
2) Disturbed graminaceous dominated, few to no shrubs _____%
3) Approximately 50/50 undisturbed graminaceous /shrubs _____%
4) Approximately 50/50 disturbed graminaceous /shrubs _____%
5) Disturbed with sparse vegetation (i.e., principally pine straw) _____%
6) Shrub dominated (shrubs knee high or less), sparse graminaceous _____%
7) Shrub dominated (shrubs between knee and head high), sparse graminaceous _____%
8) Shrub dominated (shrubs head high or more), sparse graminaceous _____%
9) Weedy graminaceous (e.g., Andropogon), few to no shrubs % _____%
10) Shrub dominated (shrubs knee high or less), sparse weedy graminaceous _____%
11) Shrub dominated (shrubs knee to head high), sparse weedy graminaceous _____%
12) Shrub dominated (shrubs head high or more), sparse weedy graminaceous _____%
13) Other _____%

Describe:_____

UPLANDS SPECIES PRESENT

Circle number and place asterisk by visually dominant species.

1) *Andropogon*
2) *Aristida stricta*
3) *Rhus copallinum*
4) *Quercus* _____
5) *Ilex glabra*
6) *Vaccinium darrowi/myrsinites*
7) *Baccharis halimifolia*
8) *Myrica cerifera*
9) *Pteridium aquilinum*
10) *Vitis*
11) *Serenoa repens*
12) *Pinus* _____
13) Other: _____

General Notes:

SKETCH WETLAND/UPLAND

1. ***Delineate locations of vegetational differences in ecotone and in wetland and uplands.***
2. ***Photograph the ecotone and pond, noting the location of the most graminaceous portion of ecotone and wetland groundcover; note photo points.***

United States Department of the Interior

Fish and Wildlife Service
105 West Park Drive, Suite D
Athens, Georgia 30606
Phone: (706) 613-9493
Fax: (706) 613-6059

West Georgia Sub-Office
Post Office Box 52560
Fort Benning, Georgia 31995-2560
Phone: (706) 544-6428
Fax: (706) 544-6419

Coastal Sub-Office
4980 Wildlife Drive
Townsend, Georgia 31331
Phone: (912) 832-8739
Fax: (912) 832-8744

February 3, 2011

Ms. Brenda A. Powell
Ecology & Environment, Inc.
1974 Commonwealth Lane
Tallahassee, Florida 32303

Re: USFWS File Number 2011-TA-0227

Dear Ms. Powell:

Thank you for your December 17, 2010, letter and attachments regarding your proposed use of habitat based flatwoods salamander and striped newt survey methodology for the Environmental Impact Statement for the proposed Modernization and Expansion of Townsend Bombing Range, Georgia. These surveys will be conducted for preparation of a draft Environmental Impact Statement for the proposed expansion of the range in McIntosh and Long Counties, Georgia. We have reviewed the information you provided and submit the following comments under provisions of the Endangered Species Act of 1973 (Act) as amended (16 U.S.C. 1531 et seq.).

According to the information you provided, the proposed acquisition areas will be assessed to determine if they have appropriate habitat for the frosted flatwoods salamander, a federally listed species, or the striped newt, a candidate species. Since the proposed acquisition areas consist mainly of planted pine stands and the area has been through a drought year, these habitat surveys will be used to determine the presence or absence of the salamander and newt, as opposed to conducting dip net surveys over several years. A more detailed description of the proposed habitat surveys are included with your letter and attachments, along with a modified habitat data sheet. We have reviewed this information and therefore agree with your proposed method of habitat surveys for the frosted flatwoods salamander and the striped newt.

We appreciate the opportunity to comment during the planning stages of your project. If you have any questions, please write or call staff biologist, Robert Brooks, of our Coastal Georgia Sub Office at 912-832-8739, extension 107.

Sincerely,

Grant Colwell for

Sandra S. Tucker
Field Supervisor

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UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
BEAUFORT, SOUTH CAROLINA 29904-5001

IN REPLY REFER TO
5090
NREAO/058
28 FEB 2011

Mr. Robert Brooks
United States Fish and Wildlife Service
Coastal Ecological Services Field Office
4980 Wildlife Drive NE
Townsend, Georgia 31331

Re: Proposed Survey Methodology for Federally-Listed and Candidate Species for the *Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia*

Dear Mr. Brooks:

During the informal consultation meeting conducted among personnel from the United States Fish and Wildlife Service (USFWS), Coastal Ecological Services Field Office; Marine Corps Air Station Beaufort (MCAS Beaufort); Naval Facilities Engineering Command Southeast (NAVFAC SE); and Ecology and Environment, Inc. (E & E) on November 30, 2010, we discussed a preliminary list of federally protected species potentially affected by the modernization and expansion of Townsend Bombing Range (TBR), Georgia.

The preliminary list of 11 federally protected species discussed during the meeting was developed based on E & E's review of the USFWS species lists for Long and McIntosh Counties, Georgia, and was originally provided in tabular format in the *Desktop Analysis of Biological and Environmental Variables for the Environmental Impact Statement* (EIS) *for the Modernization and Expansion of Townsend Bombing Range, Georgia,* dated November 2010 (2010 Desktop Analysis). The table from the 2010 Desktop Analysis is provided on the next page, but reflects minor revisions including an updated federal status for the Altamaha spinymussel (*Elliptio spinosa*) as proposed endangered. Additionally, at your request, the federally delisted bald eagle (*Haliaeetus leucocephalus*) is included in the table because of its protection under the federal Bald and Golden Eagle Act of 1940.

On December 17, 2010, E & E provided a detailed methodology proposing the use of habitat-based survey methodologies for the flatwoods salamander (*Ambystoma cingulatum*) and striped newt (*Notophthalmus perstriatus*) as opposed to using dip net

or drift net surveys. The USFWS provided concurrence with the proposed habitat-based survey methodologies for these two species via letter on February 3, 2011.

In continuation with the preparation of the EIS, E & E has received and reviewed the results of the Georgia Department of Natural Resources (GaDNR's) Coastal Resource Mapping Project completed in 2010 which delineates vegetative habitats found in Long and McIntosh Counties, Georgia. In addition, E & E and NAVFAC SE performed a site reconnaissance on February 9 through 11, 2011, to preliminarily ground-truth aerial signatures identified in the 2010 Desktop Analysis and cross-check the habitats identified in the GaDNR Coastal Resource Mapping Project.

Federally Protected Species Potentially Occurring in Long and McIntosh Counties, Georgia

Scientific Name	Common Name	Federal Listing	State Listing
AMPHIBIANS			
Drymarchon corais couperi	Eastern Indigo Snake	T	T
Ambystoma cingulatum	Frosted Flatwoods Salamander	T	T
Gopherus polyphemus	Gopher Tortoise	C	T
Notophthalmus perstriatus	Striped Newt	C	R
BIRDS			
Vermivora bachmanii	Bachman's Warbler	E	.
Dendroica kirtlandii	Kirtland's Warbler	E	.
Haliaeetus leucocephalus	Bald Eagle	*	T
Mycteria americana	Wood Stork	E	E
MOLLUSKS			
Elliptio spinosa	Altamaha Spinymussel	PE	E
PLANTS			
Baptista arachnifera	Hairy Rattleweed	E	E

C - Candidate Species; E - Endangered; PE- Proposed Endangered; T – Threatened; * Protected under Bald and Golden Eagle Protection Act of 1940

Lastly, E & E has reviewed literature regarding life histories, biology, and habitat utilization of the 10 remaining species identified in the table on the next page. Based upon the preliminary habitats identified during the site reconnaissance and E & E's literature review, they have determined that the federally-listed threatened eastern indigo snake (*Drymarchon corais couperi*); the gopher tortoise (*Gopherus polyphemus*), a candidate species for federal listing; and the federally-listed endangered wood stork (*Mycteria Americana*) have the potential to occur within the

proposed impact areas and therefore may require field surveys to determine the presence of these species. Proposed survey methodologies for these species are described in Section 1.0.

Upon review of the same sources listed above, E & E also has determined that suitable habitat for the federally-listed endangered Bachman's warbler (*Vermivora bachmanii*); the federally-listed endangered Kirtland's warbler (*Dendroica kirtlandii*); the bald eagle; the potentially endangered Altamaha spinymussel; and the federally-listed endangered hairy rattle weed (*Baptista arachnifera*) are unlikely to occur within the proposed impact areas. Based upon the lack of suitable habitat for these species, no further field assessments for these species are proposed. Further rationale for this determination is described in Section 2.0. A list of references used to make these determinations is provided in Attachment A.

At this time, we request the USFWS review and provide concurrence with the following proposed survey methodologies for the eastern indigo snake, gopher tortoise, and wood stork. Such surveys would be conducted to determine impact to these species and would be utilized for Section 7 consultation, as necessary, to complete the EIS for the Modernization and Expansion of TBR, Georgia. We also are requesting concurrence with the rationale for not conducting field surveys for the Bachman's warbler, Kirkland's warbler, bald eagle, Altamaha spinymussel, short-nose sturgeon, Atlantic sturgeon, and hairy rattle weed.

1.0 Proposed Survey Methodology for Eastern Indigo Snake, Gopher Tortoise, and Wood Stork

We propose to conduct a more thorough site review of proposed target areas for the eastern indigo snake, gopher tortoise, and wood stork to determine if sufficient habitat exists within the proposed target area to support the above-referenced species. If it is found that sufficient habitat exists to support said species, then follow-up field assessments will be made to confirm the presence or absence of these species.

Eastern Indigo Snake

Habitat Requirements

Eastern indigo snakes use a variety of habitats that include pine flatwoods, scrubby flatwoods, high pine, dry prairie, hardwood hammocks, edges of freshwater wetlands, agricultural land, coastal dunes, and disturbed areas. Eastern indigo

snakes are often associated with gopher tortoise burrows, where they seek shelter from thermal stress and lay eggs. In areas lacking tortoise burrows, decayed stumps and logs are important habitat features for cover. Indigo snakes eat a variety of small mammals and herpetofauna, including eastern diamondback rattlesnakes and gopher tortoise hatchlings. In Georgia, the eastern indigo snake is most often associated with sand ridge habitats which often occur along major coastal plain streams (Speake, Diemer, and McGlincy 1981).

The Georgia Ecological Services Field Office of the USFWS maintains a GIS database of Threatened and Endangered Species Ranges in Georgia. This database indicates that the entirety of Acquisition Areas 1 and 3 is a "Possible Range" for indigo snakes. The database also indicates that "known occurrences" of eastern indigo snakes have been documented within Acquisition Areas 1 and 3. Based upon known occurrence data, an occurrence of indigo snake was documented within the proposed 400-acre Airfield Target Area.

Preliminary Site Review

We will review high-resolution aerial imagery and Natural Resource Conservation Service (NRCS) soil data to identify potential suitable habitat for the eastern indigo snake. Suitable habitat features are: sand ridges, scrubby pine flatwoods, and open upland environments adjacent to freshwater wetlands. Positive indicators for these habitats will be the presence of gopher tortoise burrows. Soil survey data that indicate sandy soils within or adjacent to suitable habitat will also be considered a positive indicator.

The NRCS soil data contain soil drainage characteristics. For areas within the proposed impact areas, drainage characteristics are classified as: moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. Since indigo snakes utilize sandy environments with supporting wetland environments, we assume that areas with poorly drained or very poorly drained soils will not provide the necessary upland habitat to support indigo snakes. For survey purposes, those areas identified within impact areas with moderately well drained or somewhat poorly drained soils will be examined to determine if significant habitat exist to support indigo snake populations.

Areas of suitable habitat as defined above will be mapped using GIS and will be cross-referenced to known occurrences of eastern indigo snakes from the USFWS Georgia Ecological Services Field Office GIS database of Threatened and Endangered Species Ranges in Georgia. Distances from each area

of suitable habitat to the nearest known occurrences of eastern indigo snake will be documented.

Field Assessment

We will conduct follow-up surveys in areas of suitable habitat to determine if the habitat is likely to support eastern indigo snakes. These surveys will assess the potential habitat and include a survey for the presence of gopher tortoise burrows. A detailed habitat description of survey areas, as well as photographs of suitable habitat, will be completed. Upon completion of the field assessment, a summary report of survey findings will be provided to USFWS staff.

Gopher Tortoise

Habitat Requirements

Gopher tortoises are common in most types of upland communities with open canopies. They are commonly found in habitats such as sandhill, pine flatwoods, scrub, scrubby flatwoods, dry prairies, xeric hammock, pine-mixed hardwoods, and coastal dunes. Gopher tortoises construct burrows in sandy soils. The gopher tortoise resides in these burrows which protect them from other species and extreme heat. These burrows also provide similar protection for over 350 other commensal species. Key species known to occupy gopher tortoise burrows include the eastern indigo snake, eastern diamondback rattlesnake, and gopher frogs (Florida Freshwater Fish and Wildlife Conservation Commission [FWC] 2010a and 2010b).

Preliminary Site Review

We will review high-resolution aerial imagery and NRCS soil data to identify potential suitable habitat for the gopher tortoise. Suitable habitat features are: sand ridges, scrubby pine flatwoods, dry prairies, xeric hammocks, and open upland environments with sandy soils. Positive indicators for these habitats will be the presence of sandy soils as indicated from soil survey data.

The NRCS soil data contain soil drainage characteristics. For areas within the proposed impact areas, drainage characteristics are classified as: moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. Since gopher tortoises utilize sandy environments with low groundwater elevations, we assume that areas with poorly drained or very poorly drained soils will not support gopher tortoises. For survey purposes, those areas identified within impact areas with moderately well drained or somewhat poorly drained soils will be examined to determine if

significant habitat exist to support gopher tortoise populations.

Field Assessment

We will conduct follow-up surveys in areas of suitable habitat to determine if the habitat is currently utilized by gopher tortoises. Canopy and herbaceous cover percentage will be documented for upland habitats identified in the preliminary site review to determine if adequate vegetation exists to support gopher tortoises. Acceptable habitat features will be defined as a canopy cover of less than 60%, with an herbaceous cover of at least 30% (FWC 2009). If acceptable canopy and herbaceous cover percentage exist, pedestrian transects within suitable habitat will be conducted to identify gopher tortoise burrows. Existing burrows will be classified as active or abandoned and marked by Global Positioning System (GPS). A detailed habitat description of survey areas, as well as photographs of existing burrows, will be completed. Upon completion of the field assessment, a summary report of survey findings will be provided to USFWS staff.

Wood Stork

Habitat Requirements

The wood stork is a colonial bird that nests in large rookeries often constructed in cypress (*Taxodium distichum*), black gum (*Nyssa sylvatica var. biflora*) and southern willow (*Salix carolina*). Wood storks utilize the same nesting colonies from year to year as long as they remain undisturbed (USFWS 1986). They feed in flocks on small fish, crustaceans, amphibians, reptiles, and arthropods found within freshwater marshes, flooded roadside and agricultural ditches, and depressions in cypress heads, swamp sloughs, tidal creeks and pools, and estuaries. The wood stork is known to travel long distances (up to 80 miles) in search of feeding areas. Past research on Georgia wood stork colonies has found that foraging occurs within a 12-mile radius 80% of the time (USFWS 1986).

The USFWS Georgia Ecological Services Field Office GIS database of Threatened and Endangered Species Ranges in Georgia indicates a known wood stork rookery located 9 miles northwest of proposed Acquisition Area 3. During the meeting with the USFWS on November 30, 2010, and a subsequent meeting with GaDNR on December 1, 2010, both agencies confirmed that no wood stork rookeries occur within proposed Acquisition Areas 1 or 3. However, due to the project's proximity to the known rookery and the ability of wood storks to travel long distances for foraging, wetland habitats within the proposed

impact areas may be utilized as foraging habitat for wood storks.

Preliminary Site Review

During the preliminary site reconnaissance conducted on February 9 and 10, 2011, we confirmed that potential foraging habitat exists within the proposed impact areas. These habitats include swamp sloughs, forested depressions, and roadside and agricultural ditches. No individual sightings of wood storks were observed during the sight reconnaissance.

Proposed Survey Methods

Based upon preliminary site review findings noted above, we determined that appropriate foraging habitat exists within the proposed impact areas and wood storks may utilize these wetland habitats for foraging. While conducting field assessments for other protected species or wetland delineations for the project, we will document any observed sightings of this species and report these sightings in the EIS. No follow-up field surveys are proposed for this species as potential impacts to wetland habitats, and thus wood stork foraging habitat, will be quantified and further examined in the EIS.

2.0 Rationale for Determination of Other Species Not Requiring Field Surveys

Our rationale for determining that field surveys will not be required for Bachman's warbler, Kirtland's warbler, Altamaha spinymussel, and the hairy rattle weed is provided below.

Kirtland's Warbler

The Kirkland's warbler has one of the most restricted breeding ranges of any North American bird. It breeds in the open jack pine (*Pinus banksiana*) plains of central Michigan. The bird over-winters in the Bahamas with spring departures occurring in late April and early May and fall migrations between August and October (USFWS 1999). The primary migration route follows a narrow band through South Carolina, North Carolina, Virginia, West Virginia, and Ohio before reaching nesting grounds in Michigan (USFWS 1999). When warblers make their spring migration, the first quarter of the route is over water (Mayfield 1988). Some research has shown migration occurs without any stops or with limited stopovers (Mayfield 1988; USFWS 1999). These studies concluded that observations of warblers outside of the main migration route were likely strays, as a disproportionate number of documented

observations occurred in Ohio and Michigan, the last quarter of the migratory route.

The Kirtland's warbler is potentially only present in the state of Georgia for a limited time during its migratory period. Because the primary migration route for Kirkland's warbler lies north and northeast of Georgia, and since research indicates they may migrate without stopovers and that warblers within the state of Georgia are likely stray birds, no field assessments for this species are proposed.

Bald Eagle

During the November 30 and December 1, 2010, meetings with the USFWS and GaDNR, respectively, both agencies confirmed that no known bald eagle nests occur within the proposed project area. The proposed acquisition area is currently managed for silviculture operations and is composed primarily of dense planted pine stands, recently cleared pine stands, and forested wetlands. Bald eagles require tall, mature trees for nesting purposes. Due to clearing activities associated with active management of timber, trees are harvested well before they reach maturity. No suitable nesting habitat within the proposed impact areas exist for bald eagles, and therefore no detailed field assessments for this species are proposed. Visual observations of bald eagles or nests observed during other field activities will be provided to the USFWS and documented in the EIS.

Bachman's Warbler

A confirmed documentation of the Bachman's warbler has not been reported in the United States since 1962 (USWFS 2005), and therefore no field assessments for this species are proposed.

Altamaha Spinymussel

The Altamaha spinymussel utilizes the Altamaha River. As discussed during the November 30, 2010, meeting, Acquisition Area 2, which is adjacent to the river, has been removed from the project scope. Therefore, no direct or secondary impacts to the Altamaha River are anticipated, and no field assessments for this species are proposed.

Hairy Rattle Weed

The hairy rattle weed inhabits shallow pools on Piedmont granite outcrops in full sunlight. It is known to occur in

Brantley and Wayne Counties, Georgia, and the USFWS stated in the November 30, 2010, meeting that the required habitat for this species likely would not be found within the proposed acquisition areas. Therefore, no field assessments for this species are proposed.

We respectfully request that the USFWS review the survey methodologies provided herein and provide concurrence within 30 days of receipt of this letter. Please contact Jered Jackson at 904-542-6308 or e-mail jered.jackson@navy.mil with any questions or concerns regarding this submittal or if you require any additional information to process this request.

Sincerely,

WILLIAM A. DRAWDY
Natural Resources and
Environmental Affairs Officer

cc: John Conway, NAVFAC SE
Jered Jackson, NAVFAC SE
Brenda Powell, Ecology and Environment, Inc.
Jonathan Oravetz, Ecology and Environment, Inc.

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United States Department of the Interior

Fish and Wildlife Service
105 West Park Drive, Suite D
Athens, Georgia 30606
Phone: (706) 613-9493
Fax: (706) 613-6059

West Georgia Sub-Office
Post Office Box 52560
Fort Benning, Georgia 31995-2560
Phone: (706) 544-6428
Fax: (706) 544-6419

Coastal Sub-Office
4980 Wildlife Drive
Townsend, Georgia 31331
Phone: (912) 832-8739
Fax: (912) 832-8744

April 1, 2011

Mr. W. A. Drawdy
U. S. Marine Corps
Marine Corps Air Station
Beaufort, South Carolina 29904-5001

Re: FWS Log # 2011-0042

Dear Mr. Drawdy:

Thank you for your February 28, 2011, letter regarding survey methodologies for Federally listed and candidate species for the draft Environmental Impact Statement for the proposed Modernization and Expansion of Townsend Bombing Range, Georgia. We have reviewed the information you provided and submit the following comments under provisions of the Endangered Species Act of 1973 (Act) as amended (16 U.S.C. 1531 et seq.).

According to the information you provided, the federally threatened eastern indigo snake, the federally threatened frosted flatwoods salamander, the federally endangered wood stork, and the state listed gopher tortoise have the potential to occur within the proposed impact areas. You listed the gopher tortoise as a candidate species, however it is state listed now, but in the future could become a candidate species. You determined field surveys would not be required for the Kirtland's Warbler, Bald Eagle, Bachman's warbler, Altamaha spinymussel, and hairy rattleweed since habitat was lacking in the proposed acquisition impact areas. We have reviewed this information and agree with your species list and proposed method of surveys for the eastern indigo snake, wood stork, and gopher tortoise. The survey methodology for the striped newt and frosted flatwoods salamander was concurred on in a previous letter (FWS Log # 2011-TA-0227).

We appreciate the opportunity to comment during the planning stages of your project. If you have any questions, please write or call staff biologist, Robert Brooks, of our Coastal Georgia Sub Office at 912-832-8739, extension 107.

Sincerely,

Grant Colwell

Sandra S. Tucker for
Field Supervisor

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Appendix G
Threatened and Endangered Species

Appendix G.1
U.S. Fish and Wildlife Service

Survey Findings

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UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
BEAUFORT SOUTH CAROLINA 29904-5001

IN REPLY REFER TO
5090
NREAO/104
2 MAY 2011

Mr. Robert Brooks
United States Fish and Wildlife Service
Coastal Ecological Services Field Office
4980 Wildlife Drive NE
Townsend, Georgia 31331

Re: Survey Results for Eastern Indigo Snake, Gopher Tortoise, Flatwoods Salamander, Striped Newt, and Wood Stork for the *Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia*

Dear Mr. Brooks:

For the purpose of preparing an *Environmental Impact Statement (EIS) for the Modernization and Expansion of Townsend Bombing Range, Georgia*, Ecology and Environment, Inc. (E & E) conducted biological surveys for selected federally protected species potentially affected by the Proposed Action. This letter summarizes the findings of surveys conducted between 28 March and 6 April 2011 for federally protected species, including the eastern indigo snake, flatwoods salamander, and wood stork; the striped newt, a candidate species for federal listing; and the state-listed gopher tortoise.

The surveys were conducted using methodologies detailed in letters from Ms. Brenda Powell of E & E to the United States Fish and Wildlife Service (USFWS) dated 17 December 2010, and from Mr. William Drawdy of the United States Marine Corps (USMC) dated 28 February 2011. The survey methodologies were subsequently approved by the USFWS on 3 February and 1 April 2011, respectively. These letters of correspondence are provided in Attachment A.

Prior to conducting onsite field surveys, a desktop analysis of habitats found in each of the eight Target Areas was conducted to identify potential habitat for each species. The location of each Target Area is illustrated in Attachment B, on Figure 1-1. During the desktop analysis, the following data sets were reviewed:

- National Wetlands Inventory (NWI; USFWS 2010);

- Natural Resources Conservation Service (NRCS) soil surveys for Long and McIntosh Counties (NRCS 2002 and NRCS 2007, respectively);
- United States Department of Agriculture (USDA) National Agricultural Inventory Project (NAIP) 2010 True Color Aerial Imagery;
- USDA NAIP 2009 Infrared Aerial Imagery; and
- Ecological Community data from the Georgia Department of Natural Resources (GaDNR)'s Coastal Resource Mapping Project completed in 2010.

Areas identified as potential species habitat were downloaded onto sub-meter accurate Geographic Positioning System (GPS) units for subsequent in-field verification. The in-field findings for the species identified as requiring surveys are summarized below.

Eastern Indigo Snake (*Drymarchon corais couperi*)

Suitable habitat for the eastern indigo snake was defined as sand ridges, scrubby pine flatwoods, and open upland environments adjacent to freshwater wetlands (Drawdy 2011, Tucker 2011b). A positive indicator for these habitats is the presence of gopher tortoise burrows.

Field surveys identified two areas considered suitable habitat for the eastern indigo snake. The first area consists of a 1.8-acre open canopy upland habitat located within Target Area 3 (see Attachment B, Figure 1-2). This upland area was adjacent to recently harvested emergent wetlands to the east. The NRCS classified soils within this area as Bladen Fine Sandy Loam, defined as hydric, poorly drained soils. Field surveys determined that this small upland area had coarse sandy soils supporting loblolly pine (*Pinus taeda*), saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), broom sedge (*Andropogon* sp.), and shiny blueberry (*Vaccinium myrsinites*) (see Attachment C, Photo 1). The area was surveyed using pedestrian transects for the presence of gopher tortoise burrows; however, no burrows or eastern indigo snakes were observed in the field.

The second area with suitable eastern indigo snake habitat was identified within Target Area 6 (see Attachment B, Figure 1-3). The USFWS Georgia Ecological Services Field Offices maintains a GIS database of threatened and endangered species ranges in Georgia. This database indicates that a known occurrence of indigo snake was documented within the vicinity

of Target Area 6. Field surveys located a 12.8-acre sandy upland area of planted immature loblolly pines on the east side of an existing access road and adjacent to mature forested wetland areas (see Attachment B, Figure 1-3). The NRCS classified soils within this area as Mascotte Fine Sand, defined as partially hydric, poorly drained soils. Vegetation in this area included loblolly pine, saw palmetto, gallberry, broom sedge, winged sumac (*Rhus copallinum*), and shiny blueberry (see Attachment C, Photo 2). The area was surveyed using pedestrian transects for the presence of gopher tortoise burrows; however, no burrows or eastern indigo snakes were observed in the field.

The remainder of the Target Areas consisted of densely planted stands of loblolly pine with low species diversity. The majority of these areas contain poorly drained soils that do not meet suitable habitat requirements for the eastern indigo snake.

Gopher Tortoise (*Gopherus polyphemus*)

Suitable habitat for gopher tortoise was defined as sand ridges, scrubby pine flatwoods, dry prairies, xeric hammocks, and open upland environments with sandy soils (Drawdy 2011, Tucker 2011b). Acceptable habitat features were defined as a canopy cover of less than 60%, with an herbaceous cover of at least 30% (Drawdy 2011, Tucker 2011b). The presence of sandy soils as indicated from soil survey data was a positive indicator for these habitats. Those areas, with soil drainage patterns defined by the NRCS as moderately well-drained or somewhat poorly drained soils, were identified as potential gopher tortoise habitat during the desktop analysis and were loaded into the GPS units.

Potential gopher tortoise habitat that was identified during the desktop analysis was surveyed to determine if suitable habitat exists. Onsite field surveys located two areas that would be considered suitable gopher tortoise habitat. These are the same areas identified above as suitable eastern indigo snake habitat located within Target Areas 3 and 6 (see Attachment B, Figures 1-2 and 1-3). Both areas were surveyed using pedestrian transects for the presence of gopher tortoise burrows; however, no burrows were observed.

Additional areas that were identified as potential gopher tortoise habitat during the desktop analysis consisted of densely planted stands of loblolly pine with canopy cover greater than 60% and herbaceous cover less than 30%. Photographs of representative planted pine habitats are

provided in Attachment C (Photos 3 through 6). These areas did not meet the definition of suitable gopher tortoise habitat.

Numerous active gopher tortoise burrows were observed along New Road near the intersection of GC&P Road (see Attachment C, Photo 7). This area consists of an open sandy xeric environment that has been replanted with longleaf pine. Multiple gopher tortoise burrows were located within 200 feet of the road. This area was not extensively surveyed for gopher tortoise burrows as it occurs outside the defined Target Areas (see Attachment B, Figure 1-4).

Flatwoods Salamander (*Ambystoma cingulatum*) and Striped Newt (*Notophthalmus perstriatus*)

Suitable habitat for flatwoods salamander was defined as isolated ephemeral or depressional wetlands or ephemeral ponds with the absence of deep water, a treeless ecotone, and adjacency to open pine savannas or pine flatwoods (Powell 2010, Tucker 2011a). Suitable habitats for the striped newt are similar, but are most often associated with adjacency to sand or scrub upland environments (Powell 2010, Tucker 2011a).

To identify potential breeding ponds and suitable habitat for flatwoods salamander and striped newt, pedestrian transects where conducted at 50-to-100-foot intervals throughout all areas classified as wetland habitats by the NWI maps (USFWS 2010).

Isolated ephemeral ponds were located within Target Areas 1, 3, 6, 7, and 8 (see Attachment C, Photos 8 through 12). No salamanders were observed under leaf debris in any of these ponds. The ponds located within Target Area 6 (see Attachment C, Photo 11) and Target Area 7 (see Attachment C, Photo 10) supported some amphibian species, including tadpoles and frogs. However, none of the ponds in any of the Target Areas met suitable habitat requirements as they did not have treeless ecotones and were not supported by appropriate upland habitats including open pine savannahs, pine flatwoods, and sand scrub upland environments.

Wood Stork (*Mycteria Americana*)

The USFWS Georgia Ecological Services Field Offices GIS database of Threatened and Endangered Species Ranges in Georgia indicates a known wood stork rookery 9 miles northwest of proposed Acquisition Area 1 (illustrated on Figure 1-1 in Attachment B). No additional wood stork rookeries are known to occur in the study area. Past research on Georgia wood stork

colonies found that foraging occurs 80% of the time within a 12-mile radius (USFWS 1986). Target Areas 1, 2, 3, 4, 6, and 7 are within 12 miles of the rookery located northwest of Acquisition Area 1. Due to the project's proximity to the known rookery outside of the Acquisition Area, and the ability of wood storks to travel long distances for foraging, all wetland habitats within these Target Areas are presumed to be utilized as foraging habitat for wood storks.

No wood storks were observed foraging in onsite wetlands during the survey timeframe of 28 March through 6 April 2011. However, surveys were conducted early in the spring migration period and it is likely that wood storks had not reached coastal Georgia during the survey period. As stated in the 28 February 2011 survey methodology letter sent to your agency (see Attachment A), no follow-up field surveys are proposed for this species. They are presumed to utilize the wetlands located within Target Areas 1, 2, 3, 4, 6, and 7 for foraging, so impacts to wetland habitats, and thus wood stork foraging habitat, will be quantified and examined further in the EIS.

Other Observed Wildlife and Plants

During field surveys, observations of non-threatened and endangered species were recorded in field notes and were GPS located. A summary of non-protected species observed during the field surveys is provided in Table 1-1.

Table 1-1
Non-Protected Wildlife and Plants Observed During Field Surveys

Common Name	Scientific Name
Swallow Tailed Kite	*Elanoides forficatus*
Turkey	*Meleagris gallopavo*
Northern Bobwhite Quail	*Colinus virginianus*
Night Heron	*Nycticorax nycticorax*
Barred Owl	*Strix varia*
American Kestrel	*Falco sparverius*
Osprey	*Pandion haliaetus*
Red-Shouldered Hawk	*Buteo lineatus*
Cerulean Warbler	*Dendroica cerulea*

Black Racer	*Coluber constrictor*
Black Rat Snake	*Elaphe obsoleta*
Southern Toad	*Anaxyrus terrestris*
Ornate Chorus Frog	*Pseudacris ornata*
Musk Turtle	*Sternotherus odoratus*
Coyote	*Canis latrans*
Feral Pig	*Sus scrofa*
Pitcher Plant	*Sarracenia* sp.

Findings Summary

Field surveys conducted for federally protected species identified two areas, one within Target Area 3 and one within Target Area 6, as suitable habitat for the eastern indigo snake and gopher tortoise (see Attachment B, Figures 1-2 and 1-3). Gopher tortoise burrows also were observed near the intersection of New Road and GC&P Road (see Attachment B, Figure 1-4). This area occurs within Acquisition Area 1 but outside of the eight Target Areas and, therefore, extensive surveys were not conducted in this area.

Approximately 511 acres of wetland habitats were surveyed for potential breeding ponds and suitable habitat for flatwoods salamanders and striped newt. No areas of suitable habitat or breeding ponds were observed within the Target Areas for flatwoods salamander and striped newt.

No wood storks were observed during the onsite surveys; however, due to the project's proximity to a known wood stork rookery outside of Acquisition Area 1 and the ability of wood storks to travel long distances for foraging, wetland habitats within proposed Target Areas 1, 2, 3, 4, 6, and 7 are presumed to be utilized as foraging habitat for wood storks.

We will apply these survey findings to biological evaluations during development of the Proposed Action's EIS. No additional or follow-up surveys for protected species are proposed at this time. Please contact Mr. Jered Jackson at 904-542-6308 or e-mail jered.jackson@navy.mil with any questions or concerns regarding these findings or if you would like additional information.

Sincerely,

WILLIAM A. DRAWDY
Natural Resources and
Environmental Affairs Officer

Attachments

cc: John Conway, NAVFAC SE
Jered Jackson, NAVFAC SE
Brenda Powell, E & E
Jonathan Oravetz, E & E

Attachment A

Proposed USFWS Survey Methodology and Concurrence Letters

ecology and environment, inc.
Global Environmental Specialists
1974 Commonwealth Lane
Tallahassee, Florida 32303
Tel: (850) 574-1400, Fax: (850) 574-1400

December 17, 2010

Mr. Robert Brooks
United States Fish and Wildlife Service
Coastal Ecological Services Field Office
4980 Wildlife Drive NE
Townsend, Georgia 31331

Re: Proposed Use of Habitat-Based Flatwoods Salamander and Striped Newt Survey Methodology for the Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia

Dear Mr. Brooks:

As a follow-up to the informal consultation meeting conducted between personnel from the United States Fish and Wildlife Service (USFWS), Coastal Ecological Services Field Office, Naval Facilities Engineering Command Southeast (NAVFAC SE), Marine Corps Air Station Beaufort (MCAS Beaufort), and Ecology and Environment, Inc. (E & E) on November 30, 2010, and a subsequent teleconference between you and E & E representatives on December 13, 2010, we request the USFWS review and provide concurrence with the following proposed survey methodology for the federally threatened flatwoods salamander (*Ambystoma cingulatum*) and the striped newt (*Notophthalmus perstriatus*), a candidate species for federal listing, that would be used if surveys for these species are necessary. Such surveys would be conducted to determine impact to these species and would be utilized for Section 7 consultation, as necessary, to complete the Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia (referred to herein as the TBR EIS).

During the meeting on November 30, 2010, your agency expressed concern with the ability to conduct dip net surveys, if warranted, in the winter of 2011 due to a lack of rainfall in the geographic area of the Proposed Action, which includes Long and McIntosh Counties, Georgia. Therefore, on behalf of NAVFAC SE, E & E has conducted research on established survey methodologies for flatwoods salamanders. The findings of this research are summarized below. The striped newt utilizes similar habitat and has a similar life history as the flatwoods salamander. Therefore one survey methodology is proposed for the assessment of both species.

Currently, there is no set protocol for determining presence or absence of flatwoods salamanders in a particular breeding pond. The general study consensus is that a survey with drift net fences surrounding a breeding pond for two consecutive "normal" weather years will indicate an affirmative result on the determination of the pond as a breeding pond. For dip net surveys, multiple years of breeding pond surveys are required to definitively determine the presence or absence of flatwoods salamanders.[1] The drought conditions present in the project area during the recent past and the timeframe for completing the TBR EIS would make these survey methodologies infeasible for this project.

[1] USFWS, 2005a. *Biological Opinion for the Relocation of Panama City-Bay County International Airport (West Bay Site Alternative)*, Dated October 3, 2005, Prepared by USFWS, 1601 Balboa Avenue Panama City, Florida.

Habitat-based survey methods have been applied in the past for projects potentially impacting flatwoods salamanders.[1, 2] Two biological opinions issued by the USFWS Panama City, Florida office are provided as Attachments A and B for your review. Both of these studies utilized habitat-based surveys.

Habitat-based surveys examine existing habitats to determine if they are likely to be utilized as flatwoods salamander breeding ponds. These surveys typically examine ephemeral or depressional wetlands that are geographically isolated from larger water bodies. To determine if these areas serve as potential breeding ponds, a thorough assessment of the pond, ectone, and adjacent upland is conducted. Positive indicators are absence of deep water, a treeless ecotone, and adjacency to open pine savannas or pine flatwoods. Areas that maintain appropriate habitat within the pond, adjacent upland, and treeless ecotone are then assumed to be potentially utilized as a flatwoods salamander breeding pond.[2]

The proposed acquisition areas (Areas 1 and 3) are primarily composed of planted pine stands and deep forested wetlands. As such, your agency has indicated that little habitat for the flatwoods salamander or striped newt is expected to be found within the proposed target areas. In the winter of 2011, E & E will conduct wetland delineations and upland habitat classifications for the proposed target areas. Following this preliminary field effort, a detailed wetland delineation and habitat assessment report, identifying potential flatwoods salamander habitat, will be provided to USFWS.

If any areas are identified as suitable habitat for flatwoods salamanders or striped newts during the winter 2011 surveys, E & E would propose additional targeted field surveys be conducted during April and May 2011 to determine if the habitat is a potential breeding pond. These surveys would be conducted by appropriately educated botanists and/or biologists familiar with southeastern flora. For these follow-up surveys, E & E would propose to use a variation (e.g., modified slightly to include plant species found in Georgia) of the "Potential Breeding Pond Description Data Sheet for Flatwoods Salamander (*Ambystoma cingulatum*) and Striped Newt (*Notophthalmus perstriatus*)" provided in Appendix II of the *Biological Opinion for U.S. Army Corps of Engineers Regional General Permit 86 (RGP-86)*.[2] The modified data sheet proposed for follow-up habitat based surveys is provided herein as Attachment C. A list of proposed follow-up survey locations and rationale for why the area requires follow-up surveys (e.g., based on the winter 2011 survey findings, results of recent infrared aerial photo-interpretation, and review of Natural Resources Conservation Service soils datum) would be provided to the USFWS prior to the commencement of any necessary follow-up field surveys. The results of any targeted follow-up surveys would also be provided to the USFWS in report format.

Please review the methodologies herein that would be used in the event that flatwoods salamander and striped newt surveys are necessary. We respectfully request that you provide concurrence, within 30 days of receipt of this letter, with the use of habitat-based follow-up surveys as opposed to conducting dip net surveys over multiple years to confirm the presence of flatwoods salamander and striped newt breeding ponds within proposed impact areas.

---

[2] USFWS 2005b. *Biological Opinion for U.S. Army Corps of Engineers Regional General Permit 86 (RGP-86)*, Dated March 3, 2005, Prepared by USFWS, 1601 Balboa Avenue Panama City, Florida.

Please feel free to contact me (bpowell@ene.com; 850-574-1400, ext. 3911) or Jonathan Oravetz (joravetz@ene.com; 850-574-1400, ext. 3928) if you have any questions regarding this submittal or require any additional information to process this request.

Sincerely,

ECOLOGY & ENVIRONMENT, INC.

Brenda A. Powell

Brenda A. Powell
Project Biologist

Attachments

cc: Jered Jackson, NAVFAC SE
John Conway, NAVFAC SE
Billy Drawdy, MCAS Beaufort
Alice Howard, MCAS Beaufort

United States Department of the Interior

Fish and Wildlife Service
105 West Park Drive, Suite D
Athens, Georgia 30606
Phone: (706) 613-9493
Fax: (706) 613-6059

West Georgia Sub-Office
Post Office Box 52560
Fort Benning, Georgia 31995-2560
Phone: (706) 544-6428
Fax: (706) 544-6419

Coastal Sub-Office
4980 Wildlife Drive
Townsend, Georgia 31331
Phone: (912) 832-8739
Fax: (912) 832-8744

February 3, 2011

Ms. Brenda A. Powell
Ecology & Environment, Inc.
1974 Commonwealth Lane
Tallahassee, Florida 32303

Re: USFWS File Number 2011-TA-0227

Dear Ms. Powell:

Thank you for your December 17, 2010, letter and attachments regarding your proposed use of habitat based flatwoods salamander and striped newt survey methodology for the Environmental Impact Statement for the proposed Modernization and Expansion of Townsend Bombing Range, Georgia. These surveys will be conducted for preparation of a draft Environmental Impact Statement for the proposed expansion of the range in McIntosh and Long Counties, Georgia. We have reviewed the information you provided and submit the following comments under provisions of the Endangered Species Act of 1973 (Act) as amended (16 U.S.C. 1531 et seq.).

According to the information you provided, the proposed acquisition areas will be assessed to determine if they have appropriate habitat for the frosted flatwoods salamander, a federally listed species, or the striped newt, a candidate species. Since the proposed acquisition areas consist mainly of planted pine stands and the area has been through a drought year, these habitat surveys will be used to determine the presence or absence of the salamander and newt, as opposed to conducting dip net surveys over several years. A more detailed description of the proposed habitat surveys are included with your letter and attachments, along with a modified habitat data sheet. We have reviewed this information and therefore agree with your proposed method of habitat surveys for the frosted flatwoods salamander and the striped newt.

We appreciate the opportunity to comment during the planning stages of your project. If you have any questions, please write or call staff biologist, Robert Brooks, of our Coastal Georgia Sub Office at 912-832-8739, extension 107.

Sincerely,

Grant Colwell for

Sandra S. Tucker
Field Supervisor

UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
BEAUFORT, SOUTH CAROLINA 29904-5001

IN REPLY REFER TO
5090
NREAO/058
28 FEB 2011

Mr. Robert Brooks
United States Fish and Wildlife Service
Coastal Ecological Services Field Office
4980 Wildlife Drive NE
Townsend, Georgia 31331

Re: Proposed Survey Methodology for Federally-Listed and Candidate Species for the *Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia*

Dear Mr. Brooks:

During the informal consultation meeting conducted among personnel from the United States Fish and Wildlife Service (USFWS), Coastal Ecological Services Field Office; Marine Corps Air Station Beaufort (MCAS Beaufort); Naval Facilities Engineering Command Southeast (NAVFAC SE); and Ecology and Environment, Inc. (E & E) on November 30, 2010, we discussed a preliminary list of federally protected species potentially affected by the modernization and expansion of Townsend Bombing Range (TBR), Georgia.

The preliminary list of 11 federally protected species discussed during the meeting was developed based on E & E's review of the USFWS species lists for Long and McIntosh Counties, Georgia, and was originally provided in tabular format in the *Desktop Analysis of Biological and Environmental Variables for the Environmental Impact Statement* (EIS) *for the Modernization and Expansion of Townsend Bombing Range, Georgia,* dated November 2010 (2010 Desktop Analysis). The table from the 2010 Desktop Analysis is provided on the next page, but reflects minor revisions including an updated federal status for the Altamaha spinymussel (*Elliptio spinosa*) as proposed endangered. Additionally, at your request, the federally delisted bald eagle (*Haliaeetus leucocephalus*) is included in the table because of its protection under the federal Bald and Golden Eagle Act of 1940.

On December 17, 2010, E & E provided a detailed methodology proposing the use of habitat-based survey methodologies for the flatwoods salamander (*Ambystoma cingulatum*) and striped newt (*Notophthalmus perstriatus*) as opposed to using dip net

or drift net surveys. The USFWS provided concurrence with the proposed habitat-based survey methodologies for these two species via letter on February 3, 2011.

In continuation with the preparation of the EIS, E & E has received and reviewed the results of the Georgia Department of Natural Resources (GaDNR's) Coastal Resource Mapping Project completed in 2010 which delineates vegetative habitats found in Long and McIntosh Counties, Georgia. In addition, E & E and NAVFAC SE performed a site reconnaissance on February 9 through 11, 2011, to preliminarily ground-truth aerial signatures identified in the 2010 Desktop Analysis and cross-check the habitats identified in the GaDNR Coastal Resource Mapping Project.

Federally Protected Species Potentially Occurring in Long and McIntosh Counties, Georgia

Scientific Name	Common Name	Federal Listing	State Listing
AMPHIBIANS			
Drymarchon corais couperi	Eastern Indigo Snake	T	T
Ambystoma cingulatum	Frosted Flatwoods Salamander	T	T
Gopherus polyphemus	Gopher Tortoise	C	T
Notophthalmus perstriatus	Striped Newt	C	R
BIRDS			
Vermivora bachmanii	Bachman's Warbler	E	.
Dendroica kirtlandii	Kirtland's Warbler	E	.
Haliaeetus leucocephalus	Bald Eagle	*	T
Mycteria americana	Wood Stork	E	E
MOLLUSKS			
Elliptio spinosa	Altamaha Spinymussel	PE	E
PLANTS			
Baptista arachnifera	Hairy Rattleweed	E	E

C - Candidate Species; E - Endangered; PE- Proposed Endangered; T – Threatened; * Protected under Bald and Golden Eagle Protection Act of 1940

Lastly, E & E has reviewed literature regarding life histories, biology, and habitat utilization of the 10 remaining species identified in the table on the next page. Based upon the preliminary habitats identified during the site reconnaissance and E & E's literature review, they have determined that the federally-listed threatened eastern indigo snake (*Drymarchon corais couperi*); the gopher tortoise (*Gopherus polyphemus*), a candidate species for federal listing; and the federally-listed endangered wood stork (*Mycteria Americana*) have the potential to occur within the

proposed impact areas and therefore may require field surveys to determine the presence of these species. Proposed survey methodologies for these species are described in Section 1.0.

Upon review of the same sources listed above, E & E also has determined that suitable habitat for the federally-listed endangered Bachman's warbler (*Vermivora bachmanii*); the federally-listed endangered Kirtland's warbler (*Dendroica kirtlandii*); the bald eagle; the potentially endangered Altamaha spinymussel; and the federally-listed endangered hairy rattle weed (*Baptista arachnifera*) are unlikely to occur within the proposed impact areas. Based upon the lack of suitable habitat for these species, no further field assessments for these species are proposed. Further rationale for this determination is described in Section 2.0. A list of references used to make these determinations is provided in Attachment A.

At this time, we request the USFWS review and provide concurrence with the following proposed survey methodologies for the eastern indigo snake, gopher tortoise, and wood stork. Such surveys would be conducted to determine impact to these species and would be utilized for Section 7 consultation, as necessary, to complete the EIS for the Modernization and Expansion of TBR, Georgia. We also are requesting concurrence with the rationale for not conducting field surveys for the Bachman's warbler, Kirkland's warbler, bald eagle, Altamaha spinymussel, short-nose sturgeon, Atlantic sturgeon, and hairy rattle weed.

1.0 Proposed Survey Methodology for Eastern Indigo Snake, Gopher Tortoise, and Wood Stork

We propose to conduct a more thorough site review of proposed target areas for the eastern indigo snake, gopher tortoise, and wood stork to determine if sufficient habitat exists within the proposed target area to support the above-referenced species. If it is found that sufficient habitat exists to support said species, then follow-up field assessments will be made to confirm the presence or absence of these species.

Eastern Indigo Snake

Habitat Requirements

Eastern indigo snakes use a variety of habitats that include pine flatwoods, scrubby flatwoods, high pine, dry prairie, hardwood hammocks, edges of freshwater wetlands, agricultural land, coastal dunes, and disturbed areas. Eastern indigo

snakes are often associated with gopher tortoise burrows, where they seek shelter from thermal stress and lay eggs. In areas lacking tortoise burrows, decayed stumps and logs are important habitat features for cover. Indigo snakes eat a variety of small mammals and herpetofauna, including eastern diamondback rattlesnakes and gopher tortoise hatchlings. In Georgia, the eastern indigo snake is most often associated with sand ridge habitats which often occur along major coastal plain streams (Speake, Diemer, and McGlincy 1981).

The Georgia Ecological Services Field Office of the USFWS maintains a GIS database of Threatened and Endangered Species Ranges in Georgia. This database indicates that the entirety of Acquisition Areas 1 and 3 is a "Possible Range" for indigo snakes. The database also indicates that "known occurrences" of eastern indigo snakes have been documented within Acquisition Areas 1 and 3. Based upon known occurrence data, an occurrence of indigo snake was documented within the proposed 400-acre Airfield Target Area.

Preliminary Site Review

We will review high-resolution aerial imagery and Natural Resource Conservation Service (NRCS) soil data to identify potential suitable habitat for the eastern indigo snake. Suitable habitat features are: sand ridges, scrubby pine flatwoods, and open upland environments adjacent to freshwater wetlands. Positive indicators for these habitats will be the presence of gopher tortoise burrows. Soil survey data that indicate sandy soils within or adjacent to suitable habitat will also be considered a positive indicator.

The NRCS soil data contain soil drainage characteristics. For areas within the proposed impact areas, drainage characteristics are classified as: moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. Since indigo snakes utilize sandy environments with supporting wetland environments, we assume that areas with poorly drained or very poorly drained soils will not provide the necessary upland habitat to support indigo snakes. For survey purposes, those areas identified within impact areas with moderately well drained or somewhat poorly drained soils will be examined to determine if significant habitat exist to support indigo snake populations.

Areas of suitable habitat as defined above will be mapped using GIS and will be cross-referenced to known occurrences of eastern indigo snakes from the USFWS Georgia Ecological Services Field Office GIS database of Threatened and Endangered Species Ranges in Georgia. Distances from each area

of suitable habitat to the nearest known occurrences of eastern indigo snake will be documented.

Field Assessment

We will conduct follow-up surveys in areas of suitable habitat to determine if the habitat is likely to support eastern indigo snakes. These surveys will assess the potential habitat and include a survey for the presence of gopher tortoise burrows. A detailed habitat description of survey areas, as well as photographs of suitable habitat, will be completed. Upon completion of the field assessment, a summary report of survey findings will be provided to USFWS staff.

Gopher Tortoise

Habitat Requirements

Gopher tortoises are common in most types of upland communities with open canopies. They are commonly found in habitats such as sandhill, pine flatwoods, scrub, scrubby flatwoods, dry prairies, xeric hammock, pine-mixed hardwoods, and coastal dunes. Gopher tortoises construct burrows in sandy soils. The gopher tortoise resides in these burrows which protect them from other species and extreme heat. These burrows also provide similar protection for over 350 other commensal species. Key species known to occupy gopher tortoise burrows include the eastern indigo snake, eastern diamondback rattlesnake, and gopher frogs (Florida Freshwater Fish and Wildlife Conservation Commission [FWC] 2010a and 2010b).

Preliminary Site Review

We will review high-resolution aerial imagery and NRCS soil data to identify potential suitable habitat for the gopher tortoise. Suitable habitat features are: sand ridges, scrubby pine flatwoods, dry prairies, xeric hammocks, and open upland environments with sandy soils. Positive indicators for these habitats will be the presence of sandy soils as indicated from soil survey data.

The NRCS soil data contain soil drainage characteristics. For areas within the proposed impact areas, drainage characteristics are classified as: moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. Since gopher tortoises utilize sandy environments with low groundwater elevations, we assume that areas with poorly drained or very poorly drained soils will not support gopher tortoises. For survey purposes, those areas identified within impact areas with moderately well drained or somewhat poorly drained soils will be examined to determine if

significant habitat exist to support gopher tortoise populations.

Field Assessment

We will conduct follow-up surveys in areas of suitable habitat to determine if the habitat is currently utilized by gopher tortoises. Canopy and herbaceous cover percentage will be documented for upland habitats identified in the preliminary site review to determine if adequate vegetation exists to support gopher tortoises. Acceptable habitat features will be defined as a canopy cover of less than 60%, with an herbaceous cover of at least 30% (FWC 2009). If acceptable canopy and herbaceous cover percentage exist, pedestrian transects within suitable habitat will be conducted to identify gopher tortoise burrows. Existing burrows will be classified as active or abandoned and marked by Global Positioning System (GPS). A detailed habitat description of survey areas, as well as photographs of existing burrows, will be completed. Upon completion of the field assessment, a summary report of survey findings will be provided to USFWS staff.

Wood Stork

Habitat Requirements

The wood stork is a colonial bird that nests in large rookeries often constructed in cypress (*Taxodium distichum*), black gum (*Nyssa sylvatica var. biflora*) and southern willow (*Salix carolina*). Wood storks utilize the same nesting colonies from year to year as long as they remain undisturbed (USFWS 1986). They feed in flocks on small fish, crustaceans, amphibians, reptiles, and arthropods found within freshwater marshes, flooded roadside and agricultural ditches, and depressions in cypress heads, swamp sloughs, tidal creeks and pools, and estuaries. The wood stork is known to travel long distances (up to 80 miles) in search of feeding areas. Past research on Georgia wood stork colonies has found that foraging occurs within a 12-mile radius 80% of the time (USFWS 1986).

The USFWS Georgia Ecological Services Field Office GIS database of Threatened and Endangered Species Ranges in Georgia indicates a known wood stork rookery located 9 miles northwest of proposed Acquisition Area 3. During the meeting with the USFWS on November 30, 2010, and a subsequent meeting with GaDNR on December 1, 2010, both agencies confirmed that no wood stork rookeries occur within proposed Acquisition Areas 1 or 3. However, due to the project's proximity to the known rookery and the ability of wood storks to travel long distances for foraging, wetland habitats within the proposed

impact areas may be utilized as foraging habitat for wood storks.

Preliminary Site Review

During the preliminary site reconnaissance conducted on February 9 and 10, 2011, we confirmed that potential foraging habitat exists within the proposed impact areas. These habitats include swamp sloughs, forested depressions, and roadside and agricultural ditches. No individual sightings of wood storks were observed during the sight reconnaissance.

Proposed Survey Methods

Based upon preliminary site review findings noted above, we determined that appropriate foraging habitat exists within the proposed impact areas and wood storks may utilize these wetland habitats for foraging. While conducting field assessments for other protected species or wetland delineations for the project, we will document any observed sightings of this species and report these sightings in the EIS. No follow-up field surveys are proposed for this species as potential impacts to wetland habitats, and thus wood stork foraging habitat, will be quantified and further examined in the EIS.

2.0 Rationale for Determination of Other Species Not Requiring Field Surveys

Our rationale for determining that field surveys will not be required for Bachman's warbler, Kirtland's warbler, Altamaha spinymussel, and the hairy rattle weed is provided below.

Kirtland's Warbler

The Kirkland's warbler has one of the most restricted breeding ranges of any North American bird. It breeds in the open jack pine (*Pinus banksiana*) plains of central Michigan. The bird over-winters in the Bahamas with spring departures occurring in late April and early May and fall migrations between August and October (USFWS 1999). The primary migration route follows a narrow band through South Carolina, North Carolina, Virginia, West Virginia, and Ohio before reaching nesting grounds in Michigan (USFWS 1999). When warblers make their spring migration, the first quarter of the route is over water (Mayfield 1988). Some research has shown migration occurs without any stops or with limited stopovers (Mayfield 1988; USFWS 1999). These studies concluded that observations of warblers outside of the main migration route were likely strays, as a disproportionate number of documented

observations occurred in Ohio and Michigan, the last quarter of the migratory route.

The Kirtland's warbler is potentially only present in the state of Georgia for a limited time during its migratory period. Because the primary migration route for Kirkland's warbler lies north and northeast of Georgia, and since research indicates they may migrate without stopovers and that warblers within the state of Georgia are likely stray birds, no field assessments for this species are proposed.

Bald Eagle

During the November 30 and December 1, 2010, meetings with the USFWS and GaDNR, respectively, both agencies confirmed that no known bald eagle nests occur within the proposed project area. The proposed acquisition area is currently managed for silviculture operations and is composed primarily of dense planted pine stands, recently cleared pine stands, and forested wetlands. Bald eagles require tall, mature trees for nesting purposes. Due to clearing activities associated with active management of timber, trees are harvested well before they reach maturity. No suitable nesting habitat within the proposed impact areas exist for bald eagles, and therefore no detailed field assessments for this species are proposed. Visual observations of bald eagles or nests observed during other field activities will be provided to the USFWS and documented in the EIS.

Bachman's Warbler

A confirmed documentation of the Bachman's warbler has not been reported in the United States since 1962 (USWFS 2005), and therefore no field assessments for this species are proposed.

Altamaha Spinymussel

The Altamaha spinymussel utilizes the Altamaha River. As discussed during the November 30, 2010, meeting, Acquisition Area 2, which is adjacent to the river, has been removed from the project scope. Therefore, no direct or secondary impacts to the Altamaha River are anticipated, and no field assessments for this species are proposed.

Hairy Rattle Weed

The hairy rattle weed inhabits shallow pools on Piedmont granite outcrops in full sunlight. It is known to occur in

Brantley and Wayne Counties, Georgia, and the USFWS stated in the November 30, 2010, meeting that the required habitat for this species likely would not be found within the proposed acquisition areas. Therefore, no field assessments for this species are proposed.

We respectfully request that the USFWS review the survey methodologies provided herein and provide concurrence within 30 days of receipt of this letter. Please contact Jered Jackson at 904-542-6308 or e-mail jered.jackson@navy.mil with any questions or concerns regarding this submittal or if you require any additional information to process this request.

Sincerely,

WILLIAM A. DRAWDY
Natural Resources and
Environmental Affairs Officer

cc: John Conway, NAVFAC SE
Jered Jackson, NAVFAC SE
Brenda Powell, Ecology and Environment, Inc.
Jonathan Oravetz, Ecology and Environment, Inc.

United States Department of the Interior

Fish and Wildlife Service
105 West Park Drive, Suite D
Athens, Georgia 30606
Phone: (706) 613-9493
Fax: (706) 613-6059

West Georgia Sub-Office
Post Office Box 52560
Fort Benning, Georgia 31995-2560
Phone: (706) 544-6428
Fax: (706) 544-6419

Coastal Sub-Office
4980 Wildlife Drive
Townsend, Georgia 31331
Phone: (912) 832-8739
Fax: (912) 832-8744

April 1, 2011

Mr. W. A. Drawdy
U. S. Marine Corps
Marine Corps Air Station
Beaufort, South Carolina 29904-5001

Re: FWS Log # 2011-0042

Dear Mr. Drawdy:

Thank you for your February 28, 2011, letter regarding survey methodologies for Federally listed and candidate species for the draft Environmental Impact Statement for the proposed Modernization and Expansion of Townsend Bombing Range, Georgia. We have reviewed the information you provided and submit the following comments under provisions of the Endangered Species Act of 1973 (Act) as amended (16 U.S.C. 1531 et seq.).

According to the information you provided, the federally threatened eastern indigo snake, the federally threatened frosted flatwoods salamander, the federally endangered wood stork, and the state listed gopher tortoise have the potential to occur within the proposed impact areas. You listed the gopher tortoise as a candidate species, however it is state listed now, but in the future could become a candidate species. You determined field surveys would not be required for the Kirtland's Warbler, Bald Eagle, Bachman's warbler, Altamaha spinymussel, and hairy rattleweed since habitat was lacking in the proposed acquisition impact areas. We have reviewed this information and agree with your species list and proposed method of surveys for the eastern indigo snake, wood stork, and gopher tortoise. The survey methodology for the striped newt and frosted flatwoods salamander was concurred on in a previous letter (FWS Log # 2011-TA-0227).

We appreciate the opportunity to comment during the planning stages of your project. If you have any questions, please write or call staff biologist, Robert Brooks, of our Coastal Georgia Sub Office at 912-832-8739, extension 107.

Sincerely,

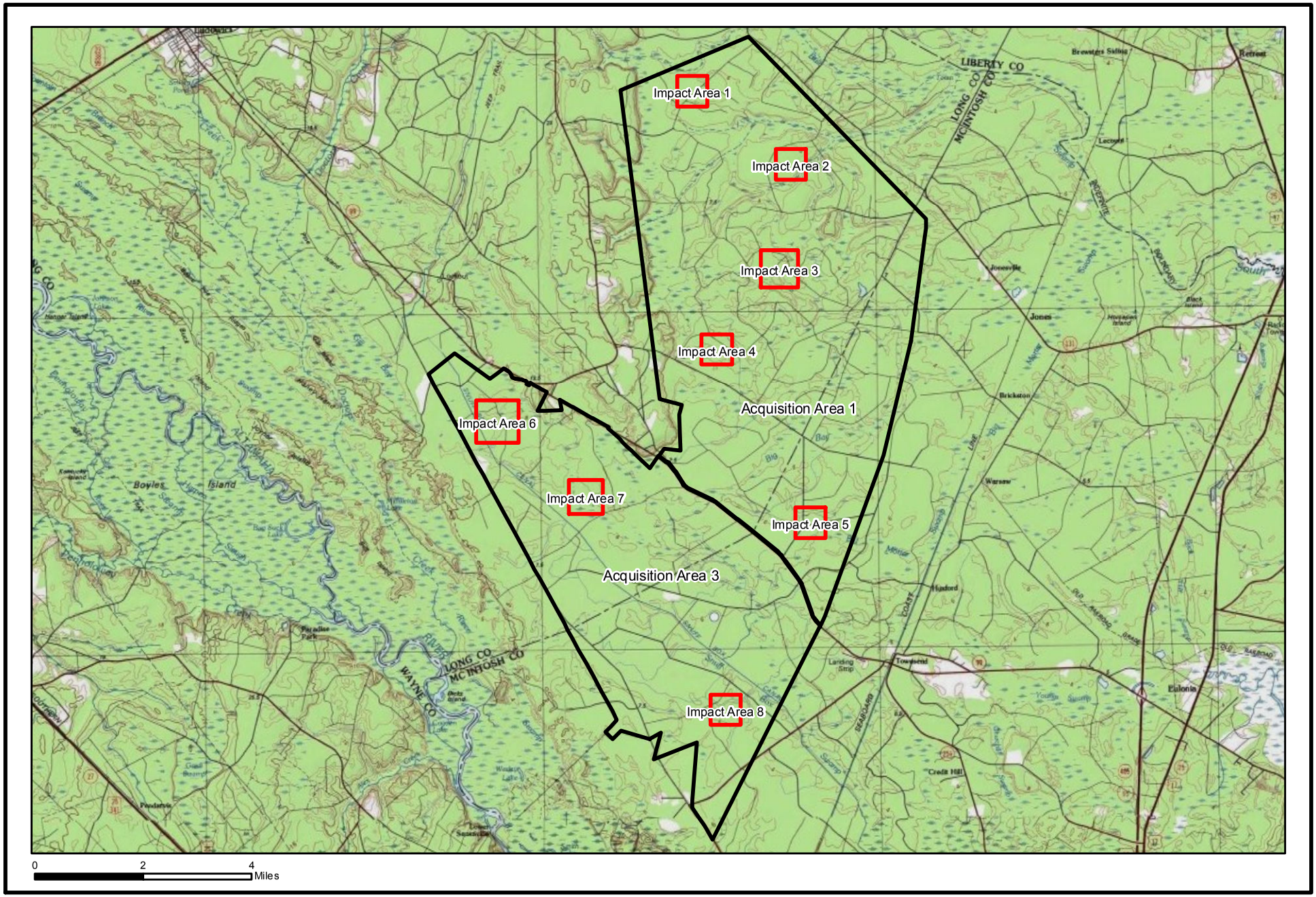
Grant Colwell

Sandra S. Tucker for
Field Supervisor

Attachment B

Figures

Path: W:\2846_Townsend\MXD\T&E_Summary_Spring2011\Fig1-1_Target_Impact_Areas.mxd



Target Impact Area

Acquisition Area

Source: USGS US Topo Maps online, 2011

Figure 1-1
Target Impact Areas
Townsend Bombing Range
Long County, Georgia

Picture

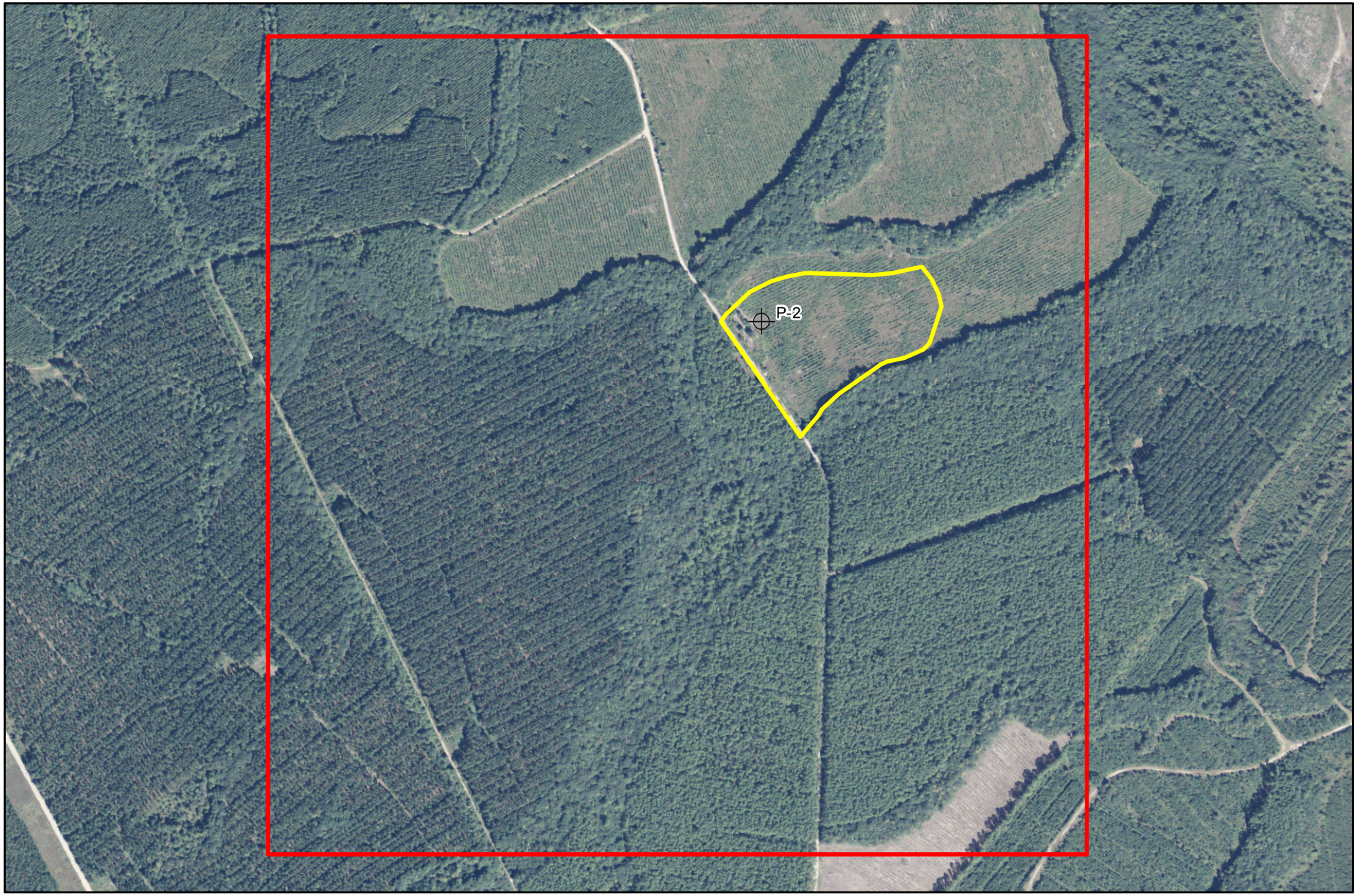
Suitable Habitat Eastern Indigo Snake/Gopher Tortoise

Target Impact Area

Source: USDA, 2010

Figure 1-2
Suitable Habitat Eastern Indigo Snake/Gopher Tortoise
Target Impact Area 3
Townsend Bombing Range
Long County, Georgia

Path: W:\2846_Townsend\MXD\T&E_Summary_Spring2011\Fig1-3_Impact_Area6_suitable_habitat.mxd



Picture

Suitable Habitat Eastern Indigo Snake/Gopher Tortoise

Target Impact Area

Source: USDA, 2010

Figure 1-3
Suitable Habitat Eastern Indigo Snake/Gopher Tortoise
Target Impact Area 6
Townsend Bombing Range
Long County, Georgia

Picture

Source: USDA, 2010

Figure 1-4
Observed Gopher Tortoise Burrows and Habitat
Acquisition Area 1
Townsend Bombing Range
Long County, Georgia

Attachment C

Photographic Log

Photographic Log

Photo 1: 1.8-acre sandy upland area located within Target Impact Area 3, illustrating suitable habitat for eastern indigo snake and gopher tortoise.

Photo 2: 12.8-acre sandy upland area located within Target Impact Area 6, illustrating suitable habitat for eastern indigo snake and gopher tortoise.

Photo 3: Area identified in the desktop analysis as potential gopher tortoise habitat based on soil drainage characteristics within Target Impact Area 1. In-field verification determined area to be unsuitable habitat for gopher tortoises.

Photo-4: Area identified in the desktop analysis as potential gopher tortoise habitat based on soil drainage characteristics within Target Impact Area 2. In-field verification determined area to be unsuitable habitat for gopher tortoises.

Photo 5: Area identified in the desktop analysis as potential gopher tortoise habitat based on soil drainage characteristics within Target Impact Area 2. In-field verification determined area to be unsuitable habitat for gopher tortoises.

Photo 6: Area identified in the desktop analysis as potential gopher tortoise habitat based on soil drainage characteristics within Target Impact Area 4. In-field verification determined area to be unsuitable habitat for gopher tortoises.

Photo 7: Gopher tortoise burrow observed adjacent to New Road.

Photo 8: Ephemeral wetland located within Target Impact Area 1. Area determined to be unsuitable habitat for flatwoods salamander.

Photo 9: Large emergent wetland with standing water in rutted areas within Target Impact Area 3. Area determined to be unsuitable habitat for flatwoods salamander.

Photo 10: Small ephemeral ponds located within old road bed within Target Impact Area 7. Area determined to be unsuitable habitat for flatwoods salamander.

Photo 11: Small ephemeral pond adjacent to forested wetland within Target Impact Area 6. Area determined unsuitable habitat for flatwoods salamander.

Photo 12: Small ephemeral pond within drainage ditch within Target Impact Area 8. Area determined unsuitable habitat for flatwoods salamander.

Attachment D

References

References

Drawdy, W., 2011. Personal communication. United States Marine Corps (USMC). Letter re: Proposed Survey Methodology for Eastern Indigo Snake, Gopher Tortoise, Wood Stork, Corkwood, and Dwarf Witch-Alder for the Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia, dated February 28, 2011, to Robert Brooks, United States Fish and Wildlife Service, Coastal Ecological Services Field Office, Townsend, Georgia.

Georgia Department of Natural Resources (GADNR). 2010. Coastal Mapping Project. Data provided by Jacob Thompson and Matt Elliott, January 2011. GADNR Wildlife Division, Nongame Conservation Section.

Natural Resources Conservation Service (NRCS). 2002. Soil Survey Geographic (SSURGO) database for Liberty and Long Counties, Georgia. Online at http://SoilDataMart.nrcs.usda.gov/

_____. 2007. Soil Survey Geographic (SSURGO) database for McIntosh County, Georgia. Online at http://SoilDataMart.nrcs.usda.gov/

Powell, B. 2010. Personal communication. Ecology and Environment, Inc. Letter re: Proposed Use of Habitat-Based Flatwoods Salamander and Striped Newt Survey Methodology for the Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia, dated December 17, 2010, to Robert Brooks, United States Fish and Wildlife Service, Coastal Ecological Services Field Office, Townsend, Georgia.

Tucker, S. 2011a. Personal communication. Field Supervisor, United States Fish and Wildlife Service, Letter re: FWS Log # 2011-TA-02227 (Survey Methods Concurrence Letter), dated February 3, 2011, to Brenda A. Powell, Ecology and Environment, Inc., Tallahassee, Florida.

Tucker, S. 2011b. Personal communication. Field Supervisor, United States Fish and Wildlife Service, Letter re: FWS Log # 2011-0042 (Survey Methods Concurrence), dated April 1, 2011, to W.A. Drawdy, United States Marine Corps, Beaufort, South Carolina.

United States Department of Agriculture (USDA). 2009. National Agricultural Inventory Project (NAIP). 1 meter resolution Infrared Aerial Imagery.

_____. 2010. National Agricultural Inventory Project (NAIP). 1 meter resolution True Color Aerial Imagery.

United States Fish and Wildlife Service (USFWS). 1986. Revised Recovery Plan for the U.S. Breeding Population of the Wood Stork.

_____. 2010. National Wetland Inventory (NWI) State-wide Database for Georgia. Online at http://www.fws.gov/wetlands/Data/DataDownload.html.

Appendix G
Threatened and Endangered Species

Appendix G.1
U.S. Fish and Wildlife Service

Determination of Effects

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UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
BEAUFORT, SOUTH CAROLINA 29904-5001

IN REPLY REFER TO
5090
NREAO/164
2 AUG 2011

Mr. Robert Brooks
United States Fish and Wildlife Service
Coastal Ecological Services Field Office
4980 Wildlife Drive NE
Townsend, Georgia 31331

Re: Determination of effects on threatened and endangered species for the *Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia*.

Dear Mr. Brooks

The Marine Corps Air Station (MCAS) Beaufort has analyzed potential biological impacts associated with the modernization and expansion of Townsend Bombing Range, Georgia (TBR). This analysis is based upon literature review, conversations and correspondences with USFWS, and on-the-ground surveys of areas expected to be directly affected by the action.

The species considered in the analysis include the Eastern indigo snake, gopher tortoise (a candidate for listing), frosted flatwoods salamander, striped newt (a candidate for listing), wood stork, Kirtland's warbler, Bachman's warbler, bald eagle (protected under the Bald and Golden Eagle Protection Act), Altamaha spinymussel (proposed for listing as endangered), and hairy rattleweed.

Biological surveys were conducted using methodologies detailed in letters from Brenda Powell of Ecology and Environment, Inc. (E & E) to the USFWS dated 17 December 2010, and from Mr. William Drawdy of the USMC dated 28 February 2011. The survey methodologies were subsequently approved by the USFWS in letters dated 3 February and 1 April 2011, respectively. During reconnaissance of the proposed action area on 9 - 11 February 2011, the USMC and E & E determined that suitable habitat for the Bachman's warbler, Kirtland's warbler, bald eagle, Altamaha spinymussel, and hairy rattleweed did not occur. Based upon the lack of suitable habitat for these species, no field assessments for them were proposed. The USFWS concurred with this decision in a letter dated 1 April 2011.

E & E conducted biological surveys for the eastern indigo snake, flatwoods salamander, striped newt, wood stork, and gopher tortoise in the proposed impact areas between 28 March and 6 April 2011. Survey findings were provided to the USFWS in a letter dated 2 May 2011. Suitable habitat was identified for the Eastern indigo snake and gopher tortoise at impact areas 3 and 6, but neither species and no gopher tortoise burrows were found in those habitats. No suitable habitat or breeding ponds were observed within the impact areas for the frosted flatwoods salamander or striped newt. No wood storks were observed but, due to the project's proximity to a known wood stork rookery, wetland habitats within proposed impact areas 1,2,3,4,6, and 7 may be utilized as foraging habitat for wood storks.

The United States Marine Corps (USMC) has determined that the proposed action may affect but is not likely to adversely affect the Eastern indigo snake, gopher tortoise, and wood stork, and that it will not affect the other species addressed in this biological evaluation. No critical habitat is present in the proposed action area.

Table 1. Determination Summary for Species of Concern that Potentially Occur in the Proposed Action Area.

Species	Summary of Effects
Eastern Indigo Snake	May affect, not likely to adversely affect
Gopher Tortoise	May affect, not likely to adversely affect
Flatwoods Salamander	No effect
Striped Newt	No effect
Wood Stork	May affect, not likely to adversely affect
Kirtland's Warbler	No effect
Bachman's Warbler	No effect
Bald Eagle	No effect
Altamaha Spinymussel	No effect
Hairy Rattle Weed	No effect

We look forward to your timely review of these determinations, and request your concurrence that the proposed action may affect, but is not likely to adversely affect listed species under your

jurisdiction. My point of contact is Mr. Jered Jackson, who can be reached at (904) 542-6308 or via email at jered.jackson@navy.mil.

Sincerely,

WILLIAM A. DRAWDY
Natural Resources and
Environmental Affairs Officer

Attachments

cc: John Conway, NAVFAC SE
Jered Jackson, NAVFAC SE
Brenda Powell, E & E
Jonathan Oravetz, E & E

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United States Department of the Interior

Fish and Wildlife Service
105 West Park Drive, Suite D
Athens, Georgia 30606
Phone: (706) 613-9493
Fax: (706) 613-6059

West Georgia Sub-Office
Post Office Box 52560
Fort Benning, Georgia 31995-2560
Phone: (706) 544-6428
Fax: (706) 544-6419

Coastal Sub-Office
4980 Wildlife Drive
Townsend, Georgia 31331
Phone: (912) 832-8739
Fax: (912) 832-8744

September 22, 2011

Mr. W. A. Drawdy
U. S. Marine Corps
Marine Corps Air Station
Beaufort, South Carolina 29904-5001

Re: USFWS File Number 2011-I-0969

Dear Mr. Drawdy:

Thank you for your August 2, 2011, letter regarding the modernization and expansion of Townsend Bombing Range, in McIntosh County, Georgia. We have reviewed the information you provided and submit the following comments under provisions of the Endangered Species Act of 1973 (Act) as amended (16 U.S.C. 1531 et seq.).

According to the information you provided, the federally threatened eastern indigo snake, the federally endangered wood stork, and the gopher tortoise, a federal candidate species, have the potential to occur within the proposed expansion area, but were not found on the proposed impact areas. Therefore, we agree with your determination that this proposed project is not likely to adversely affect any federally listed endangered or threatened species. Also, we believe that the requirements of section 7 of the Endangered Species Act have been satisfied and no further consultation is required. However, obligations under section 7 of the Act must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner which was not considered in this assessment; or (3) a new species is listed or critical habitat determined that may be affected by the identified action.

We appreciate the opportunity to comment during the planning stages of your project. If you have any questions, please contact staff biologist, Robert Brooks, of our Coastal Georgia Sub-Office at 912-832-8739, extension 107.

Sincerely,

Strant Colwell

Sandra S. Tucker for
Field Supervisor

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Appendix G
Threatened and Endangered Species

Appendix G.2
Georgia Department of Natural Resources

Survey Methodology

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UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
BEAUFORT, SOUTH CAROLINA 29904-5001

IN REPLY REFER TO
5090
NREAO/057
28 FEB 2011

Matt Elliott
Program Manager
Georgia Department of Natural Resources
Wildlife Resources Division
Nongame Conservation Section
2065 US Hwy 278, SE
Social Circle, GA 30025

Re: Proposed Survey Methodology for Eastern Indigo Snake, Gopher Tortoise, Wood Stork, Corkwood, and Dwarf Witch-alder for the Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia

Dear Mr. Elliott:

During the informal consultation meeting conducted among personnel from the Georgia Department of Natural Resources (GaDNR), Marine Corps Air Station Beaufort (MCAS Beaufort), Naval Facilities Engineering Command Southeast (NAVFAC SE), and Ecology and Environment, Inc. (E & E) on December 1, 2010, we discussed a preliminary list of state-protected species potentially affected by the modernization and expansion of Townsend Bombing Range (TBR), Georgia.

The preliminary list of 16 state-listed threatened or endangered species discussed during the meeting was developed based upon our review of the GaDNR species lists for Long and McIntosh Counties, Georgia, and was originally provided in tabular format in the *Desktop Analysis of Biological and Environmental Variables for the Environmental Impact Statement* (EIS) *for the Modernization and Expansion of Townsend Bombing Range, Georgia*, dated November 2010 (2010 Desktop Analysis). The table from the 2010 Desktop Analysis is provided below, but includes minor revisions including an updated federal status for the Altamaha spinymussel (*Elliptio spinosa*) as potentially endangered based on comments from the United States Fish and Wildlife Service (USFWS), Coastal Ecological Services Field Office, during a meeting on November 30, 2010.

In continuation with the preparation of the EIS, we have received and reviewed the results of the GaDNR's Coastal Resource Mapping Project completed in 2010 which delineates

vegetative habitats found in Long and McIntosh Counties, Georgia. In addition, we performed a site reconnaissance on February 9 through 11, 2011, to preliminarily ground-truth aerial signatures identified in the 2010 Desktop Analysis and cross-check the habitats identified in the GaDNR Coastal Resource Mapping Project. Lastly, we have reviewed literature regarding life histories, biology, and habitat utilization of the 16 species identified in the table below. Based upon the preliminary habitats identified during the site reconnaissance and our literature review, we have determined that the following state-listed species have the potential to occur within the proposed impact areas and therefore may require field surveys to determine the presence of these species: threatened eastern indigo snake (*Drymarchon corais couperi*), threatened gopher tortoise (*Gopherus polyphemus*), endangered wood stork (*Mycteria Americana*), threatened corkwood (*Leitneria floridana*), threatened dwarf witch-alder (*Fothergilla gardenia*), and threatened frosted flatwoods salamander (*Ambystoma cingulatum*) Proposed survey methodologies for these species are described in Section 1.0.

To date, we have received concurrence from the USFWS to utilize habitat-based surveys methodologies for the flatwoods salamander and striped newt as opposed to using dip net or drift net surveys. The methodology and concurrence letter are provided in Appendix A.

State Protected Species Potentially Occurring in Long and McIntosh Counties, Georgia

Scientific Name	Common Name	Federal Listing	State Listing
	AMPHIBIANS		
Drymarchon corais couperi	Eastern Indigo Snake	T	T
Ambystoma cingulatum	Frosted Flatwoods Salamander	T	T
Gopherus polyphemus	Gopher Tortoise	C	T
	BIRDS		
Haliaeetus leucocephalus	Bald Eagle	.	T
Mycteria americana	Wood Stork	E	E
	MOLLUSKS		
Elliptio spinosa	Altamaha Spinymussel	PE	E
Elliptio arctata	Delicate Spike	.	E
Toxolasma pullus	Savannah Lilliput	.	T
	FISH		
Acipenser brevirostrum	Shortnose Sturgeon	E	E

PLANTS			
Leitneria floridana	Corkwood	.	T
Fothergilla gardenii	Dwarf Witch-adler	.	T
Elliottia racemosa	Georgia Plume	.	T
Pteroglossaspis eristata	Giant Orchid	.	T
Baptista arachnifera	Hairy Rattle weed	E	E
Dicerandra radfordiana	Radford's Mint	.	E
Sageretia minutiflora	Tiny-leaf Buckthorn	.	T

C - Candidate Species; E - Endangered; PE- Proposed Endangered; T - Threatened

Upon review of the same sources listed above, we also have determined that suitable habitats for the following state-list species are unlikely to occur within the proposed impact areas: endangered Kirtland's warbler (*Dendroica kirtlandii*), threatened bald eagle (*Haliaeetus leucocephalus*), threatened Georgia plume (*Elliottia racemosa*), threatened giant orchid (*Pteroglossapis eristata*), endangered hairy rattle weed (*Baptista arachnifera*), endangered Radford's mint (*Dicerandra radfordiana*), threatened tiny-leaf buckthorn (*Sageretia minutiflora*), threatened Savannah lilliput (*Toxolasma pullus*), endangered delicate spike (*Elliptio arctata*), and endangered short-nose sturgeon (*Acipenser brevirostrum*). Based upon the lack of suitable habitat for these species, no further field assessments for these species are proposed. Further rationale for this determination is described in Section 2.0. A list of references used to make these determinations is provided in Appendix B.

We request that the GaDNR review and provide concurrence with the following proposed survey methodologies for the eastern indigo snake, gopher tortoise, wood stork, corkwood, dwarf witch-alder, and frosted flatwoods salamader. We also are requesting concurrence with the rationale for conducting no field surveys for Kirkland's warbler, bald eagle, Georgia plume, giant orchid, hairy rattle weed, Radford's mint, tiny-leaf buckthorn, Savannah lilliput, delicate spike, and short-nose sturgeon.

1.0 Proposed Survey Methodology

We propose to conduct a more thorough site review of proposed impact areas to determine if sufficient habitat exists within the areas to support the eastern indigo snake, gopher tortoise, wood stork, corkwood, dwarf witch-alder, and flatwoods salamander. Follow-up field assessments will be made to confirm the presence or absence or these species and

determine if these species have the potential to utilize habitats within the proposed target area if it is found that sufficient habitat exists to support said species.

Eastern Indigo Snake

Habitat Requirements

Eastern indigo snakes use a variety of habitats that include pine flatwoods, scrubby flatwoods, high pine, dry prairie, hardwood hammocks, edges of freshwater wetlands, agricultural land, coastal dunes, and disturbed areas. Eastern indigo snakes are often associated with gopher tortoise burrows, where they seek shelter from thermal stress and lay eggs. In areas lacking tortoise burrows, decayed stumps and logs are important habitat features for cover. Indigo snakes eat a variety of small mammals and herpetofauna, including eastern diamondback rattlesnakes and gopher tortoise hatchlings. In Georgia, the eastern indigo snake is most often associated with sand ridge habitats which often occur along major coastal plain streams (Speake, Diemer, and McGlincy 1981).

The Georgia Ecological Services Field Office of the USFWS maintains a GIS database of Threatened and Endangered Species Ranges in Georgia. This database indicates that the entirety of Acquisition Areas 1 and 3 is a "Possible Range" for indigo snakes. The database also indicates that "known occurrences" of eastern indigo snakes have been documented within Acquisition Areas 1 and 3. Based upon known occurrence data, an occurrence of indigo snake was documented within the proposed 400-acre Airfield Target Area.

Preliminary Site Review

We will review high-resolution aerial imagery and Natural Resource Conservation Service (NRCS) soil data to identify potential suitable habitat for the eastern indigo snake. Suitable habitat features are: sand ridges, scrubby pine flatwoods, and open upland environments adjacent to freshwater wetlands. Positive indicators for these habitats will be the presence of gopher tortoise burrows. In addition, soil survey data that indicate sandy soils within or adjacent to suitable habitat will be considered a positive indicator.

The NRCS soil data contain soil drainage characteristics. For areas within the proposed impact areas, drainage characteristics are classified as: moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. Since indigo snakes utilize sandy environments with supporting wetland environments, we assume that areas with poorly drained or very poorly drained soils will not provide

the necessary upland habitat to support indigo snakes. For survey purposes, those areas identified within impact areas with moderately well drained or somewhat poorly drained soils will be examined to determine if significant habitat exist to support indigo snake populations.

Areas of suitable habitat as defined above will be mapped using GIS and will be cross-referenced to known occurrences of eastern indigo snakes from the USFWS Georgia Ecological Services Field Office GIS database of Threatened and Endangered Species Ranges in Georgia. Distances from each area of suitable habitat to the nearest known occurrences of eastern indigo snake will be documented.

Field Assessment

We will conduct follow-up surveys in areas of suitable habitat to determine if the habitat is likely to support eastern indigo snakes. These surveys will assess the potential habitat and include a survey for the presence of gopher tortoise burrows. A detailed habitat description of survey areas, as well as photographs of suitable habitat, will be completed. Upon completion of the field assessment, a summary report of survey findings will be provided to GaDNR staff.

Gopher Tortoise

Habitat Requirements

Gopher tortoises are common in most types of upland communities with open canopies. They are commonly found in habitats such as sandhill, pine flatwoods, scrub, scrubby flatwoods, dry prairies, xeric hammock, pine-mixed hardwoods, and coastal dunes. Gopher tortoises construct burrows in sandy soils. The gopher tortoise resides in these burrows which protect them from other species and extreme heat. These burrows also provide similar protection for over 350 other commensal species. Key species known to occupy gopher tortoise burrows include the eastern indigo snake, eastern diamondback rattlesnake, and gopher frogs (Florida Freshwater Fish and Wildlife Conservation Commission [FWC] 2010a and 2010b).

Preliminary Site Review

We will review high-resolution aerial imagery and NRCS soil data to identify potential suitable habitat for the gopher tortoise. Suitable habitat features are: sand ridges, scrubby pine flatwoods, dry prairies, xeric hammocks, and open upland environments with sandy soils. Positive indicators for these habitats will be the presence of sandy soils as indicated from soil survey data.

The NRCS soil data contain soil drainage characteristics. For areas within the proposed impact areas, drainage characteristics are classified as: moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. Since gopher tortoises utilize sandy environments with low groundwater elevations, we assume that areas with poorly drained or very poorly drained soils will not support gopher tortoises. For survey purposes, those areas identified within impact areas with moderately well drained or somewhat poorly drained soils will be examined to determine if significant habitat exist to support gopher tortoise populations.

Field Assessment

We will conduct follow-up surveys in areas of suitable habitat to determine if the habitat is currently utilized by gopher tortoises. Canopy and herbaceous cover percentage will be documented for upland habitats identified in the preliminary site review to determine if adequate vegetation exists to support gopher tortoises. Acceptable habitat features will be defined as a canopy cover of less than 60%, with an herbaceous cover of at least 30% (FWC 2009). If acceptable canopy and herbaceous cover percentage exist, pedestrian transects within suitable habitat will be conducted to identify gopher tortoise burrows. Existing burrows will be classified as active or abandoned and marked by Global Positioning System (GPS). A detailed habitat description of survey areas, as well as photographs of existing burrows, will be completed. Upon completion of the field assessment, a summary report of survey findings will be provided to GaDNR staff.

Wood Stork

Habitat Requirements

The wood stork is a colonial bird that nests in large rookeries often constructed in cypress (*Taxodium distichum*), black gum (*Nyssa sylvatica var. biflora*) and southern willow (*Salix carolina*). Wood storks utilize the same nesting colonies from year to year as long as they remain undisturbed (USFWS 1986). They feed in flocks on small fish, crustaceans, amphibians, reptiles, and arthropods found within freshwater marshes, flooded roadside and agricultural ditches, and depressions in cypress heads, swamp sloughs, tidal creeks and pools, and estuaries. The wood stork is known to travel long distances (up to 80 miles) in search of feeding areas. Past research on Georgia wood stork colonies has found that foraging occurs 80% of the time within a 12-mile radius (USFWS 1986).

The USFWS Georgia Ecological Services Field Office GIS database of Threatened and Endangered Species Ranges in Georgia indicates a known wood stork rookery located 9 miles northwest of proposed Acquisition Area 3. During the meeting with the USFWS on November 30, 2010, and a subsequent meeting with GaDNR on December 1, 2010, both agencies confirmed that no wood stork rookeries occur within proposed Acquisition Areas 1 or 3. However, due to the project's proximity to the known rookery and the ability of wood storks to travel long distances for foraging, wetland habitats within the proposed impact areas may be utilized as foraging habitat for wood storks.

Preliminary Site Review

During the preliminary site reconnaissance conducted on February 9 and 10, 2011, we confirmed that potential foraging habitat exist within the proposed impact areas. These habitats include swamp sloughs, forested depressions, and roadside and agricultural ditches. No individual sightings of wood storks were observed during the sight reconnaissance.

Proposed Survey Methods

Based upon preliminary site review findings noted above, we determined that appropriate foraging habitat exists within the proposed impact areas and wood storks may utilize these wetland habitats for foraging. While conducting field assessments for other protected species or wetland delineations for the project, we will document any observed sightings of this species and report these sightings in the EIS. No follow-up field surveys are proposed for this species as impacts to wetland habitats, and thus wood stork foraging habitat, will be quantified and further examined in the EIS.

Corkwood

Habitat Requirements

Corkwood is found in shaded marshes accompanied with red maple, cypress, and tupelo and prefers moist poorly drained soils. Corkwood forms a large multi-stemmed colony varying from 5 to 25 feet in height and spread. Flowering occurs in late spring (Patrick, Allison, and Krakow 1995). During the December 1, 2010 meeting, staff from GaDNR provided feedback on state-listed species that are likely to occur within the project site. During this discussion, corkwood was not mentioned by GaDNR staff as likely to occur within the project site.

Preliminary Site Review

The preliminary site recognizance effort conducted on February 9 and 10, 2011, confirmed that portions of the proposed impact areas contain low wetland environments dominated by red maple, cypress, and tupelo.

Proposed Survey Methods
Areas within the proposed impact areas which contain low wetland environments dominated by red maple, cypress, and tupelo will be surveyed using pedestrian transects during the spring/summer of 2011.

Dwarf Witch-alder

Habitat Requirements
Dwarf witch-alder is a deciduous shrub that is found in flat, low lying swampy areas particularly in the shrub dominated margins of upland swamps, Carolina bays, and wet savannas. The flowering period is from March to April, and fruiting occurs between August and October (Patrick, Allison, and Krakow 1995). During the December 1, 2010 meeting, staff from GaDNR provided feedback on state-listed species that are likely to occur within the project site. During this discussion, dwarf witch-alder was not mentioned by GaDNR staff as likely to occur within the project site.

Preliminary Site Review
As confirmed during the preliminary site recognizance effort conducted on February 9 and 10, 2011, the proposed acquisition area is currently managed for silviculture operations and is composed primarily of dense planted pine stands, recently cleared pine stands, and forested wetlands. Most wetland areas lack a transitional environment between wetland and upland areas and therefore the presence of dwarf witch-alder is unlikely. However, on the margins of swamps and bays, transitional shrub areas may exist.

Proposed Survey Methods
Survey efforts for this species will focus on the identified margins of swamps and bays where transitional shrub areas may exist. Surveys will be conducted using pedestrian transects during the March-April flowering period to aid in identification.

Flatwoods Salamander

During the meeting on November 30, 2010, the USFWS expressed concern with ability to conduct of dip net surveys for flatwoods salamanders in the winter of 2011 due to a lack of rainfall in the geographic area of Acquisition Areas 1 and 3.

On December 17, 2010, a survey methodology letter was provided to the USFWS proposing to utilize habitat-based survey methods for assessment of the flatwoods salamander. Details of the proposed habitat-based survey methodology and the USFWS concurrence letter dated February 3, 2011, are provided in Appendix A.

2.0 Rationale for Determination of Species Not Requiring Field Surveys

Our rationale for determining that field surveys will not be required for Kirtland's warbler, bald eagle, Altamaha spinymussel, delicate spike, Savannah lilliput, short-nose sturgeon, Atlantic sturgeon, Georgia plume, giant orchid, hairy rattle weed, Radford's mint, and tiny-leaf buckthorne is provided below.

Kirtland's Warbler

The Kirkland's warbler has one of the most restricted breeding ranges of any North American bird. It breeds in the open jack pine (*Pinus banksiana*) plains of central Michigan. The bird over-winters in the Bahamas with spring departures occurring in late April and early May and fall migrations between August and October (USFWS 1999). The primary migration route follows a narrow band through South Carolina, North Carolina, Virginia, West Virginia, and Ohio before reaching nesting grounds in Michigan (USFWS 1999). When warblers make their spring migration, the first quarter of the route is over water (Mayfield 1988). Some research has shown migration occurs without any stops or with limited stopovers (Mayfield 1988; USFWS 1999). These studies concluded that observations of warblers outside of the main migration route were likely strays, as a disproportionate number of documented observations occurred in Ohio and Michigan, the last quarter of the migratory route.

The Kirtland's warbler is potentially only present in the state of Georgia for a limited time during its migratory period. Because the primary migration route for Kirkland's warbler lies north and northeast of Georgia, and since research indicates they may migrate without stopovers and that warblers within the state of Georgia are likely stray birds, no field assessments for this species are proposed.

Bald Eagle

During the November 30 and December 1, 2010, meetings with the USFWS and GaDNR, respectively, both agencies confirmed that no

known bald eagle nests occur within the proposed project area. The proposed acquisition area is currently managed for silviculture operations and is composed primarily of dense planted pine stands, recently cleared pine stands, and forested wetlands. Bald eagles require tall, mature trees for nesting purposes. Due to clearing activities associated with active management of timber, trees are harvested well before they reach maturity. No suitable nesting habitat within the proposed impact areas exist for bald eagles, and therefore no detailed field assessments for this species are proposed. Visual observations of bald eagles or nests observed during other field activities will be provided to the USFWS and documented in the EIS.

Altamaha Spiny Mussel, Delicate Spike, Savannah Lilliput, and Short-nose Sturgeon

The Altamaha spinymussel, delicate spike, Savannah lilliput, and short-nose sturgeon utilize the Altamaha River. As discussed in the December 1, 2010 meeting, Acquisition Area 2, which is adjacent to the Altamaha River, has been removed from the project scope; therefore no direct or secondary impacts to the Altamaha River are anticipated and no field assessments for these species are proposed.

Georgia Plume

The Georgia plume is found in xeric environments including sand ridges and oak ridges. The flower period is from June to July (Patrick, Allison, and Krakow 1995). No portions of the proposed impact areas contain xeric habitats. During the December 1, 2010 meeting, GaDNR staff provided feedback about state-listed species likely to occur within the proposed acquisition area. During this discussion, Georgia plume was not mentioned by GaDNR staff as likely to occur within the area. Based on the preliminary site recognizance effort conducted on February 9 and 10, 2011, the results of the GaDNR Coastal Mapping Project and aerial photo-interpretation of 2010 true color aerials and 2009 infrared aerial photographs, no appropriate habitat for the Georgia plume exists within the proposed impact areas, and therefore no field assessments for this species are proposed.

Giant Orchid

The giant orchid is found in sandy environments including scrub oak and sand hills, as well as open pine flatwoods. The flowering period is from June to November (Florida Natural Areas Inventory 2000). No portions of the proposed impact

areas contain scrub oak or sand hill communities. The proposed impact areas are composed primarily of dense planted pine stands, recently cleared pine stands, and forested wetlands. Based upon preliminary field assessments conducted February 9 and 10, 2011, areas of recent pine clearing with successional pine development are typically hydric. A majority of soils within these areas are classified hydric by the NRCS and do not maintain ample soil permeability to support the giant orchid. During the December 1, 2010 meeting, staff from GaDNR provided feedback about state-listed species that are likely to occur within the proposed acquisition area. During this discussion, giant orchid was not mentioned by GaDNR staff as likely to occur within the area. No appropriate habitat for the giant orchid exists within the proposed impact areas, and therefore no field assessments for this species are proposed.

Hairy Rattle Weed

The hairy rattle weed inhabits shallow pools on Piedmont granite outcrops in full sunlight. It is known to occur in Brantley and Wayne Counties, Georgia. The USFWS stated in the November 30, 2010, meeting that is not likely that the required habitat for this species would be found within the proposed acquisition areas. Therefore, no field assessments for this species are proposed.

Radford's Mint

During the December 1, 2010, meeting, staff with GaDNR stated that Radford's mint is not likely to occur within the proposed acquisition area. Therefore, no field assessments for this species are proposed.

Tiny-leaf Buckthorne

The tiny-leaf buckthorne is found on calcareous rock bluffs, shell middens and evergreen hammocks along stream banks (Patrick, Allison, and Krakow 1995). No portions of the proposed impact areas contain appropriate habitat for tiny-leaf buckthorne. During the December 1, 2010, meeting, staff from GaDNR provided feedback on state-listed species likely to occur within the proposed acquisition area. During this discussion, tiny-leaf buckthorne was not mentioned by GaDNR staff as likely to occur within the proposed acquisition area. No appropriate habitat for the tiny-leaf buckthorne exists within the proposed impact areas, and therefore no field assessments for this species are proposed.

We respectfully request that GaDNR review the survey methodologies provided herein and provide concurrence within 30 days of receipt of this letter. Please contact Jered Jackson at 904-542-6308 or e-mail jered.jackson@navy.mil with any questions or concerns regarding this submittal or if you require any additional information to process this request.

Sincerely,

WILLIAM A. DRAWDY
Natural Resources and
Environmental Affairs Officer

cc: John Conway, NAVFAC SE
Jered Jackson, NAVFAC SE
Brenda Powell, Ecology and Environment, Inc.
Jonathan Oravetz, Ecology and Environment, Inc.

From: Katrina Morris [mailto:Katrina.Morris@dnr.state.ga.us]
Sent: Thursday, March 10, 2011 10:16
To: Jackson, Jered CIV NAVFAC SE
Subject: Proposed Survey Methodology Document

Mr. Jackson,

Thank you for the opportunity to review the Proposed Survey Methodology Document for the
Townsend Bombing Range Expansion. I have reviewed the document and feel that the

proposed methodology is adequate for the species that may be found on site.

If I can be of further assistance, please don't hesitate to contact me.

Sincerely,

Trina Morris

Trina Morris, Wildlife Biologist
Environmental Review Coordinator
Georgia Dept. of Natural Resources
Nongame Conservation Section
2065 U.S. Hwy. 278 S.E.
Social Circle, GA 30025-4743
Ph: 770-918-6411 or 706-557-3032
Fax: 706-557-3033
katrina.morris@dnr.state.ga.us
http://georgiawildlife.dnr.state.ga.us/

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Wild about wildlife? Sign up for Georgia Wild, DNR's free e-newsletter about all things
nongame, from animals to habitats. Click here to subscribe (or paste this link into your
browser): http://www.georgiawildlife.com/news/e-newsletters

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Appendix G
Threatened and Endangered Species

Appendix G.2
Georgia Department of Natural Resources

Survey Findings

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UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
BEAUFORT, SOUTH CAROLINA 29904-5001

IN REPLY REFER TO
5090
NREAO/105
2 MAY 2011

Matt Elliott
Program Manager
Georgia Department of Natural Resources
Wildlife Resources Division Nongame Conservation Section
2065 US Hwy 278, SE
Social Circle, GA 30025

Re: Survey Results for Eastern Indigo Snake, Gopher Tortoise, Flatwoods Salamander, Wood Stork, Corkwood and Dwarf Witch-Alder for the *Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia*

Dear Mr. Elliott:

For the purpose of preparing an *Environmental Impact Statement (EIS) for the Modernization and Expansion of Townsend Bombing Range, Georgia*, Ecology and Environment, Inc. (E & E) conducted biological surveys for selected federally and State-protected species potentially affected by the Proposed Action. This letter summarizes the findings of the surveys conducted for State-protected species, including the eastern indigo snake, gopher tortoise, flatwoods salamander, wood stork, corkwood, and dwarf witch-alder, which were conducted between 28 March and 6 April 2011.

These surveys were conducted using methodologies detailed in a letter from Mr. William Drawdy of the United States Marine Corps (USMC) to Mr. Matt Elliott of the Georgia Department of Natural Resources (GaDNR) dated 28 February 2011. The survey methodologies were approved by Ms. Katrina Morris of the GaDNR in an electronic mail to Mr. Jered Jackson of Naval Facilities Engineering Command Southeast (NAVFAC SE) on 10 March 2011. Under separate cover, the USMC coordinated with the United States Fish and Wildlife Service's (USFWS) Coastal Ecological Services Field Office to receive approval of survey methodologies for federally-protected species potentially affected by the Proposed Action. These items of correspondence are provided in Attachment A.

Prior to conducting onsite field surveys, a desktop analysis of habitats found in the eight Target Areas was conducted to identify potential habitat for each species. The location of

each Target Area is illustrated in Attachment B, on Figure 1-1. During the desktop analysis, the following data sets were reviewed:

- National Wetlands Inventory (NWI; USFWS 2010);
- Natural Resources Conservation Service (NRCS) soil surveys for Long and McIntosh Counties (NRCS 2002 and NRCS 2007, respectively);
- United States Department of Agriculture (USDA) National Agricultural Inventory Project (NAIP) 2010 True Color Aerial Imagery;
- USDA NAIP 2009 Infrared Aerial Imagery; and
- Ecological Community data from the GaDNR's Coastal Resource Mapping Project completed in 2010.

Areas identified as potential species habitat were downloaded onto sub-meter accurate Geographic Positioning System (GPS) units for subsequent in-field verification. The in-field findings for each species identified as requiring surveys are summarized below.

Eastern Indigo Snake (*Drymarchon corais couperi*)

Suitable habitat for the eastern indigo snake was defined as sand ridges, scrubby pine flatwoods, and open upland environments adjacent to freshwater wetlands (Drawdy 2011). A positive indicator for these habitats was the presence of gopher tortoise burrows.

Field surveys identified two areas considered suitable habitat for the eastern indigo snake. The first area consists of a 1.8-acre open canopy upland habitat located within Target Area 3 (see Attachment B, Figure 1-2). This upland area was adjacent to recently harvested emergent wetlands to the east. The NRCS classified soils within this area as Bladen Fine Sandy Loam, defined as hydric, poorly drained soils. Field surveys determined that this small upland area had coarse sandy soils supporting loblolly pine (*Pinus taeda*), saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), broom sedge (*Andropogon* sp.), and shiny blueberry (*Vaccinium myrsinites*) (see Attachment C, Photo 1). The area was surveyed using pedestrian transects for the presence of gopher tortoise burrows; however, no burrows or eastern indigo snakes were observed in the field.

The second area with suitable eastern indigo snake habitat was identified within Target Area 6 (see Attachment B, Figure 1-3). The USFWS Georgia Ecological Services Field Offices

maintains a GIS database of threatened and endangered species ranges in Georgia. This database indicates that a known occurrence of indigo snake was documented within the vicinity of Target Area 6. Field surveys located a 12.8-acre sandy upland area of planted immature loblolly pines on the east side of an existing access road and adjacent to mature forested wetland areas (see Attachment B, Figure 1-3). The NRCS classified soils within this area as Mascotte Fine Sand, defined as partially hydric, poorly drained soils. Vegetation in this area included loblolly pine, saw palmetto, gallberry, broom sedge, winged sumac (*Rhus copallinum*), and shiny blueberry (see Attachment C, Photo 2). The area was surveyed using pedestrian transects for the presence of gopher tortoise burrows; however, no burrows or eastern indigo snakes were observed in the field.

The remainder of the Target Areas consisted of densely planted stands of loblolly pine with low species diversity. The majority of these areas contain poorly drained soils that do not meet suitable habitat requirements for the eastern indigo snake.

Gopher Tortoise (*Gopherus polyphemus*)

Suitable habitat for gopher tortoise was defined as sand ridges, scrubby pine flatwoods, dry prairies, xeric hammocks, and open upland environments with sandy soils (Drawdy 2011). Acceptable habitat features were defined as a canopy cover of less than 60%, with an herbaceous cover of at least 30% (Drawdy 2011). The presence of sandy soils as indicated from soil survey data was a positive indicator for these habitats. Those areas, with soils drainage patterns defined by NRCS as moderately well-drained or somewhat poorly drained soils, were identified during the desktop analysis as potential gopher tortoise habitat and were loaded into GPS units.

Potential gopher tortoise habitat that was identified during the desktop analysis was surveyed to determine if suitable habitat exists. Onsite field surveys located two areas that would be considered suitable habitat for gopher tortoises. These are the same area identified above as suitable eastern indigo snake habitat located within Target Areas 3 and 6 (see Attachment B, Figures 1-2 and 1-3). Both areas were surveyed using pedestrian transects for the presence of gopher tortoise burrows; however, no burrows were observed.

Additional areas that were identified as potential gopher tortoise habitat during the desktop analysis consisted of densely planted stands of loblolly pine with canopy cover

greater than 60% and herbaceous cover less than 30%. Photographs of representative planted pine habitats are attached (see Attachment C, Photos 3 through 6). These areas did not meet the definition of suitable gopher tortoise habitat.

Numerous active gopher tortoise burrows were observed along New Road near the intersection of GC&P Road (see Attachment C, Photo 7). This area consists of an open, sandy xeric environment that has been replanted with longleaf pine. Multiple gopher tortoise burrows were located within 200 feet of the road. This area was not extensively surveyed for gopher tortoise burrows as it occurs outside of the defined Target Areas (see Attachment B, Figure 1-4).

Flatwoods Salamander (*Ambystoma cingulatum*)

Suitable habitat for flatwoods salamander was defined as isolated ephemeral or depressional wetlands or ephemeral ponds with the absence of deep water, a treeless ecotone, and adjacency to open pine savannas or pine flatwoods (Drawdy 2011, Powell 2010).

To identify potential breeding ponds and suitable habitat for flatwoods salamander, pedestrian transects where conducted at 50- to 100-foot intervals throughout all areas classified as wetland habitats identified by the NWI maps (USFWS 2010).

Isolated ephemeral ponds were located within Target Areas 1, 3, 6, 7, and 8 (see Attachment C, Photos 8 through 12). No salamanders were observed under leaf debris in any of these ponds. The ponds located within Target Area 6 (see Attachment C, Photo 11) and Target Area 7 (see Attachment C, Photo 10), supported some amphibian species, including tadpoles and frogs. However, none of the ponds in any of the Target Areas met suitable habitat requirements as they did not have treeless ecotones or not were supported by appropriate upland habitats including open pine savannahs or pine flatwoods.

Wood Stork (*Mycteria Americana*)

The USFWS Georgia Ecological Services Field Offices GIS database of threatened and endangered species ranges in Georgia indicates a known wood stork rookery 9 miles northwest of proposed Acquisition Area 1 (illustrated on Figure 1-1 in Attachment B). No additional wood stork rookeries are known to occur in the study area. Past research on Georgia wood stork colonies has found that foraging occurs 80% of the time within a 12-mile radius (USFWS 1986). Target Areas 1, 2, 3, 4, 6, and

7 are within 12 miles of the rookery located to the northwest of Acquisition Area 1. Due to the project's proximity to the known rookery outside of the Acquisition Area, and the ability of wood storks to travel long distances for foraging, all wetland habitats within these Target Areas are presumed to be utilized as foraging habitat for wood storks.

No wood storks were observed foraging in onsite wetlands during the survey timeframe of 28 March through 6 April 2011. However, surveys were conducted early in the spring migration period and it is likely wood storks had not reached coastal Georgia during the survey period. As stated in the 28 February 2011 survey methodology letter sent to your agency (see Attachment A), no follow-up field surveys are proposed for this species. They are presumed to utilize the wetlands located within Target Areas 1, 2, 3, 4, 6, and 7 for foraging, so impacts to wetland habitats, and thus wood stork foraging habitat, will be quantified and further examined in the EIS.

Corkwood (*Duboisia myoporoides*) and Dwarf Witch-Alder (*Fothergilla gardenia*)

Suitable habitat for corkwood was defined as wetland environments dominated by red maple, cypress, and black gum (Drawdy, February 2011). Suitable habitat for dwarf witch-alder was defined as transitional shrub areas along the margins of swamps and bays (Drawdy 2011). Prior to conducting field surveys, linear transects were digitized in GIS through all areas identified as wetlands based on the NWI maps. These transects were uploaded on sub-meter accurate GPS units for field reference during surveys.

Pedestrian transects where conducted at 50-to-100-foot intervals throughout all areas identified as wetland habitats to survey for corkwood and dwarf witch-alder. Most wetland systems surveyed contained some portions of suitable habitat for corkwood and dwarf witch-alder. However, within the Target Areas, no specimens were observed.

Other Observed Wildlife and Plants

Observations of non-threatened and endangered species were recorded in field notes and were GPS located. Several pitcher plants (*Sarracenia* sp.) were observed within wetland environments at Target Areas 1, 5, and 7. The hooded pitcher plant (*Sarracenia minor)* is State-listed as unusual. A summary of non-protected species observed during the field surveys is provided in Table 1.

Table 1 **Non-Protected Wildlife and Plants Observed During Field Surveys**	
Common Name	**Scientific Name**
Swallow Tailed Kite	*Elanoides forficatus*
Turkey	*Meleagris gallopavo*
Northern Bobwhite Quail	*Colinus virginianus*
Night Heron	*Nycticorax nycticorax*
Barred Owl	*Strix varia*
American Kestrel	*Falco sparverius*
Osprey	*Pandion haliaetus*
Red-Shouldered Hawk	*Buteo lineatus*
Cerulean Warbler	*Dendroica cerulea*
Black Racer	*Coluber constrictor*
Black Rat Snake	*Elaphe obsoleta*
Southern Toad	*Anaxyrus terrestris*
Ornate Chorus Frog	*Pseudacris ornata*
Musk Turtle	*Sternotherus odoratus*
Coyote	*Canis latrans*
Feral Pig	*Sus scrofa*
Pitcher Plant	*Sarracenia* sp.

Findings Summary

Field surveys conducted for State-listed threatened and endangered species identified two areas, one within Target Area 3 and one within Target Area 6, as suitable habitat for the eastern indigo snake and gopher tortoise (see Attachment B, Figures 1-2 and 1-3). Gopher tortoise burrows were observed near the intersection of New Road and GC&P Road, outside the Target Areas but within Acquisition Area 1 (see Attachment B, Figure 1-4).

Approximately 511 acres of wetland habitats were surveyed for potential breeding ponds and suitable habitat for flatwoods salamanders. No flatwoods salamander breeding ponds and suitable habitat were observed within the Target Areas.

No wood storks were observed during the onsite surveys. However, due to the project's proximity to a known wood stork rookery outside of Acquisition Area 1, and the ability of wood storks to travel long distances for foraging, wetland habitats within the proposed Target Areas 1, 2, 3, 4, 6, and 7 are presumed to be utilized as foraging habitat for wood storks.

Approximately 511 acres of wetland habitats were surveyed for corkwood and dwarf witch-alder and portions of these areas contained suitable habitat for these species. However, neither species was observed during pedestrian transects surveys within the Target Areas. Silviculture operations such as ditching, bedding, furrowing, tilling, and clearing were evidenced in a majority of the wetland environments observed and it is likely these activities hinder propagation of corkwood and dwarf witch-alder.

We appreciate GaDNR providing results of its Coastal Resource Mapping Project to support these species surveys and are happy for the opportunity to provide your agency with these survey results. Findings described herein will be incorporated into the EIS that will be prepared for the Proposed Action. Please contact Mr. Jered Jackson at 904-542-6308 or e-mail jered.jackson@navy.mil with any questions or concerns regarding these findings or if you would like additional information.

Sincerely,

WILLIAM A. DRAWDY
Natural Resources and
Environmental Affairs Officer

Attachments

cc: John Conway, NAVFAC SE
Jered Jackson, NAVFAC SE
Brenda Powell, E & E
Jonathan Oravetz, E & E

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Attachment A

Proposed GA DNR and USFWS Survey Methodology and Concurrence Letters

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ecology and environment, inc.
Global Environmental Specialists
1974 Commonwealth Lane
Tallahassee, Florida 32303
Tel: (850) 574-1400, Fax: (850) 574-1400

December 17, 2010

Mr. Robert Brooks
United States Fish and Wildlife Service
Coastal Ecological Services Field Office
4980 Wildlife Drive NE
Townsend, Georgia 31331

Re: Proposed Use of Habitat-Based Flatwoods Salamander and Striped Newt Survey Methodology for the Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia

Dear Mr. Brooks:

As a follow-up to the informal consultation meeting conducted between personnel from the United States Fish and Wildlife Service (USFWS), Coastal Ecological Services Field Office, Naval Facilities Engineering Command Southeast (NAVFAC SE), Marine Corps Air Station Beaufort (MCAS Beaufort), and Ecology and Environment, Inc. (E & E) on November 30, 2010, and a subsequent teleconference between you and E & E representatives on December 13, 2010, we request the USFWS review and provide concurrence with the following proposed survey methodology for the federally threatened flatwoods salamander (*Ambystoma cingulatum*) and the striped newt (*Notophthalmus perstriatus*), a candidate species for federal listing, that would be used if surveys for these species are necessary. Such surveys would be conducted to determine impact to these species and would be utilized for Section 7 consultation, as necessary, to complete the Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia (referred to herein as the TBR EIS).

During the meeting on November 30, 2010, your agency expressed concern with the ability to conduct dip net surveys, if warranted, in the winter of 2011 due to a lack of rainfall in the geographic area of the Proposed Action, which includes Long and McIntosh Counties, Georgia. Therefore, on behalf of NAVFAC SE, E & E has conducted research on established survey methodologies for flatwoods salamanders. The findings of this research are summarized below. The striped newt utilizes similar habitat and has a similar life history as the flatwoods salamander. Therefore one survey methodology is proposed for the assessment of both species.

Currently, there is no set protocol for determining presence or absence of flatwoods salamanders in a particular breeding pond. The general study consensus is that a survey with drift net fences surrounding a breeding pond for two consecutive "normal" weather years will indicate an affirmative result on the determination of the pond as a breeding pond. For dip net surveys, multiple years of breeding pond surveys are required to definitively determine the presence or absence of flatwoods salamanders.[1] The drought conditions present in the project area during the recent past and the timeframe for completing the TBR EIS would make these survey methodologies infeasible for this project.

[1] USFWS, 2005a. *Biological Opinion for the Relocation of Panama City-Bay County International Airport (West Bay Site Alternative)*, Dated October 3, 2005, Prepared by USFWS, 1601 Balboa Avenue Panama City, Florida.

Habitat-based survey methods have been applied in the past for projects potentially impacting flatwoods salamanders.[1, 2] Two biological opinions issued by the USFWS Panama City, Florida office are provided as Attachments A and B for your review. Both of these studies utilized habitat-based surveys.

Habitat-based surveys examine existing habitats to determine if they are likely to be utilized as flatwoods salamander breeding ponds. These surveys typically examine ephemeral or depressional wetlands that are geographically isolated from larger water bodies. To determine if these areas serve as potential breeding ponds, a thorough assessment of the pond, ectone, and adjacent upland is conducted. Positive indicators are absence of deep water, a treeless ecotone, and adjacency to open pine savannas or pine flatwoods. Areas that maintain appropriate habitat within the pond, adjacent upland, and treeless ecotone are then assumed to be potentially utilized as a flatwoods salamander breeding pond.[2]

The proposed acquisition areas (Areas 1 and 3) are primarily composed of planted pine stands and deep forested wetlands. As such, your agency has indicated that little habitat for the flatwoods salamander or striped newt is expected to be found within the proposed target areas. In the winter of 2011, E & E will conduct wetland delineations and upland habitat classifications for the proposed target areas. Following this preliminary field effort, a detailed wetland delineation and habitat assessment report, identifying potential flatwoods salamander habitat, will be provided to USFWS.

If any areas are identified as suitable habitat for flatwoods salamanders or striped newts during the winter 2011 surveys, E & E would propose additional targeted field surveys be conducted during April and May 2011 to determine if the habitat is a potential breeding pond. These surveys would be conducted by appropriately educated botanists and/or biologists familiar with southeastern flora. For these follow-up surveys, E & E would propose to use a variation (e.g., modified slightly to include plant species found in Georgia) of the "Potential Breeding Pond Description Data Sheet for Flatwoods Salamander (*Ambystoma cingulatum*) and Striped Newt (*Notophthalmus perstriatus*)" provided in Appendix II of the *Biological Opinion for U.S. Army Corps of Engineers Regional General Permit 86 (RGP-86)*.[2] The modified data sheet proposed for follow-up habitat based surveys is provided herein as Attachment C. A list of proposed follow-up survey locations and rationale for why the area requires follow-up surveys (e.g., based on the winter 2011 survey findings, results of recent infrared aerial photo-interpretation, and review of Natural Resources Conservation Service soils datum) would be provided to the USFWS prior to the commencement of any necessary follow-up field surveys. The results of any targeted follow-up surveys would also be provided to the USFWS in report format.

Please review the methodologies herein that would be used in the event that flatwoods salamander and striped newt surveys are necessary. We respectfully request that you provide concurrence, within 30 days of receipt of this letter, with the use of habitat-based follow-up surveys as opposed to conducting dip net surveys over multiple years to confirm the presence of flatwoods salamander and striped newt breeding ponds within proposed impact areas.

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[2] USFWS 2005b. *Biological Opinion for U.S. Army Corps of Engineers Regional General Permit 86 (RGP-86)*, Dated March 3, 2005, Prepared by USFWS, 1601 Balboa Avenue Panama City, Florida.

Please feel free to contact me (bpowell@ene.com; 850-574-1400, ext. 3911) or Jonathan Oravetz (joravetz@ene.com; 850-574-1400, ext. 3928) if you have any questions regarding this submittal or require any additional information to process this request.

Sincerely,

ECOLOGY & ENVIRONMENT, INC.

Brenda A. Powell

Brenda A. Powell
Project Biologist

Attachments

cc: Jered Jackson, NAVFAC SE
John Conway, NAVFAC SE
Billy Drawdy, MCAS Beaufort
Alice Howard, MCAS Beaufort

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United States Department of the Interior

Fish and Wildlife Service
105 West Park Drive, Suite D
Athens, Georgia 30606
Phone: (706) 613-9493
Fax: (706) 613-6059

West Georgia Sub-Office
Post Office Box 52560
Fort Benning, Georgia 31995-2560
Phone: (706) 544-6428
Fax: (706) 544-6419

Coastal Sub-Office
4980 Wildlife Drive
Townsend, Georgia 31331
Phone: (912) 832-8739
Fax: (912) 832-8744

February 3, 2011

Ms. Brenda A. Powell
Ecology & Environment, Inc.
1974 Commonwealth Lane
Tallahassee, Florida 32303

Re: USFWS File Number 2011-TA-0227

Dear Ms. Powell:

Thank you for your December 17, 2010, letter and attachments regarding your proposed use of habitat based flatwoods salamander and striped newt survey methodology for the Environmental Impact Statement for the proposed Modernization and Expansion of Townsend Bombing Range, Georgia. These surveys will be conducted for preparation of a draft Environmental Impact Statement for the proposed expansion of the range in McIntosh and Long Counties, Georgia. We have reviewed the information you provided and submit the following comments under provisions of the Endangered Species Act of 1973 (Act) as amended (16 U.S.C. 1531 et seq.).

According to the information you provided, the proposed acquisition areas will be assessed to determine if they have appropriate habitat for the frosted flatwoods salamander, a federally listed species, or the striped newt, a candidate species. Since the proposed acquisition areas consist mainly of planted pine stands and the area has been through a drought year, these habitat surveys will be used to determine the presence or absence of the salamander and newt, as opposed to conducting dip net surveys over several years. A more detailed description of the proposed habitat surveys are included with your letter and attachments, along with a modified habitat data sheet. We have reviewed this information and therefore agree with your proposed method of habitat surveys for the frosted flatwoods salamander and the striped newt.

We appreciate the opportunity to comment during the planning stages of your project. If you have any questions, please write or call staff biologist, Robert Brooks, of our Coastal Georgia Sub Office at 912-832-8739, extension 107.

Sincerely,

Grant Colwell for

Sandra S. Tucker
Field Supervisor

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UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
BEAUFORT, SOUTH CAROLINA 29904-5001

IN REPLY REFER TO
5090
NREAO/057
28 FEB 2011

Matt Elliott
Program Manager
Georgia Department of Natural Resources
Wildlife Resources Division
Nongame Conservation Section
2065 US Hwy 278, SE
Social Circle, GA 30025

Re: Proposed Survey Methodology for Eastern Indigo Snake, Gopher Tortoise, Wood Stork, Corkwood, and Dwarf Witch-alder for the Environmental Impact Statement for the Modernization and Expansion of Townsend Bombing Range, Georgia

Dear Mr. Elliott:

During the informal consultation meeting conducted among personnel from the Georgia Department of Natural Resources (GaDNR), Marine Corps Air Station Beaufort (MCAS Beaufort), Naval Facilities Engineering Command Southeast (NAVFAC SE), and Ecology and Environment, Inc. (E & E) on December 1, 2010, we discussed a preliminary list of state-protected species potentially affected by the modernization and expansion of Townsend Bombing Range (TBR), Georgia.

The preliminary list of 16 state-listed threatened or endangered species discussed during the meeting was developed based upon our review of the GaDNR species lists for Long and McIntosh Counties, Georgia, and was originally provided in tabular format in the *Desktop Analysis of Biological and Environmental Variables for the Environmental Impact Statement* (EIS) *for the Modernization and Expansion of Townsend Bombing Range, Georgia*, dated November 2010 (2010 Desktop Analysis). The table from the 2010 Desktop Analysis is provided below, but includes minor revisions including an updated federal status for the Altamaha spinymussel (*Elliptio spinosa*) as potentially endangered based on comments from the United States Fish and Wildlife Service (USFWS), Coastal Ecological Services Field Office, during a meeting on November 30, 2010.

In continuation with the preparation of the EIS, we have received and reviewed the results of the GaDNR's Coastal Resource Mapping Project completed in 2010 which delineates

vegetative habitats found in Long and McIntosh Counties, Georgia. In addition, we performed a site reconnaissance on February 9 through 11, 2011, to preliminarily ground-truth aerial signatures identified in the 2010 Desktop Analysis and cross-check the habitats identified in the GaDNR Coastal Resource Mapping Project. Lastly, we have reviewed literature regarding life histories, biology, and habitat utilization of the 16 species identified in the table below. Based upon the preliminary habitats identified during the site reconnaissance and our literature review, we have determined that the following state-listed species have the potential to occur within the proposed impact areas and therefore may require field surveys to determine the presence of these species: threatened eastern indigo snake (*Drymarchon corais couperi*), threatened gopher tortoise (*Gopherus polyphemus*), endangered wood stork (*Mycteria Americana*), threatened corkwood (*Leitneria floridana*), threatened dwarf witch-alder (*Fothergilla gardenia*), and threatened frosted flatwoods salamander (*Ambystoma cingulatum*) Proposed survey methodologies for these species are described in Section 1.0.

To date, we have received concurrence from the USFWS to utilize habitat-based surveys methodologies for the flatwoods salamander and striped newt as opposed to using dip net or drift net surveys. The methodology and concurrence letter are provided in Appendix A.

State Protected Species Potentially Occurring in Long and McIntosh Counties, Georgia

Scientific Name	Common Name	Federal Listing	State Listing
	AMPHIBIANS		
Drymarchon corais couperi	Eastern Indigo Snake	T	T
Ambystoma cingulatum	Frosted Flatwoods Salamander	T	T
Gopherus polyphemus	Gopher Tortoise	C	T
	BIRDS		
Haliaeetus leucocephalus	Bald Eagle	.	T
Mycteria americana	Wood Stork	E	E
	MOLLUSKS		
Elliptio spinosa	Altamaha Spinymussel	PE	E
Elliptio arctata	Delicate Spike	.	E
Toxolasma pullus	Savannah Lilliput	.	T
	FISH		
Acipenser brevirostrum	Shortnose Sturgeon	E	E

PLANTS			
Leitneria floridana	Corkwood	.	T
Fothergilla gardenii	Dwarf Witch-adler	.	T
Elliottia racemosa	Georgia Plume	.	T
Pteroglossaspis eristata	Giant Orchid	.	T
Baptista arachnifera	Hairy Rattle weed	E	E
Dicerandra radfordiana	Radford's Mint	.	E
Sageretia minutiflora	Tiny-leaf Buckthorn	.	T

C - Candidate Species; E - Endangered; PE- Proposed Endangered; T - Threatened

Upon review of the same sources listed above, we also have determined that suitable habitats for the following state-list species are unlikely to occur within the proposed impact areas: endangered Kirtland's warbler (*Dendroica kirtlandii*), threatened bald eagle (*Haliaeetus leucocephalus*), threatened Georgia plume (*Elliottia racemosa*), threatened giant orchid (*Pteroglossapis eristata*), endangered hairy rattle weed (*Baptista arachnifera*), endangered Radford's mint (*Dicerandra radfordiana*), threatened tiny-leaf buckthorn (*Sageretia minutiflora*), threatened Savannah lilliput (*Toxolasma pullus*), endangered delicate spike (*Elliptio arctata*), and endangered short-nose sturgeon (*Acipenser brevirostrum*). Based upon the lack of suitable habitat for these species, no further field assessments for these species are proposed. Further rationale for this determination is described in Section 2.0. A list of references used to make these determinations is provided in Appendix B.

We request that the GaDNR review and provide concurrence with the following proposed survey methodologies for the eastern indigo snake, gopher tortoise, wood stork, corkwood, dwarf witch-alder, and frosted flatwoods salamader. We also are requesting concurrence with the rationale for conducting no field surveys for Kirkland's warbler, bald eagle, Georgia plume, giant orchid, hairy rattle weed, Radford's mint, tiny-leaf buckthorn, Savannah lilliput, delicate spike, and short-nose sturgeon.

1.0 Proposed Survey Methodology

We propose to conduct a more thorough site review of proposed impact areas to determine if sufficient habitat exists within the areas to support the eastern indigo snake, gopher tortoise, wood stork, corkwood, dwarf witch-alder, and flatwoods salamander. Follow-up field assessments will be made to confirm the presence or absence or these species and

determine if these species have the potential to utilize habitats within the proposed target area if it is found that sufficient habitat exists to support said species.

Eastern Indigo Snake

Habitat Requirements

Eastern indigo snakes use a variety of habitats that include pine flatwoods, scrubby flatwoods, high pine, dry prairie, hardwood hammocks, edges of freshwater wetlands, agricultural land, coastal dunes, and disturbed areas. Eastern indigo snakes are often associated with gopher tortoise burrows, where they seek shelter from thermal stress and lay eggs. In areas lacking tortoise burrows, decayed stumps and logs are important habitat features for cover. Indigo snakes eat a variety of small mammals and herpetofauna, including eastern diamondback rattlesnakes and gopher tortoise hatchlings. In Georgia, the eastern indigo snake is most often associated with sand ridge habitats which often occur along major coastal plain streams (Speake, Diemer, and McGlincy 1981).

The Georgia Ecological Services Field Office of the USFWS maintains a GIS database of Threatened and Endangered Species Ranges in Georgia. This database indicates that the entirety of Acquisition Areas 1 and 3 is a "Possible Range" for indigo snakes. The database also indicates that "known occurrences" of eastern indigo snakes have been documented within Acquisition Areas 1 and 3. Based upon known occurrence data, an occurrence of indigo snake was documented within the proposed 400-acre Airfield Target Area.

Preliminary Site Review

We will review high-resolution aerial imagery and Natural Resource Conservation Service (NRCS) soil data to identify potential suitable habitat for the eastern indigo snake. Suitable habitat features are: sand ridges, scrubby pine flatwoods, and open upland environments adjacent to freshwater wetlands. Positive indicators for these habitats will be the presence of gopher tortoise burrows. In addition, soil survey data that indicate sandy soils within or adjacent to suitable habitat will be considered a positive indicator.

The NRCS soil data contain soil drainage characteristics. For areas within the proposed impact areas, drainage characteristics are classified as: moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. Since indigo snakes utilize sandy environments with supporting wetland environments, we assume that areas with poorly drained or very poorly drained soils will not provide

the necessary upland habitat to support indigo snakes. For survey purposes, those areas identified within impact areas with moderately well drained or somewhat poorly drained soils will be examined to determine if significant habitat exist to support indigo snake populations.

Areas of suitable habitat as defined above will be mapped using GIS and will be cross-referenced to known occurrences of eastern indigo snakes from the USFWS Georgia Ecological Services Field Office GIS database of Threatened and Endangered Species Ranges in Georgia. Distances from each area of suitable habitat to the nearest known occurrences of eastern indigo snake will be documented.

Field Assessment

We will conduct follow-up surveys in areas of suitable habitat to determine if the habitat is likely to support eastern indigo snakes. These surveys will assess the potential habitat and include a survey for the presence of gopher tortoise burrows. A detailed habitat description of survey areas, as well as photographs of suitable habitat, will be completed. Upon completion of the field assessment, a summary report of survey findings will be provided to GaDNR staff.

Gopher Tortoise

Habitat Requirements

Gopher tortoises are common in most types of upland communities with open canopies. They are commonly found in habitats such as sandhill, pine flatwoods, scrub, scrubby flatwoods, dry prairies, xeric hammock, pine-mixed hardwoods, and coastal dunes. Gopher tortoises construct burrows in sandy soils. The gopher tortoise resides in these burrows which protect them from other species and extreme heat. These burrows also provide similar protection for over 350 other commensal species. Key species known to occupy gopher tortoise burrows include the eastern indigo snake, eastern diamondback rattlesnake, and gopher frogs (Florida Freshwater Fish and Wildlife Conservation Commission [FWC] 2010a and 2010b).

Preliminary Site Review

We will review high-resolution aerial imagery and NRCS soil data to identify potential suitable habitat for the gopher tortoise. Suitable habitat features are: sand ridges, scrubby pine flatwoods, dry prairies, xeric hammocks, and open upland environments with sandy soils. Positive indicators for these habitats will be the presence of sandy soils as indicated from soil survey data.

The NRCS soil data contain soil drainage characteristics. For areas within the proposed impact areas, drainage characteristics are classified as: moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. Since gopher tortoises utilize sandy environments with low groundwater elevations, we assume that areas with poorly drained or very poorly drained soils will not support gopher tortoises. For survey purposes, those areas identified within impact areas with moderately well drained or somewhat poorly drained soils will be examined to determine if significant habitat exist to support gopher tortoise populations.

Field Assessment

We will conduct follow-up surveys in areas of suitable habitat to determine if the habitat is currently utilized by gopher tortoises. Canopy and herbaceous cover percentage will be documented for upland habitats identified in the preliminary site review to determine if adequate vegetation exists to support gopher tortoises. Acceptable habitat features will be defined as a canopy cover of less than 60%, with an herbaceous cover of at least 30% (FWC 2009). If acceptable canopy and herbaceous cover percentage exist, pedestrian transects within suitable habitat will be conducted to identify gopher tortoise burrows. Existing burrows will be classified as active or abandoned and marked by Global Positioning System (GPS). A detailed habitat description of survey areas, as well as photographs of existing burrows, will be completed. Upon completion of the field assessment, a summary report of survey findings will be provided to GaDNR staff.

Wood Stork

Habitat Requirements

The wood stork is a colonial bird that nests in large rookeries often constructed in cypress (*Taxodium distichum*), black gum (*Nyssa sylvatica var. biflora*) and southern willow (*Salix carolina*). Wood storks utilize the same nesting colonies from year to year as long as they remain undisturbed (USFWS 1986). They feed in flocks on small fish, crustaceans, amphibians, reptiles, and arthropods found within freshwater marshes, flooded roadside and agricultural ditches, and depressions in cypress heads, swamp sloughs, tidal creeks and pools, and estuaries. The wood stork is known to travel long distances (up to 80 miles) in search of feeding areas. Past research on Georgia wood stork colonies has found that foraging occurs 80% of the time within a 12-mile radius (USFWS 1986).

The USFWS Georgia Ecological Services Field Office GIS database of Threatened and Endangered Species Ranges in Georgia indicates a known wood stork rookery located 9 miles northwest of proposed Acquisition Area 3. During the meeting with the USFWS on November 30, 2010, and a subsequent meeting with GaDNR on December 1, 2010, both agencies confirmed that no wood stork rookeries occur within proposed Acquisition Areas 1 or 3. However, due to the project's proximity to the known rookery and the ability of wood storks to travel long distances for foraging, wetland habitats within the proposed impact areas may be utilized as foraging habitat for wood storks.

Preliminary Site Review

During the preliminary site reconnaissance conducted on February 9 and 10, 2011, we confirmed that potential foraging habitat exist within the proposed impact areas. These habitats include swamp sloughs, forested depressions, and roadside and agricultural ditches. No individual sightings of wood storks were observed during the sight reconnaissance.

Proposed Survey Methods

Based upon preliminary site review findings noted above, we determined that appropriate foraging habitat exists within the proposed impact areas and wood storks may utilize these wetland habitats for foraging. While conducting field assessments for other protected species or wetland delineations for the project, we will document any observed sightings of this species and report these sightings in the EIS. No follow-up field surveys are proposed for this species as impacts to wetland habitats, and thus wood stork foraging habitat, will be quantified and further examined in the EIS.

Corkwood

Habitat Requirements

Corkwood is found in shaded marshes accompanied with red maple, cypress, and tupelo and prefers moist poorly drained soils. Corkwood forms a large multi-stemmed colony varying from 5 to 25 feet in height and spread. Flowering occurs in late spring (Patrick, Allison, and Krakow 1995). During the December 1, 2010 meeting, staff from GaDNR provided feedback on state-listed species that are likely to occur within the project site. During this discussion, corkwood was not mentioned by GaDNR staff as likely to occur within the project site.

Preliminary Site Review

The preliminary site recognizance effort conducted on February 9 and 10, 2011, confirmed that portions of the proposed impact areas contain low wetland environments dominated by red maple, cypress, and tupelo.

Proposed Survey Methods
Areas within the proposed impact areas which contain low wetland environments dominated by red maple, cypress, and tupelo will be surveyed using pedestrian transects during the spring/summer of 2011.

Dwarf Witch-alder

Habitat Requirements
Dwarf witch-alder is a deciduous shrub that is found in flat, low lying swampy areas particularly in the shrub dominated margins of upland swamps, Carolina bays, and wet savannas. The flowering period is from March to April, and fruiting occurs between August and October (Patrick, Allison, and Krakow 1995). During the December 1, 2010 meeting, staff from GaDNR provided feedback on state-listed species that are likely to occur within the project site. During this discussion, dwarf witch-alder was not mentioned by GaDNR staff as likely to occur within the project site.

Preliminary Site Review
As confirmed during the preliminary site recognizance effort conducted on February 9 and 10, 2011, the proposed acquisition area is currently managed for silviculture operations and is composed primarily of dense planted pine stands, recently cleared pine stands, and forested wetlands. Most wetland areas lack a transitional environment between wetland and upland areas and therefore the presence of dwarf witch-alder is unlikely. However, on the margins of swamps and bays, transitional shrub areas may exist.

Proposed Survey Methods
Survey efforts for this species will focus on the identified margins of swamps and bays where transitional shrub areas may exist. Surveys will be conducted using pedestrian transects during the March-April flowering period to aid in identification.

Flatwoods Salamander

During the meeting on November 30, 2010, the USFWS expressed concern with ability to conduct of dip net surveys for flatwoods salamanders in the winter of 2011 due to a lack of rainfall in the geographic area of Acquisition Areas 1 and 3.

On December 17, 2010, a survey methodology letter was provided to the USFWS proposing to utilize habitat-based survey methods for assessment of the flatwoods salamander. Details of the proposed habitat-based survey methodology and the USFWS concurrence letter dated February 3, 2011, are provided in Appendix A.

2.0 Rationale for Determination of Species Not Requiring Field Surveys

Our rationale for determining that field surveys will not be required for Kirtland's warbler, bald eagle, Altamaha spinymussel, delicate spike, Savannah lilliput, short-nose sturgeon, Atlantic sturgeon, Georgia plume, giant orchid, hairy rattle weed, Radford's mint, and tiny-leaf buckthorne is provided below.

Kirtland's Warbler

The Kirkland's warbler has one of the most restricted breeding ranges of any North American bird. It breeds in the open jack pine (*Pinus banksiana*) plains of central Michigan. The bird over-winters in the Bahamas with spring departures occurring in late April and early May and fall migrations between August and October (USFWS 1999). The primary migration route follows a narrow band through South Carolina, North Carolina, Virginia, West Virginia, and Ohio before reaching nesting grounds in Michigan (USFWS 1999). When warblers make their spring migration, the first quarter of the route is over water (Mayfield 1988). Some research has shown migration occurs without any stops or with limited stopovers (Mayfield 1988; USFWS 1999). These studies concluded that observations of warblers outside of the main migration route were likely strays, as a disproportionate number of documented observations occurred in Ohio and Michigan, the last quarter of the migratory route.

The Kirtland's warbler is potentially only present in the state of Georgia for a limited time during its migratory period. Because the primary migration route for Kirkland's warbler lies north and northeast of Georgia, and since research indicates they may migrate without stopovers and that warblers within the state of Georgia are likely stray birds, no field assessments for this species are proposed.

Bald Eagle

During the November 30 and December 1, 2010, meetings with the USFWS and GaDNR, respectively, both agencies confirmed that no

known bald eagle nests occur within the proposed project area. The proposed acquisition area is currently managed for silviculture operations and is composed primarily of dense planted pine stands, recently cleared pine stands, and forested wetlands. Bald eagles require tall, mature trees for nesting purposes. Due to clearing activities associated with active management of timber, trees are harvested well before they reach maturity. No suitable nesting habitat within the proposed impact areas exist for bald eagles, and therefore no detailed field assessments for this species are proposed. Visual observations of bald eagles or nests observed during other field activities will be provided to the USFWS and documented in the EIS.

Altamaha Spiny Mussel, Delicate Spike, Savannah Lilliput, and Short-nose Sturgeon

The Altamaha spinymussel, delicate spike, Savannah lilliput, and short-nose sturgeon utilize the Altamaha River. As discussed in the December 1, 2010 meeting, Acquisition Area 2, which is adjacent to the Altamaha River, has been removed from the project scope; therefore no direct or secondary impacts to the Altamaha River are anticipated and no field assessments for these species are proposed.

Georgia Plume

The Georgia plume is found in xeric environments including sand ridges and oak ridges. The flower period is from June to July (Patrick, Allison, and Krakow 1995). No portions of the proposed impact areas contain xeric habitats. During the December 1, 2010 meeting, GaDNR staff provided feedback about state-listed species likely to occur within the proposed acquisition area. During this discussion, Georgia plume was not mentioned by GaDNR staff as likely to occur within the area. Based on the preliminary site recognizance effort conducted on February 9 and 10, 2011, the results of the GaDNR Coastal Mapping Project and aerial photo-interpretation of 2010 true color aerials and 2009 infrared aerial photographs, no appropriate habitat for the Georgia plume exists within the proposed impact areas, and therefore no field assessments for this species are proposed.

Giant Orchid

The giant orchid is found in sandy environments including scrub oak and sand hills, as well as open pine flatwoods. The flowering period is from June to November (Florida Natural Areas Inventory 2000). No portions of the proposed impact

areas contain scrub oak or sand hill communities. The proposed impact areas are composed primarily of dense planted pine stands, recently cleared pine stands, and forested wetlands. Based upon preliminary field assessments conducted February 9 and 10, 2011, areas of recent pine clearing with successional pine development are typically hydric. A majority of soils within these areas are classified hydric by the NRCS and do not maintain ample soil permeability to support the giant orchid. During the December 1, 2010 meeting, staff from GaDNR provided feedback about state-listed species that are likely to occur within the proposed acquisition area. During this discussion, giant orchid was not mentioned by GaDNR staff as likely to occur within the area. No appropriate habitat for the giant orchid exists within the proposed impact areas, and therefore no field assessments for this species are proposed.

Hairy Rattle Weed

The hairy rattle weed inhabits shallow pools on Piedmont granite outcrops in full sunlight. It is known to occur in Brantley and Wayne Counties, Georgia. The USFWS stated in the November 30, 2010, meeting that is not likely that the required habitat for this species would be found within the proposed acquisition areas. Therefore, no field assessments for this species are proposed.

Radford's Mint

During the December 1, 2010, meeting, staff with GaDNR stated that Radford's mint is not likely to occur within the proposed acquisition area. Therefore, no field assessments for this species are proposed.

Tiny-leaf Buckthorne

The tiny-leaf buckthorne is found on calcareous rock bluffs, shell middens and evergreen hammocks along stream banks (Patrick, Allison, and Krakow 1995). No portions of the proposed impact areas contain appropriate habitat for tiny-leaf buckthorne. During the December 1, 2010, meeting, staff from GaDNR provided feedback on state-listed species likely to occur within the proposed acquisition area. During this discussion, tiny-leaf buckthorne was not mentioned by GaDNR staff as likely to occur within the proposed acquisition area. No appropriate habitat for the tiny-leaf buckthorne exists within the proposed impact areas, and therefore no field assessments for this species are proposed.

We respectfully request that GaDNR review the survey methodologies provided herein and provide concurrence within 30 days of receipt of this letter. Please contact Jered Jackson at 904-542-6308 or e-mail jered.jackson@navy.mil with any questions or concerns regarding this submittal or if you require any additional information to process this request.

Sincerely,

WILLIAM A. DRAWDY
Natural Resources and
Environmental Affairs Officer

cc: John Conway, NAVFAC SE
Jered Jackson, NAVFAC SE
Brenda Powell, Ecology and Environment, Inc.
Jonathan Oravetz, Ecology and Environment, Inc.

From: Jackson, Jered CIV NAVFAC SE [jered.jackson@navy.mil]
Sent: Thursday, March 10, 2011 11:12 AM
To: Oravetz, Jonathan; Powell, Brenda A.; Conway, John D CIV NAVFAC SE, JAXS; Drawdy CIV William A; Howard CIV Alice G
Subject: FW: Proposed Survey Methodology Document
Signed By: There are problems with the signature. Click the signature button for details.

We have concurrence with our letter for the state-listed species surveys at Townsend.

V/R
Jered

-----Original Message-----
From: Katrina Morris [mailto:Katrina.Morris@dnr.state.ga.us]
Sent: Thursday, March 10, 2011 10:16
To: Jackson, Jered CIV NAVFAC SE
Subject: Proposed Survey Methodology Document

Mr. Jackson,

Thank you for the opportunity to review the Proposed Survey Methodology Document for the Townsend Bombing Range Expansion. I have reviewed the document and feel that the proposed methodology is adequate for the species that may be found on site.

If I can be of further assistance, please don't hesitate to contact me.

Sincerely,

Trina Morris

Trina Morris, Wildlife Biologist
Environmental Review Coordinator
Georgia Dept. of Natural Resources
Nongame Conservation Section
2065 U.S. Hwy. 278 S.E.
Social Circle, GA 30025-4743
Ph: 770-918-6411 or 706-557-3032
Fax: 706-557-3033
katrina.morris@dnr.state.ga.us
http://georgiawildlife.dnr.state.ga.us/

Give wildlife a chance this tax season! Donate to the Georgia Wildlife Conservation Fund on your state income tax forms - line 10 on short forms (500-EZ) and line 26 on the long (500). Details at www.georgiawildlife.com/node/338. Forms at https://etax.dor.ga.gov/.

Wild about wildlife? Sign up for Georgia Wild, DNR's free e-newsletter about all things nongame, from animals to habitats. Click here to subscribe (or paste this link into your browser): http://www.georgiawildlife.com/news/e-newsletters

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Attachment B

Figures

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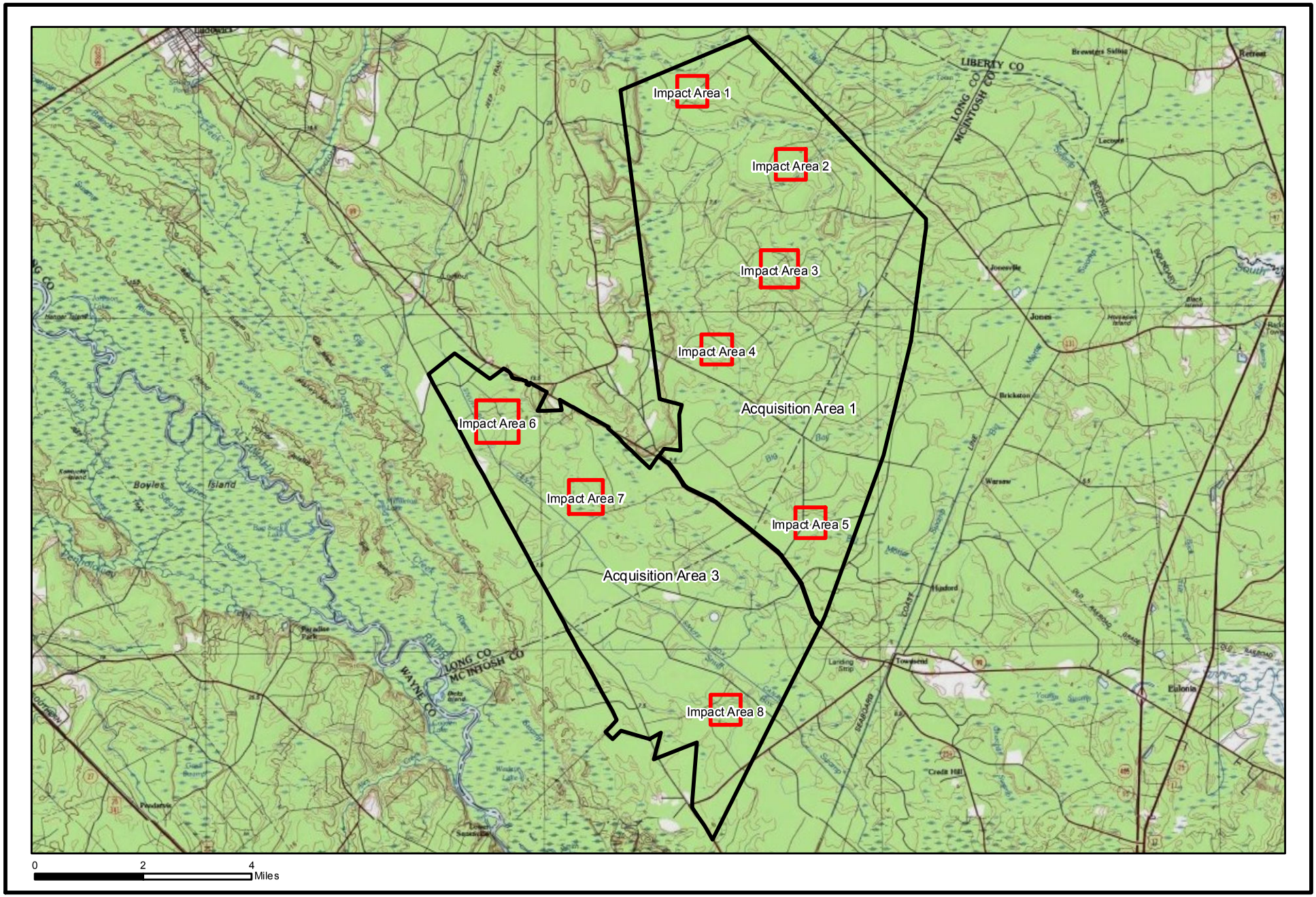

Target Impact Area

Acquisition Area

Source: USGS US Topo Maps online, 2011

Figure 1-1
Target Impact Areas
Townsend Bombing Range
Long County, Georgia

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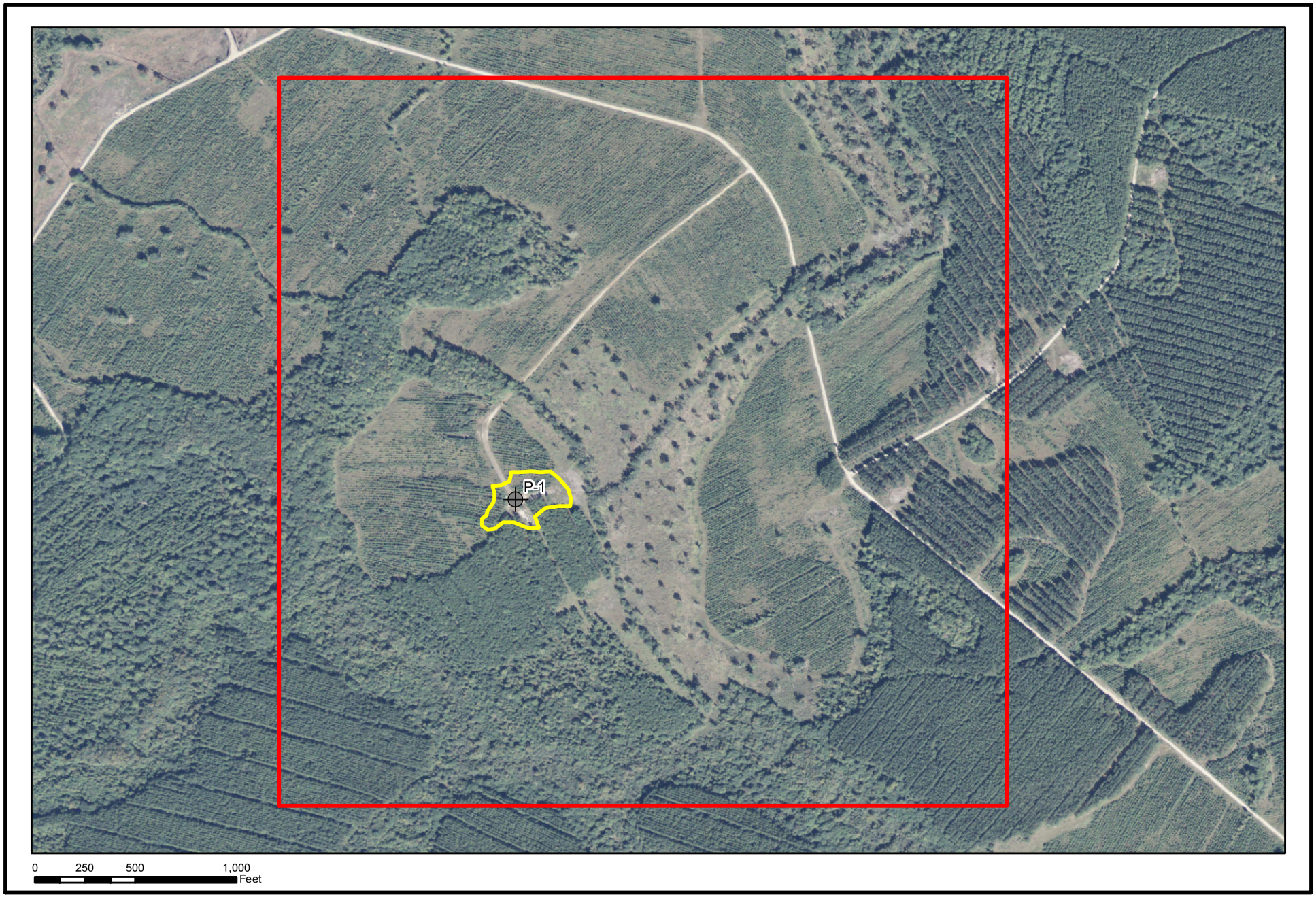

Picture

Suitable Habitat Eastern Indigo Snake/Gopher Tortoise

Target Impact Area

Source: USDA, 2010

Figure 1-2
Suitable Habitat Eastern Indigo Snake/Gopher Tortoise
Target Impact Area 3
Townsend Bombing Range
Long County, Georgia

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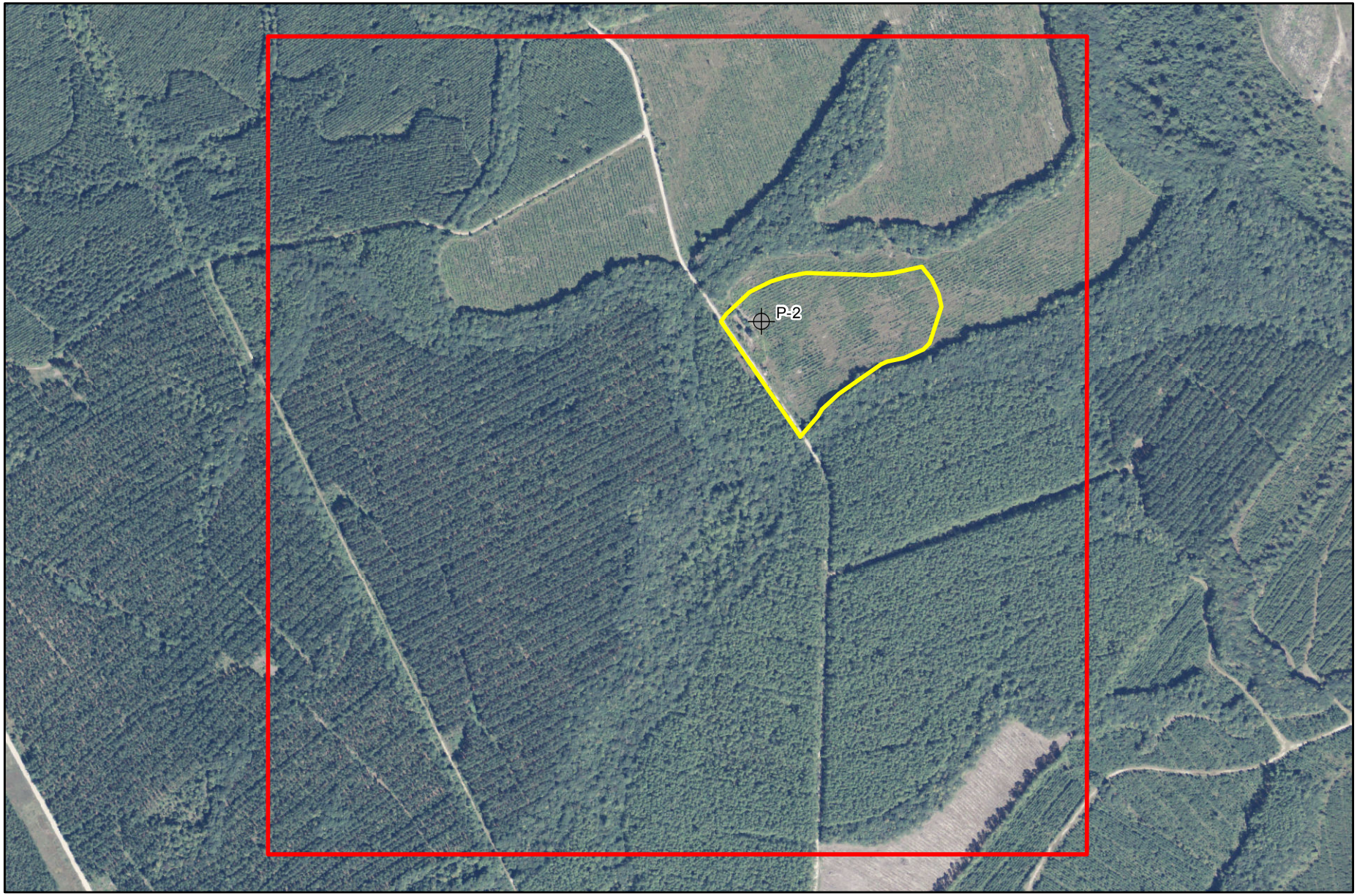

Picture

Suitable Habitat Eastern Indigo Snake/Gopher Tortoise

Target Impact Area

Source: USDA, 2010

Figure 1-3
Suitable Habitat Eastern Indigo Snake/Gopher Tortoise
Target Impact Area 6
Townsend Bombing Range
Long County, Georgia

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Picture

Source: USDA, 2010

Figure 1-4
Observed Gopher Tortoise Burrows and Habitat
Acquisition Area 1
Townsend Bombing Range
Long County, Georgia

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Attachment C

Photographs

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Photographic Log

Photo 1: 1.8-acre sandy upland area located within Target Impact Area 3, illustrating suitable habitat for eastern indigo snake and gopher tortoise.

Photo 2: 12.8-acre sandy upland area located within Target Impact Area 6, illustrating suitable habitat for eastern indigo snake and gopher tortoise.

Photo 3: Area identified in the desktop analysis as potential gopher tortoise habitat based on soil drainage characteristics within Target Impact Area 1. In-field verification determined area to be unsuitable habitat for gopher tortoises.

Photo-4: Area identified in the desktop analysis as potential gopher tortoise habitat based on soil drainage characteristics within Target Impact Area 2. In-field verification determined area to be unsuitable habitat for gopher tortoises.

Photo 5: Area identified in the desktop analysis as potential gopher tortoise habitat based on soil drainage characteristics within Target Impact Area 2. In-field verification determined area to be unsuitable habitat for gopher tortoises.

Photo 6: Area identified in the desktop analysis as potential gopher tortoise habitat based on soil drainage characteristics within Target Impact Area 4. In-field verification determined area to be unsuitable habitat for gopher tortoises.

Photo 7: Gopher tortoise burrow observed adjacent to New Road.

Photo 8: Ephemeral wetland located within Target Impact Area 1. Area determined to be unsuitable habitat for flatwoods salamander.

Photo 9: Large emergent wetland with standing water in rutted areas within Target Impact Area 3. Area determined to be unsuitable habitat for flatwoods salamander.

Photo 10: Small ephemeral ponds located within old road bed within Target Impact Area 7. Area determined to be unsuitable habitat for flatwoods salamander.

Photo 11: Small ephemeral pond adjacent to forested wetland within Target Impact Area 6. Area determined unsuitable habitat for flatwoods salamander.

Photo 12: Small ephemeral pond within drainage ditch within Target Impact Area 8. Area determined unsuitable habitat for flatwoods salamander.

Attachment D

References

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APPENDIX F

AGENCY CORRESPONDENCE

Agency correspondence will be included in the Final INRMP.

APPENDIX G

2001 BIOLOGICAL ASSESSMENT

BIOLOGICAL ASSESSMENT

OF THE

INTEGRATED NATURAL RESOURCES

MANAGEMENT PLAN

AND ITS EFFECTS ON

ENDANGERED AND THREATENED SPECIES

AT THE

TOWNSEND BOMBING RANGE

MCINTOSH COUNTY, GEORGIA

SEPTEMBER 2001

SEPTEMBER 2001

BIOLOGICAL ASSESSMENT OF THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN AND ITS EFFECTS ON ENDANGERED AND THREATENED SPECIES AT THE TOWNSEND BOMBING RANGE MCINTOSH COUNTY, GEORGIA

I. INTRODUCTION

The federally threatened flatwoods salamander (*Ambystoma cingulatum*) occurs at Townsend Bombing Range, McIntosh County, Georgia. Under the proposed Integrated Natural Resources Management Plan (INRMP), the Marine Corps would manage the species in cooperation with U.S. Fish and Wildlife Service (USFWS or Service) to maintain the existing population and periodically search for new or undiscovered populations on the Range. This appendix would serve as the main management instrument for the flatwoods salamander and as the Biological Assessment for management of the Range's natural resources, regarding the species, under Section 7 of the Endangered Species Act (15 USC 1531 *et seq*.) and 50 CFR Part 402.

The wood stork (*Mycteria americana*) has been seen flying over the Range at least once, but has not been observed nesting or feeding there. Implementation of the plan would not affect the wood stork.

The endangered red-cockaded woodpecker (*Picoides borealis*), threatened piping plover (*Charadrius melodus*), threatened bald eagle (*Haliaeetus leucocephalus*), and threatened eastern indigo snake (*Drymarchon corais couperi*) have not been located on the Range in spite of efforts to locate them during surveys in 1993-94 and 1998-2001. Implementation of the plan would not affect any of these species.

No critical habitat exists on or near the Range; implementation of the plan would not affect any critical habitat.

II. BACKGROUND AND EXISTING SITUATION

Townsend Bombing Range is located in western McIntosh County, Georgia, approximately 60 miles south of Savannah, 2 miles west of Townsend, and 15 miles north of Darien (Figure 3-1).

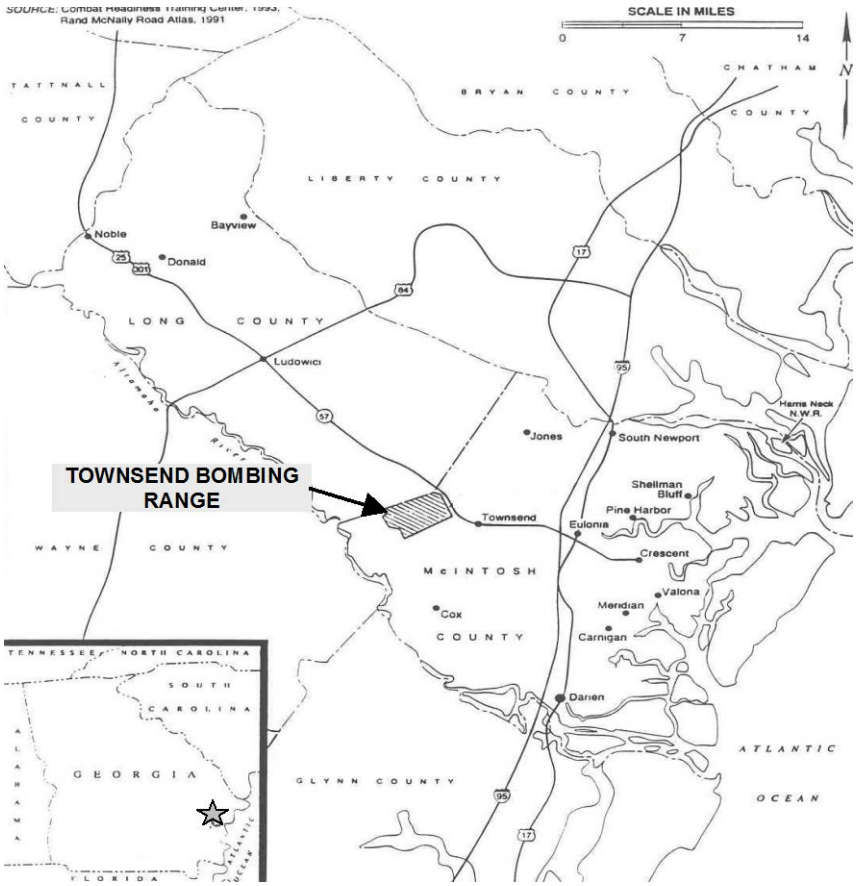

Figure 1 - Location Map

The Range encompasses approximately 5,200 acres, of which some 383 acres is cleared for placement of targets and instrumentation involved in its primary mission. The Range is owned by the Department of the Navy, the Marine Corps Air Station, Beaufort, South Carolina is responsible for managing the land, and Georgia Air National Guard's Combat Readiness Training Center is responsible for operating the Range.

The flatwoods salamander was discovered on the Range during an endangered species survey in 1994. One larva was collected in a dip-net at a small cypress pond on the edge of the cleared target area (Figure 2). Annual surveys of the Range for presence of the species were initiated in 1998 and continue to the present. However, no larvae were observed at the breeding pond in 1998-2000. These were generally poor breeding years for the species, with inadequate rainfall in October-December of each year. During this period, little or no breeding activity was recorded for flatwoods salamanders on Fort Stewart, the nearest populations to the Range (Dirk Stevenson, Fort Stewart Natural Resources Branch, personal communication). No other specimens were observed at the site until another single larva was collected in a bomb crater located at the edge of the breeding pond in April 2001. The single larva observed in April 2001 was one of the few evidences of successful breeding for the species anywhere within its range that year (John Jensen, Georgia Department of Natural Resources, personal communication).

In the Cowardin system of wetland classification, the breeding pond at the Range would be termed Palustrine, Forested, Deciduous, Semi-permanently Flooded (PF06F). The pond is dominated by pond cypress (*Taxodium ascendens*) and Ogeechee lime (*Nyssa ogeche*). The shrub layer is limited and scattered, with herbaceous understory dominated by sedges (*Carex* spp.) and other light-loving plants. Commonly known as cypress/gum ponds, these wetlands hold water throughout the growing season in most years. Even when surface water is absent, the water table is usually at or very near the land surface. Cypress/gum ponds occur in deep depressional areas in the Coastal Plain. The breeding pond burns on occasion during dry periods, which keeps the understory open and retards development of woody shrubs. In effect, these burns prevent succession from occurring, which would probably change the character of the understory in a manner that would eventually render the pond unsuitable for use by flatwoods salamanders.

Terrestrial habitat surrounding the breeding pond is cleared, treeless "prairie" to the south of the pond (part of the cleared target portion of the Range) and moderately dense, mixed pine-hardwood forest on the north side across a dirt road. It is unknown at present whether adult flatwoods salamanders inhabit the forested or cleared areas, or both. Future monitoring activites may employ short sections of drift fence and funnel traps to determine habitat use by adult salamanders.

The "prairie" area south of the breeding pond would be classified as Palustrine Emergent (PEM1F) in the Cowardin system. It is by mowing and by frequent fires both in and outside the growing season. Hydrologic regime is semi-permanently flooded. This area generally does not support tree or shrub species. Occasional pond cypress or red maple saplings are present but in a stunted growth form. A perimeter shrub component may also be present, containing inkberry (*Ilex glabra*), tall gallberry (*Ilex coriacea*), blueberries, greenbriar (*Smilax* spp.), and fetterbush. A savanna-like, diverse assembly of persistent and non-persistent emergent vegetation exists which includes St. John's Wort, soft rush (*Juncus effusus*), blue flag (*Iris virginica*), milkwort (*Asclepias* spp.), toothache grass (*Ctenium aromaticum*), Virginia chain-fern (*Woodwardia virginica*), panic grass (*Panicum* spp.), Walter's sedge (*Carex walteriana*), maidencane (*Panicum hemitomon*), hard head, pineland rosemallow (*Hibiscus aculeatus*), hatpins (*Eriocaulon decangulare*), marsh pennywort (*Hydrocotyle* sp.), meadow beauty (*Rhexia* spp.), smartweed (*Polygonium* sp.), beakrushes (*Rhyncospora* spp.), and hooded pitcher plant (*Sarracenia minor*). Percent vegetation coverage in this habitat is usually 100%.

The mixed pine-hardwood stand located to the north of the breeding pond is composed primarily of slash and loblolly pine, with slash predominant. Canopy closure can approach 80%, with a significant subcanopy often present, consisting of live oak (*Quercus virginiana*), sweetgum, laurel oak (*Quercus hemispherica*), southern magnolia (*Magnolia grandiflora*), and black cherry (*Prunus serotina*). Subcanopy closure may approach 40%. Understory is typically very sparse, exhibiting coverage of 20% or less. Typical understory plants include wiregrass (*Aristida* spp.), St. John's Wort, blackberry (*Rubus* sp.), goldenrod (*Solidago* sp.), goat's rue (*Tephrosia virginiana*), broomsedge (*Andropogon* sp.), and colic root (*Aletris lutea*). Wiregrass is present mainly in a small area immediately north of the pond.

III. MANAGEMENT PLANNED

1. **Direct Actions.**
   Management of flatwoods salamanders would consist of (1) monitoring the population at yearly to evaluate reproduction and habitat use; (2) searches for new populations; (3) assessing hydrological systems to determine the area where drainage or other development would impact the species, and (4) continuing prescribed burning both at the breeding pond and in the adjacent areas.

2. **Other Natural Resources Management Actions.**

   Forest management activities in the vicinity of the flatwoods salamander breeding pond would be conducted in accordance with the forest management guidelines presented in the Final Rule to list the species:

   (1) Within a 450-m (1,476-ft) radius of the breeding pond:
   a. Use selective harvest, only during dry periods and at a minimum of 10-year intervals, within an inner primary zone extending 164 m (538 ft) out from the edge of the breeding pond. Maintain a basal area of 4.2 to 4.7 square meters per hectare (45 to 50 square feet per acre).
   b. Use a mix of clear-cutting and selective harvest, only during dry periods and at a minimum of 10-year intervals, in an outer secondary zone at any given time, as long as you maintain 75 percent of the secondary zone in pine flatwoods habitat at a basal area of 4.2 to 4.7 square meters per hectare (45 to 50 square feet per acre). Do not separate the primary and secondary zone from each other by cleared or inappropriate habitat (e.g., non-pine flatwoods habitat such as agriculture, urban development or other forest types.
   c. Minimize skid trails and their effects through the use of prescription planning and techniques such as pallets and bridges. Locate skid trails parallel to, rather than perpendicular to, the wetland edge to reduce alterations in wetland hydrology. Locate all log landings outside the primary and secondary zones.
   d. Keep soil disturbance to a minimum. Do not conduct intensive mechanical site preparation (i.e., root-raking, disking, stumping, bedding) or any other actions that cause significant soil disturbance.
   e. Prescribed fire should be the preferred method for site preparation and control of woody vegetation. Limit herbicide use to manual application, following BMPs, when fire cannot be employed.

   Wildlife management activities on Range property in the vicinity of the flatwoods salamander breeding site and upland buffer zones would include prescribed fire, hunting, and various wildlife surveys.

   Land management activities in the vicinity of the flatwoods salamander breeding site and upland buffer zones would include surveys for and control of various exotic plants and erosion control.

3. **Restrictions on Other Actions.**
   All proposed construction on the Range would be reviewed by the Natural Resources and Environmental Affairs Officer (NREAO) at MCAS Beaufort for impacts to both

species; consultation would be initiated if a "may effect" determination is made during the NREAO's review.

All personnel attached to the Townsend Bombing Range would be briefed regarding the flatwoods salamander and the potential for impacting the species to insure that no actions are taken that might inadvertently affect the species.

IV. EVALUATION OF EFFECTS

1. Direct Management Actions.

Monitoring the known existing population and searching for new flatwoods salamander populations would not impact the species. Restricting forest harvest as outlined in the Service's Final Rule would positively impact the species at Townsend Bombing Range. The assessment of hydrologic conditions in and around the breeding pond(s) would not directly impact the salamander, and the information would be used to evaluate future actions for impact to the species. The continuation of prescribed fire would presumably benefit this species. To insure that these effects are beneficial, monitoring results would be provided to the Service, and management would be adapted, in consultation with the Service, in the manner believed to be suited to the species.

2. Other Natural Resources Management Actions.

The forest management activities, especially harvest and timber stand improvement actions have the greatest potential to affect the species. Conducting forest management activities within the primary and secondary buffer zones around the known (and any newly discovered) flatwoods salamander breeding pond in accordance with the guidelines in the Service's Final Rule would benefit the species on the Range.

For the flatwoods salamander, wildlife management activities such as hunting or wildlife surveys could result in persons walking through the breeding pond and surrounding pine flatwoods, but the effect on the salamander would be insignificant and discountable. Persons conducting biological surveys would be briefed on the salamander and would be required to conduct their activities in a manner that would not adversely impact the species or its habitat. The effects of prescribed fire would be the same as discussed under forest management activities.

Control of exotic plants and erosion would occur around the Range. Since exact actions are not known at this time, an evaluation of impacts is impossible, but all actions planned within the primary and secondary buffer zones around the known breeding pond (and any newly discovered breeding ponds) would be reviewed by NREAO at MCAS Beaufort for potential impacts to the salamander before implementation. If any activities are judged to "may affect" the species, consultation with the Service would be reinitiated.
This plan prohibits off-road vehicle use on the Range. This prohibition would benefit the species by eliminating the possibility of off-road vehicles damaging the breeding pond or terrestrial habitat of the salamander.

APPENDIX H

WILDLAND FIRE ACTION PLAN

DRAFT-FINAL
WILDLAND FIRE MANAGEMENT POLICY AND ACTION PLAN
TOWNSEND BOMBING RANGE, TOWNSEND, GEORGIA

Prepared for:

Naval Facilities Engineering Command, Southeast
P.O. Box 30 Building 903 Yorktown
Jacksonville, Florida 32212

Prepared by:

Gulf South Research Corporation
8081 Innovation Park Drive
Baton Rouge, Louisiana
70820

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Executive Summary

This is a Wildland Fire Management Policy and Action Plan. Wildland fire describes an unplanned non-structure fire that occurs in the wildland.

Wildland fire management policies of the Townsend Bombing Range (TBR) support TBR's natural and cultural resource management goals. The two foremost resource management goals are (1) preservation of access to air and land to meet military readiness requirements, and (2) protection and maintenance of natural and cultural resources within the TBR through the continuation and enhancement of ecologically appropriate and beneficial land use and management practices. Both of these goals require efficient and effective management of unplanned wildland fires.

The primary goal of this Wildland Fire Management Policy and Action Plan is to ensure public and firefighter safety while protecting natural and cultural resources and human developments from unwanted wildland fire.

This Wildland Fire Management Policy and Action Plan has the following objectives:

- To guide the decision-making process where safety, social, and resource values are evaluated by identifying and implementing appropriate management response strategies for wildland fires.
- To provide a framework for fuels management strategies through the use of prescribed fire, mechanical, and chemical treatments.
- To provide a platform to cooperate more fully in planning and implementing a wildland fire program at TBR and the surrounding area.

Program operations included in the Policy are preparedness, prevention, and suppression. Applicable natural and cultural resource goals and objectives are derived from approved Integrated Natural and Cultural Resources Management Plans for the Range.

This document is organized to combine the latest scientific knowledge, including regional and local studies, with policy direction from the United States Department of Agriculture Forest Service, Department of the Interior, State of Georgia, U.S. Marine Corps, U.S. Air Force (USAF), and U.S. Navy (Navy) to accomplish natural resource, cultural resource, and wildland fire management goals and objectives.

This document is an appendix of the TBR Integrated Natural Resources Management Plan (INRMP). Compliance requirements with National Environmental Policy Act (NEPA) guidelines have been satisfied through development of an environmental assessment (EA) for the INRMP.

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1.0 INTRODUCTION

1.1 PURPOSE OF THE WILDLAND FIRE MANAGEMENT POLICY AND ACTION PLAN

This Wildland Fire Management Policy and Action Plan (Policy and Plan) is written to assist in the prevention of wildland fire, and to guide the first response to a reported wildland fire on Townsend Bombing Range (TBR), located along the border of McIntosh and Long counties, Georgia (Figure 1-1). The Action Plan component of this document shall serve as a quick guide to the first actions required when a wildland fire occurs.

1.2 PARTNERS AND CONTRIBUTORS

Cooperation with local firefighting services and the ***Georgia Forestry Commission (GFC)*** is crucial for not only the detection of a wildland fire, but also for the response to a wildland fire. The ***Long County Fire Department*** and the ***McIntosh County Fire Department*** provide support services for wildland fires, based on the location and the severity of the fire. In addition, GFC has offices in both Long and McIntosh counties with firefighting capabilities and will provide support for fire suppression during a wildland fire.

When the fire danger rating is considered a Class 3 or higher, GFC conducts aerial surveys in the vicinity of TBR. These surveys are a valuable tool to minimize the spread of a wildland fire in the area.

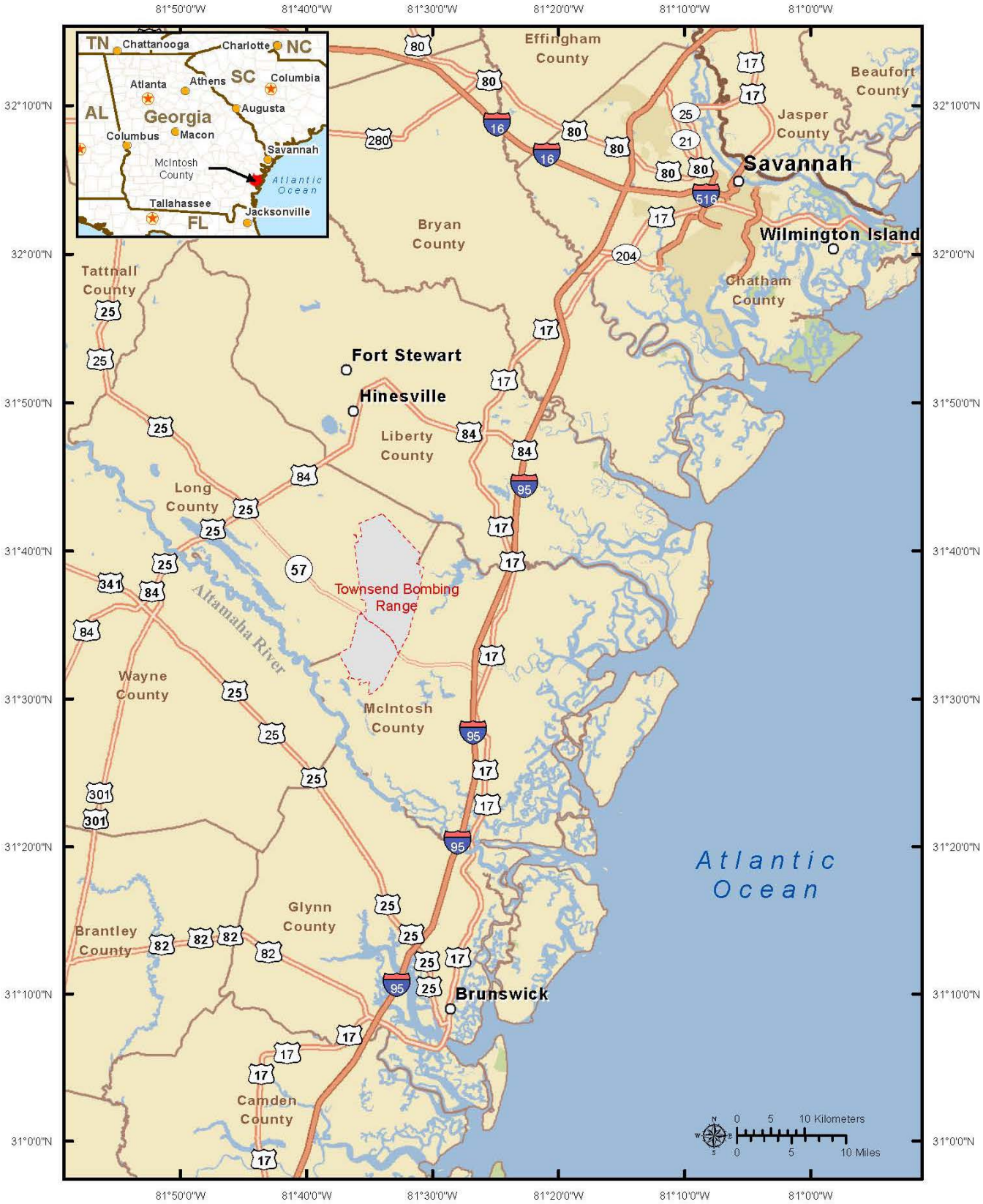
Figure 1-2 illustrates the nearest location of each of the firefighting responders to TBR.

1.3 COMPONENTS OF THE MANAGEMENT POLICY AND ACTION PLAN

The components of this document are assigned to three broad categories, ***Preparedness (2.0)***, ***Prevention (3.0)***, and ***Suppression (4.0)***, which are described in detail in the following sections.

Preparedness (Section 2.0) includes the identification of first responders who would assist in the event of a wildland fire, knowledge of conditions conducive to the ignition of a wildland fire, and acquisition of necessary training and equipment to adequately and effectively respond to a wildland fire. Knowledge of the roads and access points on TBR as well as the locations of vulnerable buildings and communities outside TBR, is also essential.

Prevention (Section 3.0) includes the management and control of combustible fuel loads on the Range, typically though prescribed burns, which are implemented through the TBR INRMP.



1 **Figure 1-1. Townsend Bombing Range Vicinity Map**

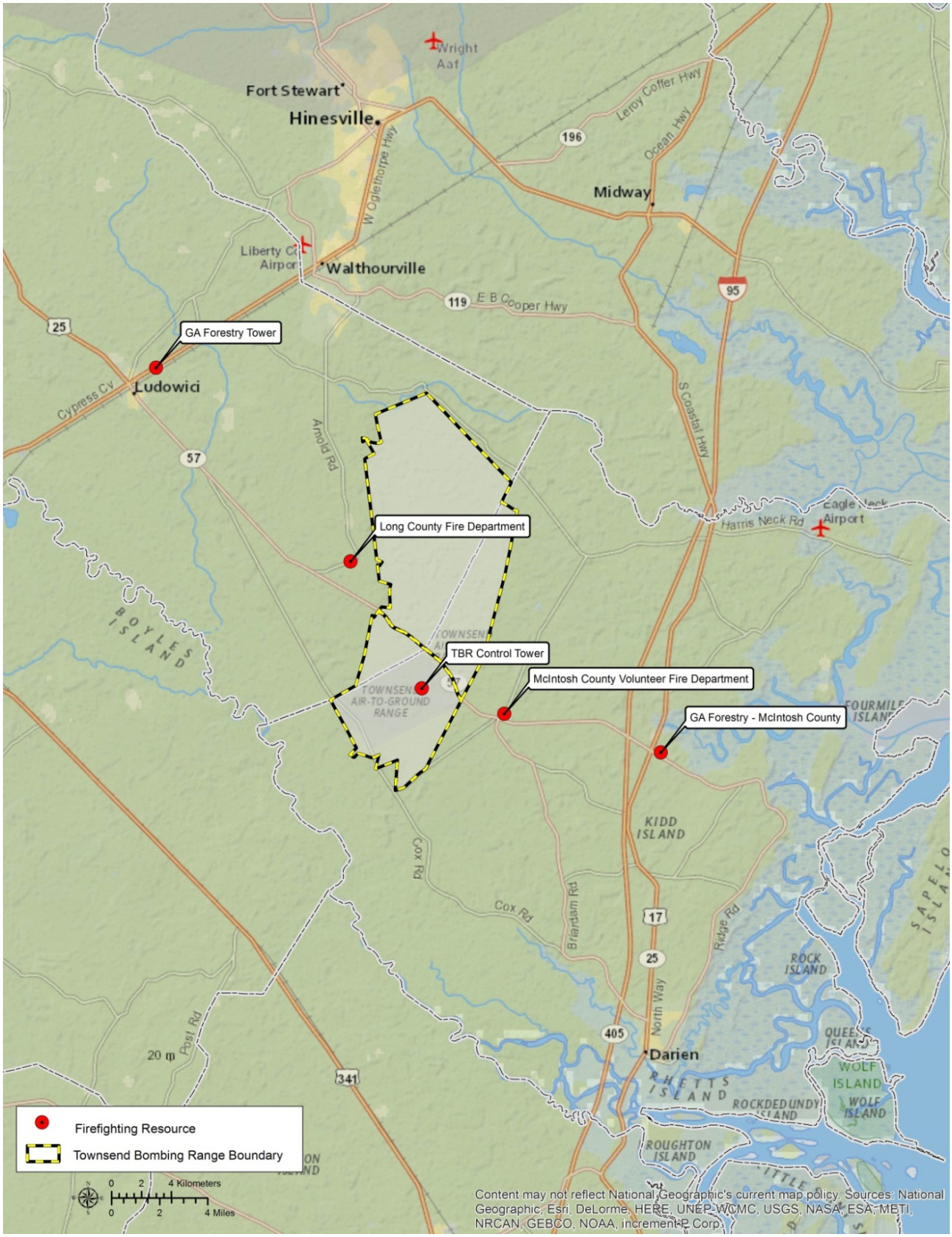


Figure 1-2. Firefighting Resources in Proximity to TBR.

As with preparedness, prevention also includes knowledge of conditions conducive to the ignition of a wildland fire, but moreover it requires the application of this knowledge to direct activites on TBR when such conditions are present.

Suppression (Section 4.0) constitiutes the “Action Plan” component of this document. This section spells out the step-by-step instructions that should be followed if, when, and where a wildland fire ignites at TBR or approaches TBR from outside TBR.

2.0 PREPAREDNESS

2.1 FEDERAL INTERAGENCY WILDLAND FIRE POLICY

The USAF adopts the following policies and standards:

- Review and Update of the 1995 Federal Wildland Fire Management Policy (January 2001)
- National Wildfire Coordinating Group (NWCG) Wildland and Prescribed Fire Qualification System Guide (PMS 310-1/NFES 1414 (January 2000)
- National Fire Protection Association (NFPA) Standard 295 – *Standard for wildfire control*, Standard 299 – *Protection of life and property from wildfire*, and Standard 1051 – *Wildland firefighter qualification standard*.
- Federal Land Assistance, Management and Enhancement (FLAME) Act of 2009
- DoD Instruction 6055.06, 10 October 2000, DoD Fire and Emergency Services Program.

2.2 AIR FORCE INSTRUCTION (AFI)

Firefighting efforts at USAF installations comply with AFI 32-2001 (27 February 2014) *Fire Emergency Services*. This instruction applies to military Air Force Reserve (AFR) and Air National Guard firefighters.

2.3 EQUIPMENT AND VEHICLES

TBR has a variety of equipment and vehicles to aid in the prevention and suppression of wildland fires. TBR personnel should maintain and update these assets as needed to ensure they are continually ready for use. Table 2-1 provides a list of contacts once a wildland fire has been reported, as well as the additional firefighting resources from Long and McIntosh Counties and GFC.

2.4 DEFENSIBLE SPACE

Creating defensible space is essential to improve a building's chance of surviving a wildfire. It is the buffer created between a building and the litter, trees, shrubs, or any wildland area that surrounds it. This space is needed to slow or stop the spread of wildfire and could protect the building from catching fire, either from direct flame contact or radiant heat. Defensible space is also important for the protection of the firefighters defending the property.

Table 2-1. **Wildland Fire Responders and Available Equipment**

Agency	Location	Distance to TBR (approx.)	Towers	Equipment	Staff	Point of Contact
TBR	On-Site	N/A	Control Tower	2 Bulldozers w/fire plow attachments 1 brush fire truck w/ 300-gallon capacity 2 brush fire pumper units (75-gallon capacity)	10	Range Control - 912-963-3007 Commander, CRTC - 912-963-3001 Commander, MCAS Beaufort - 843-228-7885 Natural Resources & Environmental Affairs Officer, MCAS Beaufort - 843-228-7370/DSN: 335.7370 Public Affairs Office - 843-228-7201/843-228-6123
GA Forestry Commission – McIntosh County **http://gatrees.org**	1119 Jack's Bluff Road Townsend, GA 31331	7.5 miles	NONE	Caterpillar DRH John Deere 750 Case 1150 Ford F-250 w/ 150-gallon Tank	4 Firefighters	Rusty Clark – Chief Ranger 912-270-4958 cell 912-832-5103 office
GA Forestry Commission – Long and Liberty Counties **http://gatrees.org**	1128 E. Hwy 84 Ludowici, GA 31316	13 miles	Yes	3 Bulldozers Brush truck w/ 400-gallon tank	3 Rangers 3 Firefighters	David Dukes – Chief Ranger 912-271-8746 (cell) 912-545-2247 Long County Office 912-884-3331 Liberty County Office
Long County Fire Department Station 3	1431 Tibet Highway SE Ludowici, GA 31316	4 miles	NONE	Engine, Brush truck Access to 3,500-gallon and 5,000-gallon tankers.	41 total (11 assigned to nearest station)	Richard Truman – Fire Chief 912-294-6627 cell 912-545-2244 office Shawn Smith – Asst. Chief 912-532-2822 cell 912-545-2244 office
McIntosh County Volunteer Fire Department	2352 Church of God Road Darien, GA 31305	2 miles	NONE	Pumper w/ 1000-gallon tank Tanker (2,500-gallon) GMC 4x4 brush truck w/ 250-gallon tank	90 total (12 assigned to nearest station)	Mark Deverger – Fire Chief 912-258-1362 cell 912-832-3950 office

Two zones make up the recommended 100 feet of defensible space:

Zone 1 extends 30 feet from buildings and structures.

- Remove all dead vegetation.
- Remove dead or dry leaves, pine needles, and dead branches from the lawn, roof, and rain gutters.
- Trim trees regularly to keep branches a minimum of 10 feet from other trees.
- Remove branches that hang over the roof.
- Relocate wood piles into Zone 2.
- Remove or prune flammable plants and shrubs near windows.
- Remove vegetation and items that could catch fire from around and under decks.
- Create a separation between trees, shrubs, and items that could catch fire, such as outdoor furniture and wood piles.

Zone 2 extends from 30 to 100 feet from buildings and structures

- Cut or mow annual grass to a maximum height of 4 inches.
- Create horizontal spacing between shrubs and trees.
- Create vertical spacing between grass, shrubs, and trees.
- Remove fallen leaves, needles, twigs, bark, cones, and small branches, or keep them limited to a depth of 3 inches.

2.5 ASSESSING FIRE DANGER

A combination of factors affects the initiation of, spread of, and difficulty in controlling a wildland fire. There are many systems and tools that attempt to provide accurate and reliable predictions of fire danger by analyzing the fuel, topography, and weather that affect the likelihood of a wildland fire ignition.

> The Georgia Forestry Commission maintains a website with daily maps and information about these various factors to inform about wildland fire preparedness: http://weather.gfc.state.ga.us/Maps.aspx

2.5.1 Fire Danger Rating

The National Fire Danger Rating System (NFDRS) provides a daily estimation of forecasted and observed fire dangers across the United States. Based on the fire danger, managers may impose restrictions or closures, plan for or pre-position staff and equipment to fight new fires, and make decisions regarding whether to suppress or allow fires to burn under prescribed conditions.

The Georgia Forestry Commission's daily Fire Danger Rating map is located at: http://weather.gfc.state.ga.us/Maps/fd.gif

Table 2-2 provides a list of five rating levels that are used to describe danger levels in public information releases and fire prevention signing:

Table 2-2. Fire Danger Rating

Spread Index	Class	Behavior Pattern
0-5 - Low	**1**	**Fire will spread slowly and tend to die.**
6-9 - Moderate	**2**	**Fire will spread in grass and leaves until extinguished.**
10-19 - High	**3**	**Fire burns briskly and spreads rapidly. Short distance spotting may occur. Young conifer stands are at risk of fire damage.**
20-39 - Very High	**4**	**Fire spreads rapidly and tends to crown in young conifer stands. Long-distance spotting is common. Intense convection activity may develop. Torching occurs in older timber.**
40 - Extreme	**5**	**Fire burns very briskly and spreads very rapidly. Where heavy vegetation occurs, fires may be unmanageable. Long-distance spotting is common. Fire behavior is unpredictable and crown fires in older timber are common.**

2.5.2 Relative Humidity

Relative humidity (RH) is the ratio of the amount of moisture in the air to the amount of moisture necessary to saturate the air at the same temperature and pressure. Relative humidity is expressed in percent. It is measured directly by automated weather stations or manually by wet and dry bulb readings taken with a psychrometer and applying the National Weather Service psychrometric tables applicable to the elevations where the reading is taken.

Relative humidity is important because dead forest fuels and the air are always exchanging moisture. Low humidity takes moisture from the fuels, and fuels in turn, take moisture from the air when the humidity is high. Light fuels, such as grass and pine needles, gain and lose moisture quickly with changes in relative humidity. When the RH drops, fire behavior increases because these fine fuels become drier. Heavy fuels, on the other hand, respond to humidity changes more slowly and require significant changes, either multiple rain events or extended dry weather, to see noticible changes in fuel moisture.

A daily map of relative humidity throughout Georgia is located at: http://weather.gfc.state.ga.us/Maps/rh.gif

2.5.3 Fuel Moisture

Fuel moistures are measured for live herbaceous (annual and perennial) and woody (shrubs, branches, and foliage) fuels and dry (dead) fuels. These are calculated values representing approximate moisture content of the fuel. Fuel moisture in live fuels varies through the growing season and between different climate classes. Dead fuel moisture is the moisture content of dead organic fuels, expressed as a percentage of the oven dry weight of the sample.

Dead Fuel Moisture

Dead fuel moisture is controlled solely by exposure to environmental conditions and is critical in determining fire potential. Dead fuel moistures are classed by time lag. A fuel's time lag is the time necessary for a fuel particle of a particular size to reach 63% of equilibrium between its initial moisture content and its current environment.

Dead fuels in the NFDRS have four time lag classes:

- 1-hour: Fine flashy fuels, dried herbaceous plants, or round wood less than 1/4" diameter. Also includes the uppermost layer of litter on the forest floor. Responds quickly to weather changes. It varies greatly throughout the calendar day and is principally responsible for diurnal changes in fire danger. It is computed from observation, time, temperature, humidity, and cloudiness.
- 10-hour: Round wood 3/4" to 1" diameter and the layer of litter that extends to 3" to 4" below the surface. It is computed from observation, time, temperature, humidity, and cloudiness, or may be a standard set of "10-Hr Fuel Sticks" that are weighed as part of the fire weather observation.

The Georgia Forestry Commission website posts a daily map of 10-hour Fuel Moistures at: http://weather.gfc.state.ga.us/Maps/fm10.gif

- 100-hour: 1" to 3" diameter. It is computed from 24-hour average boundary conditions composed of day length, hours of rain, and daily temperature and humidity ranges.
- 1000-hour: 3" to 6" diameter. It is computed from a 7-day average boundary conditions composed of day length, hours of rain, and daily temperature and humidity ranges.

Live Fuel Moisture

Live fuel moisture is the water content of live herbaceous plants expressed as a percentage of the oven dry weight of the plant. Typical herbaceous fuel moisture values start low and increase rapidly as the growing season progresses. Lower values indicate drier materials and higher fire danger.

2.5.4 Greenness Maps

Greenness maps provide a visual representation of live fuel moisture. Four vegetation greenness maps are derived weekly from Normalized Difference Vegetation Index (NDVI) data observed by satellites and provided by the Earth Sciences Observation and Science (EROS) Data Center, U.S. Geological Survey.

These maps have a 1-kilometer (0.6 mile) spatial resolution. Maps with historical references (RG and DA) are based on the years 1989 through 1995. The derived maps are consistent of the following:

- Visual Greenness Maps portray vegetation greenness compared to a very green reference such as an alfalfa field or a golf course. The resulting image is similar to what one would expect to see from the air. Normally dry areas will never appear as green as normally wetter areas.

  View the up-to-date Visual Greenness Map at:
  http://www.wfas.net/images/firedanger/vg1panel.png

- Relative Greenness Maps portray how green the vegetation is compared to how green it has been historically (since 1989). Because each pixel is normalized to its own historical range, all areas (dry to wet) can appear fully green at some time during the growing season.

  View the up-to-date Relative Greenness Map at:
  http://www.wfas.net/images/firedanger/rg1panel.png

- Departure from Average Greenness Maps portray how green each pixel is compared to its average greenness for the current week of the year.

  View the up-to-date Departure from Average Grenness Map at:
  http://www.wfas.net/images/firedanger/da1panel.png

- Live Moisture Maps portray experimental live vegetation moisture with values ranging from 50 to 250 percent of dry weight.

  View the up-to-date Live Moisture Map at:
  http://www.wfas.net/images/firedanger/mo1panel.png

Drought Maps

The Keetch-Byram Drought Index (KBDI) can be used to measure the effects of seasonal drought on fire potential. The actual numeric value of the index is an estimate of the amount of precipitation (in 1/100 inches increments) needed to bring soil back to saturation (a value of 0 being saturated). The index deals with the top 8 inches of soil profile so the maximum KBDI

value is 800 (8 inches), the amount of precipitation needed to bring the soil back to saturation. The index's relationship to fire is such that as the index values increase, the vegetation is subjected to greater stress because of moisture deficiency. At higher values living plants die and become fuel, and the duff/litter layer becomes more susceptible to fire.

> A daily map of the KBDI throughout Georgia is located at: http://weather.gfc.state.ga.us/Maps/kbdi.gif

- KBDI = 0–200—Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. This is typical of spring dormant season following winter precipitation.
- KBDI = 200–400—Typical of late spring, early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.
- KBDI = 400–600—Typical of late summer, early fall. Lower litter and duff layers actively contribute to fire intensity and will burn actively.
- KBDI = 600–800—Often associated with more severe drought with increased wildfire occurrence. Intense, deep burning fires with significant downwind spotting can be expected. Live fuels can also be expected to burn actively at these levels.

2.5.5 Haines Index

The Lower Atmosphere Stability Index, or Haines Index, is computed from the morning (12Zulu) soundings from Radiosonde Observation (RAOB) stations across North America. The index is composed of a stability term and a moisture term. The stability term is derived from the temperature difference at two atmosphere levels. The moisture term is derived from the dew point depression at a single atmosphere level.

This index has been shown to correlate with large fire growth on initiating and existing fires where surface winds do not dominate fire behavior. Haines Indices range from 2 to 6 for indicating potential for large fire growth:

- 2 - Very Low Potential (Moist Stable Lower Atmosphere)
- 3 - Very Low Potential
- 4 - Low Potential
- 5 - Moderate Potential
- 6 - High Potential (Dry Unstable Lower Atmosphere)

> A daily map of the Haines Index across the USA is located at: http://wfas.net/images/firedanger/haines.png

2.5.6 Lightning Ignition Efficiency

Lightning fires are started by strikes to ground that have a component called a continuing current. All positive discharges have a continuing current, and about 20% of negative discharges have one. Ignition depends on the duration of the current and the kind of fuel the lightning hits. Ignition in fuels with long and medium-length needles, such as those pines found on TBR, depend upon the fuel moisture. Ignitions in short-needled species, such as Douglas fir, depend far more on the depth of the duff layer than on the moisture. Spread of the fire after ignition usually depends on fuel moisture.

Lightning is expected to be a common, but not primary, source of ignition for wildland fires on TBR.

A daily map of the Lightning Ignition Efficiency across the USA is located at: http://www.wfas.net/images/firedanger/ltng_pi.png

In all cases the ignition efficiency on a 1-kilometer pixel is given on a per discharge basis. That is, if the efficiency is high, then about 9 discharges will result in one ignition; if the efficiency is extreme, about 5 or fewer discharges will result in an ignition. The ratio of positive and negative discharges is built into the calculation, as documented by Latham and Schleiter (1989) algorithm. The fuel type and depth are conversions of the 1 kilometer resolution current cover type (Hardy and others 1999) for this specific calculation. The moisture input is the 100-hour dead fuel moisture above.

3.0 PREVENTION

3.1 CAUSES OF WILDLAND FIRE

A first step to preventing a wildland fire is identifying the potential causes. Causes of unplanned ignitions on the TBR might include the following:

- Accidental ignition
- Lightning strikes
- Escaped prescribed fire
- Military activities such as
    - spotting charges
    - flares
    - blanks
    - simulators
    - pyrotechnics
    - smoke grenades
    - and equipment operation
- Arson

3.2 PRESCRIBED BURNS AND TREE THINNINGS

The MCAS Beaufort Natural Resources Manager (NRM) is responsible for securing funding on an annual basis to perform prescribed burns and tree thinning at the TBR.

Prescribed burns help reduce and eliminate fuel loads, dead woody vegetation, and accumulated leaf litter that could otherwise fuel devastating wildland fires. Personnel at the TBR should communicate regularly with the MCAS Beaufort NRM to keep the NRM aware of areas on TBR that are highest priority for prescribed burns. Prescribed burns can occasionally get out of control and become the cause of a wildland fire. The NRM and burn team leaders should therefore pay close attention to weather forecasts and conditions to ensure the burns remain controlled.

Tree thinning reduces opens lanes for easier all-terrain vehicle (ATV) and vehicle access to forested areas, reduces future fuel loads in the forest, and promotes the healthy growth of taller trees that will be more robust and resistant to fire damage.

3.3 FIRE LANES

The primary purposes of a fire lane are to prevent the spread of a wildland fire and provide access for suppression activities. This is accomplished by maintaing a wide swath of land that is relatively free of leaf litter and vegetative growth on the ground and flammable branches

above. Fire lanes, once established, should be mapped, and those maps should be shared with any partners who may respond to a wildland fire on the Range. Fire lanes must also be regularly maintained to ensure they remain relatively free of flammable materials. The MCAS Beaufort NRM is responsible for securing funding on an annual basis to establish necessary fire lanes and perform fire lane maintenance at the TBR.

3.4 RAPID DIAGNOSIS

Every unplanned ignition on the TBR need not evolve into a destructive wildland fire. Rapid diagnosis of an ignition will result in rapid response, helping to prevent the development of a damaging wildland fire. Range personnel should be intimately familiar with the conditions that are favorable for wildfire ignition and spread, as described in Section 2.5 of this Plan, and demonstrate extra diligence observing for new ignitions when such conditions exist.

4.0 SUPPRESSION

4.1 WILDLAND FIRE DETECTION

Suppression of an ignited wildland fire begins with detection. Fires at the TBR will likely be detected by the following:

- fire towers (GFC and Range Tower)
- aerial surveillance (GFC)
- vehicle patrolling

There is one Range Tower located on the Installation. The GFC primarily uses fixed-wing aircraft to detect fires; however, a GFC fire tower is located 13 miles west of the Range in Long County. All personnel using or working on TBR are responsible for detecting and reporting wildland fires to Range Control. TBR personnel will patrol the installation as necessary when the fire danger is Class 4 or higher.

Typically, the first indication of a fire is a smoke column. After sighting the smoke column, personnel will make note of its volumne, height, color, and direction to report to the notification chain.

4.2 NOTIFICATION CHAIN

Once a fire is detected on TBR and reported to Range Control the following steps will occur:

a) Range Control will request approximate location of fire
b) Range Control will "check fire" all ranges affecting the wildland fire area
c) Range Control will dispatch firefighters down range
d) Should additional resources be needed, Range Control will alert the GFC and County Fire Departments to request assistance.
    - ***Phone numbers are in Table 2-1***
e) Firefighters will notify Range Control when fire is extinguished and all firefighting personnel and equipment are clear
f) Range Control will declare the Range "Hot" and training may resume

When a call is received, TBR firefighting personnel are dispatched to assess the appropriate level of response and to determine if additional firefighting resources are needed. Additional resources may be required for large fires and fires that may require an extended effort to contain. The appropriate level of response will provide for an effective, aggressive, and safe

firefighting environment, especially for wildland fires that require an extended time period to be contained.

4.3 FIRE INCIDENT COMMANDER (IC)

The Range fire chief shall designate a Fire Incident Commander (IC) who shall be responsible for the following:

a) Developing a firefighting plan
b) Maintaining the name and location of all personnel at the fire incident
c) Transferring/confirming personnel and unit information to the appropriate Incident Command Section (ICS) Command Staff as soon as practical
d) Ensuring that personnel and unit information is recorded at the Command Post as soon as possible.

The IC is responsible for determining the risk/benefit assessment with respect to combating wildland fires at night.

Since the assistance of GFC may be required, a shared IC must be developed between GFC and TBR personnel. If a fire escapes the boundaries of TBR, the GFC will immediately become IC for that portion of the fire not on TBR property.

4.4 CONSIDERATIONS

The following is a list of size-up considerations that greatly affect tactics and strategy and should influence the IC firefighting plan:

1. Location of fire head or heads
2. Pertinent burning conditions - weather, time of day, etc.
3. Type of fuel - light, heavy fuel
4. Exposures - buildings, towers, etc.
5. Size of fire and rate of spread
6. Special hazards - hot spots, spot fires, developing heads
7. Manpower required
8. Fuel continuity
9. Accessibility of fire area
10. Water resources
11. Line of retreat/escape routes
12. Special emphasis on rehabilitation for firefighters during all wildland fires
13. Cultural and natural resource concerns

4.5 SUSPECTED ARSON

Arson is a surprisingly common cause of wildland fires and should not be discounted unless an alternate cause is definitively known. When approaching the fire scene, personnel will watch for people leaving the area and write down vehicle license numbers and any other identifying features and information. On-site personnel will look for evidence of where and how the fire may have started and protect that site until authorities have an opportunity to investigate.

4.6 "LET BURN" POLICY

Wildfires may be allowed to burn whenever feasible, safe, and a permit is available from the GFC. This "Let Burn" policy may allow for the reduction of fuel and future fire hazards. This policy should not be confused with firefighting tactics such as black lining, burning out, or backfiring. The "Let Burn" policy will apply only to wildfires that meet specific criteria, which should be the same fire weather parameters and conditions that would apply to a prescribed burn in the same area. Wildfires may be allowed to burn only if the fire can be contained, meets certain conditions (firebreaks are in place, low wind, etc.), and if none of the following are in jeopardy: buildings and structures, equipment, installation boundary, or smoke-sensitive areas. Smoke-sensitive areas include highways, roads, cantonment areas, and populated areas. Fires will not be allowed to burn if there are air quality concerns, burn bans, or on Class 3+, 4, or 5 days.

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5.0 RANGE ROAD MAPS

To assist in the prevention of wildland fire and to guide the first response of a reported wildland fire on TBR, a series of maps of the range, specifically depicting all of the known roads, access points, and firebreaks, has been developed using existing names when available and as appropriate. For those roads that do not have an existing name, a temporary notional name (number/letter system) has been designated and assigned to further facilitate more precise locations and intersections for wildland fire activities and first-response events. Continuing coordination with MCAS Beaufort staff, TBR Range personnel, first responders and local timber management employees will occur in order to create new names or better refine the number/letter system. The following series of TBR range road maps has been created and serves as a map-book reference for all of the known roads, access points, and firebreaks. Figure 5-1 is the “map index” for the entire map-book, followed by 14 individual figures (Figures 5-2 through 5-15), each depicting an equal portion of the TBR range, and concluding with a “road name index” identifying the figure location for each of the range roads, access points, and firebreaks (Figure 5-16).

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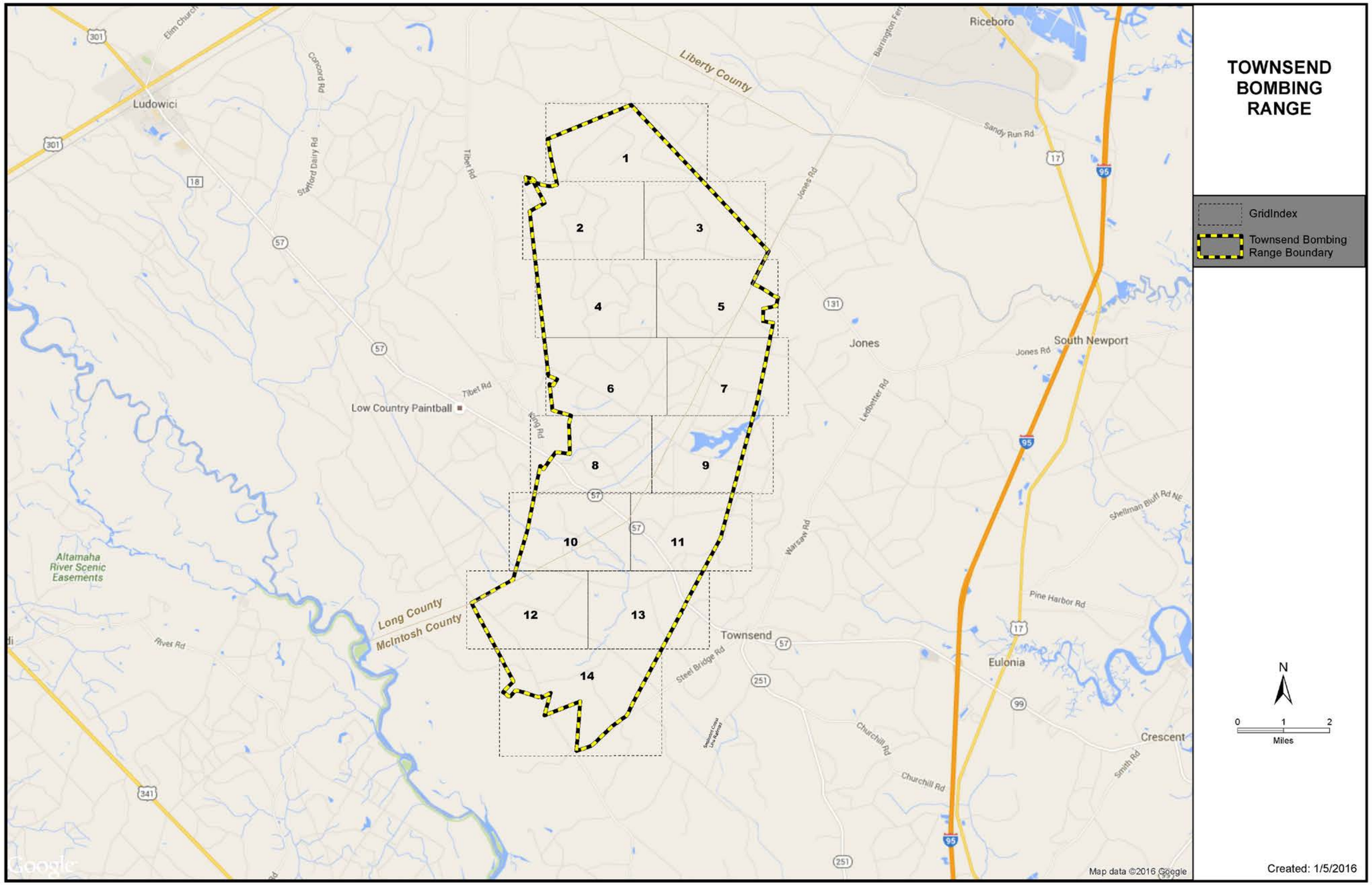

Figure 5-1. TBR Map Index

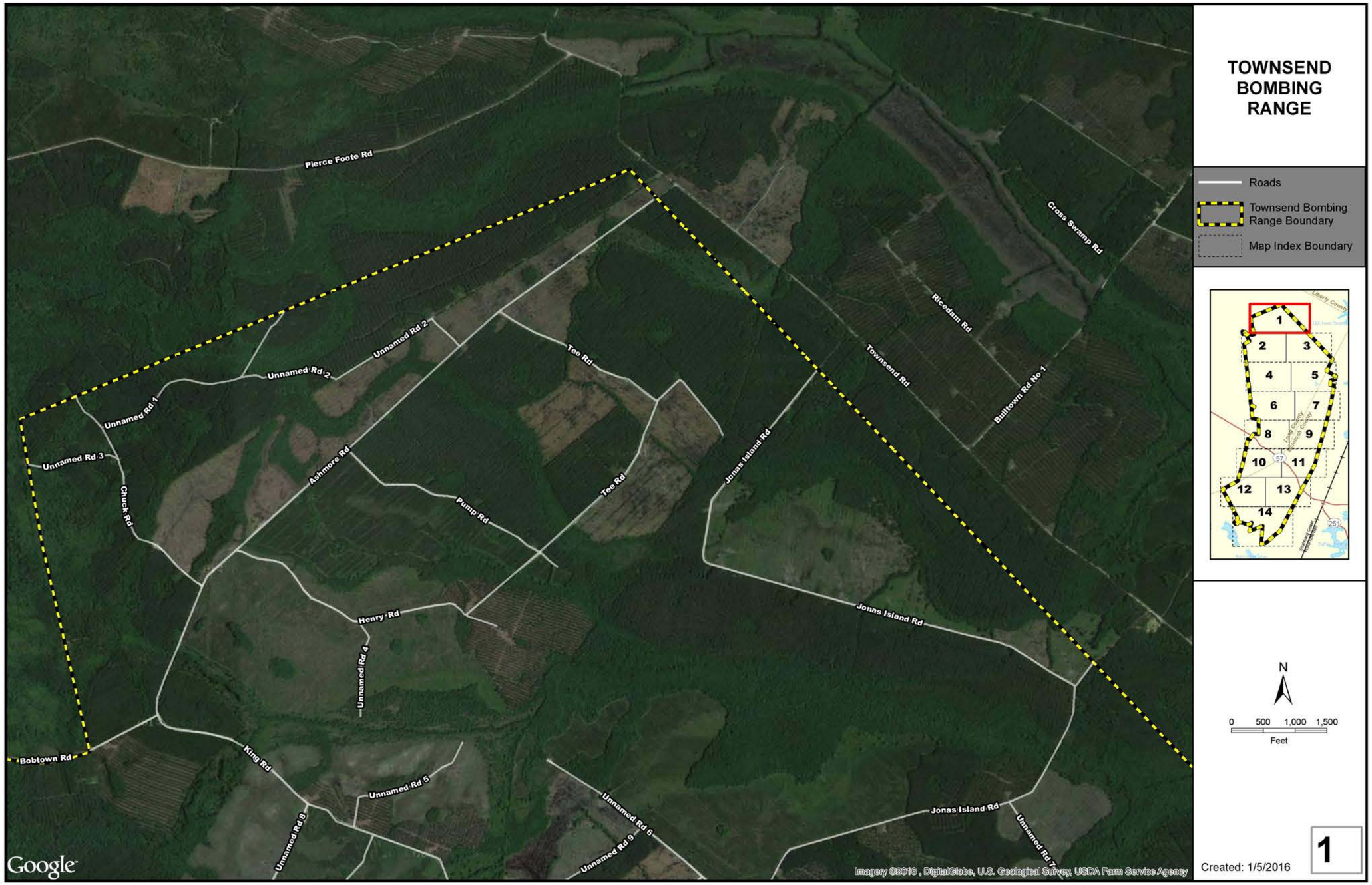

Figure 5-2. TBR Map #1

Figure 5-3. TBR Map #2

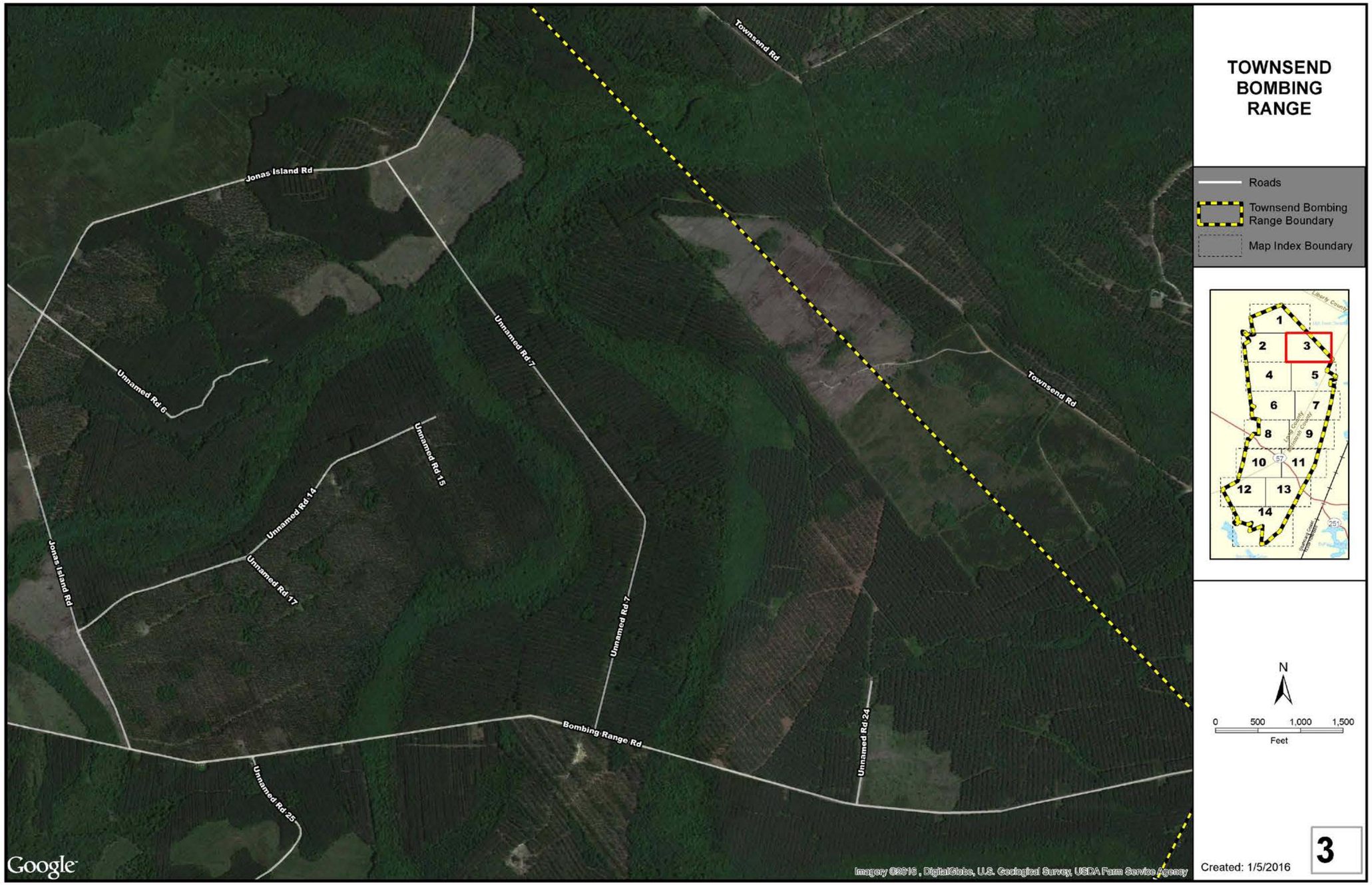

Figure 5-4. TBR Map #3

Figure 5-5. TBR Map #4

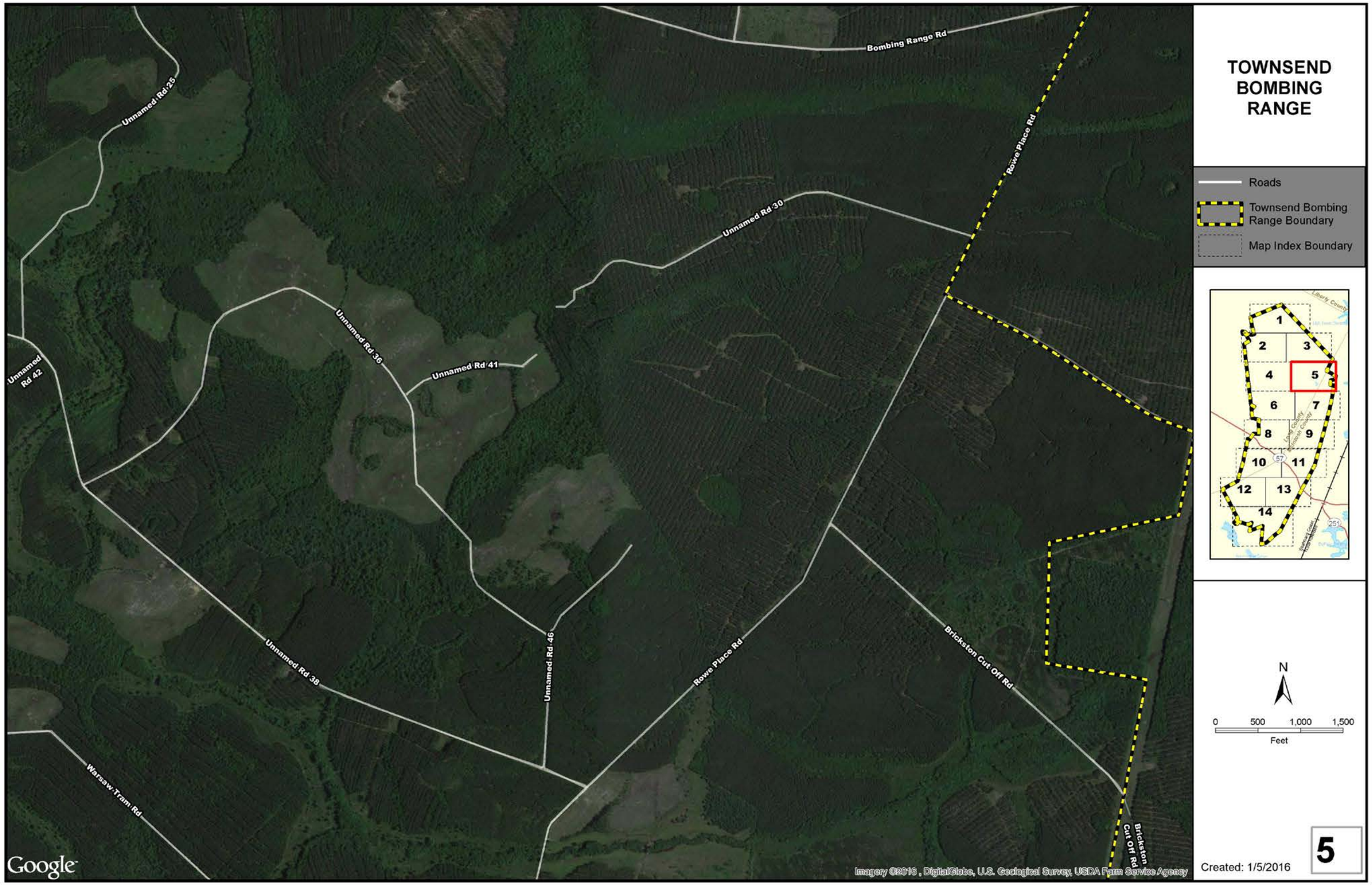

Figure 5-6. TBR Map #5

Figure 5-7. TBR Map #6

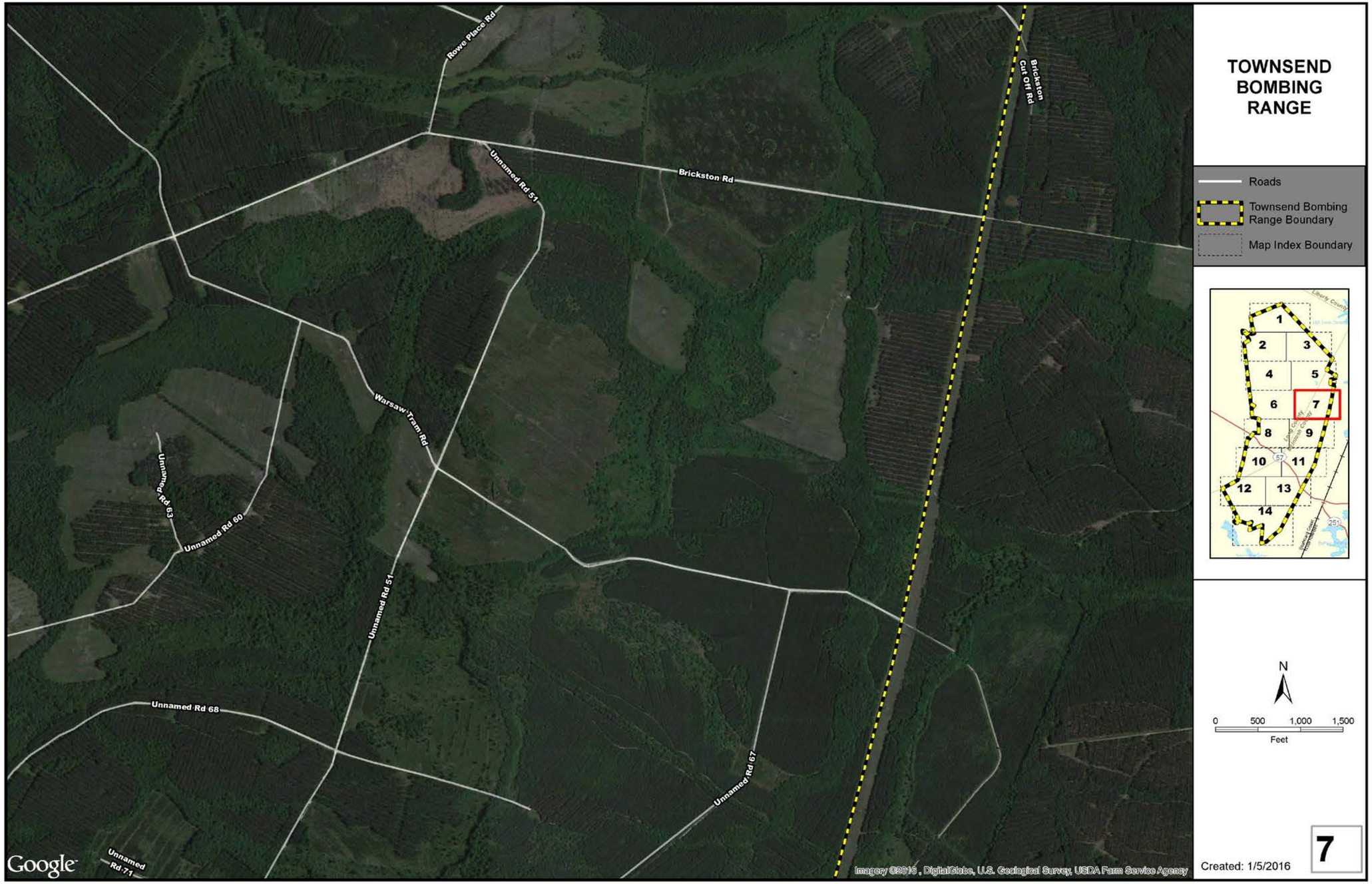

Figure 5-8. TBR Map #7

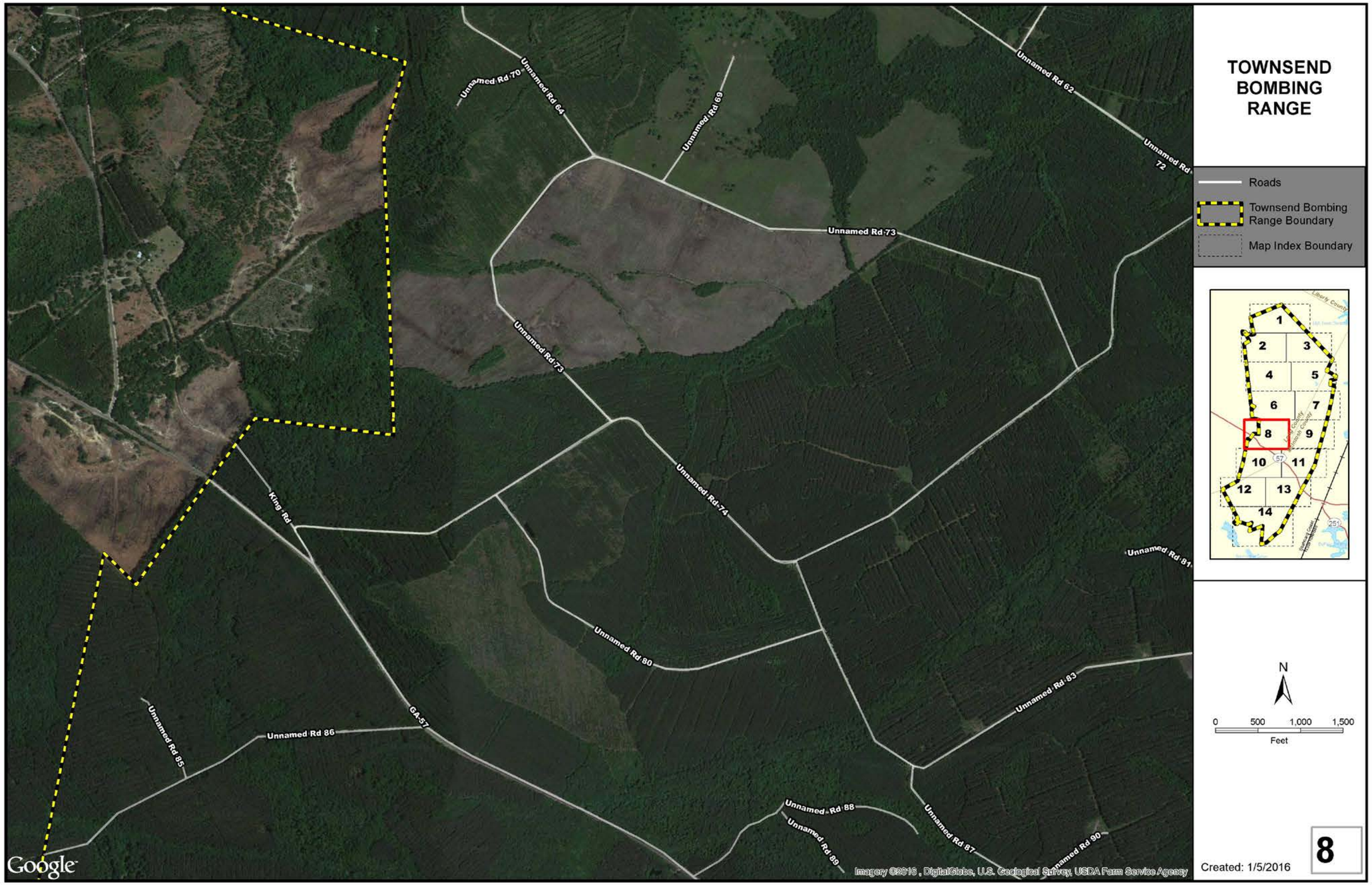

Figure 5-9. TBR Map #8

Figure 5-10. TBR Map #9

Figure 5-11. TBR Map #10

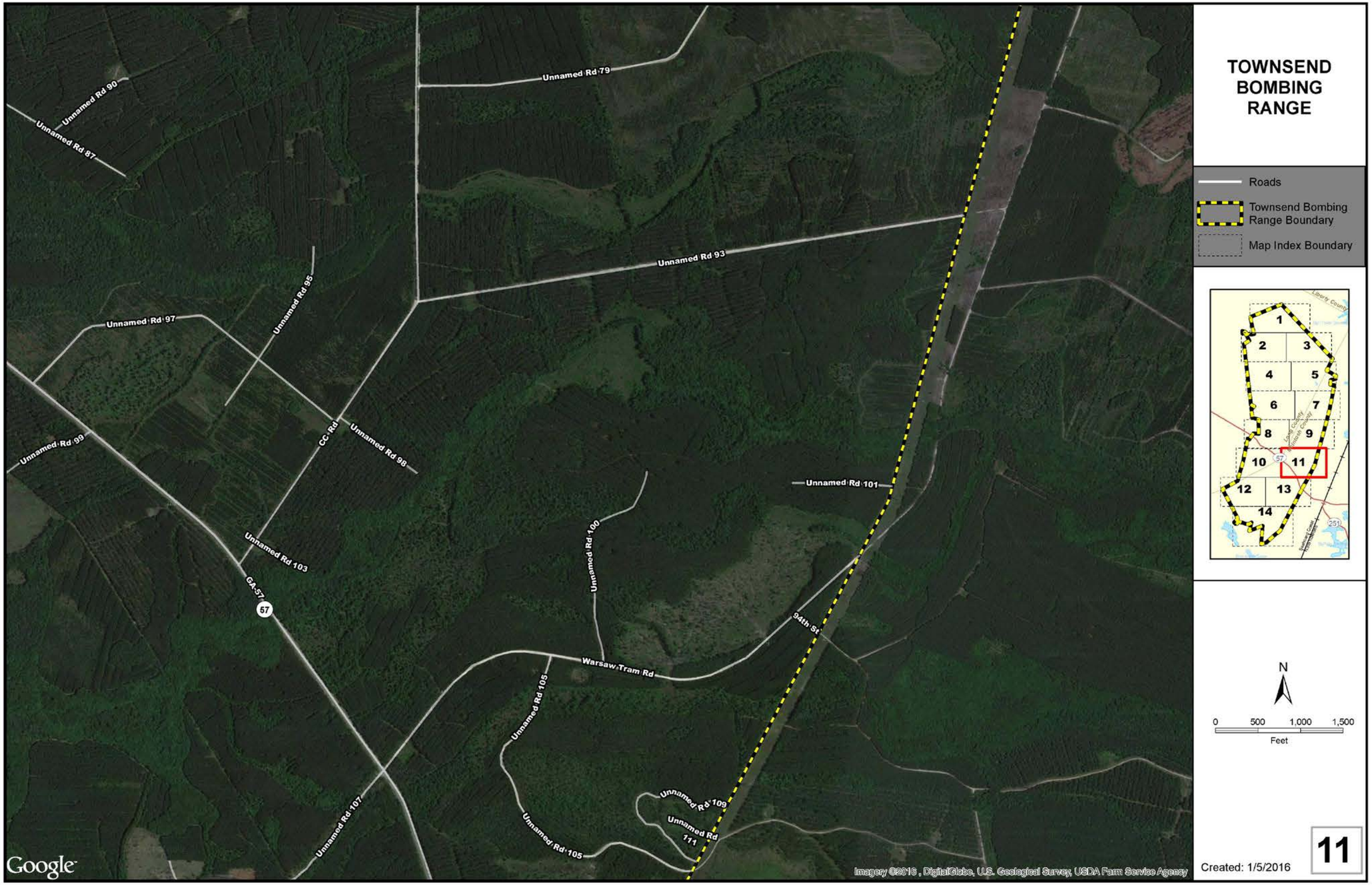

Figure 5-12. TBR Map #11

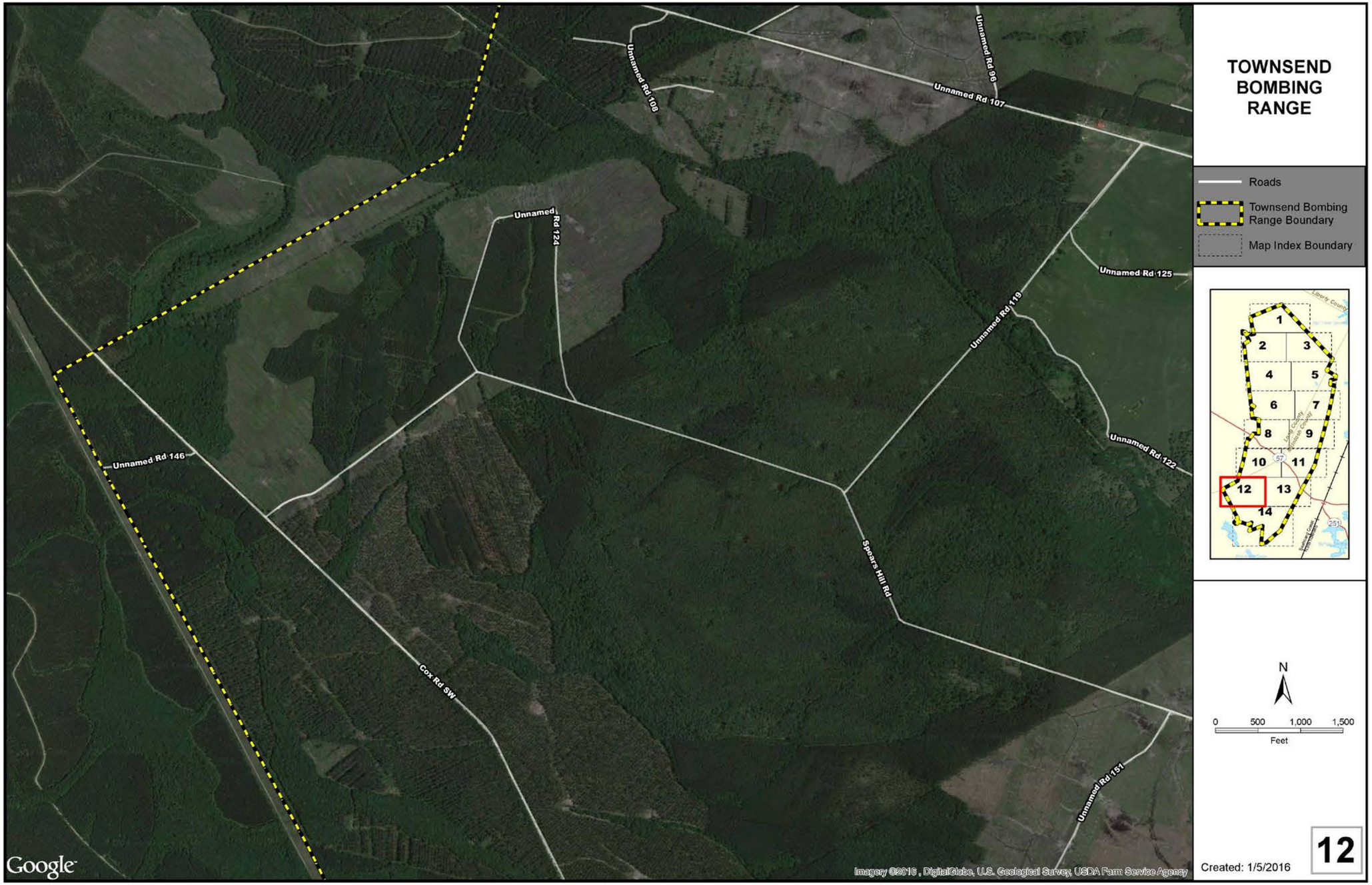

Figure 5-13. TBR Map #12

Figure 5-14. TBR Map #13

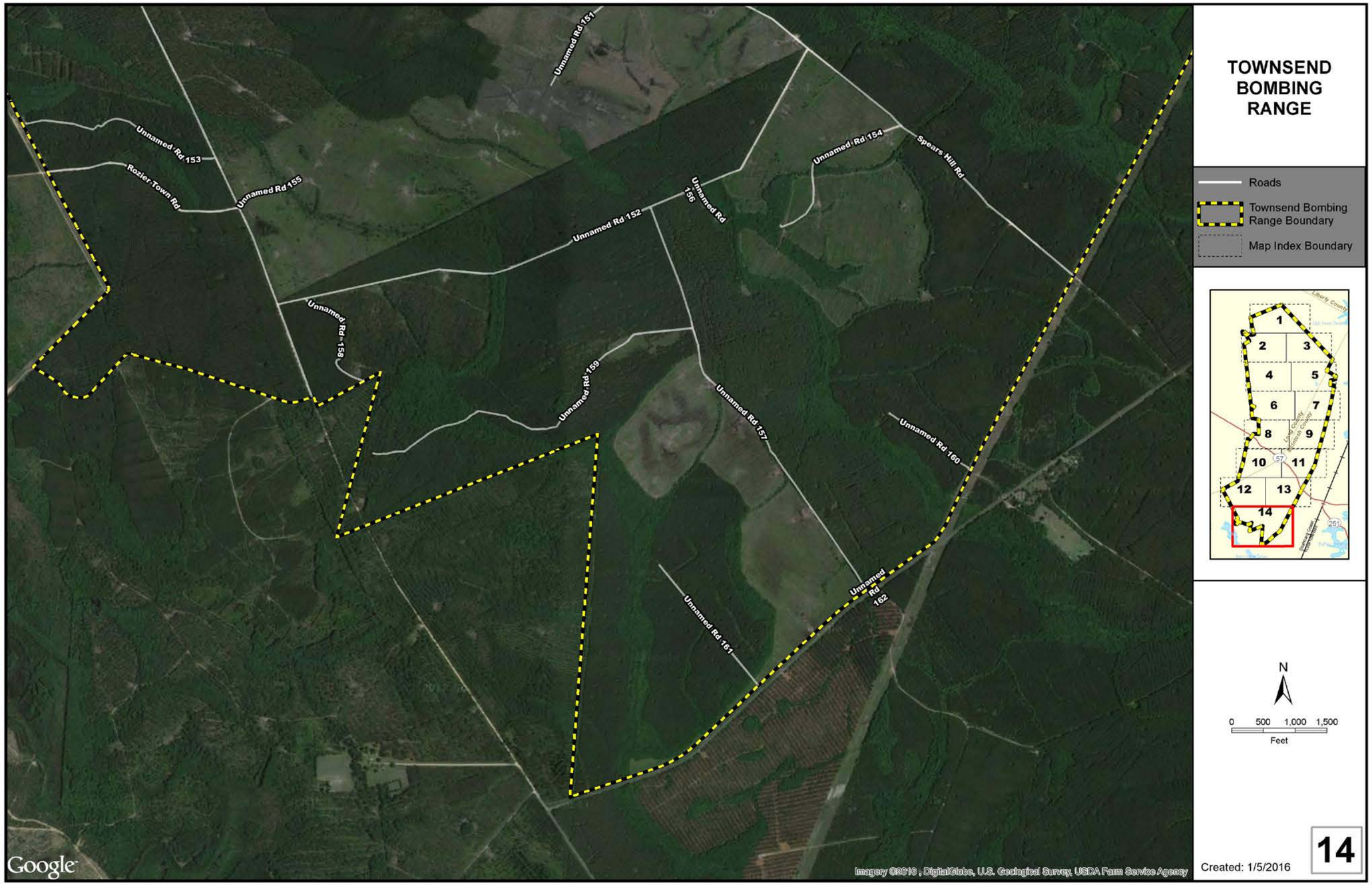

Figure 5-15. TBR Map #14

Street Index

Street Name	Page Number								
94th St	11	Unnamed Rd 17	3	Unnamed Rd 54	6	Unnamed Rd 91	10	Unnamed Rd 128	13
Ashmore Rd	1	Unnamed Rd 18	2	Unnamed Rd 55	6	Unnamed Rd 92	10	Unnamed Rd 129	13
Bombing Range Rd	2,3,4	Unnamed Rd 19	2	Unnamed Rd 56	6	Unnamed Rd 93	11	Unnamed Rd 130	13
Brickston Cut Off Rd	5	Unnamed Rd 20	2	Unnamed Rd 57	6	Unnamed Rd 94	10	Unnamed Rd 131	13
Brickston Rd	6,7	Unnamed Rd 21	2	Unnamed Rd 58	6	Unnamed Rd 95	11	Unnamed Rd 132	13
CC Rd	9,11	Unnamed Rd 22	2	Unnamed Rd 59	6	Unnamed Rd 96	10,12	Unnamed Rd 133	13
Chuck Rd	1	Unnamed Rd 23	2	Unnamed Rd 60	6,7	Unnamed Rd 97	11	Unnamed Rd 134	13
Cox Rd SW	12,14	Unnamed Rd 24	3	Unnamed Rd 61	6	Unnamed Rd 98	11	Unnamed Rd 135	13
GA-57	8,10,11,13	Unnamed Rd 25	3,5	Unnamed Rd 62	6,8	Unnamed Rd 99	10, 11	Unnamed Rd 136	13
Henry Rd	1	Unnamed Rd 26	2,4	Unnamed Rd 63	7	Unnamed Rd 100	11	Unnamed Rd 137	13
Hope Island Cemetery Rd	4	Unnamed Rd 27	2,4	Unnamed Rd 64	6,8	Unnamed Rd 101	11	Unnamed Rd 138	13
Jonas Island Rd	1,3	Unnamed Rd 28	4	Unnamed Rd 65	6	Unnamed Rd 102	10	Unnamed Rd 139	13
Jones Rd	9	Unnamed Rd 29	4	Unnamed Rd 66	6	Unnamed Rd 103	11	Unnamed Rd 140	13
King Rd	1,2,4,6,8	Unnamed Rd 30	5	Unnamed Rd 67	7,9	Unnamed Rd 104	10	Unnamed Rd 141	13
Nunnery Rd	2	Unnamed Rd 31	4	Unnamed Rd 68	6,7,9	Unnamed Rd 105	11,13	Unnamed Rd 142	13
Pump Rd	1	Unnamed Rd 32	4	Unnamed Rd 69	6,8	Unnamed Rd 106	10	Unnamed Rd 143	13
Rowe Place Rd	5,7	Unnamed Rd 33	4	Unnamed Rd 70	8	Unnamed Rd 107	10,11,12,13	Unnamed Rd 144	13
Rozier Town Rd	14	Unnamed Rd 34	4,6	Unnamed Rd 71	9	Unnamed Rd 108	10, 12	Unnamed Rd 145	13
Spears Hill Rd	12,13,14	Unnamed Rd 35	4	Unnamed Rd 72	8,9	Unnamed Rd 109	11, 13	Unnamed Rd 146	12
Steel Bridge Rd.	13	Unnamed Rd 36	5	Unnamed Rd 73	8	Unnamed Rd 110	10	Unnamed Rd 147	13
Tee Rd	1	Unnamed Rd 37	4	Unnamed Rd 74	8,9	Unnamed Rd 111	11,13	Unnamed Rd 148	13
Unnamed Rd 1	1	Unnamed Rd 38	4,5	Unnamed Rd 75	9	Unnamed Rd 112	12,13	Unnamed Rd 149	13
Unnamed Rd 2	1	Unnamed Rd 39	4	Unnamed Rd 76	9	Unnamed Rd 113	12	Unnamed Rd 150	13
Unnamed Rd 3	1	Unnamed Rd 40	4	Unnamed Rd 77	9	Unnamed Rd 114	13	Unnamed Rd 151	12, 14
Unnamed Rd 4	1	Unnamed Rd 41	5	Unnamed Rd 78	9	Unnamed Rd 115	13	Unnamed Rd 152	13, 14
Unnamed Rd 5	2	Unnamed Rd 42	4,5	Unnamed Rd 79	9,11	Unnamed Rd 116	13	Unnamed Rd 153	14
Unnamed Rd 6	2,3	Unnamed Rd 43	4	Unnamed Rd 80	8	Unnamed Rd 117	13	Unnamed Rd 154	14
Unnamed Rd 7	3	Unnamed Rd 44	4	Unnamed Rd 81	8,9	Unnamed Rd 118	13	Unnamed Rd 155	14
Unnamed Rd 8	2	Unnamed Rd 45	4	Unnamed Rd 82	9	Unnamed Rd 119	12	Unnamed Rd 156	14
Unnamed Rd 9	2	Unnamed Rd 46	5	Unnamed Rd 83	8,9	Unnamed Rd 120	13	Unnamed Rd 157	14
Unnamed Rd 10	2	Unnamed Rd 47	4	Unnamed Rd 84	9	Unnamed Rd 121	13	Unnamed Rd 158	14
Unnamed Rd 11	2	Unnamed Rd 48	4	Unnamed Rd 85	8	Unnamed Rd 122	12,13	Unnamed Rd 159	14
Unnamed Rd 12	2	Unnamed Rd 49	4,6	Unnamed Rd 86	8,10	Unnamed Rd 123	13	Unnamed Rd 160	14
Unnamed Rd 13	2,4	Unnamed Rd 50	6	Unnamed Rd 87	8,10,11	Unnamed Rd 124	12	Unnamed Rd 161	14
Unnamed Rd 14	3	Unnamed Rd 51	7,9	Unnamed Rd 88	8, 10	Unnamed Rd 125	12	Unnamed Rd 162	14
Unnamed Rd 15	3	Unnamed Rd 52	6	Unnamed Rd 89	8, 10	Unnamed Rd 126	13	Warsaw Tram Rd	4,5,7,11
Unnamed Rd 16	2	Unnamed Rd 53	6	Unnamed Rd 90	11	Unnamed Rd 127	13		

Figure 5-16. TBR Road Name Index

APPENDIX I

LONG COUNTY COMMUNITY WILDFIRE PROTECTION PLAN

Community Wildfire Protection Plan

An Action Plan for Wildfire Mitigation and Conservation of Natural Resources

Long County, Georgia

A Program of the Georgia Forestry Commission
with support from the U.S. Forest Service

SEPT 23, 2013

Prepared by;
David Duke, Chief Ranger Long County
Will Fell CWPP Specialist
Georgia Forestry Commission
1128 US Hwy 84 East
Ludowici GA 31316

The following report is a collaborative effort among various entities; the representatives listed below comprise the core decision-making team responsible for this report and mutually agree on the plan's contents:

Richard Truman
Chief Ludowici/Long County Fire Department
(912) 545-2244
chief101llcfd@yahoo.com

Darrell Ballance
Former Director Long Co EMA
gdballance@gmail.com

David Duke
Chief Ranger, Long Co Forestry Unit
(912) 545-2247
dduke@gfc.state.ga.us

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Long County Wildfire Pre-suppression Plan

NFPA 1141 Standard for Fire Protection Infrastructure for Land Development in Suburban and Rural Areas.

Preface

The extreme weather conditions that are conducive to wildfire disasters (usually a combination of extended drought, low relative humidity and high winds) can occur in this area of Georgia as infrequently as every 10-15 years. This is not a regular event, but as the number of homes that have been built in or adjacent to forested or wildland areas increases, it can turn a wildfire under these weather conditions into a major disaster. Wildfires move fast and can quickly overwhelm the resources of even the best equipped fire department. Advance planning can save lives, homes and businesses.

This Community Wildfire Protection Plan (CWPP) includes a locally assessed evaluation of the wildland urban interface areas of the county, looking at the critical issues regarding access to these areas, risk to properties from general issues such as building characteristics and "fire wise" practices and response from local fire fighting resources. It further incorporates a locally devised action plan to mitigate these risks and hazards though planning, education and other avenues that may become available to address the increasing threat of wildland fire. The CWPP does not obligate the county financially in any way, but instead lays a foundation for improved emergency response if and when grant funding is available to the county.

The Plan is provided at no cost to the county and can be very important for county applications for hazard mitigation grant funds through the National Fire Plan, FEMA mitigation grants and Homeland Security. Under the Healthy Forest Restoration Act (HFRA) of 2003, communities (counties) that seek grants form the federal government for hazardous fuels reduction work are required to prepare a Community Wildfire Protection Plan.

This plan will:

- Enhance public safety
- Raise public awareness of wildfire hazards and risks
- Educate homeowners on how to reduce home ignitability
- Build and improve collaboration at multiple levels

The public does not have to fall victim to this type of disaster. Homes (and communities) can be designed, built and maintained to withstand a wildfire even in the absence of fire equipment and firefighters on the scene. It takes planning and commitment at the local level before the wildfire disaster occurs and that is what the Community Wildfire Protection Plan is all about.

I. OBJECTIVES

The mission of the following report is to set clear priorities for the implementation of wildfire mitigation in Long County. The plan includes prioritized recommendations for the appropriate types and methods of fuel reduction and structure ignitability reduction that will protect this community and its essential infrastructure. It also includes a plan for wildfire suppression. Specifically, the plan includes community-centered actions that will:

- Educate citizens on wildfire, its risks, and ways to protect lives and properties,
- Support fire rescue and suppression entities,
- Focus on collaborative decision-making and citizen participation,
- Develop and implement effective mitigation strategies, and
- Develop and implement effective community ordinances and codes.

II. COMMUNITY COLLABORATION

The core team convened on March 8th, 2013 to assess risks and develop the Community Wildfire Protection Plan. The group is comprised of representatives from local government, local fire authorities, and the state agency responsible for forest management. Below are the groups included in the task force:

Long County Government

Ludowici/Long County Fire Department
Emergency Management

Georgia Forestry Commission

It was decided to identify general risks to WUI exposed communities in the county. We discussed these risks and hazards for the purpose of completing the following:

Risk Assessment	Assessed wildfire hazard risks and prioritized mitigation actions.
Fuels Reduction	Identified strategies for coordinating fuels treatment projects.
Structure Ignitability	Identified strategies for reducing the ignitability of structures within the Wildland interface.
Emergency Management	Forged relationships among local government and fire districts and developed/refined a pre-suppression plan.
Education and Outreach	Developed strategies for increasing citizen awareness and action and to conduct homeowner and community leader workshops.

III. COMMUNITY BACKGROUND AND EXISTING SITUATION

Background

Long County

On August 14, 1920, the state legislature proposed a constitutional amendment to create Long County from Liberty County, one of the original eight Georgia counties established in 1777 from the colonial parishes. On November 2, 1920, Georgia voters ratified the proposed amendment and Long County became Georgia's 159th county. Long County was named for Crawford Long, a doctor credited with introducing ether as an anesthesia during a surgical operation at Jefferson on March 30, 1842. Located in southeast Georgia, Long County occupies 400 square miles of the Atlantic Coast Flatwoods. The county is bordered by Liberty, McIntosh, Tattnall, and Wayne counties, and its entire southwestern boundary runs along the Altamaha River.

History

Originally the western portion of St. John's Parish, the land along the Altamaha River (earlier spelled "Alatamaha") was an important frontier boundary protecting the Georgia colony from the Spanish and Native Americans to the south and west. General James Oglethorpe established a series of forts, including Beards Bluff Fort and Fort Barrington, along the river for protection. Paths developed by Creek Indians became the first roads, including the Old Barrington Road, which was also known as the Old Post Road because it was part of the first postal route from Savannah into Florida. Inns, including Archibald Baggs's home, the Sandiford Inn, and Timothy Barnard's trading post at Beards Creek, accommodated travelers along these paths. The county seat of Ludowici began in the 1840s as a stop known as "Four and a Half" on the Atlantic and Gulf Railroad.

Around 1850, landowner Allen Johnston built his home near the railroad. A station was built across the tracks, and a small village developed known as Johnston Station. In 1903 William Ludowici established the "Dixie" plant of his Ludowici Celadon Company at Johnston Station, which he chose for the area's quality ceramic clays and transportation facilities. Ludowici donated money toward the construction of a new schoolhouse in 1905, and in his honor the citizens renamed the town Ludowici. It was incorporated that same year. Briefly during World War I (1917-18), the town was called Liberty City due to the prevailing anti-German sentiment of the time. The two-story, red-tiled school was eventually demolished for a modern school building where, today, Long County operates a public school for grades kindergarten through twelve.

Government and Economy

Long County is managed by a traditional commission government from Ludowici, which remains the only incorporated municipality in the county. The two-story brick courthouse was completed in 1926.
Designed by G. M. Harrington, the Neoclassical Revival building is listed on the National Register of Historic Places. The legal organ of the government is the Ludowici News. Long

County, historically and currently, is a rural, agricultural area. The principal farm crop was once cotton, but by the 1970s it had been replaced by tobacco, corn, soybeans, and cattle. The pine forests of the region have always played an important role in the economy. Frontiersmen settling along the Altamaha River fastened logs together to form rafts that were floated downstream to the port of Darien for export, a practice that continued through the nineteenth century. During the twentieth century, five large paper mills opened within a fifty-mile radius of Ludowici, and Long County's economy was dramatically improved by new employment opportunities and a new demand for timberlands. The northern tip of the county is occupied by Fort Stewart, the largest military installation east of the Mississippi River. Covering 280,000 acres (spread over several counties), the post, which includes forestlands and hunting preserves, provides many civil service jobs to local residents. Altamaha Technical College, which offers workforce training, operates a satellite campus in Ludowici.

Highlights

Annual events held in Long County include Old South Farm Days in March, the Catfish Festival in April, and the Long County Wildlife Festival in October. Points of interest include the Ludowici Well Pavilion (1907), an important social meeting place for the county and a National Register of Historic Places site, and Jones Creek Baptist Church (1856) and Walthourville Presbyterian Church (1884), both state historic sites.
The Altamaha River provides such recreational opportunities as fishing, boating, and water sports. A marble monument near the southern border of the county honors the lost Franklinia alatamaha, a flowering plant discovered by royal botanists John and William Bartram in 1765. The plant was last seen growing in the wild near the Altamaha River in 1803.
According to the 2000 U.S. census, Long County's population was 10,304, a 66 percent increase over the 1990 population and more than twice the population of the county after its first decade of existence. In 2010 the population increased again to 14,464.

(Courtesy Luciana M Spracher, ***New Georgia Encyclopedia***)

Existing Situation

Long County located in southeast Georgia is one of the most heavily forested counties in the state. Despite its largely rural character it has experienced a significant amount of population growth in recent years largely from people spilling over from adjacent areas such as Hinesville/Ft Stewart, nearby cities such as Savannah and retirees looking for a quiet place in the country. Growing from a population of 4,524 in 1980 to an estimated 16,408 in 2012, most of this growth has occurred outside of the traditional urban confines of the only city in the county, Ludowici (current pop 1703).

Perhaps with the exception of the large blocks of woodlands adjacent the Altamaha River and in the large industrial timberland holdings of eastern Long County, there are homes and small communities scattered throughout the county. The risks and hazards from the wildland urban interface are fairly general and substantial throughout the county even on the edges of Ludowici and adjacent Waltourville in Liberty County. Conventional wisdom would indicate that the threat to these homes would decrease with the counties rapid growth, however just the opposite is occurring. Homes are increasingly being built out in the wildland interface. Additionally many acres of previously cultivated land have reverted and still are to wildland, much of it through the replanting of pine plantations under a number of conservation programs. As these plantations come out from the program, a number are being converted to home sites exposed to potential high risk to wildfire.

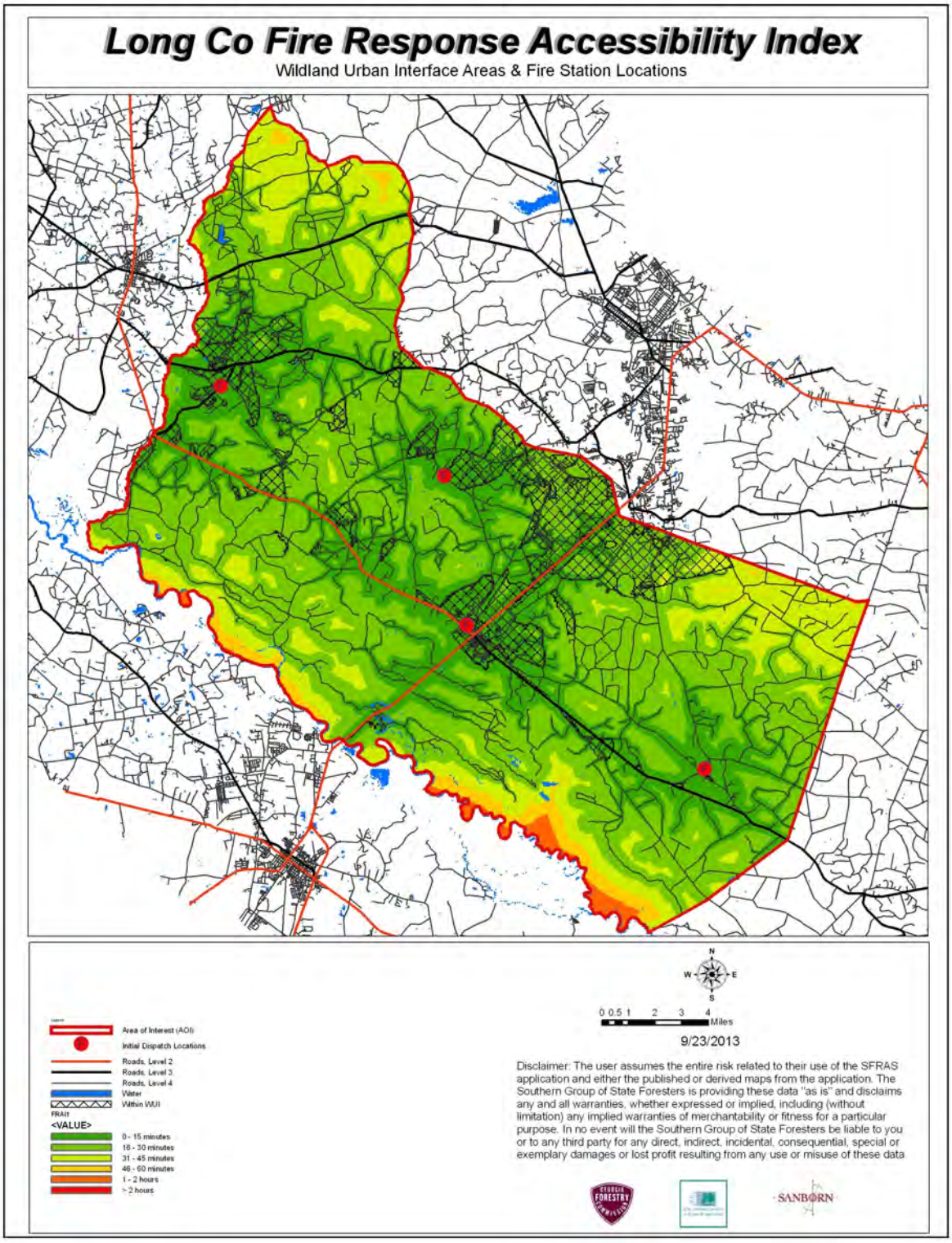
Structural protection is provided in the county by the Ludowici/Long County Fire Department, with six well spaced volunteer stations. The Georgia Forestry Commission maintains a county protection unit located just north of Ludowici on Hwy 84 to respond to wildfires throughout the county. The city of Ludowici and some adjacent areas of the county are serviced by a pressurized water system with hydrants available.

Over the past fifty six years, Long County has averaged 73 reported wildland fires per year, burning an average of 513 acres per years. Using more recent figures over the past 20 years, this number has declined somewhat to an average of 63 fires per year burning 708 acres annually. While there has been a decrease in numbers and acres in recent years, there has been about a 38% increase in the average size as the wildland fuel loads have increased with the diminished use of prescribed burning.

Over the past 20 years, the leading causes of these fires were debris burning, 36% and arson 35% of the fires and 60% and 19% of the acres burned.

Georgia Forestry Commission Wildfire Records show that in the past nine years, 18 homes have been lost or damaged by wildfire in Long County resulting in estimated losses of $416,500 along with 34 outbuildings valued at $627,500. According to reports during this period 523 homes have been directly or indirectly threatened by these fires. Additionally 17 motor vehicles values at $211,000 and eleven other pieces of mechanized equipment valued at $270,500 were lost. This is a substantial loss of non timber property attributed to wildfires in Long County.

IV. COMMUNITY BASE MAP



V. COMMUNITY WILDFIRE RISK ASSESSMENT

The Wildland-Urban Interface

There are many definitions of the Wildland-Urban Interface (WUI), however from a fire management perspective it is commonly defined as an area where structures and other human development meet or intermingles with undeveloped wildland or vegetative fuels. As fire is dependent on a certain set of conditions, the National Wildfire Coordinating Group has defined the wildland-urban interface as a set of conditions that exists in or near areas of wildland fuels, regardless of ownership. This set of conditions includes type of vegetation, building construction, accessibility, lot size, topography and other factors such as weather and humidity. When these conditions are present in certain combinations, they make some communities more vulnerable to wildfire damage than others. This "set of conditions" method is perhaps the best way to define wildland-urban interface areas when planning for wildfire prevention, mitigation, and protection activities.

There are three major categories of wildland-urban interface. Depending on the set of conditions present, any of these areas may be at risk from wildfire. A wildfire risk assessment can determine the level of risk.

1. "Boundary" wildland-urban interface is characterized by areas of development where homes, especially new subdivisions, press against public and private wildlands, such as private or commercial forest land or public forests or parks. This is the classic type of wildland-urban interface, with a clearly defined boundary between the suburban fringe and the rural countryside.

2. "Intermix" wildland-urban interface areas are places where improved property and/or structures are scattered and interspersed in wildland areas. These may be isolated rural homes or an area that is just beginning to go through the transition from rural to urban land use.

3. "Island" wildland-urban interface, also called occluded interface, are areas of wildland within predominately urban or suburban areas. As cities or subdivisions grow, islands of undeveloped land may remain, creating remnant forests. Sometimes these remnants exist as parks, or as land that cannot be developed due to site limitations, such as wetlands.
(courtesy ***Fire Ecology and Wildfire Mitigation in Florida*** 2004)

Wildland Urban Interface Hazards

Firefighters in the wildland urban interface may encounter hazards other than the fire itself, such as hazardous materials, utility lines and poor access.

Hazardous Materials

- Common chemicals used around the home may be a direct hazard to firefighters from a flammability, explosion potential and/or vapors or off gassing. Such chemicals include paint, varnish and other flammable liquids, fertilizer, pesticides, cleansers, aerosol cans, fireworks, batteries and ammunition. In addition, some common household products such as plastics may give off very toxic fumes when they burn. Stay out of smoke from burning structures and any unknown sources such as trash piles.

Illicit Activities

- Marijuana plantations or drug production labs may be found in the wildland urban interface areas. Extremely hazardous materials such as propane tanks and flammable/toxic chemicals may be encountered.

Propane Tanks

- Both large (household size) and small (gas grill size) liquefied propane gas (LPG) tanks can present hazards to firefighters, including explosion. See the “LPG Tank Hazards” discussion for details

Utility Lines

- Utility Lines may be located above and below ground and may be cut or damaged by tools or equipment. Don’t spray water on utility lines or boxes.

Septic Tanks and Fields

- Below ground structures may not be readily apparent and may not support the weight of engines or other equipment.

New Construction Materials

- Many new construction materials have comparatively low melting points and may “off-gas” extremely hazardous vapors. Plastic decking materials that resemble wood are becoming more common and may begin softening and losing structural strength at 180 degrees F, though they normally do not sustain combustion once direct flame is removed. However if they continue to burn they exhibit the characteristics of flammable liquids.

Pets and Livestock

- Pets and livestock may be left when residents evacuate and will likely be highly stressed making them more inclined to bite and kick. Firefighters should not put themselves at risk to rescue pets or livestock.

Evacuation Occurring

- Firefighters may be taking structural protect actions while evacuations of residents are occurring. Be very cautious of people driving erratically. Distraught residents may refuse to leave their property and firefighters may need to disengage from fighting fire to contact law enforcement officers for assistance. In most jurisdictions firefighters do not have the authority to force evacuations. Firefighters should not put themselves at risk trying to protect someone who will not evacuate!

Limited Access

- Narrow one-lane roads with no turn around room, inadequate or poorly maintained bridges and culverts are frequently found in wildland urban interface areas. Access should be sized up and an evacuation plan for all emergency personnel should be developed.

The wildland fire risk assessment discussions with the Ludowici/Long County Fire Department used the Hazard and Wildfire Risk Assessment Checklist as a guide. This protocol was developed looking at six areas of concern;

(1) Community Access looks at the number of entrances to the community, road width and condition, dead end roads, turn around areas along with road signs and address visibility.
(2) Surrounding Vegetation looks at the wildland fuels adjacent to and its closeness to structures.
(3) Building Construction looks at the flammability of roofing and siding materials and skirting or underpinning of structures.
(4) Fire Protection looks at the distance from staffed departments and the availability of supplemental water sources from pressurized hydrants, dry hydrants and drafting places.
(5) Utilities look at hazards to fire suppression equipment, both engines and forestry plow units from electrical service lines, propane tanks and unmarked septic tanks.
(6) Additional Factors consider large adjacent areas of wildlands, canal or ditch presence, closeness of structures, presence of undeveloped unmaintained lots, wildfire history in the area and the availability of homeowner associations to remediate issues.

The following factors were identified as issues for Long County:

- Narrow roads without drivable shoulders
- Inadequate driveway access
- Minimal defensible space around structures
- Homes with wooden siding
- Unmarked septic tanks in yards
- Lack of pressurized or non-pressurized water systems available
- Large, adjacent areas of forest or wildlands
- Heavy fuel buildup in adjacent wildlands
- Lack of prescribed burning in many areas of the county
- Undeveloped wildland areas mixed with widely scattered homes in many rural communities.
- High occurrence of wildfires in the several locations
- Lack of homeowner or community organizations

Southern Fire Risk Assessment System Maps.
The attached maps were generated from a computerized Geographical Information System (GIS) program developed by the Sanborn Company under contract from the Southern Group of State Foresters to model the various risks to life and property within the southeastern US. The program is known as the Southern Fire Risk Assessment System (SFRAS). It utilizes multiple layers of data developed cooperatively from the various states and the US Forest Service under the Southern Wildfire Risk Assessment (SWRA)

Wildland Urban Interface maps are developed using data from the SILVIS Lab at the University of Wisconsin at Madison. WUI is composed of both interface and intermix communities. In both interface and intermix communities, housing must meet or exceed a minimum density of one structure per 40 acres. Intermix communities are places where housing and vegetation intermingle. In intermix; wildland vegetation is continuous, more than 50 percent vegetation, in areas with more than one house per 40 acres. Interface communities are areas with housing in the vicinity of continuous vegetation. Interface areas have more than one house per 40 acres, have less than 50 percent vegetation, and are within 1.5 miles of an area (made up of one or more contiguous Census blocks) over 1,325 acres that is more than 75 percent vegetated. The minimum size limit ensures that areas surrounding small urban parks are not classified as interface WUI.

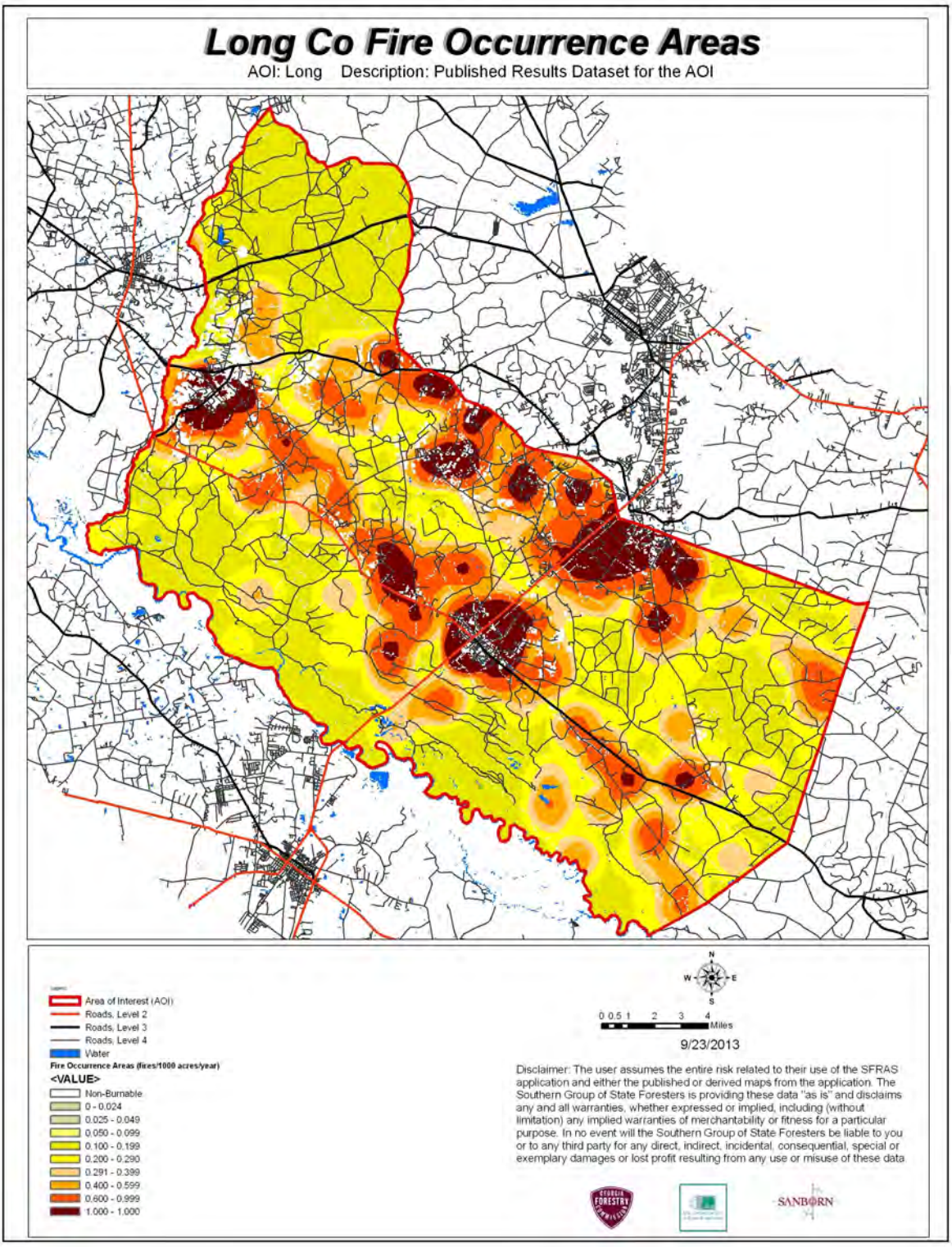
Fire Response Accessibility Index is a relative measure of how long it would take initial attack resources to drive from their station to various areas of the county. This index is derived from assigning average speeds to the various road classes in the county. For the purpose of this analysis the following speeds were assigned: 55 mph for level 1 roads, primarily interstates and four lane open highways, 50 mph for level 2 roads, primarily state and federal highways, 40 mph for level 3 roads, primarily paved two lanes collector roads and 25 mph for level 4 roads, mainly city streets and rural roads, paved and unpaved. For areas away from roads a travel speed of 3 mph is assigned as it is assumed travel will be by foot or extremely slow moving equipment.

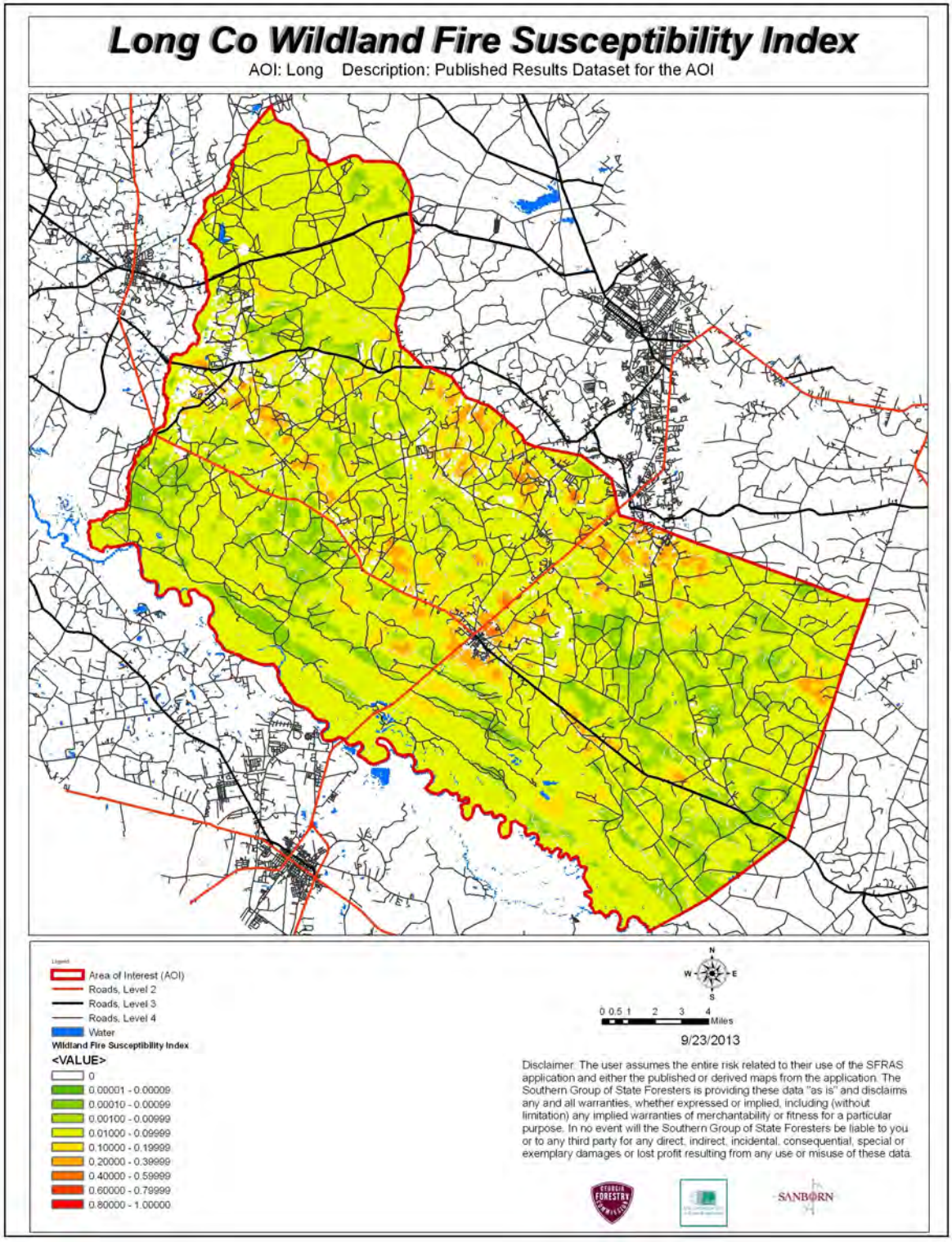
Fire Occurrence Areas maps use data from wildfire reports over the period from 1997-2002. The fire occurrence rates mapped are the probability of the number of fires occurring per 1000 acres per year base on this historic information.

Wildland Fire Susceptibility maps show an index value between 0 and 1 and are developed by a mathematical calculation process for determining the probability of an acre burning and the expected final fire size. Many layers of data are used in developing this calculation including historic fire data, wildland fuels and rate of spread, canopy attributes (closure, height and density), weather influences, topography, soils and fire suppression effectiveness.

Level of Concern maps are a complex calculation using the Wildland Fire Susceptibility Index (previously described) and the Fire Effects Index which is calculated using data layers of transportation and infrastructure, urban interface and timber values along with suppression difficulty ratings. This provides an output categorizing the expected levels of concern from low to high.

VI. COMMUNITY HAZARDS MAPS




Long Co Wildland Fire Susceptibility Index
AOI: Long Description: Published Results Dataset for the AOI
Area of Interest (AOI)
Roads, Level 2
Roads, Level 3
Roads, Level 4
Water
Wildland Fire Susceptibility Index
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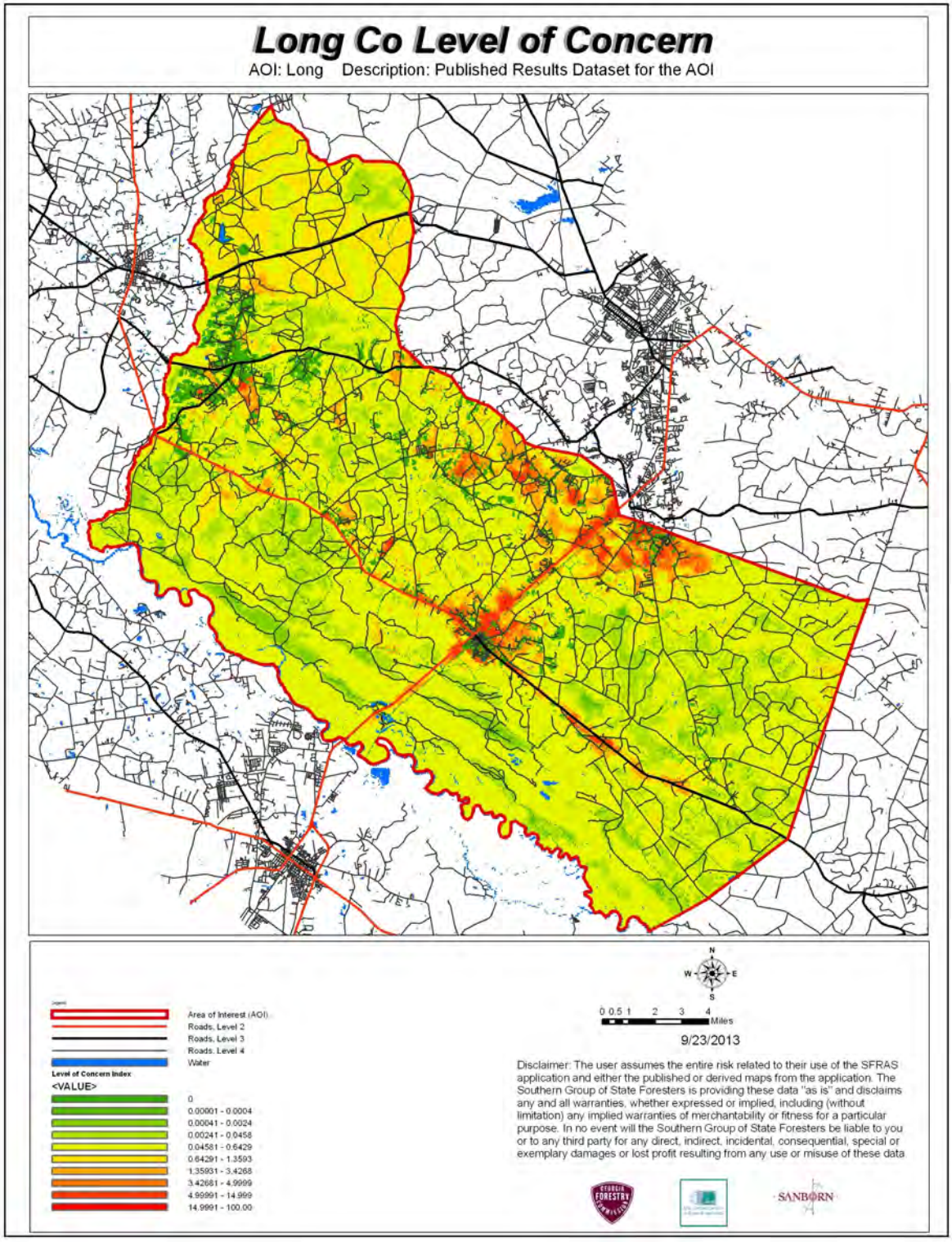
0.00010 - 0.00099
0.00100 - 0.00999
0.01000 - 0.09999
0.10000 - 0.19999
0.20000 - 0.39999
0.40000 - 0.59999
0.60000 - 0.79999
0.80000 - 1.00000
N
W
E
S
0 0.5 1 2 3 4
Miles
9/23/2013
Disclaimer: The user assumes the entire risk related to their use of the SFRAS application and either the published or derived maps from the application. The Southern Group of State Foresters is providing these data "as is" and disclaims any and all warranties, whether expressed or implied, including (without limitation) any implied warranties of merchantability or fitness for a particular purpose. In no event will the Southern Group of State Foresters be liable to you or to any third party for any direct, indirect, incidental, consequential, special or exemplary damages or lost profit resulting from any use or misuse of these data.
SANBORN


Long Co Level of Concern
AOI: Long Description: Published Results Dataset for the AOI
Area of Interest (AOI)
Roads, Level 2
Roads, Level 3
Roads, Level 4
Water
Level of Concern Index
<VALUE>
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0.00041 - 0.0024
0.00241 - 0.0458
0.04581 - 0.6429
0.64291 - 1.3593
1.35931 - 3.4268
3.42681 - 4.9999
4.99991 - 14.999
14.9991 - 100.00
N
W
E
S
0 0.5 1 2 3 4
Miles
9/23/2013
Disclaimer: The user assumes the entire risk related to their use of the SFRAS application and either the published or derived maps from the application. The Southern Group of State Foresters is providing these data "as is" and disclaims any and all warranties, whether expressed or implied, including (without limitation) any implied warranties of merchantability or fitness for a particular purpose. In no event will the Southern Group of State Foresters be liable to you or to any third party for any direct, indirect, incidental, consequential, special or exemplary damages or lost profit resulting from any use or misuse of these data
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VII. PRIORITIZED MITIGATION RECOMMENDATIONS

Executive Summary

As Southeast Georgia continues to see increased growth from other areas seeking less crowded and warmer climes, new development will occur more frequently on forest and wildland areas. Long County will have an opportunity to significantly influence the wildland fire safety of new developments. It is important that new development be planned and constructed to provide for public safety in the event of a wildland fire emergency.

Over the past 20 years, much has been learned about how and why homes burn during wildland fire emergencies. Perhaps most importantly, case histories and research have shown that even in the most severe circumstances, wildland fire disasters can be avoided. Homes can be designed, built and maintained to withstand a wildfire even in the absence of fire services on the scene. The National Firewise Communities program is a national awareness initiative to help people understand that they don't have to be victims in a wildfire emergency. The National Fire Protection Association has produced two standards for reference: NFPA 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire. 2008 Edition and NFPA 1141 Standard for Fire Protection Infrastructure for Land Development in Suburban and Rural Areas.

When new developments are built in the Wildland/Urban Interface, a number of public safety challenges may be created for the local fire services: (1) the water supply in the immediate areas may be inadequate for fire suppression; (2) if the Development is in an outlying area, there may be a longer response time for emergency services; (3) in a wildfire emergency, the access road(s) may need to simultaneously support evacuation of residents and the arrival of emergency vehicles; and (4) when wildland fire disasters strike, many structures may be involved simultaneously, quickly exceeding the capability of even the best equipped fire departments.

The following recommendations were developed by the Long County CWPP Core team as a result of surveying and assessing fuels and structures and by conducting meetings and interviews with county and city officials. A priority order was determined based on which mitigation projects would best reduce the hazard of wildfire in the assessment area.

Proposed Community Hazard and Structural Ignitability Reduction Priorities

Primary Protection for Community and Its Essential Infrastructure		
Treatment Area	Treatment Types	Treatment Method(s)
1. All Structures	Create minimum of 30-feet of defensible space**	Trim shrubs and vines to 30 feet from structures, trim overhanging limbs, replace flammable plants near homes with less flammable varieties, remove vegetation around chimneys.
2. Applicable Structures	Reduce structural ignitability**	Clean flammable vegetative material from roofs and gutters, store firewood appropriately, install skirting around raised structures, store water hoses for ready access, and replace pine straw and mulch around plantings with less flammable landscaping materials.
3. Community Clean-up Day	Cutting, mowing, pruning**	Cut, prune, and mow vegetation in shared community spaces.
4. Driveway Access	Right of Way Clearance	Maintain vertical and horizontal clearance for emergency equipment. See that adequate lengths of culverts are installed to allow emergency vehicle access.
5. Road Access	Identify needed road improvements	As roads are upgraded, widen to minimum standards with at least 50 foot diameter cul de sacs or turn arounds.
6. Codes and Ordinances	Examine existing codes and ordinances.	Amend and enforce existing building codes as they relate to skirting, propane tank locations, public nuisances (trash/debris on property), Property address marking standards and other relevant concerns Review Subdivision and development ordinances for public safety concerns. Enforce uniform addressing ordinance.
7. Burn Permits	Education and Enforcement	Greater Burn Permit enforcement and education from the Georgia Forestry Commission.

Proposed Community Wildland Fuel Reduction Priorities		
Treatment Area	Treatment Types	Treatment Method(s)
1. Adjacent WUI Lands	Reduce hazardous fuels	Encourage prescribed burning for private landowners and industrial timberlands particularly adjacent to residential areas. Seek grant for prescribed burning in WUI areas. Seek grant for WUI mitigation team.
2. Railroad Corridors	Reduce hazardous fuels	Encourage railroads to better maintain their ROW eliminating brush and grass through herbicide and mowing. Maintain firebreaks along ROW adjacent to residential areas.
3. Existing Fire Lines	Reduce hazardous fuels	Clean and re-harrow existing lines.
Proposed Improved Community Wildland Fire Response Priorities		
1. Water Sources	Dry Hydrants	Inspect, maintain and improve access to existing dry hydrants. Add signage along road to mark the hydrants. Locate additional dry hydrants as needed. Locate and pre-clear helicopter dip sites
2. Fire Stations	Equipment	Wildland hand tools. Lightweight Wildland PPE Gear.
3. Mapping	GIS	Up to date mapping of roads and water sources.
4. Road Names	Road Signage	Improved Road Signage at Crossroads. “Dead End” or “No Outlet” Tags on Road Signs
5. Personnel	Training	Obtain Wildland Fire Suppression training for Fire Personnel.
**Actions to be taken by homeowners and community stakeholders		

Proposed Education and Outreach Priorities

1. Conduct "How to Have a Firewise Home" Workshop for Long County Residents
Set up and conduct a workshop for homeowners that teach the principles of making homes and properties safe from wildfire. Topics for discussion include defensible space, landscaping, building construction, etc. Workshop will be scheduled for evenings or weekends when most homeowners are available and advertised through local media outlets. Target local schools, community groups and local senior centers. Distribute materials promoting firewise practices and planning through local community and governmental meetings.
2. Conduct "Firewise" Workshop for Community Leaders
Arrange for GFC Firewise program to work with local community leaders and governmental officials on the importance of "Firewise Planning" in developing ordinances and codes as the county as the need arises. Identify "Communities at Risk" within the county for possible firewise community recognition.
3. Spring Clean-up Event
Consider conducting an annual clean-up event in a selected high risk community involving the Georgia Forestry Commission, Ludowici/Long County Fire Department and community residents. Set up information table with educational materials and refreshments. Initiate the event with a morning briefing by GFC Firewise coordinator and local fire officials detailing plans for the day and safety precautions. Activities to include the following: • Clean flammable vegetative material from roofs and gutters • Trim shrubs and vines to 30 feet away from structures • Trim overhanging limbs • Clean hazardous or flammable debris from adjacent properties Celebrate the work with a community cookout, with Community officials, GFC and Ludowici/Long County Fire Department discussing and commending the work accomplished.
4. Informational Packets
Develop and distribute informational packets to be distributed by realtors and insurance agents. Included in the packets are the following: • Be Firewise Around Your Home • Firewise Guide to Landscape and Construction • Firewise Communities USA Bookmarks

5. Wildfire Protection Display
Create and exhibit a display for the general public at local events. Display can be independent or combined with the Georgia Forestry Commission display. Hold Open House at individual Fire Stations to promote Community Firewise Safety and develop community support and understanding of local fire departments and current issues.
6. Press
Invite the local news media to community “Firewise” functions for news coverage and regularly submit press releases documenting wildfire risk improvements in Long County.

VIII. ACTION PLAN

Roles and Responsibilities

The following roles and responsibilities have been developed to implement the action plan:

Role	Responsibility
Hazardous Fuels and Structural Ignitability Reduction	
Long County WUI Fire Council	Create this informal team or council comprised of residents, GFC officials, Ludowici/Long County Fire Department officials, a representative from the city and county governments along with the EMA Director for Long County. Meet periodically to review progress towards mitigation goals, appoint and delegate special activities, work with state, and local officials to assess progress and develop future goals and action plans. Work with residents to implement projects and firewise activities.
Key Messages to focus on	1 Defensible Space and Firewise Landscaping 2 Debris Burning Safety 3 Firewise information for homeowners 4 Prescribed burning benefits
Communications objectives	1 Create public awareness for fire danger and defensible space issues 2 Identify most significant human cause fire issues 3 Enlist public support to help prevent these causes 4 Encourage people to employ fire prevention and defensible spaces in their communities.
Target Audiences	1 Homeowners 2 Forest Landowners and users 3 Civic Groups 4 School Groups
Methods	1 News Releases 2 Radio and TV PSA's for area stations and cable access channels 3 Personal Contacts 4 Key messages and prevention tips 5 Visuals such as signs, brochures and posters

Spring Clean-up Day	
Event Coordinator	Coordinate day's events and schedule, catering for cookout, guest attendance, and moderate activities the day of the day of the event.
Event Treasurer	Collect funds from residents to cover food, equipment rentals, and supplies.
Publicity Coordinator	Advertise event through neighborhood newsletter, letters to officials, and public service announcements (PSAs) for local media outlets. Publicize post-event through local paper and radio PSAs.
Work Supervisor	Develop volunteer labor force of community residents; develop labor/advisory force from Georgia Forestry Commission, Ludowici/Long County Fire Department and Emergency Management Agency. Procure needed equipment and supplies. In cooperation with local city and county officials, develop safety protocol. Supervise work and monitor activities for safety the day of the event.

Funding Needs

The following funding is needed to implement the action plan:

Project	Estimated Cost	Potential Funding Source(s)
1. Create a minimum of 30 feet of defensible space around structures	Varies	Residents will supply labor and fund required work on their own properties.
2. Reduce structural ignitability by cleaning flammable vegetation from roofs and gutters; appropriately storing firewood, installing skirting around raised structures, storing water hoses for ready access, replacing pine needles and mulch around plantings with less flammable material.	Varies	Residents will supply labor and fund required work on their own properties.
3. Amend codes and ordinances to provide better driveway access, increased visibility of house numbers, properly stored firewood, minimum defensible space brush clearance, required Class A roofing materials and skirting around raised structures, planned maintenance of community lots.	No Cost	To be adopted by city and county governments.
4. Spring Cleanup Day	Varies	Community Business Donations.
5. Fuel Reduction Activities	$35/acre	FEMA & USFS Grants

POTENTIAL FUNDING SOURCES:

As funding is questionable in these times of tight government budgets and economic uncertainty, unconventional means should be identified whereby the need for funding can be reduced or eliminated.

Publications / Brochures –

- FIREWISE materials are available for cost of shipping only at www.firewise.org.
- Another source of mitigation information can be found at www.nfpa.org.
- Access to reduced cost or free of charge copy services should be sought whereby publications can be reproduced.
- Free of charge public meeting areas should be identified where communities could gather to be educated regarding prevention and firewise principles.

Mitigation –

- Community Protection Grant:
    - USFS sponsored prescribed burn program. Communities with at risk properties that lie within 3 miles of the USFS border may apply with the GFC to have their forest land prescribed burned free of charge.
- FEMA Mitigation Policy MRR-2-08-01: through GEMA - Hazard Mitigation Grant Program (HMGP) and Pre Disaster Mitigation (PDM)
    - To provide technical and financial assistance to local governments to assist in the implementation of long term cost effective hazard mitigation measures.
    - This policy addresses wildfire mitigation for the purpose of reducing the threat to all-risk structures through creating defensible space, structural protection through the application of ignition resistant construction, and limited hazardous fuels reduction to protect life and property.
    - With a complete and registered plan (addendum to the State plan) counties can apply for pre-mitigation funding. They will also be eligible for HMGP if the county is declared under a wildfire disaster.
- GFC - Plowing and burning assistance can be provided through the Georgia Forestry Commission as a low cost option for mitigation efforts.
- Individual Homeowners –
    - In most cases of structural protection ultimately falls on the responsibility of the community and the homeowner. They will bear the cost; yet they will reap the benefit from properly implemented mitigation efforts.
    - GEMA Grant - PDM (See above)

Ultimately it is our goal to help the communities by identifying the communities threatened with a high risk to wildfire and educate those communities on methods to implement on reducing those risks.

Assessment Strategy

To accurately assess progress and effectiveness for the action plan, the Long County WUI Fire Council will implement the following:

- Annual wildfire risk assessment will be conducted to re-assess wildfire hazards and prioritize needed actions.
- Mitigation efforts that are recurring (such as mowing, burning, and clearing of defensible space) will be incorporated into an annual renewal of the original action plan.
- Mitigation efforts that could not be funded in the requested year will be incorporated into the annual renewal of the original action plan.
- Continuing educational and outreach programs will be conducted and assessed for effectiveness. Workshops will be evaluated based on attendance and post surveys that are distributed by mail 1 month and 6 months following workshop date.
- The Long County WUI Council will publish an annual report detailing mitigation projects initiated and completed, progress for ongoing actions, funds received, funds spent, and in-kind services utilized. The report will include a "state of the community" section that critically evaluates mitigation progress and identifies areas for improvement. Recommendations will be incorporated into the annual renewal of the action plan.
- An annual survey will be distributed to residents soliciting information on individual mitigation efforts on their own property (e.g., defensible space). Responses will be tallied and reviewed at the next Long County WUI Council meeting. Needed actions will be discussed and delegated.

This plan should become a working document that is shared by local, state, and federal agencies that will use it to accomplish common goals. An agreed-upon schedule for meeting to review accomplishments, solve problems, and plan for the future should extend beyond the scope of this plan. Without this follow up this plan will have limited value

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APPENDIX J

MCINTOSH COUNTY COMMUNITY WILDFIRE PROTECTION PLAN

Community Wildfire Protection Plan

An Action Plan for Wildfire Mitigation and Conservation of Natural Resources

McIntosh County, Georgia

A Program of the Georgia Forestry Commission
with support from the U.S. Forest Service

APRIL 28, 2010

Prepared by;
Rusty Clark, Chief Ranger McIntosh County
Will Fell CWPP Specialist
Georgia Forestry Commission
1119 Jacks Bluff Rd
Townsend GA 31331

The following report is a collaborative effort among various entities; the representatives listed below comprise the core decision-making team responsible for this report and mutually agree on the plan's contents:

Boyd Gault
McIntosh County Commission Chair

Luther Smart
McIntosh County Manager

Mark Deverger
Chief McIntosh County Fire Dept

Ray Parker
McIntosh County EMA Director

Rusty Clark
Chief Ranger McIntosh County Forestry Unit

Ronnie Young
McIntosh County Public Works Director

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McIntosh County Wildfire Pre-suppression Plan

NFPA 1141 Standard for Fire Protection Infrastructure for Land Development in Suburban and Rural Areas.

I. OBJECTIVES

The mission of the following report is to set clear priorities for the implementation of wildfire mitigation in McIntosh County. The plan includes prioritized recommendations for the appropriate types and methods of fuel reduction and structure ignitability reduction that will protect this community and its essential infrastructure. It also includes a plan for wildfire suppression. Specifically, the plan includes community-centered actions that will:

- Educate citizens on wildfire, its risks, and ways to protect lives and properties,
- Support fire rescue and suppression entities,
- Focus on collaborative decision-making and citizen participation,
- Develop and implement effective mitigation strategies, and
- Develop and implement effective community ordinances and codes.

II. COMMUNITY COLLABORATION

The core team convened on November 19th, 2008 to assess risks and develop the Community Wildfire Protection Plan. The group is comprised of representatives from local government, local fire authorities, and the state agency responsible for forest management. Below are the groups included in the task force:

McIntosh County Government

Fire Department
Emergency Management
Board of County Commissioners

Georgia Forestry Commission

Georgia Department of Natural Resources.

US Fish and Wildlife Service.

It was decided to conduct community assessments on the basis of the on high risk communities and the individual fire districts in the county. The core team assessed the identified communities and districts and reconvened on May 8th, 2009 for the purpose of completing the following:

Risk Assessment	Assessed wildfire hazard risks and prioritized mitigation actions.
Fuels Reduction	Identified strategies for coordinating fuels treatment projects.
Structure Ignitability	Identified strategies for reducing the ignitability of structures within the Wildland interface.
Emergency Management	Forged relationships among local government and fire districts and developed/refined a pre-suppression plan.
Education and Outreach	Developed strategies for increasing citizen awareness and action and to conduct homeowner and community leader workshops.

III. COMMUNITY BACKGROUND AND EXISTING SITUATION

Background

McIntosh County, on the Georgia coast, was created from Liberty County by an act of the state legislature in 1793. The county was named for the McIntosh family, who were among the earliest Scottish Highlanders to settle the area three years after the founding of the Georgia colony. The most prominent member of this family was General Lachlan McIntosh, commander of Georgia forces in the Revolutionary War (1775-83) and a primary force in the colony's movement toward independence.

The earliest settlers in the lands that became McIntosh County were Guale Indians, followed by Spanish missionaries from about 1595 to 1686, both on the mainland and on nearby Sapelo Island. The first English presence was established by South Carolina Rangers, who built Fort King George in 1721. The first permanent settlement was a group of Highland Scots from Inverness, who, under the auspices of James Edward Oglethorpe, founded the town Darien in January 1736.

Darien was incorporated and made the seat of McIntosh County in 1816, during a period when the area began to prosper as a primary outlet for the shipment of upland-grown cotton conveyed to the port down the Altamaha River. During the antebellum period rice and Sea Island cotton plantations made McIntosh County one of the wealthiest sections of the south Atlantic coast. Rice shipments from the local Altamaha delta exceeded 6 million pounds in 1859, the peak year for exports. The leaders in the production of this valuable commodity were Pierce Butler, Jacob Barrett, and Robert B. Rhett. Meanwhile, the county's most prominent citizen of the time, Thomas Spalding of Sapelo Island, established one of the leading plantations of the antebellum South.

McIntosh County was devastated by Union military and naval action during the Civil War (1861-65). Darien, deserted and undefended, was sacked and burned by Union colonel Robert Gould Shaw and his 54th Massachusetts regiment in June 1863, and most of the county's river plantations were destroyed in a series of raids in 1862-64.

During Reconstruction, Tunis G. Campbell, an agent of the Freedmen's Bureau, became McIntosh County's first African American elected official, serving in the Georgia General Assembly as well as in various local positions. During his period of public service, Campbell did much to enhance educational and economic opportunities for McIntosh County's freed slaves.

McIntosh County was an international timber market for four decades after the Civil War. The volume of rafts of virgin yellow-pine timber floating down the Altamaha River from the interior of Georgia established Darien as the primary outlet for lumber and timber on the Atlantic coast. Sawmills and loading docks in the county provided employment for hundreds of local black citizens displaced by the war.

Sailing vessels and steamships from Europe, South America, and the Far East loaded cargoes of lumber processed at mills in and around Darien. Later, investments of northern capital further energized the county and led to the construction of a railroad into Darien in 1895. In 1900 an all-time record of more than 112 million board feet of lumber was processed and shipped overseas from McIntosh County.

By 1915 the Altamaha River timber supply was exhausted because of overcutting upriver from Darien, and the local timber trade was all but over by 1925. The demise of timber as an economic resource led numerous county citizens to seek their livelihoods from other sources—primarily the nearby Atlantic Ocean. In the first half of the twentieth century McIntosh County became a leading producer of seafood, especially oysters, shrimp, and crabs. By 1960 McIntosh had one of the largest shrimp-boat fleets on the south Atlantic coast, although the county's population was then only 6,364 residents. About 1975, however, the seafood industry entered a period of steady decline, brought about by rising operating costs and the increasing importation of cheaper foreign shrimp.

During World War II (1941-45) the U.S. Army operated an air training facility with concrete runways, barracks, and support facilities at Harris Neck in a remote section of McIntosh County, for the training of P-40 fighter pilots. The Coast Guard had submarine watch stations on Sapelo and Blackbeard islands. In 1953 the University of Georgia established its Marine Institute on Sapelo Island.

The county population, according to the 2000 U.S. census, was 10,847 (61.3 percent white, 36.8 percent black, and 0.9 percent Hispanic). The largest employers continue to be forestry and commercial fishing, although the area, including Sapelo Island, has become increasingly dependent on tourism.

(Courtesy *New Georgia Encyclopedia*)

Existing Situation

McIntosh County, one of most rural of the coastal counties, is also one of the most heavily forested with most of the upland land area in extensive forested tracts. Even though a large portion of the eastern half of the county is tidal marsh and barrier islands there are still almost 150,000 acres of commercial timberland within the confines of the county. While the traditional population centers were Darien, the county seat, near the south end of the county and a handful of small waterfront communities along the waterways, there are now numerous small communities and developments spread the length of the county, primarily east of I-95 with a significant risk as from the wildland urban interface around them.

McIntosh County is protected by organized fire departments within the city of Darien and seven volunteer fire departments in Cox, Townsend, Eulonia, Meridian, Crescent, Shellman and the Harris Neck areas. There is also a pumper truck maintained by the Georgia DNR on Sapelo Island. There are also small island communities located on Hird and Barbour Islands with no fire equipment where the only access is by water along with individual homes on several more isolated islands within the county. The Georgia Forestry Commission maintains a county protection unit located just east of Eulonia off Hwy 99 to respond to wildfires throughout the county. The city of Darien is serviced by a pressurized water system with well placed hydrants throughout.

Over the past fifty years, McIntosh County has averaged 138 reported wildland fires per year. The occurrence of these fires shows a definite peak in the months January, February, March and April accounting for 75% of the fires over the 20 year period. These fires have burned an average of 705 acres annually over the 50 year period with 70% of the acreage lost during the above mentioned first four months of the year.

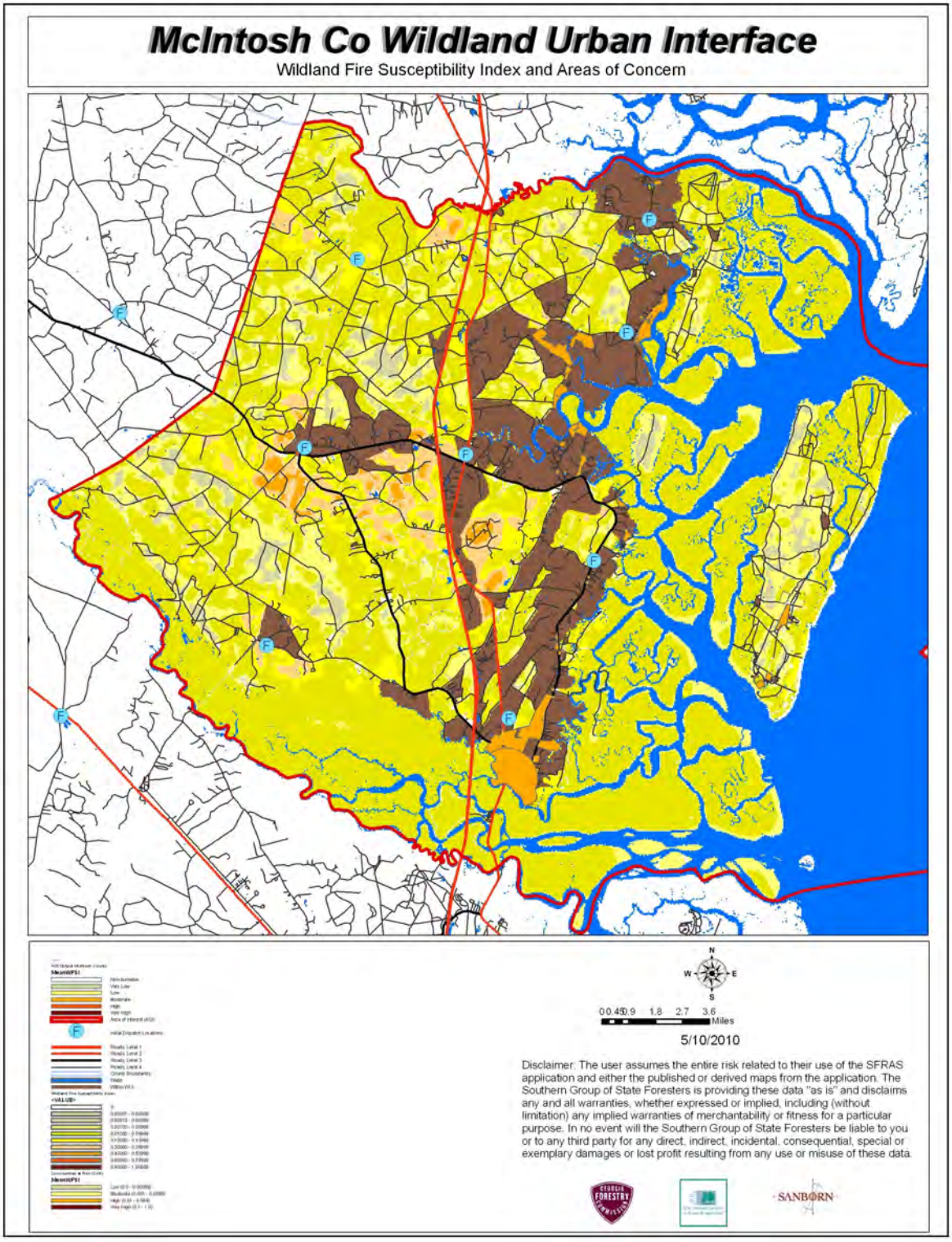
Using just the data for the past 10 years, there has been a shift in this pattern. While the average number of fires per year declined to 80 per year, the average annual acreage lost increased to 806 acres per year. Also the period of peak activity in terms of numbers of fires has broadened to the period January through May with 74% of the reported fires occurring during that five month period. As for total acres lost to wildfire during the last 10 years, the five month period from March through July accounted for 91% of the annual average acres lost.

While the numbers of fires has noticeably declined over the past 20 plus years since the advent of the burning permit law, the acreage lost has not shown a similar response. This perhaps a result of the decrease in the practice of prescribed burning and the resultant increase in wildland fuel loadings. Despite this alarming trend in fire behavior, more homes are being built outside of traditional communities into the wildland urban interface.

The leading causes of these fires over the past 50 years were arson and debris burning causing 67% and 18% respectively of the fires and 65% and 13% respectively of the acres burned. Using just figures from the last 10 years of complete records, from 1998 through 2008, there has been a significant reduction from arson caused fires, but it still remains the leading cause of wildland fires in McIntosh County with 49% of the fires and 38% of the acres lost. Debris burning is still the second leading cause with 28% of the fires. In acreage lost lighting has been the leading cause over the past ten years accounting for 54% of the acres lost.

Georgia Forestry Commission Wildfire Records show that in the past five years only one home has been damaged by wildfire in McIntosh County resulting in estimated losses of $2,600 along with 2 outbuildings valued at $3,500. According to reports during this period 113 homes have been directly or indirectly threatened by these fires. Additionally 3 vehicles valued at $2,750 were lost. While McIntosh County has been fairly lucky compared to most counties in this regard, the potential is there for significant loses to non-timber property from wildfire.

IV. COMMUNITY BASE MAP



V. COMMUNITY WILDFIRE RISK ASSESSMENT

The Wildland-Urban Interface

There are many definitions of the Wildland-Urban Interface (WUI), however from a fire management perspective it is commonly defined as an area where structures and other human development meet or intermingles with undeveloped wildland or vegetative fuels. As fire is dependent on a certain set of conditions, the National Wildfire Coordinating Group has defined the wildland-urban interface as a set of conditions that exists in or near areas of wildland fuels, regardless of ownership. This set of conditions includes type of vegetation, building construction, accessibility, lot size, topography and other factors such as weather and humidity. When these conditions are present in certain combinations, they make some communities more vulnerable to wildfire damage than others. This "set of conditions" method is perhaps the best way to define wildland-urban interface areas when planning for wildfire prevention, mitigation, and protection activities.

There are three major categories of wildland-urban interface. Depending on the set of conditions present, any of these areas may be at risk from wildfire. A wildfire risk assessment can determine the level of risk.

1. **"Boundary" wildland-urban interface** is characterized by areas of development where homes, especially new subdivisions, press against public and private wildlands, such as private or commercial forest land or public forests or parks. This is the classic type of wildland-urban interface, with a clearly defined boundary between the suburban fringe and the rural countryside.

2. **"Intermix" wildland-urban interface** areas are places where improved property and/or structures are scattered and interspersed in wildland areas. These may be isolated rural homes or an area that is just beginning to go through the transition from rural to urban land use.

3. **"Island" wildland-urban interface**, also called occluded interface, are areas of wildland within predominately urban or suburban areas. As cities or subdivisions grow, islands of undeveloped land may remain, creating remnant forests. Sometimes these remnants exist as parks, or as land that cannot be developed due to site limitations, such as wetlands.

(courtesy *Fire Ecology and Wildfire Mitigation in Florida* 2004)

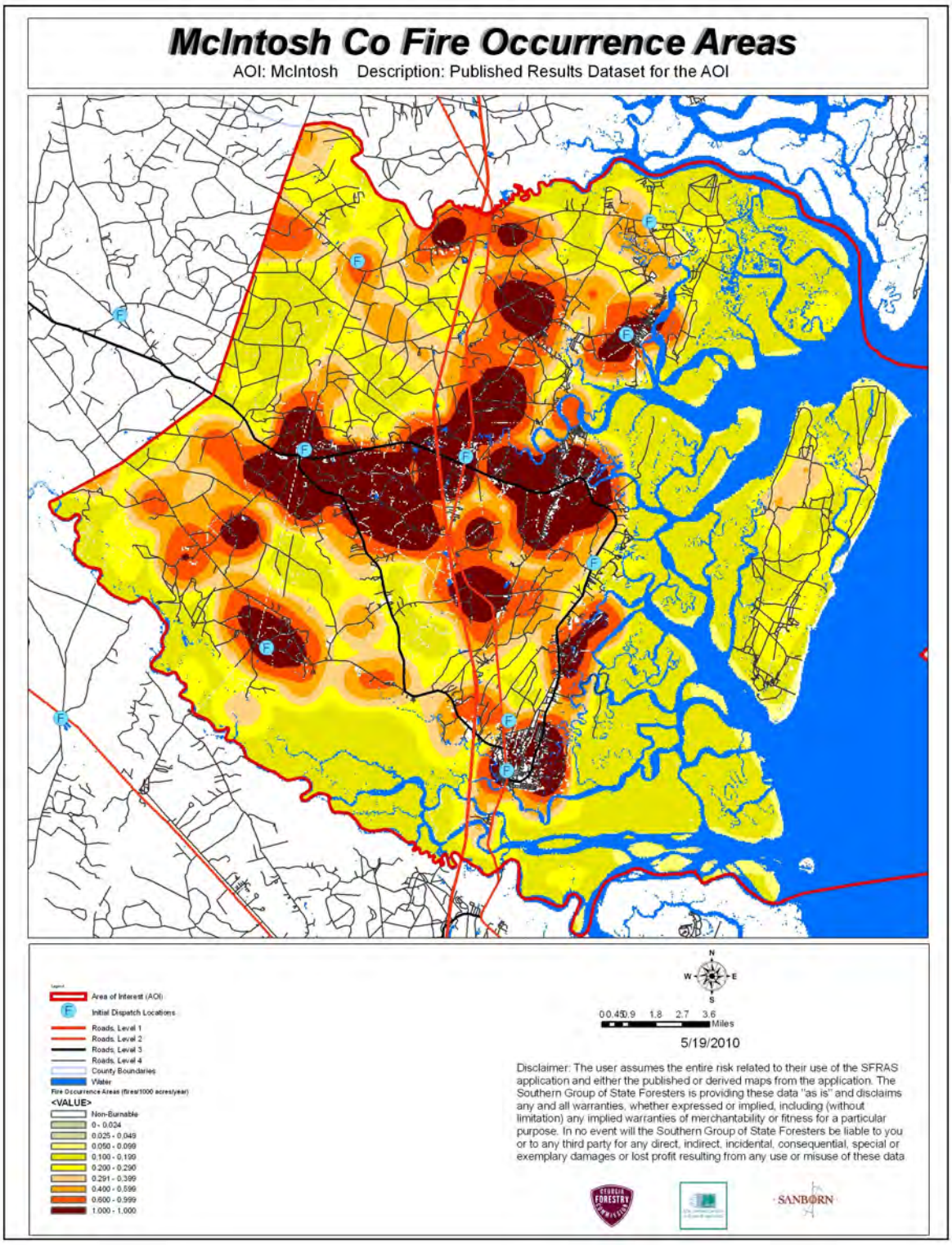
The wildland fire risk assessments conducted in 2009 by the McIntosh County Fire Departments returned an average score of 109, placing McIntosh County in the "very high" hazard range. The risk assessment instrument used to evaluate wildfire hazards to McIntosh County's WUI was the Woodland Community Wildfire Hazard Assessment Checklist. The instrument takes into consideration accessibility, vegetation (based on fuel models), roofing assembly, building construction, and availability of fire protection resources, placement of gas and electric utilities, and additional rating factors. The following factors contributed to the wildfire hazard score for McIntosh County:

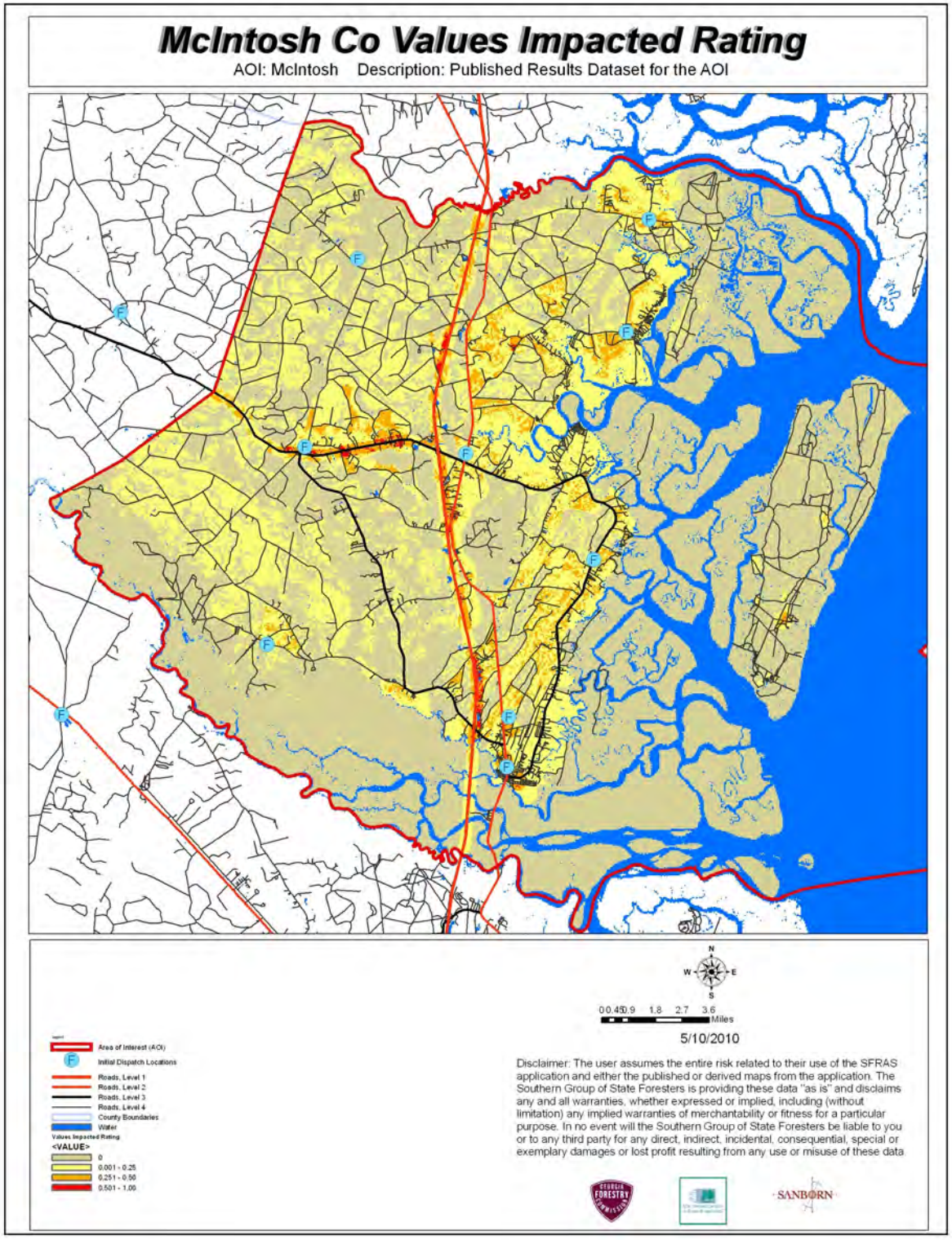
- Dead end roads with inadequate turn arounds
- Narrow roads without drivable shoulders
- Long, narrow, and poorly labeled driveways
- Limited street signs and homes not clearly addressed
- Thick, highly flammable vegetation surrounding many homes
- Minimal defensible space around structures
- Homes with wooden siding and roofs with heavy accumulations of vegetative debris
- No pressurized or non-pressurized water systems available
- Above ground utilities
- Large, adjacent areas of forest or wildlands
- Heavy fuel buildups in adjacent wildlands
- Undeveloped lots comprising half the total lots in many rural communities.
- High occurrence of wildfires in the several locations
- Distance from fire stations
- Island Communities with limited or no fire fighting capacity
- Lack of homeowner or community organizations

Summary of McIntosh County Assessment Ratings

Community	Fire Station	Community Design	Site Hazard	Bldg Construction	Add. Hazards	Total Score	Hazard Rating
Darien, Blounts Crossing, Ridge	Northside	10	51	21	43	125	Moderate
Cox, Barrington, Blues Reach	Cox	18	35	30	42	125	Moderate
Townsend, Briardam, Churchill, Warsaw	Townsend	14	39	30	42	125	Moderate
Jones, LaCount, Youngs Island	Jones	14	41	20	47	122	Moderate
Eulonia, Crescent, Briar Patch	Eulonia	20	45	25	45	135	High
Shellman, Contentment, Sutherlands, White Chimney	Shellman	12	42	20	40	114	Moderate
Crescent, Bellville, Meridian, Sapelo, Smith Rd	Meridian	16	70	18	36	140	Extreme
Eagles Nest, Harris Neck Rd, Belvidere, Springfield	Harris Neck	10	49	17	39	115	Moderate
Sapelo Island, Hog Hammock, Barbour Island, Hird Island	Sapelo Island DNR	20	65	22	46	153	Extreme

VI. COMMUNITY HAZARDS MAPS




McIntosh Co Values Impacted Rating
AOI: McIntosh Description: Published Results Dataset for the AOI
N
W
E
S
0 0.45 0.9 1.8 2.7 3.6
Miles
5/10/2010
Area of Interest (AOI)
Initial Dispatch Locations
Roads, Level 1
Roads, Level 2
Roads, Level 3
Roads, Level 4
County Boundaries
Water
Values Impacted Rating
<VALUE>
0
0.001 - 0.25
0.251 - 0.50
0.501 - 1.00
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VII. PRIORITIZED MITIGATION RECOMMENDATIONS

Executive Summary

As Southeast Georgia continues to see increased growth from other areas seeking less crowded and warmer climes, new development will occur more frequently on forest and wildland areas. McIntosh County will have an opportunity to significantly influence the wildland fire safety of new developments. It is important that new development be planned and constructed to provide for public safety in the event of a wildland fire emergency.

Over the past 20 years, much has been learned about how and why homes burn during wildland fire emergencies. Perhaps most importantly, case histories and research have shown that even in the most severe circumstances, wildland fire disasters can be avoided. Homes can be designed, built and maintained to withstand a wildfire even in the absence of fire services on the scene. The national Firewise Communities program is a national awareness initiative to help people understand that they don't have to be victims in a wildfire emergency. The National Fire Protection Association has produced two standards for reference: NFPA 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire. 2008 Edition and NFPA 1141 Standard for Fire Protection Infrastructure for Land Development in Suburban and Rural Areas.

When new developments are built in the Wildland/Urban Interface, a number of public safety challenges may be created for the local fire services: (1) the water supply in the immediate areas may be inadequate for fire suppression; (2) if the Development is in an outlying area, there may be a longer response time for emergency services; (3) in a wildfire emergency, the access road(s) may need to simultaneously support evacuation of residents and the arrival of emergency vehicles; and (4) when wildland fire disasters strike, many structures may be involved simultaneously, quickly exceeding the capability of even the best equipped fire departments.

The following recommendations were developed by the McIntosh County CWPP Core team as a result of surveying and assessing fuels and structures and by conducting meetings and interviews with county and city officials. A priority order was determined based on which mitigation projects would best reduce the hazard of wildfire in the assessment area.

Proposed Community Hazard and Structural Ignitability Reduction Priorities

Primary Protection for Community and Its Essential Infrastructure		
Treatment Area	Treatment Types	Treatment Method(s)
1. All Structures	Create minimum of 30-feet of defensible space**	Trim shrubs and vines to 30 feet from structures, trim overhanging limbs, replace flammable plants near homes with less flammable varieties, remove vegetation around chimneys.
2. Applicable Structures	Reduce structural ignitability**	Clean flammable vegetative material from roofs and gutters, store firewood appropriately, install skirting around raised structures, store water hoses for ready access, and replace pine straw and mulch around plantings with less flammable landscaping materials.
3. Community Clean-up Day	Cutting, mowing, pruning**	Cut, prune, and mow vegetation in shared community spaces.
4. Driveway Access	Culvert installation	See that adequate lengths of culverts are installed to allow emergency vehicle access.
5. Road Access	Identify needed road improvements	As roads are upgraded, widen to minimum standards with at least 50 foot diameter cul de sacs or turn arounds.
6. Codes and Ordinances	Examine existing codes and ordinances.	Amend and enforce existing building codes as they relate to skirting, propane tank locations, public nuisances (trash/debris on property), Property address marking standards and other relevant concerns Review Subdivision and development ordinances for public safety concerns. Adopt uniform addressing ordinance.

Proposed Community Wildland Fuel Reduction Priorities		
Treatment Area	Treatment Types	Treatment Method(s)
1. Adjacent WUI Lands	Reduce hazardous fuels	Encourage prescribed burning for private landowners and industrial timberlands particularly adjacent to residential areas. Seek grant for WUI mitigation team.
2. Public Lands	Reduce hazardous fuels	Work with GA DNR and US FWS on fuel reduction on public lands adjacent to residential areas.
3. Existing Fire Lines	Reduce hazardous fuels	Clean and re-harrow existing lines.
Proposed Improved Community Wildland Fire Response Priorities		
1. Water Sources	Dry Hydrants	Inspect, maintain and improve access to existing dry hydrants. Add signage along road to mark the hydrants. Locate additional dry hydrants as needed.
2. Fire Stations	Equipment	Wildland hand tools. Lightweight Wildland PPE Gear. Investigate need for "brush" trucks.
3. Fire Station Coverage	New Station	Work towards establishing new station in Ardick Rd/Hwy 251 area.
4. Substandard Bridges	Improve Bridges	Survey bridge access to coastal communities.
4. Water Sources	Drafting equipment	Investigate need for additional drafting pumps.
5. Remote Island Communities	Equipment	Work towards locating pumper and drafting equipment on Hird, Barbour and Sapelo Islands.
6. Personnel	Training	Obtain Wildland Fire Suppression training for Fire Personnel.
**Actions to be taken by homeowners and community stakeholders		

Proposed Education and Outreach Priorities

1. Conduct "How to Have a Firewise Home" Workshop for McIntosh County Residents
Set up and conduct a workshop for homeowners that teach the principles of making homes and properties safe from wildfire. Topics for discussion include defensible space, landscaping, building construction, etc. Workshop will be scheduled for evenings or weekends when most homeowners are available and advertised through local media outlets. Distribute materials promoting firewise practices and planning through local community and governmental meetings.
2. Conduct "Firewise" Workshop for Community Leaders
Arrange for GFC Firewise program to work with local community leaders and governmental officials on the importance of "Firewise Planning" in developing ordinances and codes as the county as the need arises. Identify "Communities at Risk" within the county for possible firewise community recognition.
3. Spring Clean-up Event
Conduct clean-up event every spring involving the Georgia Forestry Commission, McIntosh County Fire Departments and community residents. Set up information table with educational materials and refreshments. Initiate the event with a morning briefing by GFC Firewise coordinator and local fire officials detailing plans for the day and safety precautions. Activities to include the following: • Clean flammable vegetative material from roofs and gutters • Trim shrubs and vines to 30 feet away from structures • Trim overhanging limbs • Clean hazardous or flammable debris from adjacent properties Celebrate the work with a community cookout, with Community officials, GFC and McIntosh County Fire Departments discussing and commending the work accomplished.
4. Informational Packets
Develop and distribute informational packets to be distributed by realtors and insurance agents. Included in the packets are the following: • Be Firewise Around Your Home • Firewise Guide to Landscape and Construction • Firewise Communities USA Bookmarks

5. Wildfire Protection Display
Create and exhibit a display for the general public at the Blessing of the Fleet. Display can be independent or combined with the Georgia Forestry Commission display.
6. Press
Invite the Brunswick and Savannah and local news media to community "Firewise" functions for news coverage and regularly submit press releases documenting wildfire risk improvements in McIntosh County.

VIII. ACTION PLAN

Roles and Responsibilities

The following roles and responsibilities have been developed to implement the action plan:

Role	Responsibility
Hazardous Fuels and Structural Ignitability Reduction	
McIntosh County WUI Fire Council	Create this informal team or council comprised of residents, GFC and DNR officials, McIntosh County Fire Department officials, US Fish and Wildlife official, a representative from the city and county government and the EMA Director for McIntosh County. Meet periodically to review progress towards mitigation goals, appoint and delegate special activities, work with federal, state, and local officials to assess progress and develop future goals and action plans. Work with residents to implement projects and firewise activities.
Key Messages to focus on	1 Defensible Space and Firewise Landscaping 2 Debris Burning Safety 3 Firewise information for homeowners 4 Prescribed burning benefits
Communications objectives	1 Create public awareness for fire danger and defensible space issues 2 Identify most significant human cause fire issues 3 Enlist public support to help prevent these causes 4 Encourage people to employ fire prevention and defensible spaces in their communities.
Target Audiences	1 Homeowners 2 Forest Landowners and users 3 Civic Groups 4 School Groups
Methods	1 News Releases 2 Personal Contacts 3 Key messages and prevention tips 4 Visuals such as signs, brochures and posters

Spring Clean-up Day	
Event Coordinator	Coordinate day's events and schedule, catering for cookout, guest attendance, and moderate activities the day of the event.
Event Treasurer	Collect funds from residents to cover food, equipment rentals, and supplies.
Publicity Coordinator	Advertise event through neighborhood newsletter, letters to officials, and public service announcements (PSAs) for local media outlets. Publicize post-event through local paper and radio PSAs.
Work Supervisor	Develop volunteer labor force of community residents; develop labor/advisory force from Georgia Forestry Commission, McIntosh County Fire Departments, and Emergency Management Agency. Procure needed equipment and supplies. In cooperation with local city and county officials, develop safety protocol. Supervise work and monitor activities for safety the day of the event.

Funding Needs

The following funding is needed to implement the action plan:

Project	Estimated Cost	Potential Funding Source(s)
1. Create a minimum of 30 feet of defensible space around structures	Varies	Residents will supply labor and fund required work on their own properties.
2. Reduce structural ignitability by cleaning flammable vegetation from roofs and gutters; appropriately storing firewood, installing skirting around raised structures, storing water hoses for ready access, replacing pine needles and mulch around plantings with less flammable material.	Varies	Residents will supply labor and fund required work on their own properties.
3. Amend codes and ordinances to provide better driveway access, increased visibility of house numbers, properly stored firewood, minimum defensible space brush clearance, required Class A roofing materials and skirting around raised structures, planned maintenance of community lots.	No Cost	To be adopted by city and county government.
4. Spring Cleanup Day	Varies	Community Business Donations.
5. Fuel Reduction Activities	$35 / acre	FEMA & USFS Grants

POTENTIAL FUNDING SOURCES:

As funding is questionable in these times of tight government budgets and economic uncertainty, unconventional means should be identified whereby the need for funding can be reduced or eliminated.

Publications / Brochures –

- FIREWISE materials are available for cost of shipping only at www.firewise.org.
- Another source of mitigation information can be found at www.nfpa.org.
- Access to reduced cost or free of charge copy services should be sought whereby publications can be reproduced.
- Free of charge public meeting areas should be identified where communities could gather to be educated regarding prevention and firewise principles.

Mitigation –

- Community Protection Grant:
    - USFS sponsored prescribed burn program. Communities with at risk properties that lie within 3 miles of the USFS border may apply with the GFC to have their forest land prescribed burned free of charge.
- FEMA Mitigation Policy MRR-2-08-01: through GEMA - Hazard Mitigation Grant Program (HMGP) and Pre Disaster Mitigation (PDM)
    - To provide technical and financial assistance to local governments to assist in the implementation of long term cost effective hazard mitigation measures.
    - This policy addresses wildfire mitigation for the purpose of reducing the threat to all-risk structures through creating defensible space, structural protection through the application of ignition resistant construction, and limited hazardous fuels reduction to protect life and property.
    - With a complete and registered plan (addendum to the State plan) counties can apply for pre-mitigation funding. They will also be eligible for HMGP if the county is declared under a wildfire disaster.
- GFC - Plowing and burning assistance can be provided through the Georgia Forestry Commission as a low cost option for mitigation efforts.
- Individual Homeowners –
    - In most cases of structural protection ultimately falls on the responsibility of the community and the homeowner. They will bear the cost; yet they will reap the benefit from properly implemented mitigation efforts.
    - GEMA Grant - PDM (See above)

Ultimately it is our goal to help the communities by identifying the communities threatened with a high risk to wildfire and educate those communities on methods to implement on reducing those risks.

Assessment Strategy

To accurately assess progress and effectiveness for the action plan, the McIntosh County WUI Fire Council will implement the following:

- Annual wildfire risk assessment will be conducted to re-assess wildfire hazards and prioritize needed actions.
- Mitigation efforts that are recurring (such as mowing, burning, and clearing of defensible space) will be incorporated into an annual renewal of the original action plan.
- Mitigation efforts that could not be funded in the requested year will be incorporated into the annual renewal of the original action plan.
- Continuing educational and outreach programs will be conducted and assessed for effectiveness. Workshops will be evaluated based on attendance and post surveys that are distributed by mail 1 month and 6 months following workshop date.
- The McIntosh County WUI Council will publish an annual report detailing mitigation projects initiated and completed, progress for ongoing actions, funds received, funds spent, and in-kind services utilized. The report will include a "state of the community" section that critically evaluates mitigation progress and identifies areas for improvement. Recommendations will be incorporated into the annual renewal of the action plan.
- An annual survey will be distributed to residents soliciting information on individual mitigation efforts on their own property (e.g., defensible space). Responses will be tallied and reviewed at the next McIntosh County WUI Council meeting. Needed actions will be discussed and delegated.

This plan should become a working document that is shared by local, state, and federal agencies that will use it to accomplish common goals. An agreed-upon schedule for meeting to review accomplishments, solve problems, and plan for the future should extend beyond the scope of this plan. Without this follow up this plan will have limited value

P. O. Box 819Macon, GA 312021-800-GA-TREESGaTrees.org

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