

NAVFAC Atlantic Environmental Technical Services

Contract # N62470-18D-7003; Delivery Order N40085-19-F-5682



Final Integrated Natural Resources Management Plan for Marine Corps Logistics Base Albany 2021



Prepared for: NAVFAC Atlantic
1322 Patterson Ave. SE, Suite 1000
Washington Navy Yard, DC 20374-5065



Prepared by:
LG² Environmental Solutions, Inc.
10475 Fortune Parkway, Suite 201
Jacksonville, FL 32256



Tetra Tech, Inc.
1320 North Courthouse Road, Suite 600
Arlington, VA 22201



NAVFAC Atlantic Environmental Technical Services

Contract # N62470-18D-7003; Delivery Order N40085-19-F-5682

Final Integrated Natural Resources
Management Plan for
Marine Corps Logistics Base Albany

2021

Prepared for:

NAVFAC Atlantic
1322 Patterson Ave. SE, Suite 1000
Washington Navy Yard, DC 20374-5065

Prepared by:

LG² Environmental Solutions, Inc.
10475 Fortune Parkway, Suite 201
Jacksonville, FL 32256


Tetra Tech, Inc.
1320 North Courthouse Road, Suite 600
Arlington, VA 22201

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

MARINE CORPS LOGISTICS BASE ALBANY

2021

Approving Officials:



Commanding Officer, MCLB Albany

7 Mar 21

Date

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

MARINE CORPS LOGISTICS BASE ALBANY

2020

Approving Officials:

Commanding Officer, MCLB Albany

Date

Donald W. Imm

U.S. Fish and Wildlife Service

11/12/2020

Date

Georgia Department of Natural Resources

Date

Natural Resources Manager,
Naval Facilities Engineering Command

Date

Julie Robbins

Natural Resources Manager, MCLB Albany

3/15/2021

Date

Annual Reviews

Name and Title of Reviewer

Date

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

**MARINE CORPS LOGISTICS BASE ALBANY
2021**

Approving Officials:

Georgia Department of Natural Resources

Date

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

MARINE CORPS LOGISTICS BASE ALBANY

2021

Approving Officials:

Natural Resources Manager,
Naval Facilities Engineering Command

Date

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

**MARINE CORPS LOGISTICS BASE ALBANY
2021**

Approving Officials:

Natural Resources Manager, MCLB Albany

Date

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

**MARINE CORPS LOGISTICS BASE ALBANY
2021**

Annual Reviews

Name and Title of Reviewer

Date

PLAN UPDATES TRACKING FORM

DATE	SECTION/PAGE	COMMENT	REVIEWER

This page intentionally left blank.

EXECUTIVE SUMMARY

ES.1 Type of Document

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

ES.2 Purpose of Document

The Sikes Act, 16 United States Code (U.S.C.) § 670a *et seq.*, requires 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 Sikes Act amendments require the Secretaries of military departments to “prepare and implement an INRMP for each military installation in the United States” (U.S.) unless the absence of significant natural resources on a particular installation makes preparation of a plan for that installation inappropriate. The primary purpose of this INRMP is to guide the Marine Corps Logistics Base Albany, Georgia, (MCLB Albany or Installation) natural resource management program from 2021 until updated/revised. The U.S Department of the Navy (Navy) has prepared and will implement this INRMP in accordance with the following regulations and guidance documents:

- Sikes Act (16 U.S.C. § 670a *et seq.*), as amended;
- Department of Defense Instruction (DODINST) 4715.03, *Natural Resources Conservation Program* (18 March 2011; incorporating Change 2, 31 August 2018);
- DOD Manual (DODM) 4715.03: *Integrated Natural Resources Management Plan (INRMP) Implementation Manual* (25 November 2013; incorporating Change 2, 31 August 2018);
- Headquarters, U.S. Marine Corps (HQMC) *Environmental Compliance and Protection Program*, MCO 5090.2 (11 June 2018);
- HQMC *Handbook for Preparing, Revising, and Implementing Integrated Natural Resources Management Plans on Marine Corps Installations* (October 2007).

The INRMP is a long-term planning document to guide the Installation Commander in the management of natural resources to support the Installation mission, while protecting and enhancing Installation resources for multiple use, sustainable yield, and biological integrity. The INRMP ensures that natural resources conservation measures and military operations on the Installation are integrated and consistent with stewardship and legal requirements through cooperation among DOD, U.S. Fish and Wildlife Service (USFWS), and State fish and wildlife agencies. DOD will annually review the INRMP and determine adjustments needed to keep the INRMP current. Formal reviews of the INRMP as to operation and effect will be completed no less often than every five years to determine whether it meets the requirements of the Sikes Act and contributes to the conservation and restoration of natural resources.

When implemented, this INRMP will replace the MCLB Albany INRMP update that was completed in 2014. There have been substantial changes to the Installation’s natural resources in recent years as a result of extensive destruction caused by two natural disasters—an EF3 tornado

in 2017 and Hurricane Michael in 2018. Therefore, this document constitutes a formal revision rather than a simple update to the INRMP.

ES.3 Goals and Objectives of the INRMP

This INRMP describes and implements an ecosystem-based conservation program that: provides for conservation and rehabilitation of natural resources in a manner consistent with the military mission; integrates and coordinates all natural resources management activities; provides for sustainable multipurpose uses of natural resources; and provides public access for use of natural resources subject to safety and military security considerations. The Installation will apply an adaptive management approach, which allows flexibility to adjust management as necessary to accommodate the evolving scientific understanding of the ecosystem.

Goals and objectives have been identified for MCLB Albany's INRMP, including 10 Installation-wide ecosystem management goals and 35 objectives, each of which corresponds to one of the goals. The objectives developed to implement each goal are related to natural resources issues facing the Installation. The INRMP goals and objectives for MCLB Albany are defined in Section 1.6, *INRMP Goals and Objectives*. Modifications to the INRMP goals and objectives may be made as deemed necessary during future reviews.

ES.4 Natural Resources Management Areas

To facilitate effective management of MCLB Albany natural resources and to achieve the Installation-wide goals and objectives, natural resources projects and ongoing management actions are defined for five natural resources management areas: land; fish and wildlife; forestry; outdoor recreation management; and integrated ecosystem management and partnering. A program area includes the primary practices and activities necessary to achieve the long-term goals and objectives of the INRMP.

Land management at the Installation includes protection of land areas with natural resources value; water resources (including watersheds, floodplains, wetlands, riparian areas, and water quality; vegetation and habitats); invasive plant and noxious weeds; grounds maintenance, and landscaping; agricultural outleasings; wildland fire; forestry; and rare, threatened, and endangered plants.

Fish and wildlife management at MCLB Albany includes proactive management of wildlife and their habitats; fisheries and aquatic species; invasive and nuisance wildlife species; zoonosis prevention; and rare, threatened, and endangered wildlife species.

Forestry management includes a variety of management activities (e.g., timber harvesting/thinning, longleaf pine [*Pinus palustris*] restoration, prescribed burning) to provide for sustained yield of high-quality timber products while maintaining the long-term health and vigor of the forest. The Installation will utilize a multi-use integrated approach to forest management with a goal of providing sustained timber yield as well as facilitating the protection and development of other natural resources dependent on the forest communities.

Outdoor recreation management at MCLB Albany includes management of fishing and hunting resources and programs, public access, and educational outreach. Outdoor recreation management actions include continuing the Installation's outdoor recreation program (including fish stocking

activities), retaining fish and wildlife funds obtained at the local level for use by the MCLB Albany natural resources program, and establishing harvest limits as a result of completion of game species density surveys.

Integrated ecosystems management and partnering includes training of natural resources personnel, geographic information systems, data integration, access, and reporting; and partnering with federal and state agencies, universities, and non-governmental organizations. Integrated ecosystems management actions include providing adequate staffing, equipment, technology and training for the MCLB Albany natural resources program; and implementing training, education, and stewardship initiatives. Partnering actions include maintaining interagency cooperation with federal and state agencies, and development of partnerships to implement wildlife monitoring and protection programs.

ES.5 Physical Environment and Ecosystems

MCLB Albany occupies 3,326 acres of land located in Dougherty County in southwest Georgia, approximately 5 miles to the southeast of the city of Albany (see Figure 1 in Section 1.1, *INRMP Purpose*). The closest large metropolitan areas are Columbus, Georgia, approximately 90 miles to the northwest, and Tallahassee, Florida, approximately 95 miles to the south.

The Installation lies within the Atlantic Coastal Plain physiographic province which extends landward from the coast of southern Georgia to North Carolina. This province is characterized by generally low-lying sedimentary soils, gentle slopes, dense forests, and marsh wetlands (SOUTHNAVFACENCOM, 1993). Land uses in the area immediately surrounding the Installation consist of a mixture of agricultural, commercial, industrial, and residential development.

Within the Installation, three land use zones have been designated. These include industrial/warehouse (western one-third of the property), administrative (central one-third of the property), and residential (remaining eastern one-third of the property). Open fields, maintained fields, managed forests, orchards, ponds, and some wetlands are also found throughout MCLB Albany, which provide habitat for many wildlife species. To date, some 201 wildlife species (including 143 birds, 22 reptiles, 19 amphibians and 17 mammals) have been documented on the Installation. One intermittent stream, Piney Woods Creek, flows through the northeastern most corner of the base.

ES.6 Projects of the INRMP

The projects developed to support the INRMP goals and objectives incorporate sustainable practices and take advantage of ecosystem management principles, where practicable. The projects defined for MCLB Albany's natural resources management program help the Commanding Officer effectively conserve and protect Installation lands and resources to support the military mission and ensure compliance with applicable environmental regulations. The INRMP projects that have been identified for implementation during the plan period are listed in Appendix F. Also included in Appendix F will be one-page descriptions for each project, presently under development.

Funding for implementation of the INRMP will come from the Installation Commander. The natural resources programs and projects described in this INRMP update are divided into compliance and stewardship categories to reflect implementation priorities. Funding will be acquired to implement DOD compliance projects in the timeliest manner possible. Stewardship projects will be funded through the Installation operations and management budget, and other funding sources. These other funding sources include but are not limited to partnerships with federal and state resource agencies, forestry revenues, fishing and hunting revenues, agriculture outleasings, and Legacy Funds.

ES.7 Mission Sustainability

As a component of the Marine Corps' supporting establishment, the MCLB Albany mission is to provide facilities, infrastructure, and a range of tailored support services enabling supported commands aboard the Installation to accomplish their assigned missions in support of the warfighter.

The Marine Corps recognizes that preserving and enhancing ecosystem integrity will support military readiness and sustainability. Over the long term, ecosystem-based management and natural resources conservation will provide the biodiverse environments required for realistic and sustainable military training and testing operation. Implementation of the INRMP will primarily focus on enhancing and sustaining the military mission, but at the same time MCLB Albany will implement projects designed to enhance and protect the natural resources under their jurisdiction.

ES.8 Species Management

The natural resource management actions described in this INRMP update will benefit the plants, animals, and ecosystems occurring on this Installation. Special attention is given to rare, threatened, and endangered species and their habitats through management actions discussed in Section 4, and referenced in Table ES-1, Table ES-2, Table ES-3, Table 3, and Table 4, as well as included in Appendix F. These actions are long-term measures that provide benefits for terrestrial and aquatic habitats on the Installation, and enhancement of the natural environment while promoting mission objectives. Soil conservation and stormwater management actions will control sediment and pollutant runoff to protect water quality for species such as wading birds, waterfowl, and fish. Forestry management actions such as prescribed burning, thinning, and reforestation help to re-establish the imperiled longleaf pine ecosystem and herbaceous low-lying vegetation that improve conditions for several rare plant species (woodland poppy-mallow [*Callirhoe papaver*], crestless plume orchid [*Pteroglossaspis ecristata*], and beakrush [*Rhynchospora* sp.]), and provide habitat and resources for rare, threatened and endangered wildlife species including gopher tortoise (*Gopherus polyphemus*), eastern diamondback rattlesnake (*Crotalus adamanteus*), eastern tiger salamander (*Ambystoma tigrinum*), Bachman's sparrow (*Peucaea aestivalis*), northern bobwhite (*Colinus virginianus*), loggerhead shrike (*Lanius ludovicianus*), and wood stork (*Mycteria americana*).

Actions that will benefit Installation flora and fauna include control of invasive species; grounds maintenance and landscaping management; internal project planning and agency consultation for projects that may impact federally listed species; and outdoor education and outreach. Routine monitoring of migratory birds will provide valuable information on the suite of avian species found on the Installation and facilitate monitoring of the nine State High Priority Species known to

currently occur there: Bachman’s sparrow, northern bobwhite, loggerhead shrike, wood stork, bald eagle (*Haliaeetus leucocephalus*), little blue heron (*Egretta caerulea*), rusty blackbird (*Euphagus carolinus*), prothonotary warbler (*Protonotaria citrea*), grasshopper sparrow (*Ammodramus savannarum*); and three additional rare bird species, the yellow-crowned night-heron (*Nyctanassa violacea*), winter wren (*Troglodytes hiemalis*), and least flycatcher (*Empidonax minimus*) (Barbour et al. 2013, GDNR 2020a).

Table ES-1. Habitat Management Actions at MCLB Albany.

Habitat Management Actions	Section
Water Resources	4.1.1
Vegetation and Habitat	4.1.3
Agricultural Outleases	4.1.4
Rare, Threatened, and Endangered Plant Species and Natural Communities	4.1.5
Wildlife Habitat	4.2.1
Migratory Birds	4.2.2
Fish and Aquatic Species	4.2.3
Invasive and Nuisance Wildlife	4.2.5
Rare, Threatened, and Endangered Wildlife Species	4.2.7
General Forestry	4.3
Fire Management	4.3.7

In addition, the “Rare, Threatened, and Endangered Wildlife Species” section of this INRMP (Section 4.2.2.7) includes additional goals, objectives, strategies, and specific projects for the benefit and long-term conservation of RTE species found, or may potentially occur, on the Installation. Forty-five (45) animal species and 41 plant species of high priority have the potential to occur on the Installation based on their life history, home ranges, and habitat preferences, and have been the target of recent biological studies on the Installation (Barbour et al. 2013, GDNR 2020a), those species include:

Table ES-2. Federal and State Rare, Threatened, and Endangered Species with Potential Occurrence on MCLB Albany.

Amphibians and Reptiles	
• Carolina gopher frog	• Eastern diamondback rattlesnake
• Eastern tiger salamander	• Eastern indigo snake
• Frosted flatwoods salamander	• Florida pinesnake
• Reticulated flatwoods salamander	• Southern hognose snake
• Southern dusky salamander	• American alligator
• Striped newt	• Gopher tortoise
• Mimic glass lizard	• Spotted turtle

Birds	
• King rail	• Red-cockaded woodpecker
• Black-necked stilt	• Loggerhead shrike
• Wood stork	• Henslow's sparrow
• Swallow-tailed kite	• Bachman's sparrow
• Southeastern American kestrel	• Painted bunting
• Northern bobwhite	• Bald eagle
• Golden eagle	• Least tern
• Golden-winged warbler	• Cerulean warbler
• Least bittern	• Little blue heron
• Nelson's sharp-tailed sparrow	• Whooping crane
• Swainson's warbler	• Black rail
• Tricolored heron	• Yellow-crowned night-heron
• Barn owl	
Mammals	
• Northern yellow bat	• Southeastern pocket gopher
• Little brown myotis	• Southeastern myotis
• Spotted skunk	
Plants	
• Georgia purple foxglove	• Drummond's yellow-eyed grass
• Harper's fimbry	• Harper yellow-eyed grass
• Sandhill angelica	• Florida finger grass
• Wagner spleenwort	• Chapman's fringed orchid
• Purple honeycomb head	• Green-fly orchid
• Velvet sedge	• Southern white fringed orchid
• Godfrey's sedge	• Yellow fringeless orchid
• Florida senna	• Crestless plume orchid
• Elliott croton	• Awned meadowbeauty
• Cream-flowered tick-trefoil	• Spotted beakrush
• Hirst's panic grass	• Solitary beakrush
• Tracy's dew-threads	• Yellow flytrap
• Dwarf witch-alder	• Whitetop pitcherplant
• Michaux orchid	• Hooded pitcherplant
• Narrowleaf water-willow	• Parrot pitcherplant
• Southern bog-button	• American chaffseed
• Pondberry/Southern spicebush	• Wire-leaf dropseed
• Southern twayblade	• Pan-American balsamscale
• Pond spice	• Swamp buckthorn
• Boykin lobelia	• Canby dropwort
• Hummingbird flower	• Stokes aster
• Trailing milkvine	• Cooley's meadowrue
• Trailing bean-vine	• Relict trillium
• Savanna cowbane	• Virginia Stewartia

Clams	
• Gulf moccasinshell	• Oval pigtoe
• Shinyrayed pocketbook	

Based on biological inventories conducted on the Installation by GDNR between 1990 and 1992 and in 1995, as well as surveys conducted by ANHP and Auburn University in 2013, two plant species and thirteen animals, which are either state or federally listed or identified as species of special concern, have been confirmed on the Installation (Barbour et al. 2013, GDNR 1995, MCLB 2007) and are listed in Table ES-2 and Table ES-3. Crestless plume-orchid is identified as state threatened, and beakrush species are considered high priority species, but are not federally listed. Six of the fourteen wildlife species documented are federally protected species. The bald eagle is protected under the federal *Bald and Golden Eagle Protection Act*; the wood stork is federally listed as threatened; the gopher tortoise, eastern diamondback rattlesnake, and monarch butterfly are candidate species for federal listing; the American alligator is federally listed as similarity of appearance (threatened). Those with additional state status protection are the gopher tortoise and bald eagle designated as threatened, and the wood stork as endangered. Further, Bachman’s sparrow is listed as rare by the state. The remaining seven species—eastern tiger salamander, little blue heron, northern bobwhite, loggerhead shrike, rusty blackbird, prothonotary warbler, and grasshopper sparrow—are state High Priority species.

Table ES-3. Federal and State Listed Species and High Priority Species Confirmed on MCLB Albany.

Amphibians and Reptiles	
• Eastern diamondback rattlesnake	• Gopher tortoise
• Eastern tiger salamander	• American alligator
Birds	
• Bachman’s sparrow	• Northern bobwhite
• Little blue heron	• Loggerhead shrike
• Wood stork	• Bald eagle
• Rusty blackbird	• Prothonotary warbler
• Grasshopper sparrow	
Plants	
• Crestless plume orchid	• Beakrush species
Invertebrates	
• Monarch butterfly	

ES.9 INRMP Crosswalk Table

This INRMP has been prepared to comply with the Office of the Under Secretary of Defense INRMP format (Office of the Under Secretary of Defense 2006). Table ES-4 provides a cross-reference of the recommended format and the corresponding sections of this INRMP update.

Table ES-4. Cross Reference of the Office of the Under Secretary of Defense Integrated Natural Resources Management Plan (INRMP) Template to the Contents of this INRMP.

Office of the Secretary of Defense Recommended INRMP Format	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	1.0 Introduction
1.a – Purpose	1.1 INRMP Purpose
1.b – Scope	1.2 INRMP Scope
1.c – Goals and Objectives Summary	1.6 INRMP Goals and Objectives
1.d – Responsibilities of Stakeholders	1.7 Roles and Responsibilities 1.7.1 INRMP Funding 1.7.2 INRMP Implementation Responsibilities
1.e – Commitment of Regulatory Agencies	1.7.3 Agency Coordination 1.7.4 Internal Stakeholders 1.7.5 External Stakeholders
1.f – Authority	1.8 Authority
1.g – Stewardship of Compliance Statement	1.7.6 Stewardship and Compliance
1.h – Review and Revision Process	1.4 INRMP Review and Revision Process
1.i – Management Strategies	1.5 Natural Resources Management Strategies and Focus Areas
1.j – Integration with Other Plans	2.2 Integration with Other Plans
Chapter 2 – Current Conditions and Use	2.0 Current Conditions and Use
2.0 – Installation Information	2.1 Installation Information
2.a.1 – Location Statement (concise)	2.1.3 Installation Location, History and Military Mission
2.a.2 – Regional Land Use	2.3.3.3 Regional Land Use
2.a.3 – History and Pre-Military Land Use (abbreviated)	2.1.3.2 Pre-Military Land Use and Installation History
2.a.4 – Military Mission (concise)	2.1.3.3 Military Mission
2.a.5 – Operations and Activities	2.1.3.4 Operations and Activities
2.a.6 – Constraints Map	2.1.2 Natural Resources Constraints and Opportunities, Figure 3
2.a.7 – Opportunities Map	Figure 6, Figure 7, Figure 8, Figure 9, and 2.1.2 Natural Resources Constraints and Opportunities
2.b – General Physical Environment and Ecosystems	2.3 Land Resources, 2.3.1 Climate; 2.3.4 Geology; 2.3.5 Topography; 2.3.6 Soils
2.c – General Biotic Environment	2.3.7 Water Resources; 2.3.8 Terrestrial Vegetation and Communities; 2.4 Fish and Wildlife Resources
2.c.1 – Threatened and Endangered Species and Species of Concern	2.3.10 Sensitive Habitats and Rare Ecosystems; 2.3.11 Rare, Threatened and Endangered Plant Species; and 2.4.6 Rare, Threatened and Endangered Wildlife Species

Office of the Secretary of Defense Recommended INRMP Format	Cross Reference to Required Information in this Document
2.c.2 – Wetlands and Deep-Water Habitats	2.3.7 Water Resources; 2.3.7.3 Wetland Habitats; 2.3.7.4 Aquatic Habitats
2.c.3 – Fauna	2.4 Fish and Wildlife Resources
2.c.4 – Flora	2.3.8 Terrestrial Vegetation and Communities; 2.3.10 Sensitive Habitats and Rare Ecosystems; 2.3.11 Rare, Threatened and Endangered Plant Species; and 2.3.9 Nuisance and Invasive Plant Species
Chapter 3 – Environmental Management Strategy and Mission Sustainability	3.0 Environmental Planning 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 Integration of the Military Mission and Land Use
3.a.2 – Define Impact to the Military Mission	3.1.2 Impacts to the Military Mission
3a.3 – Describe Relationship to Range Complex Management Plan or Other Operational Area Plans	Not Applicable
3.b – Natural Resources Consultation Requirements (Section 7, EFH)	3.3 Natural Resources Consultation Requirements
3.c – NEPA Compliance	3.4 National Environmental Policy Act Compliance
3.d – Opportunities for Beneficial Partnerships and Collaborative Resource Planning	4.5.4 Partnering with Federal and State Agencies, Universities, and NGOs
3.e – Public Access and Outreach	4.4.2 Public Access; 4.4.3 Educational Outreach
3.e.1 – Public Access and Outdoor Recreation	4.4 Outdoor Recreation Management; 4.4.2 Public Access; 4.4.1 Fishing and Hunting Management
3.e.2 – Public Outreach	4.4.3 Educational Outreach
3.e.3 – Encroachment Partnering	3.5 Encroachment Partnering
3.e.4 – State Comprehensive Wildlife Plans (SCWP) Integration	4.2.1 Wildlife Management and Habitat Enhancement
Chapter 4 – Program Elements	4.0 Natural Resources Management
4.a – Threatened and Endangered Species and Species Benefit, Critical Habitat, Species of Concern Management	4.1.5 Rare, Threatened, and Endangered Plant Species and Natural Communities Management; 4.2.7 Rare, Threatened, and Endangered Wildlife Species Management
4.b – Wetlands and Deep-Water Habitats	4.1.1 Water Resources Management
4.c – Law Enforcement	4.5.2 Natural Resources Law Enforcement
4.d – Fish and Wildlife	4.2 Fish and Wildlife Management
4.e – Forestry	4.3 Forestry Management
4.f – Vegetation	4.1.3 Vegetation and Habitat Management
4.g – Migratory Birds	4.2.2 Migratory Bird Management
4.h – Invasive Species	4.1.3.1 Invasive Plant and Noxious Weed Management; 4.2.5 Invasive and Nuisance Wildlife Management

Office of the Secretary of Defense Recommended INRMP Format	Cross Reference to Required Information in this Document
4.i – Pest Management	4.1.3.1 Invasive Plant and Noxious Weed Management; 4.1.3.2 Grounds Maintenance and Landscaping Management; 4.2.5 Invasive and Nuisance Wildlife Management
4.j – Land Management	4.1 Land Management
4.k – Agricultural Outleasing	4.1.4 Agricultural Outlease Management
4.l – GIS Management, Data Integration, Access, and Reporting	4.5.3 GIS, Data Integration, Access, and Reporting
4.m – Outdoor Recreation	4.4 Outdoor Recreation Management
4.n – Bird Aircraft Strike Hazard	4.2.4 BASH Reduction
4.o – Wildland Fire	4.3.7 Fire Management
4.p – Training of Natural Resource Personnel	4.5.1 Training of Natural Resources Personnel
4.q – Coastal/Marine	4.1.2 Coastal Zone Management
4.r – Floodplains	4.1.1.1 Watershed and Floodplains Management
4.s – Other Leases	4.1.4 Agricultural Outlease Management
Chapter 5 – Implementation	5.0 INRMP Implementation
5.a – Summary of Project Prescription Development Process	5.1 Project Development and Classification
5.b – Achieving No Net Loss	3.2 Achieving No Net Loss
5.c – Use of Cooperative Agreements	4.5.4 Partnering with Federal and State Agencies, Universities, and NGOs
5.d – Funding Process	5.2 Funding Sources
Appendices	
Appendix 1. Acronyms	Appendix A – Acronyms and Abbreviations
Appendix 2. Detailed Natural Resources Prescriptions	4.0 Natural Resources Management; and Appendix F – INRMP Project Data
Appendix 3. List of Projects	Appendix F – INRMP Project Data
Appendix 4. Surveys: Results of Planning Level Surveys	Appendix C –Flora and Fauna Lists; Sections 2.3.9 Nuisance and Invasive Plant Species; 2.3.10 Sensitive Habitats and Rare Ecosystems; 2.3.11 Rare, Threatened and Endangered Plant Species; 2.4 Fish and Wildlife Resources; and 2.4.6 Rare, Threatened and Endangered Wildlife Species
Appendix 5. Research Requirements	Appendix F – INRMP Project Data
Appendix 6. Migratory Bird Management	4.2.2 Migratory Bird Management
Appendix 7. Benefits for Endangered Species	4.1.5 Rare, Threatened, and Endangered Plant Species and Natural Communities; 4.2.7 Rare, Threatened, and Endangered Wildlife Species Management; 4.2.7.3 Other Species of Special Concern
Appendix 8. Critical Habitat	Not applicable

Source: Office of the Under Secretary of Defense 2006

TABLE OF CONTENTS

Section	Page
1.0 INTRODUCTION	1
1.1 INRMP Purpose	1
1.2 INRMP Scope	2
1.3 INRMP Organization	2
1.4 INRMP Review and Revision Process	3
1.5 Natural Resource Management Strategies and Focus Areas	4
1.6 INRMP Goals and Objectives.....	6
1.6.1 Definitions	7
1.6.2 Goals and Objectives Specific to MCLB Albany.....	7
1.7 Roles and Responsibilities	10
1.7.1 INRMP Funding	10
1.7.2 INRMP Implementation Responsibilities.....	10
1.7.3 Agency Coordination.....	11
1.7.4 Internal Stakeholders	11
1.7.5 External Stakeholders	11
1.7.6 Stewardship and Compliance	14
1.7.7 Policies and Regulations.....	14
1.8 Authority.....	14
2.0 CURRENT CONDITIONS AND USE	17
2.1 Installation Information	17
2.1.1 Installation Site Condition	17
2.1.2 Natural Resources Constraints and Opportunities	17
2.1.3 Installation Location, History and Military Mission	22
2.1.3.1 Location.....	22
2.1.3.2 Pre-military Land Use and Installation History.....	22
2.1.3.3 Military Mission.....	23
2.1.3.4 Operations and Activities	23
2.2 Integration with Other Plans	24
2.3 Land Resources	25
2.3.1 Climate.....	25
2.3.1.1 Climate Change	26
2.3.3 Land Use.....	27
2.3.3.1 Installation Land Use.....	27
2.3.3.2 Agricultural Outleases	29
2.3.3.3 Regional Land Use	29
2.3.4 Geology.....	30
2.3.4.1 General Geology.....	30
2.3.4.2 Surficial Geology.....	30
2.3.4.3 Seismicity	30
2.3.4.4 Petroleum and Minerals.....	30

2.3.5	Topography	30
2.3.6	Soils	31
2.3.7	Water Resources	36
2.3.7.1	Floodplains	36
2.3.7.2	Groundwater	36
2.3.7.3	Wetland Habitats	37
2.3.7.4	Aquatic Habitats	38
2.3.8	Terrestrial Vegetation and Communities	42
2.3.8.1	Riparian Habitat	42
2.3.8.2	Upland Habitat	42
2.3.9	Nuisance and Invasive Plant Species	47
2.3.10	Sensitive Habitats and Rare Ecosystems	48
2.3.10.1	Clayhill Longleaf Woodland	48
2.3.10.2	Limesink Pond/Pond Cypress Pond	50
2.3.10.3	South Atlantic Willow Oak Flatwoods Forest	51
2.3.11	Rare, Threatened, and Endangered Plant Species	51
2.3.12	Conservation Lands	52
2.4	Fish and Wildlife Resources	52
2.4.1	Invertebrates	52
2.4.2	Fish	53
2.4.3	Amphibians and Reptiles	53
2.4.4	Birds	54
2.4.5	Mammals	55
2.4.6	Rare, Threatened, and Endangered Wildlife Species	55
2.4.6.1	Bald Eagles	58
2.4.6.2	Eastern diamondback rattlesnakes	58
2.4.6.3	Gopher tortoise	59
2.4.6.4	Wood Stork	60
2.4.7	Nuisance and Invasive Wildlife Species	61
3.0	ENVIRONMENTAL PLANNING AND MISSION SUSTAINABILITY	63
3.1	Supporting Sustainability of the Military Mission and the Natural Environment	63
3.1.1	Integration of the Military Mission and Land Use	63
3.1.2	Impacts to the Military Mission	63
3.1.3	Relationship of Range Complex Management Plan or Other Operation Area Plan	64
3.2	Achieving No Net Loss	64
3.3	Natural Resources Consultation Requirements	64
3.4	National Environmental Policy Act Compliance	65
3.5	Encroachment Partnering	67
4.0	NATURAL RESOURCES MANAGEMENT	69
4.1	Land Management	69
4.1.1	Water Resources Management	70
4.1.1.1	Watershed and Floodplains Management	72
4.1.1.2	Wetland and Deepwater Habitats Management	73

4.1.1.3	Riparian Areas Management	77
4.1.1.4	Water Quality Management.....	78
4.1.2	Coastal Zone Management	81
4.1.3	Vegetation and Habitat Management	82
4.1.3.1	Invasive Plant and Noxious Weed Management.....	83
4.1.3.2	Grounds Maintenance and Landscaping Management.....	85
4.1.4	Agricultural Outlease Management.....	88
4.1.5	Rare, Threatened, and Endangered Plant Species and Natural Communities Management.....	90
4.2	Fish and Wildlife Management.....	97
4.2.1	Wildlife Management and Habitat Enhancement.....	97
4.2.2	Migratory Bird Management	101
4.2.3	Fisheries and Aquatic Species Management	105
4.2.4	BASH Reduction	107
4.2.5	Invasive and Nuisance Wildlife Management.....	108
4.2.6	Zoonosis Prevention	111
4.2.7	Rare, Threatened, and Endangered Wildlife Species Management	111
4.2.7.1	Federally Listed and Candidate Species.....	115
4.2.7.2	State Listed Species.....	119
4.2.7.3	Other Species of Special Concern (not state or federally protected).....	119
4.3	Forestry Management	122
4.3.1	Forest Inventory.....	124
4.3.2	Forest Stands Compartments.....	125
4.3.3	GIS Database Development and Maintenance	125
4.3.4	Management by Forest Cover Type	126
4.3.5	Forest Protection and Health	130
4.3.6	Incorporation of the Statewide Wildlife Action Plan	131
4.3.7	Fire Management.....	133
4.4	Outdoor Recreation Management.....	138
4.4.1	Fishing and Hunting Management.....	139
4.4.2	Public Access.....	146
4.4.3	Educational Outreach.....	147
4.5	Integrated Ecosystems Management and Partnering	149
4.5.1	Training of Natural Resources Personnel.....	149
4.5.2	Natural Resources Law Enforcement	151
4.5.3	GIS, Data Integration, Access, and Reporting.....	153
4.5.4	Partnering with Federal and State Agencies, Universities, and NGOs.....	155
4.5.5	Climate Change Management Strategies.....	158
5.0	INRMP IMPLEMENTATION	160
5.1	Project Development and Classification.....	160
5.2	Funding Sources.....	162
5.2.1	O&M, MC Funds.....	162

5.2.2	The Legacy Resource Management Program.....	163
5.2.3	Natural Resources Conservation Compliance Program	163
5.2.4	Forestry Revenues	164
5.2.5	Agricultural Outleasing	164
5.2.6	Fish and Wildlife Fees.....	165
5.2.7	Recycling Funds	165
5.2.8	Strategic Environmental Research and Development Program (SERDP) Funds....	165
5.2.9	Non-DOD Funds.....	166
5.3	Commitment	166
6.0	REFERENCES	167
	APPENDICES	179

APPENDICES

APPENDIX A	ACRONYMS AND ABBREVIATIONS	A-1
APPENDIX B	APPLICABLE REGULATIONS AND PUBLIC LAWS.....	B-1
APPENDIX C	FLORA AND FAUNA SPECIES LISTS	C-1
APPENDIX D	FACT SHEETS FOR RARE, THREATENED, AND ENDANGERED SPECIES CONFIRMED TO OCCUR AT MARINE CORPS LOGISTICS BASE ALBANY.....	D-1
APPENDIX E	INTERNET RESOURCES	E-1
APPENDIX F	INRMP PROJECT DATA	F-1
APPENDIX G	EXTERNAL STAKEHOLDER CORRESPONDENCE.....	G-1

LIST OF FIGURES

Figure 1.	Location Map Showing Regional Context.....	19
Figure 2.	Installation Map. Marine Corps Logistics Base Albany. Albany, GA.	20
Figure 3.	Constraints on Mission-Related Activities. Marine Corps Logistics Base Albany. Albany, GA.	21
Figure 4.	Land Use. Marine Corps Logistics Base Albany. Albany, GA.	28
Figure 5.	Soil Types. Marine Corps Logistics Base Albany. Albany, GA.	35
Figure 6.	Surface Water and Wetlands. Marine Corps Logistics Base Albany. Albany, GA.	41
Figure 7.	Vegetation Communities. Marine Corps Logistics Base Albany. Albany, GA.	46
Figure 8.	Sensitive Habitats and Rare-Threatened-Endangered Species. Marine Corps Logistics Base Albany. Albany, GA.	49
Figure 9.	Hunting Areas. Marine Corps Logistics Base Albany. Albany, GA.	142

LIST OF TABLES

Table ES-1.	Habitat Management Actions at MCLB Albany.	xiii
Table ES-2.	Federal and State Rare, Threatened, and Endangered Species with Potential Occurrence on MCLB Albany.	xiii
Table ES-3.	Federal and State Listed Species and High Priority Species Confirmed on MCLB Albany.	xv
Table ES-4.	Cross Reference of the Office of the Under Secretary of Defense Integrated Natural Resources Management Plan (INRMP) Template to the Contents of this INRMP.	xvi
Table 1.	Roles and Responsibilities of Stakeholders of Natural Resources on MCLB Albany.	12
Table 2.	Soils of Marine Corps Logistics Base Albany.	32
Table 3.	Occurrences of Rare, Threatened and Endangered Plants Confirmed on MCLB Albany.	52
Table 4.	Rare, Threatened and Endangered Wildlife Confirmed on MCLB Albany.	56
Table 5.	Potential Effects from Forest Management Practices on Rare Plant Species Found on MCLB Albany.	93
Table 6.	Potential Effects from Forest Management Practices on Longleaf Pine Communities.	95
Table 7.	Overview of Potential Forest Management Techniques for Federal and State-listed Wildlife Species of MCLB Albany.	117
Table 8.	Stand Ages and Acreage by Pine Species on MCLB Albany.	124
Table 9.	Prescribed Burn Data for Marine Corps Logistics Base Albany.	136
Table 10.	Hunter Harvest Data. ¹	143
Table 11.	Creel Limits	144

1.0 INTRODUCTION

1.1 INRMP PURPOSE

Section 101(a)(1)(B) of the Sikes Act Improvement Act (SAIA) (16 United States Code [U.S.C.] §670a-o) requires that each Military Department prepare and implement an Integrated Natural Resources Management Plan (INRMP) for installations that contain significant natural resources, unless the Secretary of Defense determines that the absence of significant natural resources on a particular installation makes preparation of such a plan inappropriate. INRMPs serve as a planning tool for natural resources managers (NRMs) to conserve and restore an installation's natural resources in a coordinated manner within the context of the operational military mission.

The primary purpose of this INRMP is to guide the Marine Corps Logistics Base Albany (MCLB Albany or Installation) natural resources management program from 2021 until updated/revised in accordance with the following regulations and guidance documents:

- Sikes Act (16 U.S.C. § 670a *et seq.*), as amended;
- Department of Defense Instruction (DODINST) 4715.03, Change 2, *Natural Resources Conservation Program* (18 March 2011; incorporating Change 2, 31 August 2018);
- DOD Manual (DODM) 4715.03, Change 2: *Integrated Natural Resources Management Plan (INRMP) Implementation Manual* (25 November 2013; incorporating Change 2, 31 August 2018);
- Endangered Species Act (ESA) of 1973 (16 U.S.C. §1531–1544);
- Headquarters, U.S. Marine Corps (HQMC) *Environmental Compliance and Protection Program*, MCO 5090.2 (11 June 2018); and
- HQMC *Handbook for Preparing, Revising, and Implementing Integrated Natural Resources Management Plans on Marine Corps Installations* (October 2007).

Marine Corps installations are required to implement and maintain an integrated program to manage natural resources under their administration through sustainable management, multiple-use, protection, and enhancement of natural resources. Maintaining sustainable yield of forest products and ecosystem integrity are requirements under DODINST 4715.03 and MCO 5090.2. The primary INRMP user is the MCLB Albany Natural Resources Manager (NRM); however, environmental planning personnel will also find the INRMP useful for determining potential environmental impacts of proposed actions during environmental reviews. The INRMP provides for integrated management of land, fish and wildlife, forestry, and outdoor recreation resources. It also identifies the requirements of relevant natural resource laws and regulations with respect to the military mission and/or natural resources management actions.

In accordance with the Sikes Act and DODINST 4715.03, this INRMP has been prepared in cooperation with United States Fish and Wildlife Service (USFWS) and Georgia Department of Natural Resources (GDNR), and must reflect the mutual agreement of those agencies, wherever practical. When implemented, this INRMP will replace the MCLB Albany INRMP update that was completed in 2014. There have been substantial changes to the Installation's natural resources in recent years as a result of extensive destruction caused by two natural disasters—an EF3 tornado

in 2017 and Hurricane Michael in 2018. Therefore, this document constitutes a formal revision, rather than a simple update, to the INRMP. Cooperating agencies were provided an opportunity to review and discuss the Pre-Final INRMP revision in August 2020. The USFWS provided a letter on 03 December 2020 stating that they did not have any comments. The USFWS letter is provided in the Final INRMP (Appendix G). The GDNR had one comment to fix the spelling of the bird common name bobwhite quail on page 162. An email from GDNR confirming this one comment is provided in Appendix G.

1.2 INRMP SCOPE

The Marine Corps will comply with all applicable laws and regulations related to the conservation of natural resources in the United States (U.S.) (HQMC 2018). This INRMP covers all conservation activities for MCLB Albany and establishes procedures to ensure compliance with applicable environmental laws and regulations. Such activities include management of threatened and endangered species, forestry operations, agricultural outleases, hunting and fishing, fire management, soil erosion control, invasive species control, and protection and enhancement of wetlands and Waters of the U.S. Whereas this INRMP provides the direction for natural resources management at MCLB Albany, it does not replace or affect any federal laws or state responsibility and authority for protecting fish and wildlife resources.

This INRMP addresses natural resources management on those lands associated with MCLB Albany that are:

- Owned by the U.S. and administered by the U.S. Department of the Navy (Navy).
- Used by the Marine Corps via license, permit, or lease for which the Navy has been assigned management responsibility.
- Withdrawn from the public domain for use by the Marine Corps for which the Marine Corps has been assigned management responsibility.
- Leased on the installation and occupied by non-Department of Defense (DOD) entities.

1.3 INRMP ORGANIZATION

Section 1.0 of the INRMP provides an overview of the INRMP purpose and organization, including a summary of natural resources management areas covered by each of the programmatic objectives and natural resources elements that are addressed in this INRMP, and the INRMP goals and objectives that have been established. Section 2.0 includes information on the Installation location, history and military mission, as well as information on responsibilities and authority associated with this INRMP. It also includes details on the existing natural resources, including species with known and potential occurrence on the Installation, and their current conditions. Section 3.0 provides information associated with INRMP implementation, including a summary of supporting sustainability of the military mission and the natural environment, agency consultation requirements, achieving no net loss, National Environmental Policy Act (NEPA) requirements, and encroachment partnering. Section 4.0 provides natural resources management recommendations and project information for the Installation, organized by the five natural resources management programmatic objectives: (1) land management; (2) fish and wildlife management; (3) forestry management; (4) outdoor recreation management; and (5) integrated

ecosystems management and partnering. Section 5.0 describes aspects of INRMP implementation, from project development and classification to funding, commitment, and use of cooperative agreements and partnerships. Section 6.0 includes the list of references cited in this document, and the INRMP's Appendices A–G follow at the back of the document.

1.4 INRMP REVIEW AND REVISION PROCESS

In accordance with the Sikes Act, DODINST 4715.03, and MCO 5090.2, DOD components, the USFWS, and the appropriate State fish and wildlife agency must formally review each INRMP for operation and effect on a regular basis, but *no less often than every five years*, to determine whether it is implemented pursuant to the Sikes Act and contributes to the conservation and rehabilitation of natural resources on military installations. The formal review conducted in coordination with USFWS and State partners shall verify that all environmental compliance projects have been budgeted for and implemented on schedule; that all required natural resource positions are filled with trained staff, or are in the process of being filled; that projects and activities identified for the coming year are included in the INRMP; that all required coordination has been conducted; and that all significant changes to the installation's mission requirements or its natural resources have been identified.

DOD installations are required to perform informal reviews of their INRMP annually. The annual reviews provide an opportunity to incorporate changes in accepted environmental conservation practices and scientific advances associated with evaluation and implementation of natural resources management. As applicable, the annual review will include documentation of changes in natural ecosystems or their management, updates to INRMP projects and activities, updates to species listing status, and details on any changes to the operational mission that may impact natural resources. Minor revisions to the INRMP should be completed annually to reduce the need for a more costly and time-consuming update following the formal, not less often than, the five-year review. Forms to document annual reviews and plan updates are included at the front of this INRMP and should be used to note changes to the INRMP that will improve natural resources management. Each entry in this section should reference the plan section and page number that is being updated to facilitate quick cross-referencing.

If USFWS and state partners agree, the completed annual review forms may be used in lieu of a formal review. Annual reviews should be fully documented each year to provide each installation the option to utilize their annual review documentation to fulfill the formal review requirement whenever possible. If results of the formal review determine that the existing INRMP is effective, the INRMP need not be revised. Any changes to the authorities and guidance documents driving INRMP requirements would be addressed as appropriate during the annual review or update process.

During the INRMP review process, the DOD Components, USFWS, and appropriate state fish and wildlife agencies should determine whether it is necessary to update or revise the document. INRMP updates are usually covered by the original NEPA documentation (usually an Environmental Assessment [EA]) prepared for the INRMP; however, INRMP modifications will be reviewed to determine if those modifications are significant. If INRMP modifications are deemed to be not significant, updated actions will be covered by the original NEPA documentation.

Circumstances that may suggest that a revision is necessary include: (a) the current INRMP no longer provides adequately for the conservation and rehabilitation of the natural resources on the base; (b) the installation mission or physical features have changed significantly; or (c) there are substantial natural resources effects anticipated from base realignment and closure, such as: a new species listing, new construction, new training, changes to training type or tempo, or other factors that were not addressed in the existing INRMP (DODM 4715.03, Change 2). Any of these activities should be brought to the attention of the USFWS and GDNR during the formal review process. All such revisions require approval by all parties to the INRMP and will usually call for a new or supplemental NEPA analysis.

As is described in further detail in Section 2.3.8, *Terrestrial Vegetation and Communities*, since the INRMP update in 2014, MCLB Albany has experienced severe damage to its forest resources as a result of two natural disasters: an EF-3 tornado that struck in 2017, and Hurricane Michael in 2018. Due to the substantial physical and ecological changes incurred to the Installation, this document constitutes an INRMP revision.

1.5 NATURAL RESOURCE MANAGEMENT STRATEGIES AND FOCUS AREAS

Marine Corps policy on natural resources management, as summarized from MCO 5090.2, is to manage natural resources to support and to be consistent with the installation mission, while protecting and enhancing those resources for multiple use, sustainable yield, and biological integrity. Land use practices and decisions must be based on scientifically sound conservation procedures and techniques, use scientific methods, and use an ecosystem-based management approach.

DODINST 4715.03 also requires that INRMPs incorporate the guidance for ecosystem management of natural resources under the stewardship and control of DOD. In accordance with this policy, and the U.S. Marine Corps *Handbook for Preparing, Revising, and Implementing Integrated Natural Resources Management Plans on Marine Corps Installations* (HQMC 2007), the Marine Corps will strive to maintain healthy, contiguous ecosystems on its own lands; where ecosystem boundaries extend onto adjoining lands, the Marine Corps will strive to work cooperatively with neighboring landowners to manage these ecosystems. The use of ecosystem management on military lands supports present and future training and testing requirements while preserving, improving, and enhancing ecosystem integrity. Over the long-term, this approach maintains and improves the sustainability and biological diversity of terrestrial and aquatic ecosystems while supporting sustainable economies, human use, and an environment that supports recreational use. In accordance with MCO 5090.2 and DODINST 4715.03, ecosystem-based management on installations will:

- 1) Avoid single-species management and implement an ecosystem-based multiple species management approach, insofar as that is consistent with the requirements of the ESA.
- 2) Use an adaptive management approach to manage natural resources such as climate change.
- 3) Evaluate and engage in the formation of local or regional partnerships that benefit the goals and objectives of the INRMP.

- 4) Use the best available scientific information in decision-making and adaptive management techniques in natural resource management.
- 5) Foster long-term sustainability of ecosystem services.

An ecosystem-based management approach encourages management decisions to be made on the community or ecosystem level rather than at a single species level. Maintaining or improving the quality, integrity, and connectivity of the ecosystem benefits both natural communities and individual species. Efforts to maintain, enhance, and restore natural ecosystems may be the most appropriate management strategy. In accordance with DODINST 4715.03, biodiversity conservation on DOD lands and waters should be followed whenever practicable.

Management goals and objectives are identified and assessed on a periodic basis to maintain the function and integrity of MCLB Albany's ecosystems. However, these goals and target objectives must be adapted as unknown factors arise and change occurs. Adaptive management is an iterative cycle of planning, monitoring, evaluating, and adjusting management as needed. Periodic reviews of management goals and practices provide the opportunity to incorporate new science and information as well as assess the performance of management actions. An ecosystem-based management approach is applied at MCLB Albany, with management strategies adapted as needed, to the following focus areas:

1. Land Management

- Water Resources Management
- Watersheds and Floodplain Management
- Surface Waters, Groundwater, Wetlands, and Riparian Areas Management
- Water Quality Management
- Vegetation and Habitat Management
- Natural Communities
- Maintained Land
- Invasive Plant Species Management
- Rare Communities and Significant Wildlife Habitat
- Regional Conservation Lands
- Agricultural Outleasings

2. Fish and Wildlife Management

- General Fish and Wildlife Management
- Aquatic Species
- Terrestrial Species
- Rare, Threatened, and Endangered Species and Special Concern Species Management
- Migratory Bird Management
- Critical Habitat Management for Protected Species
- Invasive Species and Nuisance Wildlife Management

3. Forestry Management

- General Forestry Management
- Fire Management

4. Outdoor Recreation Management

- Fishing and Hunting Management
- Special Natural Areas Management, including Watchable Wildlife Areas
- Public Access
- Educational Outreach

5. Integrated Ecosystems Management and Partnering

- Training of Natural Resources Personnel
- Natural Resources Law Enforcement
- GIS Management, Data Integration, Access, and Reporting
- Staffing and Equipment
- Partnerships with Federal and State Agencies, Universities, and NGOs

This INRMP also includes a review of potential projects to be implemented over the duration of the plan and has been prepared to accommodate anticipated changes in land use and habitat management. Projects and actions to achieve INRMP goals with measurable objectives are described in Section 4.0. Appendix F provides a summary table of INRMP projects, followed by project details. Annual reviews of the INRMP are required and will be used to assess and review updates that should be incorporated into the plan, including changes affected by environmental regulation and/or scientific advancement related to management of natural resources at MCLB Albany. This INRMP is scheduled to be formally reviewed, revised as necessary, and reapproved five years after its initial approval; and will incorporate updates to natural resources projects and activities, and describe any changes to the operational mission.

1.6 INRMP GOALS AND OBJECTIVES

This INRMP is a long-term planning document designed to guide the Installation NRM in the management of natural resources in support of the military mission while protecting and enhancing Installation resources for multiple use, sustainable yield, and biological integrity. In accordance with Integrated Natural Resources Management Program (32 CFR Appendix to Part 190), the Sikes Act, and MCO 5090.2, this plan must provide for the following goals, consistent with military operations at the Installation:

- Management of fish and wildlife, land, and forest resources.
- Identification of fish- and wildlife-oriented recreational use activities and areas.
- Enhancement or modification of fish and wildlife habitat.
- Protection, enhancement, and restoration of wetlands where necessary for support of fish, wildlife, or plants.
- Integration of, and consistency among, the various activities conducted under the INRMP.

- Establishment of specific natural resources management goals and objectives, and time frames for proposed actions.
- Sustainable use by the public of natural resources to the extent that such use is consistent with the needs of natural resources management and subject to Installation safety and security requirements.
- Enforcement of natural resources laws and regulations.
- No net loss in the capability of military lands to support the military mission of the Installation.
- Review this INRMP and its effects on a regular basis, but no less often than every five years, with informal annual reviews.

The goals and objectives that follow have been defined to address INRMP regulatory requirements and the Installation-specific needs.

1.6.1 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 the Installation and provide conservation and ecosystem management targets and direction.

Objectives: Objectives are defensible targets or specific components of a goal that enable staff to measure progress toward meeting that goal. Objectives help focus management activities and provide a measurement tool for evaluating and communicating results. One or more objectives may be identified for successfully achieving a specific goal. Objectives are comprised of strategies and defined actions or projects.

1.6.2 Goals and Objectives Specific to MCLB Albany

Goal 1. Restore, manage, preserve, and/or enhance ecologically significant plant communities, including wetlands.

Objective 1.1 Assess current native groundcover and develop guidelines for maintaining species diversity and abundance.

Objective 1.2 Restore native groundcover.

Objective 1.3 Enhance pollinator habitats by converting non-native landscaped areas to native wildflowers and forbs.

Goal 2. Assess the impact of invasive species on MCLB Albany, prioritize treatment, and conduct control measures.

Objective 2.1 Develop protocols for reducing the spread of invasive species.

Objective 2.2 Identify invasive species infestation locations.

Objective 2.3 Treat invasive species with appropriate chemical or mechanical means of control that are not harmful to sensitive inhabitants of the ecosystem.

Goal 3. Rare, Threatened and Endangered Species (RTE) Habitat Management and Surveys.

Objective 3.1 Identify existing locations of rare, threatened or endangered species.

Objective 3.2 Conserve and manage RTE species and habitats to promote biodiversity.

Goal 4. Address issues related to nuisance domestic animals, feral animals, and wildlife aboard MCLB Albany.

Objective 4.1 Correspond with, utilize and cooperate with state and federal wildlife agencies, local animal control or other organizations on nuisance control activities.

Objective 4.2 Employ appropriate abatement and/or removal techniques to address nuisance wildlife, feral animal, and domestic animal complaints.

Objective 4.3 Manage database of MCLB Albany nuisance animal interactions.

Goal 5. Review pest management at the Installation and ensure utilization of integrated pest management (IPM) techniques.

Objective 5.1 Perform functions of the Integrated Pest Management Coordinator.

Objective 5.2 Update Integrated Pest Management Plan.

Goal 6. Implement a sound forest and fire management program.

Objective 6.1 Conduct prescribed burns and manage wildfire risk by creating and maintaining firebreaks, reducing fuel loads, and improving wildland-urban interfaces.

Objective 6.2 Plan and implement a longleaf pine restoration program.

Objective 6.3 Manage timber in a manner compatible with multiple-use strategies.

Objective 6.4 Monitor forest health and implement actions to address forest insect, disease or other mortality threats.

Objective 6.5 Submit Quarterly Forestry Reports.

Objective 6.6 Update forestry databases, GIS layers, and inventory.

Goal 7. Support outdoor recreation involving the consumptive or non-consumptive utilization of natural resources.

Objective 7.1 Manage game populations to provide hunting opportunity consistent with ecological and cultural carrying capacity.

Objective 7.2 Manage woods, roads, and trails to provide multiple user benefits.

Objective 7.3 Provide angling opportunity and support game fish populations in Covella Pond, Robinson Pond, Horseshoe Pond, and Indian Lake by maintaining facilities to make this possible.

Objective 7.4 Work with Marine Corps organizations, NGOs, local clubs, societies, and other organizations, to support opportunities for outdoor recreation.

Goal 8. Enforce compliance with Federal and State environmental, natural, and cultural resources laws, Marine Corps policies, and other guidelines.

Objective 8.1 Collect and track data related to violations of environmental, natural, or cultural resource laws (Conservation Law Enforcement Program).

Objective 8.2 Define clear boundaries for hunting, fishing, and other outdoor recreational areas.

Objective 8.3 Enforce applicable environmental, natural, and cultural laws in accordance with DODINST 5525.17 (Conservation Law Enforcement Program).

Objective 8.4 Provide education and training to authorized personnel on MCLB Albany to prevent violation of environmental, natural, and cultural resource laws (Conservation Law Enforcement Program).

Objective 8.5 Provide training and equipment to the Conservation Law Enforcement Officer to enforce applicable Federal and State laws.

Objective 8.6 Provide training to Natural and Cultural Resources Manager in MCLB Albany compliance with applicable Federal and State conservation laws.

Goal 9. Conduct educational outreach activities for natural and cultural resources in partnership with local organizations.

Objective 9.1 Collaborate with wildlife agencies, universities, colleges, and others to achieve regional conservation goals.

Objective 9.2 Contribute to news articles, Welcome Aboard Brief, and other media events.

Objective 9.3 Coordinate Conservation Volunteer Program.

Objective 9.4 Coordinate National Bowhunters Education Foundation course.

Objective 9.5 Oversee opening and daily operations of the Natural and Cultural Resources Center and the Indian Lake Boardwalk.

Goal 10. Provide technical and other support for the completion of the 2021 Integrated Natural Resources Management Plan for MCLB Albany.

Objective 10.1 Prepare Integrated Natural Resources Management Plan for MCLB Albany 2021.

As described in Section 1.5, a process of adaptive management will be used in implementing this INRMP and modifications may be made if needed to reach the desired goal. For example, a change may become necessary because of an unforeseeable and large-scale disturbance (e.g., a hurricane or a drought). An adaptive management approach allows the Installation flexibility to adjust management as necessary to accommodate the evolving scientific understanding of the ecosystem.

Some of the INRMP projects covered by this plan may require some level of construction and/or ground disturbance; however, these activities are not expected to substantially affect natural resources. If impacts to sensitive natural resources are expected from implementation of management actions associated with this INRMP, MCLB Albany will coordinate as early as possible during the construction planning process with the appropriate resource agencies that have jurisdictional oversight of the natural resources involved. Section 5.3 of this document describes agency consultation requirements for potential impacts to federally listed species.

1.7 ROLES AND RESPONSIBILITIES

1.7.1 INRMP Funding

In accordance with MCO 5090.2, the MCLB Albany Commanding Officer is responsible for funding the INRMP and the Natural Resources Program (NRP) by including them in annual Program Objective Memorandum submittals. Funds may also be sought from other sources. Potential sources of funding for specific INRMP projects are discussed in Section 6.2.

1.7.2 INRMP Implementation Responsibilities

The MCLB Albany Commanding Officer has the primary responsibility for implementing this INRMP and ensuring compliance with laws associated with implementation of the plan. The concept of integrated management of natural resources both justifies and requires that internal and external stakeholders contribute to the development and implementation of the natural resource recommendations identified in this document and management of natural resources at the Installation. As such, the Commanding Officer will use available technical assistance as needed, including NRMs at MCLB Albany and Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic (MIDLANT), in developing and maintaining an effective, integrated program to protect, conserve, and utilize natural resources on MCLB Albany properties.

Although the Commanding Officer has overall responsibility for the INRMP, the MCLB Albany NRM is responsible for implementing the INRMP. Additional assistance will be obtained, as needed, from outside federal and state agencies, including USFWS, U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (EPA), Natural Resources Conservation Service (NRCS), GDNR and NAVFAC. The Marine Corps Community Services (MCCS) is responsible for developing and coordinating the outdoor recreation and educational program covered by this INRMP with the NRM.

Additionally, the Installation and Environment Division directs, supervises and coordinates the planning, organizing, staffing and controlling of all facilities engineering. Divisions that are under the supervision and management of the Installation and Environment Division include the Environmental Branch, which among other duties directs and coordinates the management and maintenance of natural resources at MCLB Albany. The Environmental Branch and its Natural Resources section, as designated by the Commanding Officer, are responsible for the development and implementation of this INRMP.

The NAVFAC MIDLANT is the major command assisting MCLB Albany in developing and implementing conservation programs, as well as reviewing and providing final signatory approval for this INRMP.

1.7.3 Agency Coordination

During the planning process for Marine Corps actions and projects that impact sensitive natural resources, the Marine Corps will coordinate as early as practical with appropriate federal and state natural resource agencies. When actions or projects are mission essential and/or severely time-constrained, agency coordination may not occur except as required by laws or regulations for impacts to wetlands and/or federally threatened or endangered plant and wildlife species. This INRMP has been prepared to provide guidance on avoiding or minimizing impacts to natural resources, and to limit disturbance to natural resources located in non-priority mission areas. Mitigation actions will be coordinated with appropriate regulatory agency for unavoidable natural resources impacts that result from military mission or INRMP activities.

1.7.4 Internal Stakeholders

The MCLB Albany Commanding Officer and the NRM are directly involved in implementation of this INRMP, while ensuring successful implementation of the military mission. The MCLB Albany Commanding Officer is responsible for ensuring that MCLB Albany personnel comply with the laws and requirements relevant to the conservation and management of natural resources. The Environmental Branch Head and NRM has the responsibility of ensuring this INRMP is reviewed annually and updated as necessary to reflect current natural resources conditions, and formally reviewed and updated every five years as required by the Sikes Act.

1.7.5 External Stakeholders

Stakeholders of MCLB Albany natural resources include federal and state natural resource agencies, local governments and landowners, civic and conservation groups and the Marine Corps. For this INRMP, a stakeholder is an individual, group, or agency that has the responsibility or mandate to preserve and manage natural resources on MCLB Albany, that has a right or privilege to make use of the natural resources, or that may be affected directly or indirectly by natural resources management actions conducted on MCLB Albany.

State and federal agencies, such as USFWS and GDNR are the primary stakeholders responsible for natural resources protection and preservation. Other stakeholders, including the MCCA Environmental Branch, Public Works Office, and contractors working at MCLB Albany, are responsible for managing access to natural resources for economic and recreational purposes, and/or with natural resources management and protection. Other stakeholders include non-governmental organizations (NGOs) and individuals who make use of those natural resources, such as civilian groups, including residents of the surrounding communities who have access to, or are affected by, the condition of MCLB Albany natural resources, and private conservation organizations. Table 1 provides a list of stakeholders currently involved with natural resources management at MCLB Albany.

Table 1. Roles and Responsibilities of Stakeholders of Natural Resources on MCLB Albany.

Stakeholder	Roles and Responsibilities
Federal, State and Local Agencies	
U.S. Fish and Wildlife Service	USFWS provides signatory agreement concerning the conservation, protection, and management of the fish and wildlife resources presented in the INRMP. USFWS is the primary federal agency for issues regarding fish and wildlife management, as well as the regulatory authority for the Endangered Species Act of 1973 and the Migratory Bird Treaty Act (16 U.S.C. 703-712).
U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS)	The NRCS works in cooperation with MCLB Albany to protect and enhance Installation lands by preventing soil erosion, restoring eroded areas, maintaining vegetative cover, protecting watersheds, providing pest management and wildlife habitat management, and reducing impacts downstream both on and off military lands through planned conservation treatments and vegetative surveys.
USDA, U.S. Forest Service (USFS)	The USFS provides technical assistance for control and prevention of forest insect and disease outbreaks.
USDA, Animal and Plant Health Inspection Service (APHIS)	APHIS provides assistance with animal damage control problems.
U.S. Geological Survey (USGS)	The USGS provides assistance with water and wildlife issues.
U.S. Environmental Protection Agency	The EPA provides limited input on wetland delineations and federally listed threatened and endangered species.
State of Georgia Department of Natural Resources (GDNR)	GDNR provides signatory agreement concerning the conservation, protection, and management of the fish and wildlife resources presented in the INRMP. GDNR 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. GDNR is also a consulting agency under the U.S. Fish and Wildlife Coordination Act (48 State, 401, as amended; 16 U.S.C. 661 et. seq.).
Georgia Forestry Commission.	The Georgia Forestry Commission provides technical assistance for aerial detection of insect infestations, and personnel support for fire suppression.

Stakeholder	Roles and Responsibilities
Shawnee Tribe	Open communication regarding sites of religious or cultural significance to the Tribe, and potential soil-disturbing activities that rise to the level of an EA or EIS.
Dougherty County*	Adjacent landowner, including County Landfill southeast of Base, and partner on maintenance of the Marine Ditch Canal.
City of Albany*	Adjacent landowner, partner on maintenance of the Marine Ditch Canal, and other water use issues.
Marine Corps and Navy	
Commanding Officer	The Commanding Officer is directly responsible for operating and maintaining MCLB Albany, including the implementation and enforcement of this INRMP.
Installation and Environment Division (I&E)	Supervises and coordinates the planning, organizing, staffing and controlling of all facilities engineering. Branches under the supervision and management of I&E Division include the Public Works Office, Housing, and Environmental Branch, which among other duties directs and coordinates the management and maintenance of natural resources at MCLB Albany. The Environmental Branch and its Natural Resources section are responsible for the development and implementation of this INRMP.
Environmental Branch - Natural Resource Section	Directs and coordinates the management and maintenance of natural resources at MCLB Albany. Responsible for the development and implementation of this INRMP.
Naval Facilities Engineering Southeast Command	Assist MCLB Albany in developing and implementing conservation programs, as well as reviewing and providing final signatory approval for this INRMP.
Non-Governmental Organizations and Individuals	
Contractors	Contractors provide MCLB Albany with technical support for natural resources and environmental management projects. This technical support includes preparation of the INRMP, National Environmental Policy Act (NEPA) analyses and documentation, and cultural and biological resource surveys.

Note: Asterisk (*) denotes adjacent landowner

1.7.6 Stewardship and Compliance

Compliance in terms of an INRMP refers to the actions that must be taken in order to abide by the statutes and regulations applicable to natural resources at the Installation. These are actions that an installation is legally mandated or obligated to take in order to meet current or recurring natural and cultural resources conservation management requirements, and for which it *must* obtain funding. Examples of compliance actions include developing, updating, and revising INRMPS; conducting biological surveys to determine population status of rare, threatened, and endangered species; and conducting wetland surveys for planning, monitoring and/or permit condition requirements. Compliance is essential, so these projects are of the utmost priority.

Stewardship is the responsibility to survey, inventory, manage, conserve, protect, and enhance the natural resources entrusted to one's care in a way that respects the intrinsic value of these resources and the needs of present and future generations (MCO 5090.2). Installations are required to recognize and balance environmental stewardship with mission readiness in retaining control and use of Marine Corps land, sea, and air space for the purpose of maintaining the military mission. Conscious and active consideration for the inherent value of natural resources must be given in all Marine Corps plans, actions, and programs (MCO 5090.2). Stewardship projects and programs enhance an installation's natural resources, promote proactive conservation measures, and support investments that demonstrate Marine Corps environmental leadership. Examples include education and public awareness projects, biological surveys or habitat protection for non-listed species, or management and execution of volunteer and partnership programs. Stewardship is an important component of the Marine Corps Environmental Program, and, because stewardship projects can occur on an indefinite time scale, these projects are prioritized after compliance projects.

1.7.7 Policies and Regulations

Appendix B provides a list of all regulations and policies that are applicable to development and implementation of this INRMP. More detailed summaries of the federal statutes, federal regulations, executive orders (EOs), and DOD policies are found in MCO 5090.2, Volume 11, Appendix A. The sections of Chapter 4.0, Natural Resources Management, also lists the relevant laws, EOs, regulations, directives, and memoranda relevant to each of the goals and objectives described for natural resources management at MCLB Albany.

1.8 AUTHORITY

This INRMP was prepared to comply with the Sikes Act, DODINST 4715.03, and MCO 5090.2. These regulations require that the Secretary of Defense implement a program to provide for the conservation and rehabilitation of natural resources on military installations. The Secretaries of each military department are authorized to carry out the program, consistent with the use of military installations, to ensure the preparedness of the U.S. Armed Forces. The Secretary of the Navy implements and maintains a balanced and integrated natural resources management program for all Navy and U.S. Marine Corps installations.

To facilitate the NRP, the Secretary of each military department is directed to prepare and implement an INRMP for each military installation under the jurisdiction of the Secretary. The INRMP must be prepared in cooperation with the Secretary of the Interior, acting through the

Director of the USFWS, and the head of the appropriate fish and wildlife agencies of the state in which the military installation is located.

The Sikes Act acknowledges that the principal use of military installations is to ensure the preparedness of the U.S. Armed Forces. In accordance with the Sikes Act, the INRMP shall, to the extent appropriate and applicable, provide for the following:

- Implementation of an ecosystem-based program that provides for conservation and rehabilitation of natural resources consistent with the military mission.
- Integration and coordination of all natural resources management activities.
- Provision for sustainable multipurpose uses of natural resources.
- Provision for public access for use of natural resources subject to safety and military security considerations.
- Enforcement of applicable natural resource laws (including regulations).

The Sikes Act also requires that the INRMP, and subsequent revisions, be submitted for public review and comment before being finalized. To satisfy NEPA requirements (HQMC 2018), an EA was prepared. To fulfill public review requirements, the Pre-Final Public Review INRMP revision was made available for public review with appropriate public notifications. There were no public comments received during the 30-day review period from November 27 through December 27, 2020.

This page intentionally left blank.

2.0 CURRENT CONDITIONS AND USE

2.1 INSTALLATION INFORMATION

MCLB Albany is a DOD Installation that comprises one parcel of approximately 3,326 acres in Dougherty County, southern Georgia (Figure 1 and Figure 2). This property is strategically located to meet operational and training requirements of the Navy. The Installation's primary mission is to rebuild and repair ground combat and combat support equipment and to support installations on the East Coast of the United States (U.S.). More broadly, MCLB Albany serves as a military logistics hub responsible for basing, maintaining, storing, repurposing, and transporting equipment, vehicles, and systems for all branches of the U.S. military from across the globe—particularly Marine Corps Logistics Command and its components.

2.1.1 Installation Site Condition

The entire Installation is surrounded by high security fence line, and each entrance is controlled by gates and manned security access points. Three primary land use areas have been established within the facility to focus similar activities in designated use areas of the facility: industrial/warehouse; administrative; and residential (MCLB 2013a). The western one-third of the Installation is occupied by industrial and warehousing activities. The middle third is primarily for administrative functions. The remaining eastern one-third is Family Housing (Figure 2).

2.1.2 Natural Resources Constraints and Opportunities

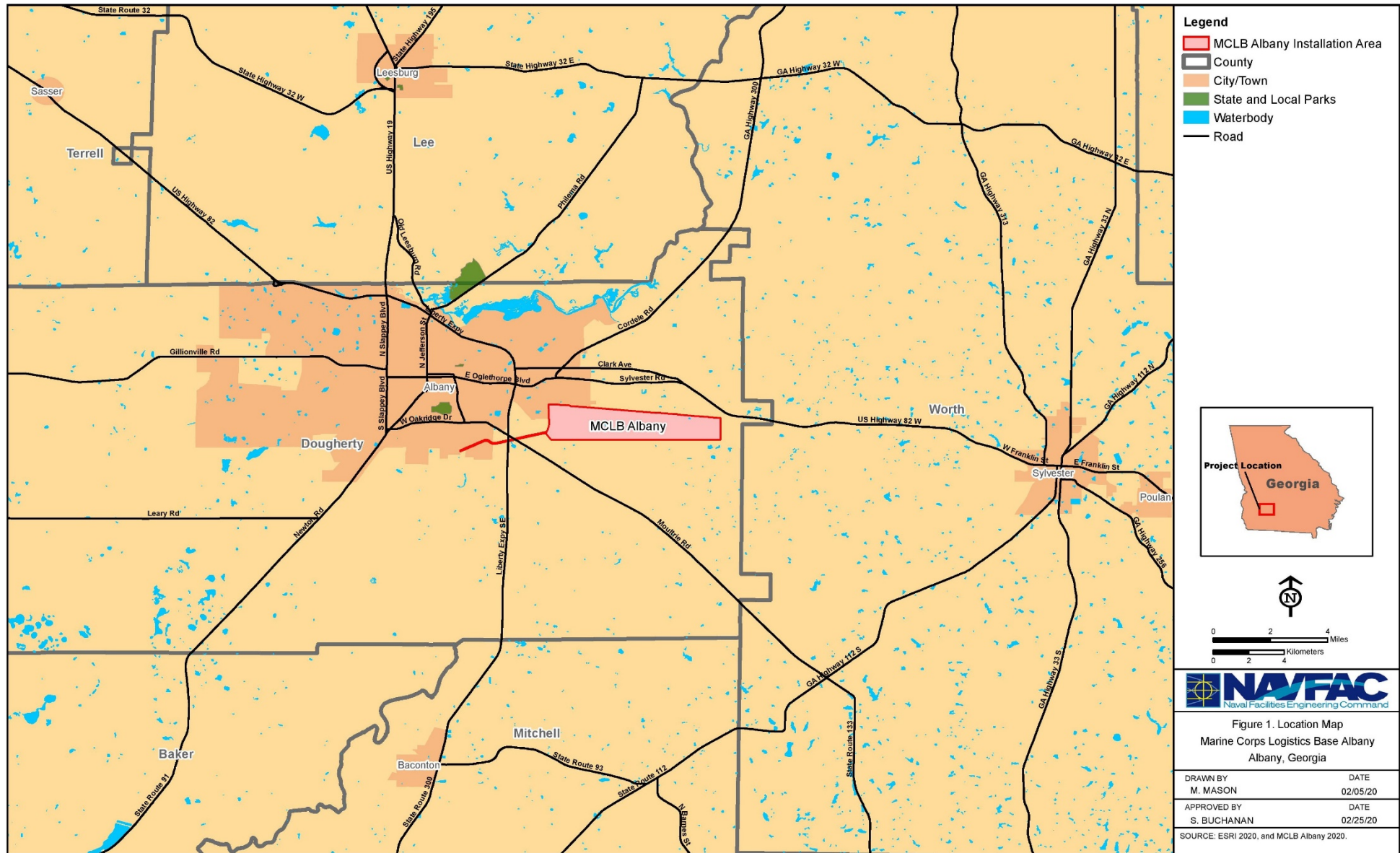
MCLB Albany works to ensure that ongoing mission-related activities are confined to currently existing facilities and roads in order to minimize impacts to existing natural resources. These natural resources lend support to the mission at MCLB Albany by controlling erosion, reducing the hazards associated with wildfires, and improving overall operational safety and efficiency. This helps the Installation to reduce costs associated with repairs to damaged facilities, roads and fences, and wildfire control.

Although natural resources provide benefits to MCLB Albany, their existence also has the potential to impose constraints on the military mission and on further development activities. Identified constraints, which for purposes of facilitating planning also include cultural resources, are shown on Figure 3 and include:

- Need for conservation and management of federally protected species known to occur at MCLB Albany.
- Limitation on new construction in wetlands, floodplains, and riparian buffer areas.
- Avoidance of historic, cultural, and pre-historic features (e.g., Native American artifacts).
- Restrictions on future uses of sites where hazardous substances were released (e.g., land use controls might preclude residential development or recreational use).

Outside of these constraints, the remaining areas of MCLB Albany represent opportunity areas where mission activities would not be restricted by natural resources management issues (Figure 3). In addition, although they are not mapped, agricultural lands surrounding MCLB

Albany serve as encroachment buffers preventing conflict with the public along the base perimeter (i.e., opportunities); whereas industrial sites along the Installation's boundary pose constraints.



Marine Corps Logistics Base Albany
 Final Integrated Natural Resources Management Plan

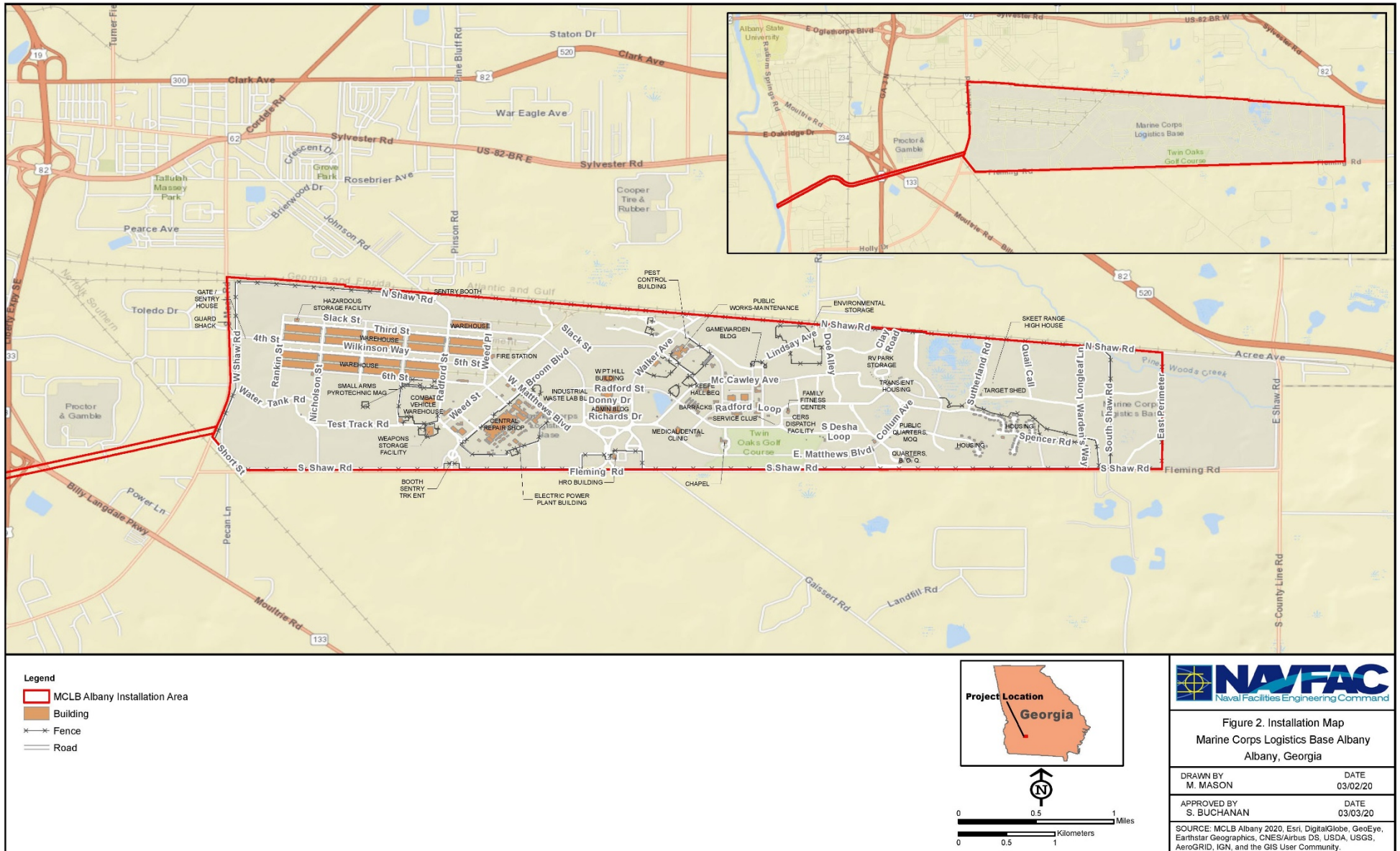
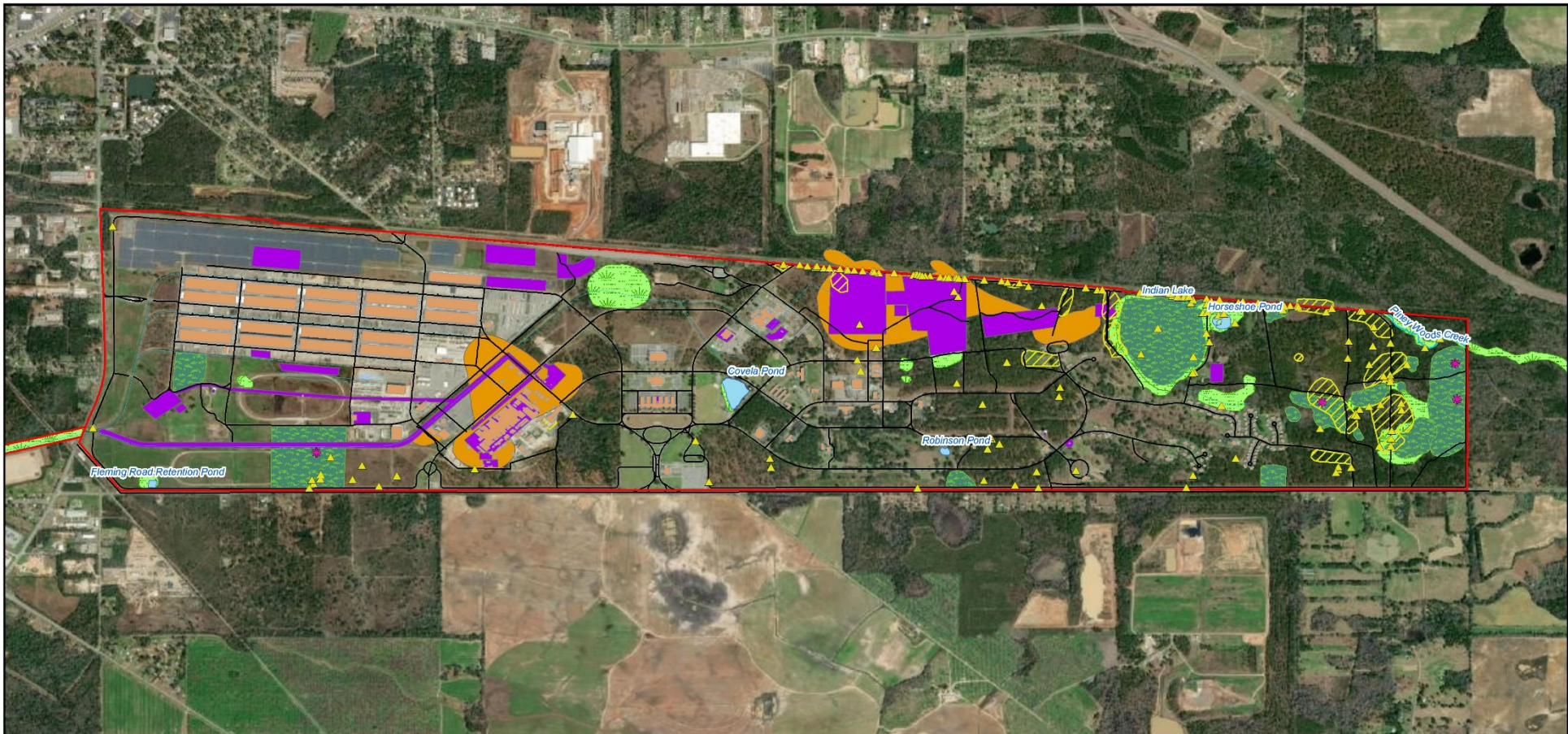


Figure 2. Installation Map
 Marine Corps Logistics Base Albany
 Albany, Georgia

DRAWN BY M. MASON DATE 03/02/20

APPROVED BY S. BUCHANAN DATE 03/03/20

SOURCE: MCLB Albany 2020, Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.



Legend

MCLB Albany Installation Area	Pollution Area
Building	Environmental Remediation Site Area
Road	Rare, Threatened, or Endangered Animal Observation
Stream	Rare Plant Observation
Cultural Resource	
Natural Community	
Waterbody	
Wetland	

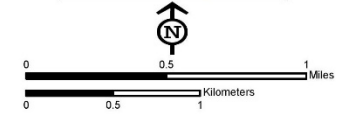


Figure 3. Constraints on Mission-Related Activities Marine Corps Logistics Base Albany Albany, Georgia

DRAWN BY M. MASON	DATE 08/07/20
APPROVED BY S. BUCHANAN	DATE 08/07/20

SOURCE: MCLB Albany 2020, Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

2.1.3 Installation Location, History and Military Mission

2.1.3.1 *Location*

MCLB Albany is in Dougherty County in southwest Georgia, southeast of the city of Albany (Figure 1). The Installation encompasses one 3,326-acre parcel and does not have any satellite installations. The majority of Dougherty County is typified by level to gentle relief, with most of the area having a slope less than (<) 5 percent. Open fields, maintained fields, managed forests, and multiple water bodies are found throughout MCLB Albany. Primary land uses on the Installation include industrial/warehouse (western one-third of the property), administrative (central one-third of the property), and residential (remaining eastern one-third of the property) (Figure 2).

2.1.3.2 *Pre-military Land Use and Installation History*

Southwest Georgia was occupied by Native Americans from the Paleo-Indian to Historic Periods. The Creek Indians, who called the area along the riverbank “Thronateeska,” meaning “the place where flint is picked up,” established villages in and around Albany from the middle of the eighteenth century until the time of the Indian Removal. Fittingly, the river that flows through Albany is called the Flint (Albany Convention & Visitors Bureau 2013). Nine potential archaeological sites and over 200 artifacts have been unearthed within the Installation (MCLB 2007). The flint knives, scrapers, drills, agricultural tools, arrowheads and spearheads recovered on the Installation are believed to date back some 8,000 to 10,000 years. These items are evidence that Native Americans also used the site where MCLB Albany is located as a center of resupply or a supply base. Artifacts also indicate that a Native American hunting camp once stood on the high ground at the east end of the Installation. The Creek Indians inhabited the Albany area until treaties imposed by the United States in the early 1800s ended Native American claims to lands in Georgia and opened the area to settlement (Explore Southern History 2013).

Nelson Tift founded the city of Albany in 1836, hoping that the settlement would prosper as a trade center. Albany grew to incorporate several plantations during the mid-1800s. During the Civil War (1861–1865), the town served as a key cotton producer for the Confederacy and its factories produced hardtack and beef for soldiers. No battles occurred in the city and it rebounded quickly following the Civil War (Explore Southern History 2013). Peanuts and pecans became increasingly profitable crops following the war. Low water and sandbars in the Flint River made steamboat navigation an unreliable method of transportation. Albany eventually focused on developing its railroad infrastructure, and by the turn of the 20th century Albany’s Union Station united seven railroads and served as many as 55 trains daily. Industry and commerce followed the railroads, and an active arts community ensured cultural as well as economic growth.

The Installation was established on 1 March 1952 when the Marine Corps Depot of Supplies was commissioned at the current MCLB Albany site. The location was selected because of its level ground, convenient location to the Gulf of Mexico and Atlantic Ocean, and road and rail infrastructure. Expansion progressed at a rapid pace until the Installation was large enough to adequately supply all Marine Corps activities east of the Rocky Mountains. In 1954, the command was renamed the Marine Corps Supply Center. In the 1950s and 1960s, the base managed and controlled Marine Corps supply distribution for the eastern half of the United States, and the

Atlantic, Caribbean, and Mediterranean areas. In 1976, support functions such as inventory control and financial management were relocated from the closing of the Philadelphia, Pennsylvania facility to the Marine Corps Supply Center. The name of the facility in Albany, Georgia was renamed to its current designation of Marine Corps Logistics Base Albany in 1978 (SOUTHNAVFACENGCOM 2006).

2.1.3.3 *Military Mission*

The Installation provides facilities infrastructure and a range of tailored support services that enable supported commands aboard the Installation to accomplish their assigned missions in support of the warfighter (MCLB 2015a). MCLB Albany is one of seven commands under Marine Corps Installations East (headquartered in Camp Lejeune, N.C.). Although the Installation's priority is to support Installation tenants, whose focus of effort is the warfighter, the facility is also committed to providing service members, civilian-Marines and their families a safe and secure environment to work and live. Within capabilities, MCLB Albany also serves as a designated safe haven for the Marine Corps and other DOD entities within the Southeast and Gulf Coast regions during times of threat and recovery from destructive weather and emergency situations.

2.1.3.4 *Operations and Activities*

MCLB Albany is home to the Marine Corps Logistics Command's Headquarters. Additional units within the Installation include:

- Critical Asset Rapid Distribution Facility (CARDF) Marine Forces Reserve Supply – functions as an intermediate supply point for the acquisition, storage and fielding of material, as well as the central control point for the management of the individual combat equipment for Marine reserve units.
- Defense Distribution Depot Albany, Georgia (DDAG) – the primary source for storage, distribution, packaging and preservation of secondary repair parts and expendables such as meals ready-to-eat, clothing and textiles, construction materials, electrical supplies, and electronic components.
- Detachment 2 Supply Company – field, train, and provide qualified supply augmentees and capabilities to the active component.
- Defense Reutilization and Marketing Service (DRMS/DRMO) – specializes in distributing “ready-to-reuse” property.
- Department of Defense Humanitarian Assistance-Excess Property Program (HAP-EP) – prepares and transports non-lethal excess property to foreign countries.
- Joint Equipment Assessment Program for Chemical and Biological Defense (JEAP) – responsible for integrated technical and business processes which support the surveillance, assessment, life-cycle testing, reuse and disposal of chemical and biological defense equipment.
- Marine Corps Logistics Command (LOGCOM) – specializes in providing logistics solutions for the warfighter, including fielded weapons systems, support services, and supplies.

- Marine Depot Maintenance Command (MDMC) – a multi-commodity depot maintenance center which provides logistics support to ensure continuous readiness and sustainment necessary to meet military operational requirements.
- Naval Facilities Engineering Command (NAVFAC) – enhances the readiness and capabilities of supported commands by safely delivering quality services and construction on time and within budget. Responsible for awarding and administering service, construction and engineering contracts.
- Marine Corps Systems Command (SYSCOM) – outfits Marines with everything they drive, shoot and wear to equip and sustain Marine forces with a full spectrum, current, and future expeditionary and crisis-response capabilities.

In addition to the supported military commands and unit operations and facilities, MCLB Albany also provides substantial resources to service members, civilian-Marines and their families to ensure a safe and secure environment to work and live. Other tenant organizations and resources on the Installation include Naval branch health and dental clinics, Naval audit service, Naval Criminal Investigative Service (NCIS), Naval Facilities Contracts Office (OICC/ROICC), commissary and restaurants, federal union, newspaper production, document automation and production facility, bachelor and family housing, pass/ID office and pet/vehicle/weapon registry, banks, chapel, convenience store, offices for legal advice, employment and labor relations, counseling services, and recreational facilities such as a youth and teen center, theatre, RV park, skeet and pistol range, auto repair, fitness center, bowling, and pool hall.

Outdoor military training activities on the base include day use only small arms firing at the pistol range, occasional bivouac training exercises by the Marines and Georgia Army National Guard, land navigation training, and refueling training operations by National Guard units 1 to 2 times per year. Recreational use of the base includes hunting, fishing, hiking, bird watching, and is generally limited to active duty and retired military and civil service personnel, their dependents, and guests. However, in the future recreational uses of the Installation may be expanded to include the general public.

2.2 INTEGRATION WITH OTHER PLANS

In addition to this INRMP, there are several other plans and management documents that address specific issues of natural resources management at MCLB Albany. These plans are listed below and are described, where applicable, in this document:

- Burn Plan (MCLB 2019b)
- Wildfire Protection Plan (USACE 2010)
- Lake and Pond Management Recommendations (MCLB 2012b, MCLB 2013c)
- Integrated Pest Management Plan (MCLB 2015b, 2013b)
- Forest Management Plan (MCLB 2015c)
- Stormwater Management Plan (MCLB 2008)
- Integrated Cultural Resources Management Plan (MCLB 2015d)

- Encroachment Control Plan Update (MCLB 2016)
- State Wildlife Action Plan (SWAP; GDNR 2015)
- Landscape management and approved planting list

Although current management activities on the Installation often encompass a broad coverage of natural resource areas and issues, many are being performed without specific detailed and long-term plans. This INRMP also provides recommendations for development of additional specific natural resources plans as identified in Appendix F. Implementation of these plans, once available, will be integrated with this INRMP and include:

- Indian Lake management
- Erosion control plan
- Utility right-of-way management
- Open area management
- Brush pile management
- Orchard management
- Invasive flora management
- Species-specific RTE habitat improvement plans
- Migratory bird conservation plan
- Nuisance animal control plan
- Longleaf pine (*Pinus palustris*) restoration plan

2.3 LAND RESOURCES

2.3.1 Climate

An understanding of general climate patterns is important to the planning and success of natural resources management and construction activities. Albany, Georgia has a humid subtropical climate typical of the southeastern United States, with long, warm summers and short, mild winters. The average annual high temperature is 78.3°F, and the average annual low temperature is 54.9°F (Western Regional Climate Center 2020); the average temperature in the summer 81°F and 50°F in the winter (NOAA 2013). Precipitation occurs throughout the year, with an average annual precipitation of 50.01 inches (Western Regional Climate Center 2020). Much of the precipitation originates in the Gulf of Mexico, and water-laden air masses pass through the Albany region as thunderstorms or along with cold fronts. On average, 26 tornadoes or hurricanes strike Georgia in a given year (NOAA 2020). Historically, January and July were the peak months for rainfall (NOAA 2013); while July remains the wettest month, the precipitation patterns have shifted, and the next two months with greatest precipitation for the period 1891 to 2016 were March and August (Western Regional Climate Center 2020). October is typically the driest month (NOAA 2013; Western Regional Climate Center 2020). Snowfall is rare, with an annual mean of 0.1 inches.

During the 30-year period from 1989–2018, the temperature in southern Georgia has remained stable, with average minimum, average maximum, and average mean temperatures changing by less than $\pm 0.5^{\circ}\text{F}$ per decade (NOAA NCDC 2020b). The years 2012, 2017, and 2018 were the warmest on record (NOAA NCDC 2020a). In some areas of the region, the average minimum temperature during summer and autumn are increasing by 0.5°F to 1.0°F per decade (NOAA NCDC 2020b), indicating a trend toward seasonally warmer nights. During the same 30-year period, southwestern Georgia has trended toward drier autumns, receiving an average of 0.5 to 2.0 inches fewer of precipitation per decade, countered by wetter winters, with 0.5 to 1.5 inches more of precipitation per decade (NOAA NCDC 2020b).

2.3.1.1 *Climate Change*

DODI 4715.03 requires the Navy and Marine Corps to consider climate change in the development of INRMPs to help mitigate impacts on military installations. Impacts that must be considered include shifts in species' ranges and distributions, changes in phenology, rising sea levels, and variations in ecological processes such as drought, fire, and flood (DOD 2011a). Assessing the impacts of climate change is best approached by identifying an environmental baseline for the future that considers the differences in landscape form and function caused by climate change and other stressors on the landscape (Commander, Navy Installations Command [CNIC] 2012).

Climate change is causing rising annual average temperatures, altering precipitation patterns, and increasing hurricane intensity, a rise in heat-related illness, declines in forest growth, and changing to ecological systems and species distribution. The Marine Corps recognizes that climate change will impact DOD's strategic, infrastructure, and natural resources considerations at MCLB Albany for the foreseeable future. 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 temperature, and strain electricity supply due to the increased demand on the grid for cooling. Changes in precipitation patterns likely will reduce water supply, increase the frequency and intensity of wildfires, damage local ecosystems, and cause shifts in species composition or geographic range.

According to the 2015 Georgia SWAP's *Climate Change Adaptation Technical Team Report* (Pfaffko and Ambrose 2015), projected climate changes in Georgia by 2070 that are likely to impact wildlife include:

- Increased average day and night temperature with extreme maximum of 40–70 days above 95°F ;
- Greater rates of evaporation and evapotranspiration;
- Uncertain frequency changes in precipitation but with greater flood amplitude and deeper and longer droughts;
- Fewer but larger hurricanes and major storms; and
- Sea level rise.

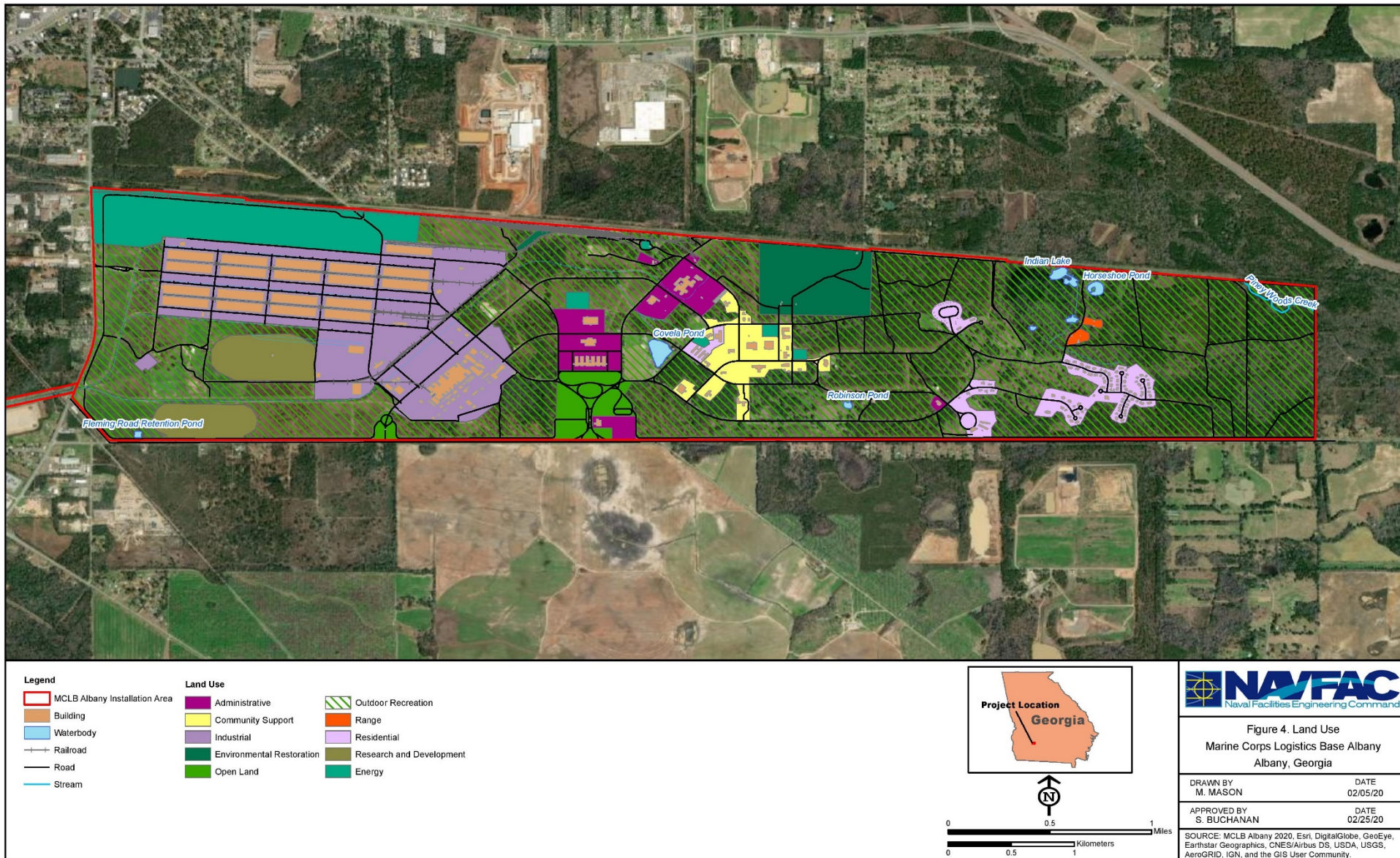
2.3.3 Land Use

2.3.3.1 *Installation Land Use*

MCLB Albany occupies 3,326 acres in Dougherty County, Georgia and is located approximately five miles southeast of the city of Albany Central Business District (CBD). The Installation is not currently threatened by adjacent land use encroachment (MCLB 2009b) and there are no encroachment partnering agreements in place.

Within the facility, three primary land use areas have been established to focus similar activities in designated use areas of the facility: industrial/warehouse; administrative; and residential (MCLB 2013a). Each land use zone is further described below, and specific land uses are shown on Figure 4:

- ***Industrial/Warehouse Area.*** The industrial/warehouse area is generally located in the western portion of the Installation and contains warehouses; the railway shipping and receiving areas; and facilities serving Installation utilities. Access to this area from off base is provided via the Industrial Gate, which is located off Fleming Road to the south and west of the Main Gate. The major tenant for MCLB Albany, the Marine Depot Maintenance Command (MDMC), is located in the administrative area and is responsible for repair maintenance and testing of all Marine Corps vehicular equipment on the East Coast (MCLB 2013a). This area also includes one agricultural outlease area (considered open space) which is currently managed for the production of pecans.
- ***Administrative Area.*** The administrative area is located generally in the center portion of the facility and accessed via the Main Gate off Fleming Road in the south-central part of the Installation. Most of the central portion of the base has been developed with buildings, roads, parking lots, and lawns. The central and western portions of the base contain an extensive drainage system which has lowered the water table and dried out much of what may have originally been wetland habitat in these portions of the base (Barbour et al. 2013). This area contains all the facilities necessary to meet the administrative and community support needs of MCLB Albany. The administrative area also includes public works facilities; morale, welfare, and recreation facilities; bachelor enlisted quarters; and recreational areas (MCLB 2013a). The administrative area plays a dual role in that it serves the administrative functions of the Installation during daylight hours, and it serves as a transition zone between two incompatible land uses, industrial and residential (SOUTHNAVFACENGCOM 2006).



- **Residential Area.** The residential area is located on the eastern portion of the Installation and includes Hill Village Family Housing Area (single family housing units), Indian Lake Wildlife Refuge which is located adjacent to and north of the housing area, a golf driving range, and an inactive golf course. Between 2007 and 2009, 250 housing units were demolished. During that time period, 110 new units were built. The open area footprint of the former units will be managed primarily for wildlife habitat through a combination of reforestation and restoration (MCLB 2012a). A small arms range is located northeast of the housing area. Access to the residential area is from the East Matthews Boulevard, through the administrative area from the Main Gate (MCLB 2013a).

Although the majority of the land within Installation boundaries has been altered significantly by past agricultural use and the construction of Installation infrastructure, large tracts of open space throughout the Installation serve as buffer zones that interconnect the three land use areas, as well as buffer zones between the Installation and the surrounding off-base area. Open space includes approximately 1,452 acres of upland and wetland forest, the majority of which is planted or natural stands of pine, predominantly slash pine (*Pinus elliottii*) with a few smaller areas of remnant longleaf pine, 185 acres of orchard, and 802 acres of open land (CZR Incorporated 1996, Barbour et al. 2013) located predominantly in the eastern half of the Installation (Figure 4).

2.3.3.2 *Agricultural Outleases*

From 2011 to 2014, MCLB Albany had approximately 140 acres of pecan orchard in an agricultural outlease held by Turtle Shoals LLC. The annual lease fee offset the costs of maintaining the pecan grove, while providing low-cost opportunities for local farmers to produce crops. The lease eventually became commercially unviable. Since that time, most of the pecan orchard has been converted to other habitat types planted with native species. The 7.5 acres of remaining pecan orchard will be maintained for wildlife habitat and to provide for recreational nut production. There are currently no plans to outlease any of MCLB Albany's lands.

2.3.3.3 *Regional Land Use*

The Installation lies within the Atlantic Coastal Plain physiographic province which extends landward from the coast of southern Georgia to North Carolina, and within the Dougherty Plain subdivision of the Southeastern Plains ecoregion (Barbour et al. 2013). The Southeastern Plains ecoregion covers approximately 16,270,450 acres in middle and southwest Georgia. The Dougherty Plain subdivision is mostly flat to gently rolling and influenced by limestone near the surface of the soil. The karst topography contains numerous sinkholes and springs, with many shallow, flat-bottomed depressions (Grady ponds and limesink ponds) scattered throughout the region (GNDR 2005). Overall, the region is characterized by broad, flat uplands, numerous geographically isolated wetlands, and few, but deeply incised streams. The Dougherty Plain subdivision is the largest ecoregion in Georgia. However, it has the lowest percentage of lands in permanent protected conservation status (2.6 percent) (GDNR 2005).

The predominant land uses surrounding the Installation include agricultural, silvicultural, and low-density residential (MCLB 2013a, SOUTHNAVFACENGCOM 2006). Row crops such as cotton, peanuts, and pecans, pasture, and both natural and planted pine forests are common. Land use north of MCLB Albany is predominantly agricultural with scattered low-density residential,

industrial, and linear commercial development. Areas east and south of the Installation is also mainly agricultural, with some forested areas and low-density residential areas along major roadways. A large pecan grove is located just across Fleming Road from the Installation to the south. Land use west of the Installation is industrial, with scattered low-density residential development. High density residential and industrial lands are concentrated in the vicinity of Albany, approximately 5 miles to the northwest of the Installation.

2.3.4 Geology

2.3.4.1 *General Geology*

The Installation is located in the Dougherty Plain District of the Atlantic Coastal Plain physiographic province (MCLB 2007). The regional geology is characterized by alternating layers of sand, clay, sandstone, dolomite, and limestone that extend to a depth of over 5,000 feet below the land surface. The flat to gently rolling topography of the area is characterized by numerous sinkholes and associated marshes and ponds.

2.3.4.2 *Surficial Geology*

Undifferentiated sedimentary deposits of Quaternary (1.8 million years ago to present) age overlie the Ocala and Suwannee Limestone formations at MCLB Albany. The Quaternary deposits consist of interbedded layers of fine to coarse sands and clays (MCLB 2007).

2.3.4.3 *Seismicity*

MCLB Albany is located in earthquake Hazard Zone 1. Earthquake Hazard Zone 4 represents areas with the highest potential of risk for damage or loss of life associated with earthquakes and Hazard Zone 1 is assigned to areas with the least potential. In accordance with the Earthquake Hazards Reduction Act of 1977, federally owned or leased buildings are required to be in compliance with federally established standards for the reduction of seismic hazards. The Naval Facilities Engineering Command's (NAVFACENGCOM) Earthquake Safety Program investigates facilities located in Seismic Zones 3 and 4 and essential facilities located in Zone 2. The program also identifies buildings that are vulnerable to serious potential damage from the maximum potential earthquakes at Navy and Marine Corps sites. No seismically inadequate structures have been identified at the Installation (SOUTHNAVFACENGCOM 2006).

2.3.4.4 *Petroleum and Minerals*

There are no petroleum or mineral resources extracted or produced at MCLB Albany.

2.3.5 Topography

Topography at the Installation is characterized as flat to gently rolling. Elevations range from approximately 195 feet National Geodetic Vertical Datum (NGVD) to 275 feet NGVD. Higher elevations occur in the central section of the east half of the base. Elevations decrease to the east and west of the divide, with the lowest elevations occurring in the western half of the base (MCLB 2007).

2.3.6 Soils

Based on the Soil Survey of Dougherty County, compiled by the USDA, there are 24 soil mapping units occurring on the base, as shown in Figure 5 (MCLB 2013a, USDA 2012). Table 2 lists the soil mapping units and provides general characteristics of the soil series or soil complexes. Drainage characteristics, textural characteristics, landscape position, and some potential limitations associated with the mapping units are provided.

Mapping units that are designated as hydric or have inclusions that are hydric are also indicated in Table 2. Hydric soils are soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic (oxygen-deficient) conditions in their upper part. Anaerobic soil conditions are conducive to the establishment of vegetation that is adapted for growth under oxygen-deficient conditions and is typically found in wetlands (hydrophytic vegetation). Areas on MCLB Albany where hydric soils have been mapped are typically associated with the general location of wetlands on the Installation.

Figure 5 and Table 2 provide a good general characterization of soil conditions on MCLB Albany and are useful tools in determining use and management of the resource. Where proposed activities will directly affect soils, or the viability of a proposed use is dependent on soil conditions, on-site soil characterization should be conducted.

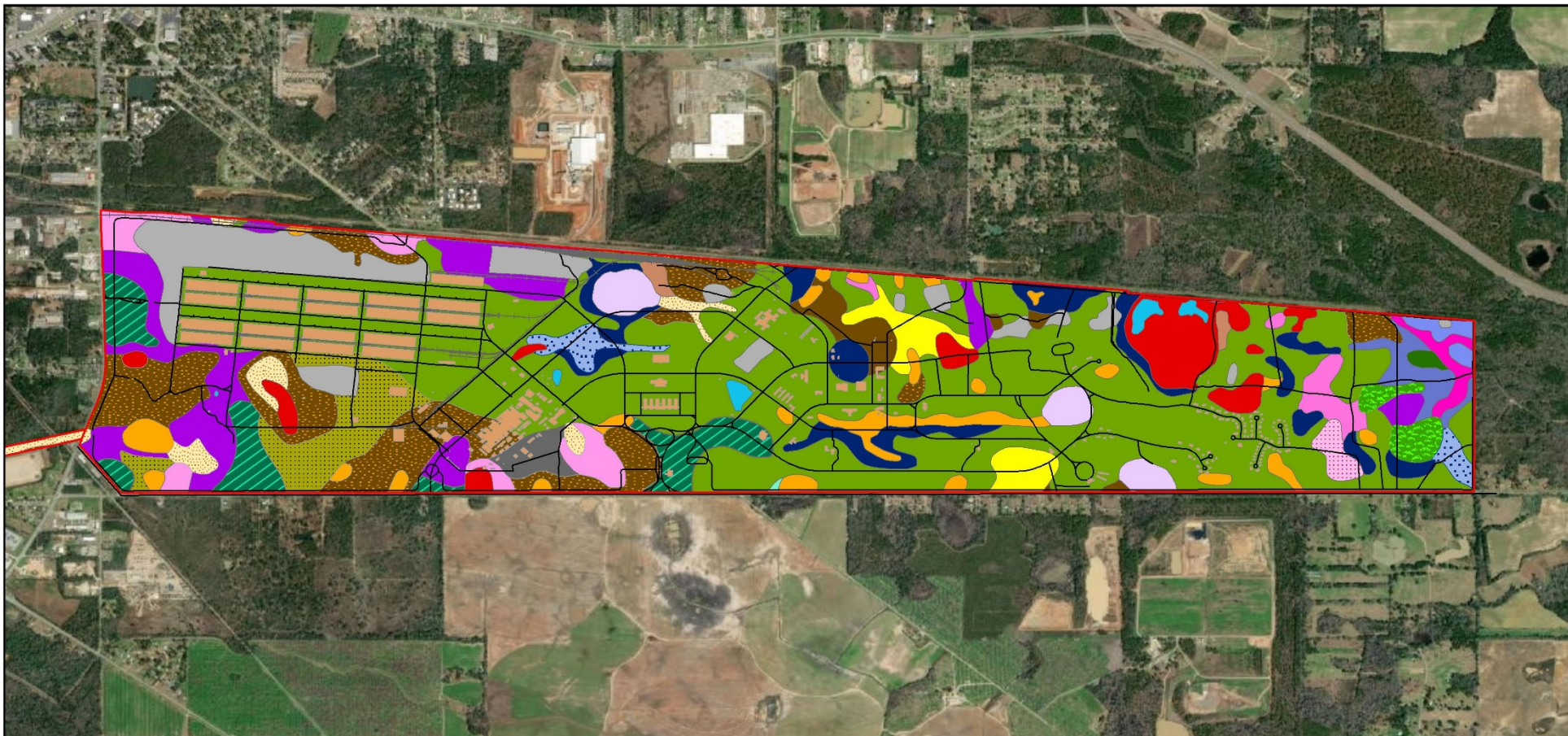
Table 2. Soils of Marine Corps Logistics Base Albany.



Soil Series	Map Unit	Texture/Parent Material	Drainage Class	Hydric	Limitations	Landscape Position
Alluvial land, wet	Avp	Surface: SL-LS-S subsoil: SC-SCL	Poorly drained	Yes	Wetness	Narrow strips along small streams
Bladen loam	Bia	Surface: L subsoil: C-SC	Poorly drained	Yes	Wetness; occasional flooding	Nearly level stream terraces
Carnegie sandy loam, 2–5 percent slopes, eroded	CoB2	Surface: L subsoil: C-SC	Well drained	No	Severe erosion hazard	Uplands
Carnegie sandy loam, 5–8 percent slopes, eroded	CoC2	Surface: SL subsoil: SCL-CL	Well drained	No	Severe erosion hazard	Uplands
Dune land	DsL	Surface: S-CS subsoil: CS	Excessively drained	No	Low fertility; very rapid permeability; low water capacity	Gently rolling dunes
Eustis loamy sand, 0–5 percent slopes	EqB	Surface: LS subsoil: LS	Somewhat excessively drained	No	Droughty	Level to gently rolling landscapes along the Flint River and Cooleewahee Creek
Flint fine sandy loam, 0–2 percent slopes	FrA	Surface: FSL subsoil: C	Moderately well drained	No	Wetness; occasional flooding	Stream terraces
Grady clay loam	Gcl	Surface: muck-variable textures subsoil: C	Poorly drained-very poorly drained	Yes	Wetness; ponding	Ponded depressions
Grady soils	Grd	Surface: variable texture subsoil: C	Poorly drained-very poorly drained	Yes	Wetness; ponding	Ponded depressions

Soil Series	Map Unit	Texture/Parent Material	Drainage Class	Hydric	Limitations	Landscape Position
Irvington sandy loam, 0–2 percent slopes	IgA	Surface: SL subsoil: SCL	Moderately well drained	No	Wetness; flooding	Uplands
Izagora-Dunbar loamy fine sand	IzA	Izagora surface: LFS-SL subsoil: SCL Dunbar surface: LS-L subsoil: SC-sic	Izagora moderately well drained Dunbar Somewhat poorly drained	Izagora no Dunbar hydric inclusions	Wetness; flooding	Upland flats and nearly level terraces along larger streams
Local alluvial land	LcM	Surface: sil-SL subsoil: SL-SCL	Moderately well drained	No	Frequently flooded in winter	Small depressions with slightly concave sides
Lucy loamy sand, 2-5 percent slopes	LMB	Surface: LS subsoil: SCL	Well drained	No	Slight erosion hazard; slightly droughty	Level to gently sloping landscapes
Lakeland sand, 0-5 percent slopes	LpB	Surface: loose S subsoil: loose S	Excessively drained	No	Slight erosion hazard	Level to gently sloping landscapes
Lynchburg sandy loam, 0–2 percent slopes	LtA	Surface: SL subsoil: SCL	Somewhat poorly drained	Hydric inclusions	Wetness; flooding	Level or nearly level uplands
Norfolk loamy sand, 0–2 percent slopes	NhA	Surface: LS-SL subsoil: SCL	Well drained	No	–	Uplands
Ocilla loamy sand, 0–2 percent slopes	OhA	Surface: LS subsoil: LS-SL-SCL	Somewhat poorly drained	Hydric inclusions	Wetness	Nearly level to slightly depressional areas on uplands
Orangeburg loamy sand, 0–2 percent slopes	OeA	Surface: LS-SL subsoil: SCL	Well drained	No	–	Uplands
Orangeburg loamy sand, 2–5 percent slopes	OeB	Surface: LS-SL subsoil: SCL	Well drained	No	Moderate erosion hazard	Uplands

Soil Series	Map Unit	Texture/Parent Material	Drainage Class	Hydric	Limitations	Landscape Position
Orangeburg loamy sand, 2–5 percent slopes, eroded	OeB2	Surface: LS subsoil: SCL	Well drained	No	Moderate erosion hazard	Uplands
Sawyer-Susquehann a cobbly loamy sand, 2–8 percent slopes, eroded	SSC2	Sawyer surface: LS subsurface: SC-plastic C Susquehanna surface: LS subsurface: plastic C	Sawyer moderately well drained Susquehanna somewhat poorly drained	No	Moderate to severe erosion hazard	Broad ridges
Soil Series	Map Unit	Texture/ parent material	Drainage class	Hydric	Limitations	Landscape position
Sawyer-Susquehann a loamy sands, 2–5 percent slopes, eroded	SUB2	Sawyer surface: LS subsurface: SC-plastic C Susquehanna surface: LS subsurface: plastic C	Sawyer moderately well drained Susquehanna somewhat poorly drained	No	Moderate to severe erosion hazard	Broad ridges
Tifton sandy loam, 2–5 percent slopes	TuB	Surface: SL subsoil: SCL-SC	Well drained	No	–	Uplands
Tifton sandy loam, 2–5 percent slopes, eroded	TuB2	Surface: SL subsoil: SCL-SC	Well drained	No	–	Uplands

Notes: L = Loam S = Sand CS = Coarse sand SL = Sandy loam Source: USDA, 1968. LS = Loamy sand FSL = Fine sandy loam LFS = Loamy fine sand SiL = Silt loam SCL = Sandy clay loam CL = Clay loam SC = Sandy clay SiC = Silty clay C = Clay



<p>Legend</p> <ul style="list-style-type: none"> MCLB Albany Installation Area Building Road Railroad 	<p>Soil Types</p> <ul style="list-style-type: none"> Alluvial land Bladen loam Borrow pits Carnegie sandy loam, 2-5% slopes, moderately eroded Carnegie sandy loam, 5-8% slopes, moderately eroded Dunbar, Izagora, and Bladen soils Eustis loamy sand, 0-5% slopes 	<ul style="list-style-type: none"> Flint fine sandy loam, 0-2% slopes Grady clay loam, 0-2% slopes, frequently ponded Grady soils Irvington sandy loam, 0-2% slopes Izagora-Dunbar loamy fine sands Lucy loamy sand, 0-2% slopes Lucy loamy sand, 2-5% slopes 	<ul style="list-style-type: none"> Local alluvial land Lakeland sand, 0-5% slopes Lynchburg sandy loam, 0-2% slopes Norfolk loamy sand, 0-2% slopes Orangeburg loamy sand, 0-2% slopes Orangeburg loamy sand, 2-5% slopes Orangeburg loamy sand, 2-5% slopes, moderately eroded 	<ul style="list-style-type: none"> Ocilla loamy sand, 0-2% slopes Sawyer-Susquehanna cobbly loamy sands, 2-8% slopes, eroded Sawyer-Susquehanna loamy sands, 2-5% slopes, eroded Tifton sandy loam, 2-5% slopes Tifton sandy loam, 2-5% slopes, moderately eroded Water 	<div style="text-align: center;">  <p>Project Location Georgia</p> <p>0 0.5 1 Miles</p> <p>0 0.5 1 Kilometers</p> </div>	<div style="text-align: center;">  <p>NAVFAC Naval Facilities Engineering Command</p> </div> <p style="text-align: center;">Figure 5. Soil Types Marine Corps Logistics Base Albany Albany, Georgia</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">DRAWN BY M. MASON</td> <td style="width: 50%;">DATE 02/05/20</td> </tr> <tr> <td>APPROVED BY S. BUCHANAN</td> <td>DATE 02/25/20</td> </tr> </table> <p style="font-size: small;">SOURCE: MCLB Albany 2020, Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.</p>	DRAWN BY M. MASON	DATE 02/05/20	APPROVED BY S. BUCHANAN	DATE 02/25/20
DRAWN BY M. MASON	DATE 02/05/20									
APPROVED BY S. BUCHANAN	DATE 02/25/20									

2.3.7 Water Resources

The major uses of Installation water resources are training, recreation, and aquatic habitat. The water resources of MCLB Albany can be divided into three main categories: groundwater, surface water, and wetlands. Each has its own physical and chemical components, which in turn regulate the aquatic flora and fauna that comprise the biological communities. The following discussion describes the existing water resources at MCLB Albany.

2.3.7.1 Floodplains

Most of the floodplains at MCLB Albany are relatively minor and are associated with small depressional features that fill during storm events. The largest floodplain on the base is associated with the large depressional area around Indian Lake (BEA 1998). There are no Federal Emergency Management Agency (FEMA) designated Flood Hazard Zones on the Installation (FEMA 2013). Although not within a floodplain, flooding has been an issue at several locations in the east section of the Installation. The source of the flooding is believed to be due to inlets that are directing flow onto the base from offsite areas (MCLB 2012a).

2.3.7.2 Groundwater

Aquifers in the Coastal Plain Province of Georgia consist generally of alternating units of clay, sandstone, dolomite, and limestone. Confining units between the aquifers are mostly silt and clay. The complex interbedded clastic rocks and sediments of the Coastal Plain aquifers range in age from Quaternary to Cretaceous. Because of gradational changes in hydrologic properties, aquifer and stratigraphic boundaries are not always coincident (USGS 1999). The surficial aquifer system in the Coastal Plain is a shallow, mostly unconfined water table aquifer consisting of cross-bedded sand, gravel, and clay with undifferentiated alluvium near rivers. Isolated domestic wells withdraw water from the surficial aquifer system.

The Floridan Aquifer System, one of the most productive systems worldwide, underlies about 100,000 square miles in Florida, Alabama, southern Georgia, and southern South Carolina. The Floridan aquifer system is comprised of a thick sequence of carbonate rocks that are of Tertiary age and are hydraulically connected in varying degrees. The Ocala Limestone, which underlies MCLB Albany, is one of the thickest and most productive formations that crops out in the Dougherty Plain and it gives rise to a karst topography riddled with sinkholes. The complex hydrology of the Floridan Aquifer System is reflected by highly variable transmissivities (e.g., rate which groundwater flows horizontally through an aquifer) that range from 2,000 to 1,300,000 feet squared per day. Range in transmissivities in the Ocala Limestone is caused by the variable fractured nature, and the dissolution of limestone that creates conduits and solution openings (USGS 1999).

The Installation provides its own water, wells, and irrigation (MCLB 2012a). Water is provided from three deep wells and is distributed through mains ranging from 1.5 inches to 16 inches in diameter. The wells are located on the western end of the base in Building 1465, on the eastern end of the base in Building 10100, and at Building 4500 at the northwest corner of Radford Boulevard and Walker Avenue (BEA 1998). Sanitation waste for base housing is processed by a private contractor, and some industrial waste is processed on base as part of the Installation's

pretreatment permit with the city of Albany. Numerous water testing wells are also located throughout the facility and are slated for removal (MCLB 2012a).

2.3.7.3 *Wetland Habitats*

In general terms, wetlands are semi-terrestrial areas where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil or on its surface. Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions and that do so under normal circumstances.

There are approximately 128 acres of delineated wetlands (CZR 1996) and an additional 188 acres classified as wetland by the National Wetland Inventory (MCLB 2013a, USFWS 2012a) (Figure 6). These include wetlands in and surrounding three human-made ponds (Covella Pond, Horseshoe Pond, and Robinson Pond); a large naturally occurring limesink pond complex known as Indian Lake; several smaller limesink wetlands; and approximately 2,625 feet of Piney Woods Creek. Wetland habitat types determined to occur on MCLB Albany based on the Cowardin (1992) classification system include palustrine forested, palustrine scrub shrub, and palustrine emergent wetlands.

- ***Palustrine forested*** systems are the most common type of wetland habitat on the base. The palustrine forested wetlands are typically dominated by bald cypress (*Taxodium distichum*), red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*) and a variety of oaks (*Quercus* spp.). See Section 3.1.9.2.4 for a description of MCLB Albany's forested wetlands.
- ***Palustrine scrub shrub*** wetland is found at one location on MCLB Albany. This wetland is approximately 60 acres and is part of the approximately 66-acre Indian Lake wetland system. Examples of vegetation in the scrub shrub area of the wetland include scattered pond cypress (*Taxodium ascendens*), buttonbush (*Cephalanthus occidentalis*), and fetterbush (*Lyonia lucida*). Examples of herbaceous vegetation include chain ferns (*Woodwardia* spp.), maidencane (*Panicum hemitoma*), and paspalum (*Paspalum distichum*).
- ***Palustrine emergent*** wetlands on MCLB Albany occur primarily in small, disturbed areas such as old borrow pits. These wetlands are typically dominated by herbaceous species such as maidencane and other *Panicum* species (CZR 1996).

The largest wetland system on MCLB Albany occurs in the 85-acre Indian Lake Wildlife Refuge (MCLB 2007). The refuge, which includes the 66-acre Indian Lake, consists of three deep limesink ponds in a broad, shallow basin. The semi-permanently flooded basin contains open water, emergent, scrub shrub, and forested wetland habitats. Dominant trees along the edge of Indian Lake include laurel oak (*Quercus laurifolia*), water oak (*Q. nigra*), live oak (*Q. virginiana*), sugarberry (*Celtis laevigata*), sweetgum, and red maple. Pond cypress, swamp blackgum (*Nyssa sylvatica*), and red maple are found in the central section of the basin. The open water and emergent areas of the lake include a variety of common wetland and aquatic plants including pickerelweed

(*Pontederia* sp.), buttonbush (*Cephalanthus* sp.), bladderwort (*Utricularia* sp.), maidencane, duckweed (*Spirodela* sp.), bulrush (*Scirpus* sp.), pond lily (*Nymphaea* sp.), and water shield (*Brasenia* sp.). Another similar wetland occurs on the east side of East Shaw Road, just north of Fleming Road. This wetland is dominated in its central area by bald cypress and swamp blackgum. Slash pine is common around its edges (BEA 1998). Although they comprise a large and diverse wetland system, the wetlands at Indian Lake are drying out and changing species composition, presumably due to water loss from extended drought periods and off-site agricultural uses (MCLB 2012a).

2.3.7.4 *Aquatic Habitats*

The most significant surface water feature in the vicinity of MCLB Albany is the Flint River. The Flint River is part of the Apalachicola-Chattahoochee-Flint River Basin, and discharges through State forests and the Apalachicola National Estuarine Research Reserve. All but the western part of Dougherty County drains to the Flint River, which flows from north to south through the central part of the county. In Georgia's State Wildlife Action Plan, the watersheds that compose the Flint River are identified as high priority watersheds, with global significance scores of High to Highest for containing important populations of high conservation of a high priority aquatic species (GDNR 2015). Located approximately two miles from the western edge of MCLB Albany, the Flint River has been dammed to create a reservoir for the Georgia Power Company. The reservoir, called Lake Worth, is located approximately five miles to the north of MCLB Albany. The major tributaries flowing into the Flint River within Dougherty County include Piney Woods Creek, Dry Creek, and Muckafoonee Creek.

Aquatic habitats (i.e., rivers, streams, creeks, brooks, channels, lakes, and ponds) on MCLB Albany make up approximately 2 percent of the facility (MCLB 2013a), and all drainage from the Installation ultimately discharges to the Flint River. Surface water features of MCLB Albany are shown in Figure 6. However, some ditches and canals have not been mapped/included in the Installation's GIS data base (MCLB 2013a).

The eastern third of the base is drained by Piney Woods Creek. Piney Woods Creek is the only naturally occurring stream on the Installation and flows through the northeastern most corner of MCLB Albany, with approximately 2,625 ft. of stream channel on the base. Piney Woods Creek is an intermittent stream that can be dry for significant portions of the year (Barbour et al. 2013) and likely supports limited aquatic life.

The remainder of the base drains west through a system of ditches and canals, conveying all stormwater runoff from the central part of the base and discharging to the Marine Corps Canal. The Marine Corps Canal or "Marine Ditch Canal" is more than 60 years old and 3-miles long. The canal extends off base (MCLB 2012b) and flows to the west from the southwest corner of the base (Figure 2 and Figure 3), discharging to the Flint River approximately 5 miles below the dam for Lake Worth. The canal is owned by the Installation, but other institutions such as Proctor and Gamble, Dougherty County, and the City of Albany also use it for stormwater runoff. MCLB Albany has signed Grant of Easement with the Dougherty County Public Works Department, which states they are responsible for maintaining the canal from the outfall of the base to the Flint River. These ditch/canal features contain water for much of the year and likely support a diversity

of aquatic species (MCLB 2012b); however, no known biological studies have been completed within these features.

There are also approximately 74 acres of lakes and ponds on MCLB Albany (MCLB 2013a), including the naturally occurring Indian Lake and three manmade ponds as described below:

- **Indian Lake** (66 acres) is a naturally occurring cypress pond within the 85-acre Indian Lake Wildlife Refuge located along the northeastern boundary of MCLB Albany. This unique wetland pond system is maintained as a wildlife refuge and nature observation area and consists of three relatively deep ponds within in a long, shallow basin. The semi-permanently flooded basin contains open water, emergent, scrub shrub and forested wetland habitats. The southern half of the lake has been overtaken by duckweed, and aquatic weeds have become abundant throughout the lake, presumably due to water loss from extended drought periods and offsite agricultural uses (MCLB 2012b). Indian Lake supports limited fish populations due to adverse water quality conditions including low dissolved oxygen levels and lower than ideal pH levels (MCLB 2012b). The large amounts of aquatic vegetation and other organic matter that naturally accumulate in cypress domes depletes oxygen levels and limits fish species to those that can tolerate such conditions. Surveys of the fish species located in Indian Lake have found spotted gar (*Lepisosteus oculatus*), bullhead catfish (*Ameiurus* sp.), flier (*Centrarchus macropterus*), and bowfin (*Amia calva*). These species provide limited angling opportunities (MCLB 2012b).
- **Covella Pond** (5.2 acres) is located in the central section of the base adjacent to the intersection of Radford Boulevard and McCawley Avenue and is managed primarily to provide fishing opportunities for catfish and hybrid striped bass (*Morone chrysops x Morone saxatilis*) (MCLB 2012b). The pond was drawn down and renovated in 1998 due to an overpopulation of fish (MCLB 2007). Since then, Covella Pond was drawn down approximately every third November and restocked with channel catfish (*Ictalurus punctatus*). However, in December 2012 the pond was renovated following a fish die-off associated with the protozoan ectoparasite *Ichthyophthirius multifiliis*. Competitive fish species such as bluegill (*Lepomis macrochirus*), shiners, and grass carp (*Ctenopharyngodon idella*) were removed. Automatic fish feeders were installed in FY13 help to ensure a consistent source of food and improve fish growth rates. Healthy channel catfish and hybrid striped bass populations remain in the pond and the pond is monitored through harvest records. Fish are stocked in Covella Pond every fall/winter as needed. An annual fishing event, The Buddy Fishing Tournament, is held at Covella Pond traditionally on the first Saturday in June. This event provides a venue for families to enjoy fishing.
- **Horseshoe Pond** (2.1 acres) is located adjacent to Indian Lake. The pond has a long history of problems associated with widely fluctuating water levels and associated poor water quality. In 1997 the pond was drained, all fish were removed, and the pond was restocked in 1998 with 3,000, 5- to 7-inch channel catfish. Few catfish survived and an additional 1,000 catfish were stocked in late 1998. In 1999, the pond was stocked with four hundred 3-inch largemouth bass (*Micropterus salmoides*); stocked in 2001 with two thousand 7- to 9-inch channel catfish; and stocked in 2006 with one thousand 5- to 7-inch channel catfish and twenty 8- to 10-inch grass carp. In the past, survivorship of these species was poor due

to the inability of the pond to retain sufficient water levels. Fish species known to occupy Horseshoe Pond in 2012 consisted only of a few largemouth bass, bluegill, carp, catfish and gar (MCLB 2012b). However, in 2014, MCLB Albany installed a well in the pond to control water levels, thereby improving the pond's ability to support fish populations.

- ***Robinson Pond*** (0.6 acres) is located within the former MCLB Albany golf course and is also maintained to provide recreational fishing opportunities. The pond was initially dug and used as an irrigation pond for the golf course. Three wells supplied water to the pond, although now only one well is operational (MCLB 2012b). Following closure of the golf course, the pond remained idle until tests could confirm that pesticides used on the golf course were not present in the fish. Following the recommendations prepared by the pond management consultants, Robinson Pond was designated as a youth fishing pond in Fiscal Year 2013. The pond provides catch-and-release fishing opportunity for bluegill, hybrid striped bass, largemouth bass, and channel catfish. An inaugural stocking of rainbow trout occurred in November 2013 and provided catch-and-release opportunity through February 2014, after which youth anglers were allowed to remove up to seven trout daily until all trout were removed. Due to the small size of the pond and steep banks, a fishing pier was installed in FY2013 and provides the only fishing access to the pond. The fishing pier is large enough to accommodate multiple families.



<p>Legend</p> <ul style="list-style-type: none"> MCLB Albany Installation A1 Building Waterbody Road Stream 	<p>Wetland Classification</p> <ul style="list-style-type: none"> Palustrine Emergent Persistent, Seasonally Flooded (PEM1C) Palustrine Forested Broad/Needle-Leaved Deciduous, Semipermanently Flooded (PFO1Z/F) Palustrine Forested Broad-Leaved Deciduous, Temporarily Flooded (PFO1A) Palustrine Forested Broad-Leaved Deciduous, Seasonally Flooded (PFO1C) Palustrine Forested Broad-Leaved Deciduous, Seasonally Flooded, Impounded (PFO1Ch) Palustrine Forested Broad-Leaved Deciduous, Semipermanently Flooded (PFO1F) 	<ul style="list-style-type: none"> Palustrine Scrub-Shrub Needle-Leaved Deciduous, Semipermanently Flooded (PSS2F) Palustrine Unconsolidated Bottom, Permanently Flooded, Impounded (PUBHh) Palustrine Unconsolidated Bottom, Permanently Flooded, Excavated (PUBHx) 	<p>Project Location</p> <p style="text-align: center;">North Arrow</p> <p style="text-align: center;">0 0.5 1 Miles 0 0.5 1 Kilometers</p>	<p>Figure 6. Surface Water and Wetlands Marine Corps Logistics Base Albany Albany, Georgia</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">DRAWN BY M. MASON</td> <td style="padding: 2px;">DATE 02/05/20</td> </tr> <tr> <td style="padding: 2px;">APPROVED BY S. BUCHANAN</td> <td style="padding: 2px;">DATE 02/25/20</td> </tr> </table> <p style="font-size: small; padding: 2px;">SOURCE: MCLB Albany 2020, Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.</p>	DRAWN BY M. MASON	DATE 02/05/20	APPROVED BY S. BUCHANAN	DATE 02/25/20
DRAWN BY M. MASON	DATE 02/05/20							
APPROVED BY S. BUCHANAN	DATE 02/25/20							

2.3.8 Terrestrial Vegetation and Communities

2.3.8.1 *Riparian Habitat*

A blackwater stream riparian forest occurs along the poorly defined floodplain of Piney Woods Creek in the northeastern corner of MCLB Albany (Figure 6 and Figure 7). This riparian habitat is listed as a significant natural community on the base and is dominated by willow oak (*Quercus phellos*), water oak, red maple, Carolina ash (*Fraxinus caroliniana*), laurel oak, and sweetgum. Swamp blackgum and pond cypress occur within the banks of the creek. Although limited in extent, the blackwater stream riparian forest represents an important component of the biological diversity on the base. The riparian forest community is bordered on both sides by pine-hardwood forest (GDNR 1995).

2.3.8.2 *Upland Habitat*

Intensive vegetation surveys have not been conducted on the Installation. However, the GDNR conducted surveys for rare species and rare natural communities on MCLB Albany between June 1990 and June 1992, and again in 1995 (GDNR 1995, MCLB 2007) and a subsequent inventory for rare species and natural communities was conducted by ANHP in 2013 (Barbour et al. 2013). Although the focus of the inventories was generally rare and federal or state listed species, numerous non-target flora species were identified in the process. Additionally, many plant species have also been documented on the facility incidentally by reputable professionals (Barbour et al. 2013, MCLB 2012a, 2013e). A list of flora known to occur, or with the potential to occur, on the Installation is provided in Section 3.1.12 and Appendix C.

Terrestrial habitats on the base primarily include natural pine, pine plantations, hardwood, early successional systems, and maintained fields and lawns. MCLB Albany has approximately 1,523 acres of forestlands (including forested wetlands), 32 acres of orchard, and 570 acres of undeveloped open land interspersed between industrial, administrative, recreational, and residential areas (Lincoln Military Housing); the majority of the base's forested land is planted or natural stands of pine, predominantly slash pine with a few smaller areas of remnant longleaf pine (MCLB 2013a). Based on 1948 aerial photographs, the land area comprising what was to become MCLB Albany were largely made up of agricultural fields (approximately [~] 70%), pecan orchard (~15%), and various types of forestlands (~15%). These forested areas included forested wetlands, remnant stands of longleaf pine, and other timber types that cannot be differentiated from the aerial photographs. The remnant longleaf pine stands can be distinguished from other forest cover types based on the presence of old growth trees (greater than [>] 100 years old) and associated ground cover such as wiregrass (*Aristida stricta*). The presence of the native ground cover indicates that very little soil disturbance occurred in these stands. This pre-construction landscape was drastically altered by the Installation of a series of ditches, the development of industrial, administrative and residential areas, and the planting of even-aged plantation pines (mostly slash) during the 1960s.

Overall, the amount of forestland on MCLB Albany increased substantially, almost tripling, since construction of the base; however, significant loss of forested wetlands and remnant longleaf stands has also occurred during this time frame. In 2015, 130 acres of forest and 20 acres of pecan orchard on the northwestern portion of the Installation were clear-cut to construct a solar array. Construction of the solar array began in 2016 and finished in 2018. Additionally, on January 22,

2017, an EF-3 tornado struck the western and central portions of the Installation. The tornado destroyed or damaged more than 800 acres of forest and most of the pecan orchard. Following the tornado, 245 acres of longleaf pine, 32.2 acres of slash pine, and 24.2 acres of hardwood orchards were planted. The current undeveloped areas of MCLB can broadly be categorized into the following cover types: Upland Pines (923.2 acres), Mixed Pine Hardwood (236.2 acres), Upland Hardwood (152.9 acres), Forested Wetland (173.4 acres), Pecan Orchard (7.5 acres), as well as open land acres (27.0 acres of utility rights-of-way and 27.5 acres food plots, and 69.8 acres of fallow fields or native groundcover).

Three significant natural communities have been designated on MCLB including Limesink Pond/Pond Cypress Pond, Clayhill Longleaf Woodland, and South Atlantic Willow Flatwoods Forest (Barbour et al. 2013). These communities cross forest stand boundaries and fall within the Upland Pine, Mixed Pine Hardwood, and Forested Wetland forest cover types. These natural communities have been identified as rare and ecologically sensitive areas. They are described under Section 3.1.11 Sensitive Habitats and Rare Ecosystems.

2.3.8.2.1 Upland Pine

The Upland Pine cover type comprises 62.1% of MCLB Albany's forested land area. This cover type consists of the total acreage of planted slash (510.0 acres), loblolly (133.6 acres), longleaf pine (281.7 acres), and natural pine stands (23.2 acres) with a minimal overstory hardwood component (< 30% of the overall stand basal area). Natural pine stands include the remnant longleaf stands visible in the 1948 aerial photographs. Understory vegetation in upland pine stands varies considerably depending upon stand age, basal area, and the degree of hardwood competition. Sweetgum, cherry (*Prunus* spp.), live oak, and water oak constitute the majority of the hardwood competition. Other common species include laurel oak, live oak, sumac (*Rhus* sp.), grape (*Vitis* sp.), greenbrier (*Smilax* sp.), beggarweed (*Desmodium* sp.), and partridge pea (*Chamaecrista fasciculata*). Some fire-tolerant upland hardwoods including southern red oak (*Quercus falcata*), are also scattered throughout the upland pine plantations. Incidences of cankered, diseased and malformed trees, and insect damage occur at slight to moderate densities in upland pine stands.

2.3.8.2.2 Mixed Pine Hardwood

This cover type comprises approximately 236.2 acres or 15.9% of MCLB Albany and generally occurs in areas bordering upland pines and forested wetland cover types. Other stands classified as mixed pine hardwood include stands of loblolly and slash pine plantation or fire-excluded natural pine stands with a significant component of hardwood (greater than 30%). This latter stand type, found on drier soils and slopes, contains scattered pine species including remnant longleaf pine and more fire-tolerant hardwood species such as southern red oak. The absence of fire, however, has resulted in extensive intrusion of invasive, fire-intolerant, hardwood species such as water oak and sweetgum. Hardwood trees commonly encountered in the Mixed Pine Hardwood cover type include southern magnolia (*Magnolia grandiflora*), water oak, laurel oak, and live oak. Understory plant species associated with this vegetative cover type include grape, greenbrier, poison ivy (*Toxicodendron radicans*), and beautyberry (*Callicarpa* spp.).

2.3.8.2.3 Upland Hardwood

The Upland Hardwood forest cover type comprises 152.9 acres or 10.3% of MCLB Albany and consists of relatively small stands of hardwood species such as live oak, southern magnolia, laurel oak, and water oak. Portions of this cover type appear to have been planted or consist of former wetlands drained during the construction or early history of the Installation. Understory plant species associated with this vegetative cover type include grape, greenbrier, and Chinese privet (*Ligustrum sinense*).

2.3.8.2.4 Forested Wetland

This vegetative cover type consists of limesink pond, flatwoods (South Atlantic Willow Flatwoods Forest), and riparian hardwoods. Comprising 173.4 acres, this cover type represents 11.7% of the total land area of MCLB Albany. Water levels fluctuate considerably depending upon weather conditions within the forested wetlands. The largest forested wetland on MCLB Albany is known as Indian Lake, a 66-acre limesink pond. Tree species present include pond cypress, blackgum, willow, sweetgum, and red maple. Buttonbush dominates the shrub component of this vegetative cover type while herbaceous groundcover includes members of the following families: rushes (Juncaceae), sedges (Cyperaceae), and the grass family (Gramineae). Flatwoods forests occur mainly on the central and eastern portion of the Installation. This vegetative cover type is associated with willow oak, water oak, sweetgum, greenbrier, and sedge species. Riparian forest is located along Piney Woods Creek. This area is flooded intermittently with aerobic water on sites located along stream channels and anaerobic water where no distinct stream channel exists. During extreme drought, Piney Woods Creek ceases flowing, and the channel may dry completely. Overstory trees associated with this forest cover type include bald cypress, water tupelo (*Nyssa aquatic*), and oak species.

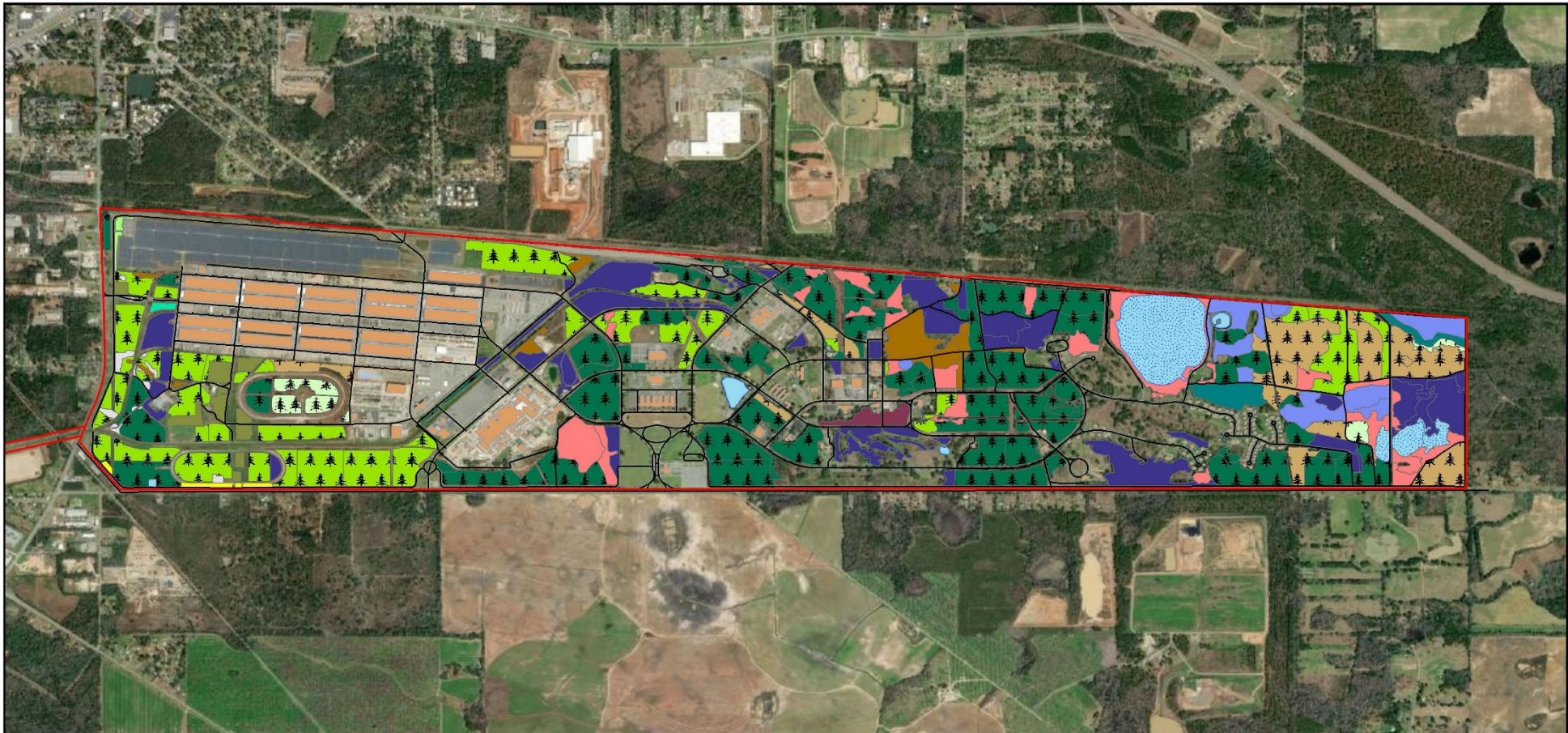
2.3.8.2.5 Pecan Orchard

MCLB Albany's pecan orchard predated construction of MCLB Albany and was a key feature of its landscape. Originally 600 acres of pecan orchard were present on the Installation but by 2015 only 185 acres were left. The orchard was managed by an agricultural lease until 2014. The commercial viability of the orchard had declined as a result of many factors and plans were in place to begin phasing out the orchard and converting the area to other land uses. These plans were accelerated when the January 2017 tornado destroyed most of the remaining pecan orchard. Currently only 7.5 acres of the pecan orchard remains in several small stands and scattered surviving trees. These areas will be maintained for wildlife habitat and to provide for recreational nut production. Twenty-four acres of the pecan orchard was converted into hardwood orchards with the remaining orchard areas replanted to longleaf pine, slash pine, or native groundcover fields. The hardwood orchards contain 14 native species of trees including Nuttall Oak, Shumard Oak, Sycamore, Green Ash, and Pecan. The hardwood orchards are planted and maintained to mimic the look of a pecan orchard.

2.3.8.2.6 Open Land

Open Lands on MCLB Albany consist of utility rights-of-way (27.0 acres), wildlife openings (27.5 acres), native groundcover areas (69.8 acres), the disused golf course excluding the driving range (63.8 acres), former housing footprint (80.7 acres), and maintained grass (482.1 acres). Maintained grass areas are dominated by lawn grasses such as Bermuda grass (*Cynodon* spp.), Bahiagrass

(*Paspalum notatum*), and centipedegrass (*Eremochloa ophiuroides*) and in some areas have a canopy of live oak trees. Native groundcover areas consist of wildlife openings planted with native warm season grasses and forbs attractive to pollinator species.



Legend MCLB Albany installation Area Building Waterbody Road	Forest Stand Cypress Pond Fallow Field Flatwoods Live Oak Hardwood Hardwood Orchard Riparian Hardwood Upland Hardwood Ornamental Hardwood Mixed Pine Hardwood Natural Pine Longleaf Pine Slash Pine Slash and Longleaf Pine Loblolly Pine Pecan	 Project Location Georgia					
			<p>Figure 7. Vegetation Communities Marine Corps Logistics Base Albany Albany, Georgia</p> <table border="1"> <tr> <td>DRAWN BY M. MASON</td> <td>DATE 02/28/20</td> </tr> <tr> <td>APPROVED BY S. BUCHANAN</td> <td>DATE 03/02/20</td> </tr> </table> <p><small>SOURCE: MCLB Albany 2020, Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.</small></p>	DRAWN BY M. MASON	DATE 02/28/20	APPROVED BY S. BUCHANAN	DATE 03/02/20
DRAWN BY M. MASON	DATE 02/28/20						
APPROVED BY S. BUCHANAN	DATE 03/02/20						

2.3.9 Nuisance and Invasive Plant Species

Controlling nuisance and exotic, invasive plants is essential to the protection of the Installation's biodiversity. Nuisance and exotic invasive species can displace native plants and animals, change the structure of natural communities, and impact the ecological functions of ecosystems.

Nuisance plants are defined as native species that generally cause relatively limited inconvenience, annoyance, or irritation to the general human population or damage to habitats. The negative effects of nuisance plants can range from reducing the aesthetic values of an area to humans, to physically impacting the natural communities by out-competing other species, changing habitat conditions, or reducing the productivity of a site.

Invasive exotic plants are defined as non-native, introduced species that may spread into, or are introduced to an area, and disturb the habitat of a similar native species or a non-similar species that is dependent upon the habitat required by the invasive species. Generally, an invasive species is likely to cause a much higher level of economic or environmental harm, or harm to human health, relative to nuisance plant species (Executive Order [EO] 13112). Invasive exotic species have invaded millions of acres throughout the state, threatening natural habitats, rare species, agricultural land, and have caused large-scale ecosystem changes, including altered fire and water cycles (Barbour et al. 2013).

The GDNR conducted surveys for rare species and rare natural communities on MCLB Albany between June 1990 and June 1992, and again in 1995 (GDNR 1995, MCLB 2007). A subsequent inventory for rare species and natural communities was conducted by ANHP in 2013 (Barbour et al. 2013). Although the focus of the inventories was generally rare and federal or state listed species, numerous non-target exotic flora species were identified in the process. Additionally, many exotic plant species have also been documented on the facility incidentally by reputable professionals (Barbour et al. 2013, MCLB 2012a). Exotic species known to occur on the Installation are identified in Appendix C.

Thirty invasive non-native plant species have been documented on the Installation and most are widespread (Barbour et al. 2013, MCLB 2019a). Of these, 10 species are causing significant negative impacts on native plant and animal communities based upon current abundance or have the potential to significantly degrade habitat if not treated (MCLB 2019a). These priority species include bahiagrass (*Paspalum notatum*), Bermuda grass (*Cynodon* sp.), bicolor lespedeza (*Lespedeza bicolor*), Chinese privet, Chinese wisteria (*Wisteria sinensis*), glossy privet (*Ligustrum japonicum*), kudzu (*Pueraria montana*), lantana (*Lantana* sp.), Japanese climbing fern (*Lygodium japonicum*), and the aquatic species alligatorweed (*Alternanthera philoxeroides*). The largest invasive communities occur along the perimeter of the facility and right-of-way corridors. Two native species, buttonbush (*Cephalanthus occidentalis*) and red maple (*Acer rubrum*), are considered noxious species in some locations on the Installation due to their impact on the desirable communities they are invading. In general, hardwood tree species such as live oak, laurel oak, and water oak, sweetgum, and cherry are also problematic in locations where they are invading upland pine stands in the absence of fire (MCLB 2019a). Additional invasive or noxious plant species are also likely to occur on the Installation but have not been well-documented (MCLB

2012a). Focused surveys are needed to identify and map the extent of these. Plants considered by USFWS to be invasive species for the MCLB Albany property are identified in Appendix C.

The MCLB Albany 2015 Integrated Pest Management Plan addresses nuisance and invasive plants (MCLB 2015b). The use of fire for the protection and maintenance of upland habitats (which also facilitates the control of invasives) is addressed in the MCLB Albany Wildfire Protection Plan (USACE 2010) and MCLB Albany's Burn Plan (MCLB 2019).

2.3.10 Sensitive Habitats and Rare Ecosystems

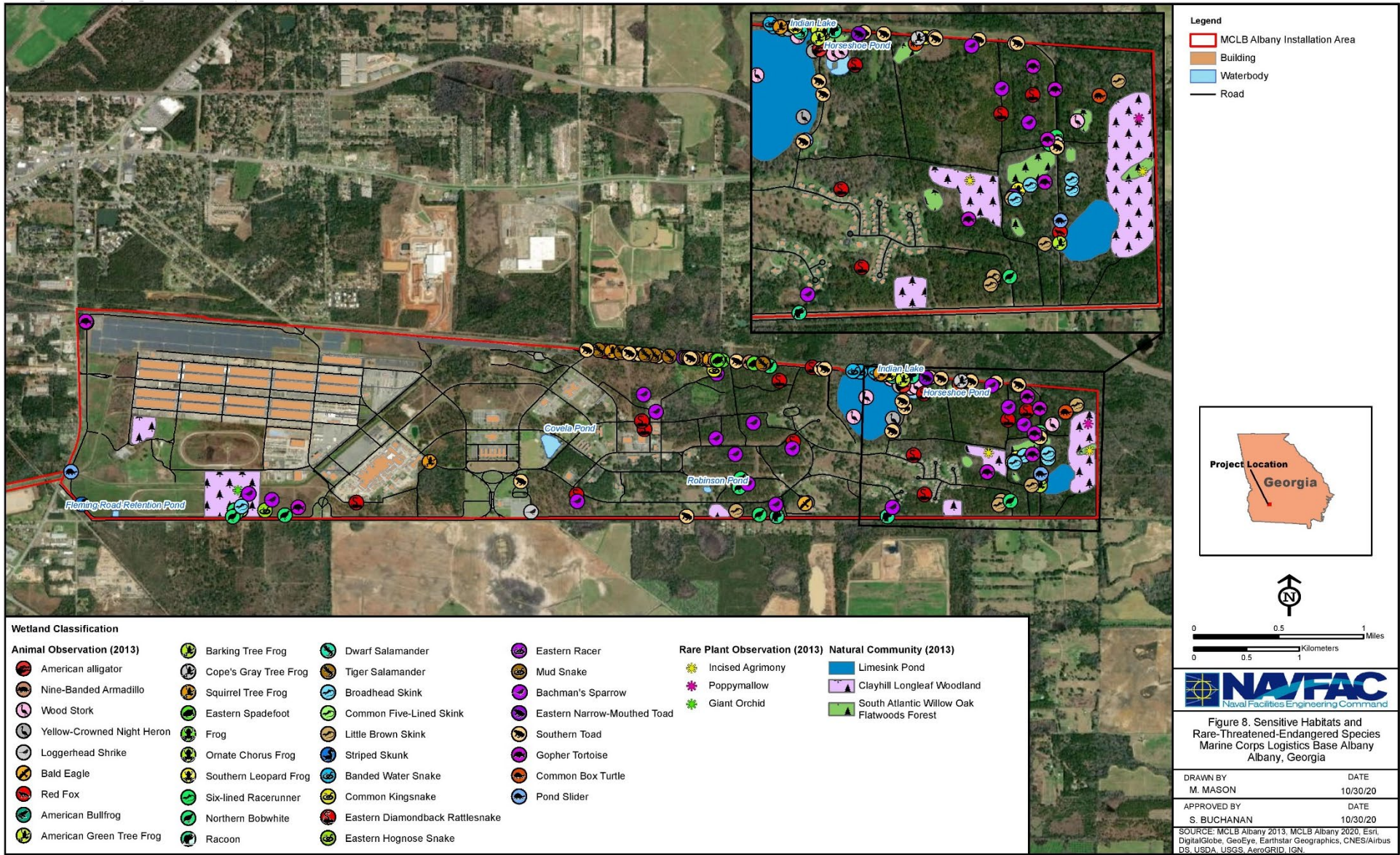
Protection of ecologically sensitive areas is provided by SAIA under the provisions of wildlife and fish habitat enhancement in support of managing these populations. The GDNR conducted surveys for rare species and rare natural communities on MCLB Albany between June 1990 and June 1992, and again in 1995 (GDNR 1995, MCLB 2007). A subsequent inventory for rare species and natural communities was conducted by ANHP in 2013 (Barbour et al. 2013). Through this effort, three natural communities deemed to be of special concern due to the potential presence of rare, threatened, or endangered species that are often associated with the community, and/or that are considered globally rare, were identified on the Installation (Barbour et al. 2013, NatureServe 2013). Each community of special concern is described below:

- Clayhill Longleaf Woodland
- Limesink Pond/Pond Cypress Pond
- South Atlantic Willow Oak Flatwoods Forest

2.3.10.1 Clayhill Longleaf Woodland

The Longleaf Pine/Longleaf Pawpaw (*Asimina angustifolia*)/Wiregrass – Little Bluestem (*Schizachyrium scoparium*) – Oblong-leaf Twinflower (*Dyschoriste oblongifolia*) Woodland community (i.e., Clayhill Longleaf Woodland), historically spanned a vast landscape of gently rolling terrain that now encompasses the present day Installation and southwest Georgia, but has largely disappeared or been greatly modified as a result of agriculture, timber production, and fire suppression (Barbour et al. 2013). This community is now represented as mere remnants scattered across the Installation (Figure 8). Historically, in conjunction with a higher incidence of naturally caused fires, the canopy was relatively open, characterized by a woodland of widely spaced trees with a diverse understory of low growing shrubs, forbs, and grasses in the ground cover. Currently, however, as a result of insufficient fire, many examples are closed forests characterized by a dense growth of woody vegetation in the understory and a prevalence of hardwood tree species (Barbour et al. 2013).

Common species in the canopy of this community on the Installation include longleaf pine, slash pine, live oak, water oak, southern red oak, black cherry (*Prunus serotina*), sweetgum, and sassafras (*Sassafras albidum*). The shrub layer is typically well-established and dominated by saplings of the canopy trees as well as shrub species such as deerberry (*Vaccinium stamineum*), shiny blueberry (*V. myrsinites*), winged sumac (*Rhus copallina*), poison oak (*Toxicodendron pubescens*), and flowering dogwood (*Cornus florida*). The herbaceous layer is typically patchy distribution due to the closed canopy and dense shrub layer, but is exemplified by a rich diversity of species, including bracken fern (*Pteridium aquilinum* var. *pseudocaudatum*), wiregrass,



hairawn muhly (*Muhlenbergia capillaris*), slender bluestem (*Schizachyrium tenerum*), Virginia broomsedge (*Andropogon virginicus*), goat's-rue (*Tephrosia virginiana*), hairy phlox (*Phlox amoena*), tread-softly (*Cnidocolus stimulosus*), southern beardtongue (*Penstemon australis*), blue sage (*Salvia azurea*) Small's skullcap (*Scutellaria multiglandulosa*), oblong-leaf twinflower, narrow-leaved ironweed (*Vernonia angustifolia*), grass-leaf golden-aster (*Pityopsis graminifolia* var. *graminifolia*), sweet goldenrod (*Solidago odora*), and scaleleaf aster (*Symphotrichum adnatum*).

Several federal- or state-listed species, or species identified by the USFWS or GDNR as vulnerable, have been documented in this community, including crestless plume-orchid (*Pteroglossaspis ecristata*), woodland poppy-mallow (*Callirhoe papaver*), beakrush (*Rhynchospora* sp.), eastern diamondback rattlesnake (*Crotalus adamanteus*), gopher tortoise, northern bobwhite (*Colinus virginianus*), and Bachman's sparrow (*Peucaea aestivalis*). These species are believed to be at some risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors (Barbour et al. 2013).

2.3.10.2 Limesink Pond/Pond Cypress Pond

The Limesink Pond/Pond Cypress Pond community (which may also be described as Myrtle-leaved Holly (*Ilex myrtifolia*) Depression Forest) is generally characterized as irregularly defined depressions indicative of karst regions underlain by either limestone or dolomite (Barbour et al. 2013). Water levels are highly variable and are driven by seasonal precipitation, connectivity to subterranean aquatic systems, as well as human activities. Extreme fluctuations of water depth and a high variability of successional stages account for broad diversity of plant life.

Indian Lake, the most notable example of this community on the Installation (Figure 6 and Figure 8), appears to be inundated for extended periods of time, resulting in a deep accumulation of peat (Barbour et al. 2013). However, although fluctuating water levels generally benefit this community type, long periods of drought and reduced hydrologic input due to a diversion of water for alternate uses appear to be negatively altering this community type at Indian Lake (MCLB 2012a). Common species in the patchily distributed canopy include pond cypress, and to a lesser extent red maple and black willow (*Salix nigra*). The understory is also patchy and is dominated by saplings of the canopy tree species as well as shrubs such as buttonbush, willow oak, sweetgum, and persimmon (*Diospyros virginiana*) in shallower areas. Herbaceous species include maidencane, woolgrass (*Scirpus cyperinus*), clearweed (*Boehmeria cylindrica*), and false fennel (*Eupatorium leptophyllum*).

A smaller, more densely forested example of this community also occurs on the far eastern end of the Installation (Figure 8). This community is represented by a more advanced level of vegetation succession than Indian Lake. Similar species are present, but, in addition, the community has a greater assemblage of trees, shrubs, and herbs, and the forest and shrub layer are denser and more uniformly distributed (Barbour et al. 2013). Characteristic herbs in this example community include Virginia chain fern (*Woodwardia virginica*), warty panicgrass (*Panicum verrucosum*), redtop panicgrass (*Coleataenia rigidula* ssp. *rigidula*), pocosin sedge (*Carex striata*), waxy sedge (*C. glaucescens*), beakrushes (*Rhynchospora* spp.), clearweed, and camphorweed (*Pluchea camphorata*). Poison ivy is a characteristic vine.

Several federal- or state-listed species, or species identified by the USFWS or GDNR as vulnerable, have been documented in this community, including eastern tiger salamander (*Ambystoma tigrinum tigrinum*), yellow-crowned night heron (*Nyctanassa violacea*), and wood stork (*Mycteria americana*) (Barbour et al. 2013).

2.3.10.3 South Atlantic Willow Oak Flatwoods Forest

The Willow Oak – Cherrybark Oak, Swamp Post Oak (*Quercus pagoda*, *Q. similis*) – Loblolly Pine (*Pinus taeda*)/Slender Spikegrass (*Chasmanthium laxum*) Forest (i.e., South Atlantic Willow Oak Flatwoods Forest) has a global G3G2 rank (e.g., is at moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors (NatureServe 2013). These forests are relatively uncommon on the Installation and occur as shallow depressions scattered throughout MCLB Albany (Barbour et al. 2013). The best representative location of this association is located along either side of East Shaw Road, in the eastern portion of the Installation (Barbour et al. 2013) (Figure 8). This community is represented by a closed forest canopy dominated by willow oak, and lesser amounts of live oak, water oak, and sweetgum. The shrub and herb layers are relatively sparse. Typical species in the understory include saplings and seedlings of the canopy tree species as well as Virginia willow (*Itea virginica*), round-leaf greenbrier (*Smilax rotundifolia*), glaucous sedge (*Carex glaucescens*), hop sedge (*C. lupulina*), and lizard’s-tail (*Saururus cernuus*).

2.3.11 Rare, Threatened, and Endangered Plant Species

The GDNR conducted surveys for rare species and natural communities on MCLB Albany between June 1990 and June 1992, and again in 1995. These surveys did not locate any federal or state listed plants but did identify three plants of special concern: incised groove-bur, woodland poppy-mallow, and sandhills ceanothus (*Ceanothus microphyllus*) (GDNR 1995, MCLB 2007). A subsequent survey for rare species and natural communities by ANHP in 2013 also failed to locate any federal or state listed plants. This survey located two of the species of concern previously identified by GDNR (incised groove-bur and poppy-mallow), and also found crestless plume orchid, an additional plant of special concern (Barbour et al. 2013) (Figure 8). The sandhills ceanothus was not located in 2013, and in addition, is no longer identified by natural resource agencies as a plant of special concern (Barbour et al. 2013).

The State of Georgia came out with a State Wildlife Action Plan in 2015 that came up with a list of high priority species, considering those who were already listed as species of special concern (GDNR 2015). Based on the 2013 MCLB Albany survey results and those species listed as high priority by the state, two rare plant species are known to occur on the Installation. The crestless plume orchid is state-listed as threatened, and a high priority species, and beakrush (*Rhynchospora spp.*) species are high priority. Each is identified in Table ES-2, Table ES-3, Table 3. Plants believed to occur on the Installation (including those that are federal or state-listed rare, threatened and endangered species [GDNR 2015, 2020a; USFWS 2020]), are identified in Table ES-2, Table ES-3, Table 3, and Appendix C (Barbour et al. 2013). Fact sheets, which provide additional details about each of the rare plants confirmed on the Installation, are located in Appendix D. Refer to Section 4.2.2.7 for profiles and management strategies for each of the rare, threatened and endangered fauna species confirmed to be found at MCLB Albany.

Table 3. Occurrences of Rare, Threatened and Endangered Plants Confirmed on MCLB Albany.

Scientific Name	Common Name	Number of Element Occurrences (EOs) on Installation	Number of EOs in Georgia	% of state EOs on Installation	Number of protected EOs in Georgia
<i>Pteroglossaspis ecristata</i>	Crestless plume orchid / wild coco	1	16	6.25	16
<i>Rhynchosopora spp.</i>	Beakrush*	1	11	9	0

Source: Barbour et al. 2013; Chafin 2019, 2020.

*The Decurrent Beakrush (*Rhynchosopora decurrens*) was used to fill in this table, based on its documented historical occurrence in Albany, Georgia (Georgia Biodiversity Portal 2020).

2.3.12 Conservation Lands

Conservation lands include state or federally protected lands, such as state and national parks, wildlife refuges, and wildlife management areas (WMAs). These areas are generally established to conserve habitats and wildlife populations of special importance, provide research and educational opportunities, and to provide public hunting, hiking, bird watching and other outdoor recreational opportunities that are compatible with conservation goals. There are no conservation lands immediately adjacent to MCLB Albany. Nearby conservation lands (< 30 miles from the Installation) include Chickasawhatchee WMA (19,700 acres), Albany Nursery WMA (300 acres), and Elmodel WMA (1,600 acres). Other lands set aside for recreation and conservation include Albany Dougherty Community Greenspace. Located along the Flint River, these properties were set aside by the City of Albany and Dougherty County to provide passive outdoor recreation, protect water quality, wildlife habitat and other values.

2.4 FISH AND WILDLIFE RESOURCES

Intensive fish and wildlife surveys have not been conducted on the Installation. However, the GDNR conducted surveys for rare species and natural communities on MCLB Albany between June 1990 and June 1992, and again in 1995 (GDNR 1995, MCLB 2007), and a subsequent inventory for rare species and natural communities was conducted by ANHP in 2013 (Barbour et al. 2013). Although the focus of the inventories was generally rare and federal or state listed species, numerous non-target species were identified in the process. Additionally, many species have also been documented on the facility incidentally by reputable professionals (Barbour et al. 2013, MCLB 2012a, 2013e). Discussions of the species observations are included in the sections below. A comprehensive list of species with confirmed or possible occurrence on the Base is located in Appendix C; this table includes their protection status, and for birds, notation of what time of year they were seen on the Installation.

2.4.1 Invertebrates

No surveys have been conducted for invertebrates on MCLB Albany, and although many invertebrates reside on the Installation, there is no official record of most of the species (MCLB 2012a). The NRM has documented 33 species of butterflies on the Installation including brush-

footed butterflies (Family Nymphalidae), hairstreaks (Family Lycaenidae), swallowtails (Family Papilionidae), skippers (Family Hesperidae), and whites and sulphurs (Family Pieridae). The monarch butterfly (*Danaus plexippus plexippus*) is a high priority species for conservation in Georgia and is under review to be listed federally (USFWS 2014b, GDNR 2015). The monarch caterpillars use milkweed plants as a food and habitat source, and adult monarchs feed off nectar-producing native plants. The butterflies migrate through Georgia during the fall and spring, stopping to feed and breed (UGA 2018). Further, seven species of damselflies and dragonflies found at MCLB Albany are described on an educational sign on the Installation's nature trail. These pollinators include the familiar bluet (*Enallagma civile*), skimming bluet (*Enallagma geminatum*), orange bluet (*Enallagma signatum*), widow skimmer (*Libellula luctosa*), carolina saddlebags (*Tramea carolina*), common green darner (*Anax junius*), and the eastern pondhawk (*Erythemis simlicicollis*). Because they hatch from eggs laid in the water, damselflies and dragonflies will be most commonly found in proximity of wetlands and ponds. In addition, there are two apiaries on the base that house honeybee hives: one on the northwest side of Indian Lake in a pine stand, maintained by the NRM and USDA Wildlife Biologist; the other, in the southwest portion of the Installation, maintained by the bee owner.

Three native and endangered aquatic invertebrates have the potential to occur on the Installation. These are the gulf moccasinshell (*Medionidus penicillatus*), oval pigtoe (*Pleurobema pyriforme*), and shinyrayed pocketbook (*Lampsilis subangulata*). All three are river mussels (Family Unionoida), federal and state-listed as endangered, and native to southeastern United States (USFWS, 2020).

Appendix C provides a full list of these invertebrate species.

2.4.2 Fish

Water bodies at MCLB Albany are stocked periodically with gamefish such as channel catfish, hybrid striped bass, largemouth bass, bluegill, and/or rainbow trout (*Oncorhynchus mykiss*) (MCLB 2007, MCLB 2012b). Other species known to occur in water bodies of the Installation include flier, bowfin, brown bullhead (*Ictalurus nebulosus*), weed shiner (*Notropis texanus*), grass carp, mosquito fish (*Gambusia* sp.), and spotted gar (MCLB 2013d, 2013e).

2.4.3 Amphibians and Reptiles

Based on prior studies and incidental observations documented by environmental staff, 19 amphibians and 22 reptiles have been documented on the Installation, and an additional 21 amphibians and 36 reptiles may be present based on their home ranges and habitat preferences (MCLB 2013e). Appendix C, Table ES-2, and Table ES-3 provide a list of species documented, and with the potential to occur, on the Installation and their conservation status. Some of the more common amphibians on MCLB Albany include the southern toads (*Anaxyrus terrestris*), tree frogs (*Hyla* spp.), spring peepers (*Pseudacris crucifer*), chorus frogs (*Pseudacris* sp.), and various other frogs (*Lithobates* spp.) (GDNR 1995, Barbour et al. 2013). Some of the more common reptiles found on MCLB Albany include green anole (*Anolis carolinensis*), ground skink (*Scincella lateralis*), black racer (*Coluber constrictor*), banded watersnake (*Nerodia fasciata fasciata*), eastern garter snake (*Thamnophis sirtalis sirtalis*), Florida cooter (*Pseudemys floridana floridana*), common snapping turtle (*Chelydra serpentina serpentina*), eastern box turtle (*Terrapene carolina carolina*), and yellow-bellied slider (*Trachemys scripta scripta*) (Barbour et al. 2013).

Out of the 23 species of salamander found in southwest Georgia, four species are found on the Installation, including the two-toed amphiuma (*Amphiuma means*), tiger salamander (*Ambystoma tigrinum*), slimy salamander (*Plethodon glutinosus*), and dwarf salamander (*Eurycea quadridigitata*) (MCLB 2019c). The Eastern tiger salamander is found throughout the U.S. and secure in many states but is a high priority species in Georgia with an S3 – Vulnerable status (Jensen 2020). They are found in grassy ephemeral ponds for breeding, and a variety of habitats during nonbreeding where they inhabit underground burrows (e.g. dry pine savanna) (Jensen 2020; MCLB Albany 2019b). At MCLB Albany, they have been observed along the edge of the base along a portion of North Shaw Road situated northwest of Covella Pond, and west of Indian Lake.

The only state listed amphibian or reptile species documented on the Installation is the gopher tortoise (*Gopherus polyphemus*), a dry-land turtle, which is state listed as threatened and a candidate species for federal listing in Georgia. Gopher tortoises that are a candidate species for federal listing are found throughout southeastern USA, from southern South Carolina, throughout most of Florida, and southern Alabama (east of the Tombigbee and Mobile Rivers). Their range continues to the west of Mobile and Tombigbee Rivers in Alabama, Mississippi and Louisiana where they are federally listed as Threatened (USFWS 2019b). The gopher tortoise exists in very low population numbers on the Installation. They have been observed throughout the Installation including in the northwest along South Shaw Road near the solar array on the back side of the longleaf pine stand, along Oak Lane, and east of Indian Lake (at the edge of a clayhill longleaf woodland community, a south Atlantic willow oak flatwoods forest and near South Shaw Road west of the fence).

Additionally, although not currently a federal or state listed species, the eastern diamondback rattlesnake (*Crotalus adamanteus*), generally inhabiting dry areas, is under consideration for federal listing and has been documented on MCLB Albany (Barbour et al. 2013) in many spots mostly east of Covella Pond (e.g., near Mc Cawley Avenue, next to Horseshoe Pond and Indian Lake, near Putnam Avenue, and more). Within the country, they are found in the Lower Coastal Plain of the southeast from the southern parts of North Carolina, Georgia, to southeastern Louisiana and all of Florida (USFWS 2019a). Lastly, the American alligator (*Alligator mississippiensis*) is federally listed as Similarity of Appearance (Threatened) due to its similarity to the American crocodile. They are found in wetland habitats throughout the southeast from the southern tip of Texas to northeastern North Carolina (GDNR 2016). At MCLB Albany, they have been observed along the northwest part of Indian Lake.

2.4.4 Birds

Based on prior studies, incidental observations documented by environmental staff, and sightings reported on eBird (eBird 2012) and the Avian Knowledge Network (BISON 2013), 143 bird species have been documented on the Installation (Barbour et al. 2013, GDNR 1995), and an estimated 133 additional species are likely to occur on the facility based on their life histories and habitat availability (MCLB 2007, 2012e, 2013e). Of these, 95 are neotropical migrants and are protected under the federal Migratory Bird Treaty Act (MBTA), which established federal responsibilities for protecting birds that migrate across international borders, as well as their eggs and nests (USFWS 2011a).

Birds representative of nearly every order occur on the facility, including but not limited to, herons and egrets (Family Ardeidae); ducks and geese (Family Anatidae); vultures (Family Cathartidae); harriers, kites, hawks, and eagles (Family Accipitridae); kestrels (Family Falconidae); northern bobwhite, cuckoos (Family Cuculidae); killdeer (Family Charadriidae); turkey (Family Phasianidae); woodpeckers and flickers (Family Picidae); flycatchers and warblers (Order Passiformes); kingbirds (Family Tyrannidae); vireos (Family Vireonidae); crows (Family Corvidae); owls (Order Strigiformes); nightjars (Family Caprimulgidae); swifts (Apodidae); swallows (Family Hirundinidae); hummingbirds (Family Trochilidae); kingfisher (Order Coraciiformes); titmice and chickadees (Family Paridae); nuthatches (Family Sittidae); creepers (Family Certhiidae); wrens (Family Troglodytidae); kinglets (Family Regulidae); gnatcatchers (Family Polioptilidae); bluebirds (*Sialia* spp.); robins and thrushes (Family Turdidae); catbirds, mockingbirds, and thrashers (Family Mimidae); starlings (Family Sturnidae); tanagers (Family Thraupidae); waterthrushes (Family Parulidae); redstarts (Family Muscicapidae); waxwings (Family Bombycillidae); towhees (Family Emberizidae); and sparrows (Family Passeridae). Appendix C, Table ES-2, and Table ES-3 provide a full list of documented species as well as those likely to occur on MCLB Albany and includes their migratory status.

In addition, nine of the bird species documented on the Installation are high priority species, eight are rare species, three are state or federally listed species, and bald eagles are protected under other federal acts (i.e., the Bald and Golden Eagle Protection Act). Documented protected species include the bald eagle, wood stork, and Bachman's sparrow.

2.4.5 Mammals

Seventeen mammal species have been documented on the facility, and an additional 33 species are thought to occur on the Installation based on their life histories and habitat availability (Barbour et al. 2013, GDNR 1995, MCLB 2007, 2013e). Three mammal species (i.e., white-tailed deer [*Odocoileus virginianus*], eastern cottontail rabbit [*Sylvilagus floridanus*], and the eastern gray squirrel [*Sciurus carolinensis*]) are considered game species and are managed accordingly (MCLB 2007). Documented species include Virginia opossum (*Didelphis virginiana*), beaver (*Castor canadensis*), short-tailed shrew (*Blarina carolinensis*), nine-banded armadillo (*Dasypus novemcinctus*), eastern gray squirrel, eastern fox squirrel (*Sciurus niger*), southern flying squirrel (*Glaucomys volans*), house mouse (*Mus musculus*), Norway rat (*Rattus norvegicus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), northern raccoon (*Procyon lotor*), and white-tailed deer. One exotic mammal, wild hog (*Sus scrofa*) has also been documented, although there does not appear to be an established population within the Installation. Feral cats (*Felis catus*) and dogs (*Canis lupus familiaris*) occur on the Installation. None of the mammals identified on the Installation are state or federally listed species. Appendix C, Table ES-2, and Table ES-3 identify the mammal species documented on MCLB Albany, as well as those with potential to occur on the facility and their conservation status.

2.4.6 Rare, Threatened, and Endangered Wildlife Species

Biological inventories for rare species and natural communities were conducted on MCLB Albany by GDNR between June 1990 and June 1992, and again in 1995. These surveys did not locate any federally listed wildlife but did confirm the presence of one state listed bird (Bachman's sparrow) (GDNR 1995, MCLB 2007). Based on life history, home ranges, habitat preferences and

availability of the Installation, 32 animal species of special conservation concern have high potential to occur on MCLB Albany and were subsequently targeted during biological inventories on the facility by ANHP in 2013 (Barbour et al. 2013).

The subsequent study confirmed evidence of the previously documented Bachman’s sparrow, as well as twelve additional wildlife high priority species (Barbour et al. 2013, GDNR 1995; GDNR, 2015). Six species are federally-protected species or are under immediate consideration for federal listing (bald eagle, wood stork, gopher tortoise, eastern diamondback rattlesnake, American alligator, and monarch butterfly). Four species (gopher tortoise, bald eagle, wood stork, and Bachman’s sparrow) are state listed, and the remaining ten species (tiger salamander, little blue heron, northern bobwhite, loggerhead shrike [*Lanius ludovicianus*], rusty blackbird, prothonotary warbler, grasshopper sparrow, yellow-crowned night heron, winter wren, and least flycatcher) are high priority and/or rare species. Table 3 and Table 4 identify the rare, threatened, endangered and high priority species documented on MCLB Albany. A complete list of rare, threatened and endangered fauna that have the potential to occur at MCLB Albany, including their conservation status (GDNR 2015, GDNR 2020a, NatureServe 2019, USFWS 2020, USFWS 2014a), can be found in Appendix C. Fact sheets, which provide additional details about each of the high priority species found on MCLB Albany, are located in Appendix D. Refer to the sections below for profiles and Section 4.2.2.7 for management strategies for each of the rare, threatened and endangered fauna species confirmed to be found at MCLB Albany.

Table 4. Rare, Threatened and Endangered Wildlife Confirmed on MCLB Albany.

Species	Common Name	Federal Status	State Status	High Priority ¹	Rare ²
Amphibians					
<i>Ambystoma tigrinum</i>	Eastern tiger salamander			Yes	Yes
Reptiles					
<i>Crotalus adamanteus</i>	Eastern diamondback rattlesnake	UR		Yes	Yes
<i>Gopherus polyphemus</i>	Gopher tortoise	C	T	Yes	Yes
<i>Alligator mississippiensis</i>	American alligator	SA		No	
Birds					
<i>Haliaeetus leucocephalus</i>	Bald eagle	GBA	T	Yes	Yes
<i>Mycteria americana</i>	Wood stork	LT	E	Yes	Yes
<i>Colinus virginianus</i>	Northern bobwhite			Yes	
<i>Lanius ludovicianus</i>	Loggerhead shrike			Yes	Yes
<i>Peucaea aestivalis</i>	Bachman’s sparrow		R	Yes	Yes
<i>Egretta caerulea</i>	Little blue heron			Yes	Yes
<i>Euphagus carolinus</i>	Rusty blackbird			Yes	
<i>Protonotaria citrea</i>	Prothonotary warbler			Yes	

Species	Common Name	Federal Status	State Status	High Priority ¹	Rare ²
<i>Ammodramus savannarum</i>	Grasshopper sparrow			Yes	
<i>Nyctanassa violacea</i>	Yellow-crowned night heron				Yes
<i>Troglodytes hiemalis</i>	Winter wren				Yes
<i>Empidonax minimus</i>	Least flycatcher				Yes
Invertebrates					
<i>Danaus plexippus plexippus</i>	Monarch butterfly	UR		Yes	

¹High Priority as identified in the Georgia Department of Natural Resources (GDNR), Wildlife Resources Division’s State Wildlife Action Plan (September 2015).

² Identified rare by the GDNR because of its importance for biodiversity conservation. Note this is different than the state status of Rare. (GDNR 2020b)

Sources: Barbour et al. 2013, GDNR 2015, GDNR 2020a, NatureServe 2019, USFWS 2020; USFWS 2014a; USFWS 2014b.

GBA – Protected under the Bald and Golden Eagle Protections Act; C – Federally listed as Candidate ; LT – Federally listed as Threatened; E – State listed as endangered; T – State listed as threatened; R – State listed as rare; UR – Federally listed as Under Review, species that are petitioned for listing or being reviewed for candidate process; SA – Federally listed as Similarity of Appearance (Threatened).

Birds of Conservation Concern (BCC) are species, subspecies, and populations of migratory and non-migratory birds that the USFWS has determined to be the highest priority for conservation actions (USFWS 2008). Game birds and invasive species are not included. The purpose of the BCC Concern list is to prevent or remove the need for additional ESA bird listings by implementing proactive management and conservation actions needed to conserve these species. The USFWS maintains a list of BCC whereby species are prioritized and listed according to Bird Conservation Regions (BCRs) which maximize the utility of the lists for a variety of partner agencies and organizations. The Installation falls within BCR 27: Southeast Coastal Plain (USFWS 2008).

Fifty-four priority bird species are identified in BCR 27. Of these, 14 species—including the bald eagle, solitary sandpiper (*Tringa solitaria*), common ground dove (*Columbina passerina*), Chuck-will’s-widow (*Caprimulgus carolinensis*), redheaded woodpecker (*Melanerpes erythrocephalus*), loggerhead shrike, brown-headed nuthatch (*Sitta pusilla*), wood thrush (*Hylocichla mustelina*), black-throated green warbler (*Dendroica virens*), prairie warbler (*D. discolor*), prothonotary warbler (*Protonotaria citrea*), Kentucky warbler (*Oporornis formosus*), Bachman’s sparrow, and rusty blackbird (*Euphagus carolinus*)—have been confirmed on MCLB Albany (Barbour et al. 2013, GDNR 1995). Furthermore, the USFWS Information for Planning and Consultation (IPaC) site indicated that in addition to the BCC species that have been confirmed on the base, swallow-tailed kite (*Elanoides forficatus*), American kestrel (*Falco sparverius sparverius*), cerulean warbler (*Setophaga cerulea*), lesser yellowlegs (*Tringa flavipes*), semipalmated sandpiper (*Calidris pusilla*), and short-billed dowitcher (*Limnodromus griseus*) species also have the potential to occur at MCLB Albany (USFWS 2020). Also, an additional 17 species could

potentially occur on the Installation based on their home ranges and habitat preferences (MCLB 2013e).

2.4.6.1 Bald Eagles

The bald eagle is federally protected under the *Bald and Golden Eagle Protections Act*, an Act passed in 1940, and amended in 1962 to include the golden eagle (*Aquila chrysaetos*). The Act protects the species and their parts against being taken, possessed, and transported (Eagle Permits, 50 CFR §22). The bald eagle was previously listed as endangered federally but recovery in populations allowed the bird to be removed from the list in 2007. The primary threat to bald eagles was loss of reproduction due to DDT (dichloro diphenyl trichloroethane) and other chemicals (Ozier et al. 2019), although with habitat protections and the banning of DDT in 1972 (CDC 2017; USFWS, 2015) populations were able to recover. Today, the greatest threat posed to the bald eagle is the presence of persistent toxic chemicals such as PCBs, mercury, and other pesticides and herbicides, which can either poison the bird directly or impair its ability to reproduce (Ozier et al. 2019). In the State of Georgia, the bald eagle is listed as Threatened (Georgia Comp. R. & Regs. R. 391-4-10-.09 (2)(n) 2020).

Bald eagles are found across the country, and they are known to live near rivers, lakes, wetlands, and sometimes coastlines (USFWS, 2015). They usually nest in a large, open-topped pine—or occasionally a cypress—near open water, often on high ground if available (Ozier et al. 2019). Bald Eagles have been reported by personnel at MCLB Albany, but surveys on the base failed to detect the species (Barbour et al. 2013). They do not appear to nest or be permanent residents of the Installation (Barbour et al. 2013, GDNR 1995); rather, it is likely that eagle sightings on the base pertained to either migrating or foraging eagles. Bald eagle nests are large and usually conspicuous, and it is likely that any nesting eagles would have been detected on surveys. It is therefore likely that the eagle sightings on the base pertained to either migrating or foraging eagles. Bald eagle populations in Georgia are steadily recovering and nesting pairs are known to occur in Dougherty County.

2.4.6.2 Eastern diamondback rattlesnakes

Eastern diamondback rattlesnakes are found in the Lower Coastal Plain of the southeast from the southern parts of North Carolina, Georgia, to southeastern Louisiana and all of Florida (USFWS 2019a). Eastern diamondback rattlesnakes are of increasing conservation concern because they have apparently experienced a significant decline in numbers and distribution over the past several decades. In response to a petition to list the eastern diamondback rattlesnake as threatened, the USFWS issued a 90-day finding that listing may be warranted and initiated a review of the status of the species to determine if listing is warranted (USFWS 2012b).

Eastern diamondback rattlesnakes have been confirmed present on MCLB Albany (Figure 8). They occupy most dry, upland habitats with an open canopy, especially the rare longleaf pine woodland community, and usually do not persist in suburban or other developed areas. The eastern diamondback rattlesnake is a large, heavy-bodied snake that typically reaches a maximum length of 1.65 m (5.5 ft.), but occasionally may reach up to 2.2 m (7.2 ft.) (Means 2004). Eastern diamondback rattlesnakes have large, dark, diamond-shaped markings outlined in white or yellow on a ground color of brown, gray, or yellowish and a uniformly cream-colored belly. Rattlesnakes

are unique in possessing a terminal rattle, composed of unshed scales, that is used to give an aural warning. Their diet consists mainly of mammals, primarily rodents and rabbits, and occasionally birds. Diamondback rattlesnakes are ambush predators that may remain stationary in one spot for weeks waiting for prey (primarily rodents, rabbits, birds) to pass by. Rattlesnakes are almost exclusively diurnal and are rarely found moving after dark. This species becomes inactive during cold weather from November through March and seeks underground shelter in stump holes with networks of decayed root tunnels and gopher tortoise burrows, often returning to the same underground refugia which they used in previous winters (Means 2004). During the warmer months, they spend most of their time above ground waiting to ambush prey. However, gravid females often go underground in August and September to give birth.

2.4.6.3 Gopher tortoise

Gopher tortoise populations west of the Mobile River in Alabama, Mississippi, and Louisiana were listed as threatened under the U.S. Endangered Species Act (ESA) in July 1987 (Endangered and Threatened Wildlife and Plants, 50 CFR §17). Eastern populations in Alabama east of the Mobile River, in Florida, Georgia, and South Carolina were elevated to a candidate for protection under the ESA on 27 July 2011, with a Listing Priority Number of 8 (meaning that threats are imminent and of moderate magnitude) (76 FR 45130, USFWS 2011b). The State of Georgia lists the gopher tortoise as a threatened species (Georgia Comp. R. & Regs. R. 391-4-10-.09(3)(h) 2020). Gopher tortoises are a species of increasing conservation concern because of population declines throughout their range due to habitat loss and fragmentation, habitat degradation, and historic effects of overexploitation for meat and gassing of burrows for rattlesnake roundups. In addition to habitat destruction or degradation, threats to the gopher tortoise population across its range include illegal hunting and collection, motor vehicle accidents, and predation. Additionally, feral and domestic dogs, coyotes and raccoons are known to kill adult tortoises. Nests and hatchlings are preyed upon by armadillos, raccoons, opossums, foxes, cats, skunks, and snakes (Kobilinsky 2016; Jensen et al. 2011). MCLB Albany has a high population of these predators, including a small population of coyotes, because of suitable conditions for them (e.g., access to dumpsters). Gopher tortoise courtship and mating occur from April to early June; nesting peaks in early June but may last until mid-July (Jensen et al. 2018).

Of the four tortoise species that occur in the United States, the gopher tortoise is the only species that is indigenous to the southeastern United States (MCLB 2007). The range of the tortoise extends throughout the southeastern coastal plain in dry habitats, such as longleaf pine-scrub oak sandhills and clayhills, live oak and red oak hammocks, sand pine scrub, wire grass flatwoods, dry prairies, and coastal dune ecosystems (Jensen et al. 2018). Gopher tortoises feed on low plant growth and dig burrows that can be as large as 40 feet long and 10 feet deep, where they spend most of their time (Jensen et al. 2018). The burrows also act as shelter for more than 360 species of animals, including skunks, opossums, rabbits, quail, armadillos, burrowing owls, snakes, lizards, frogs, toads, and many invertebrates. Gopher tortoise habitat includes sandhills, dry hammocks, longleaf pine-turkey oak woodlands, and old fields. Although diverse herbaceous ground cover and an open canopy are important components of gopher tortoise habitat, soil type is the single most reliable indicator of suitable habitat. Suitable undeveloped soil types for the gopher tortoise on MCLB Albany are summarized in ANHP (2013) and Guyer et al. (2011).

Gopher tortoises previously occupied MCLB Albany and based on recent studies on the facility likely still occur in low numbers on the Installation (Barbour et al. 2013, MCLB 2007). Surveys of the suitable areas in 2013 confirmed two active burrows on the Installation. The study also found the remains of a tortoise (shell fragments and a few bones) on the edge of a pine stand south of Desha Loop and located four abandoned burrows (Barbour et al. 2013) (Figure 8). Based on an assessment of site conditions and knowledge of gopher tortoise life history, gopher tortoises were at that time believed to be close to being extirpated from the Installation (Barbour et al. 2013). More recent surveys in October of 2019 confirmed that two gopher tortoise burrows were in active use on the Installation: one by the solar array at the edge of the Installation on the fire break, and one on the back side of a longleaf pine stand in Area 3, which is a forest stand in the northeast quadrant between Quail Call Road and South Shaw Road (see Figure 8; Robbins 2019).

Gopher tortoises are typically associated with well-drained, deep, sandy soils in which burrows can be excavated. They construct extensive underground burrows and are the only turtle in the southeast that digs its own burrow (Buhlman et al. 2008). These deep burrows create a unique microenvironment that is used by more than 360 other animal species (Aresco and Guyer 2004). Therefore, gopher tortoises are thought to be a keystone species for the longleaf pine ecosystem (Guyer and Bailey 1993).

Gopher tortoises are primarily associated with longleaf pine and xeric oak (*Quercus* spp.) sandhills, but are also found in other habitats such as pine flatwoods, mixed hardwood-pine communities, coastal grasslands and dunes, and a variety of disturbed habitats such as utility rights-of-way and field edges (Florida Fish and Wildlife Conservation Commission 2007). Open areas are important for thermoregulation, so tortoises avoid areas with thick shrubby vegetation and prefer habitat with a relatively open canopy that promotes the growth of sufficient herbs and grasses for foraging and allows the sunlight intensity necessary for thermoregulation and nesting (Aresco and Guyer 2004, Buhlman et al 2008). Guyer et al. (2011) reported tortoise burrow densities on private land in south-central Georgia were highest in open-canopied pine stands that were managed with prescribed fire, whereas unburned areas and agricultural sites provided poor habitat.

2.4.6.4 Wood Stork

Wood storks are found across the southeast from North Carolina, to Mississippi, and all throughout Florida with nesting occurring in Florida, Georgia, North Carolina, and South Carolina (USFWS, 2018). They are federally listed as a threatened species as of July 30, 2014 (Endangered and Threatened Wildlife and Plants, 50 CFR §17). They are large, long-legged wading birds, approximately 50 inches in height with a wingspan of 60 to 65 inches (Major 2004). The wood stork is highly colonial and usually nests in rookeries within the upper branches of large trees (often cypress) in proximity to water and wetlands (Major 2004, MCLB 2007). Wood storks capture their prey by wading in water, probing around with their bills open, and snapping them shut when fish touch them. They feed in freshwater marshes, narrow tidal creeks, or flooded tidal pools.

Georgia populations of the wood stork averaged 1,389 pairs per year from 1992–2005 (GDNR 2010). The largest nesting population ever recorded in the state occurred in 2008 when 2,292 pairs nested. Indications are that the state's population is presently stable or increasing slightly. In June

2014, the USFWS down-listed the wood stork from federally endangered to federally threatened (USFWS 2014a). The species remains listed as endangered by the State of Georgia (Georgia Comp. R. & Regs. R. 391-4-10-.09(2)(o) 2020). The number of nesting pairs or wood storks in Georgia has an overall positive trend but with significant variability year to year (Harris et al. 2019). Primary factors in population declines for wood stork include habitat damage and drainage of wetlands; less significant factors include prolonged drought or flooding, raccoon predation on nests, and human disturbance of rookeries (MCLB 2007).

Studies in 2012 and 2013 found that wood storks did not breed on MCLB Albany but used wetlands on the base for foraging (Barbour et al. 2013, MCLB 2012b). They were known to roost in the cypress trees at Indian Lake during post-breeding movements. However, more recent observations by natural resources personnel have raised the possibility that wood storks might have begun nesting in Indian Lake's cypress stand. Drone imagery captured in 2019 in partnership with GDNR was not high enough resolution to confirm that wood storks were definitively the species of white bird visible nesting, so the NRM will reattempt to make this determination during the 2020 nesting season (Robbins 2020).

2.4.7 Nuisance and Invasive Wildlife Species

Nuisance wildlife are species that cause inconvenience, annoyance, or irritation to the general human population, may damage property, or disrupt ecosystem function and natural communities. Nuisance wildlife on MCLB Albany includes a range of mammals, reptiles, birds, and insects, including species classified as invasive and/or exotic species. Invasive species may include native species, such as white-tailed deer, that under certain conditions proliferate and cause nuisance-related issues. Exotic species are those which are introduced or colonize an area outside their native ranges and may or may not cause nuisance related issues. House mouse (*Mus musculus*), Norway rat, black rats (*Rattus rattus*), German cockroach (*Blattella germanica*), and the red imported fire ant (*Solenopsis invicta*) are examples of nuisance exotic species found on MCLB Albany. These species are also classified as invasive. Feral domestic animals such as feral cats, dogs, and hogs are often classified as nuisance wildlife, exotic wildlife, and in the case of feral cats and hogs are invasive. All three species occur on the Installation (Barbour et al. 2013). A list of wildlife considered by the USFWS to be invasive species for the Installation is provided in Appendix C.

Imported red fire ants, cockroaches of various species, and other insects that colonize buildings are the most common invasive animal species found on MCLB Albany. The tawny crazy ant (*Nylanderia fulva*) has been reported in Dougherty County and may become established on MCLB Albany. The tawny crazy ant is known to displace other ant species and inflict painful bites and stings. Africanized honeybees (*Apis mellifera*) have also been documented in Dougherty County.

Stray or feral cats and dogs are often the most significant nuisance wildlife issue facing military Installations. Feral cats, identified as one of the world's 100 worst invasive species (ISSG 2010), commonly occur on the facility and have become a significant issue within the past several years (MCLB 2012a). The domestic cat is an exotic species to North America and those that are feral or free-ranging are recognized as a widespread and potentially serious threat to the integrity of native wildlife populations and natural ecosystems. Both free-ranging cats and dogs can harbor and transmit a variety of fatal and non-fatal diseases to domestic and other wildlife and can adversely affect human health and welfare. The effects of cats on wildlife are difficult to quantify, however,

a growing body of literature strongly suggests that feral cats are a significant factor in the mortality and population shifts of small mammals, birds, reptiles, and amphibians (Dauphine and Cooper 2009, Loss et. al. 2013, Winter 2006).

Feral hog (*Sus scrofa*) numbers are generally increasing in southern Georgia. These animals cause damage to native habitats and wildlife food plots, compete with native wildlife for food and space, and damage agricultural crops on adjoining farms, and can be difficult to eradicate once established. Feral hogs occur intermittently on MCLB Albany as they travel along Piney Woods Creek. However, it has been more than five years since the most recent observation of two feral sows on the Installation (MCLB 2013b, Robbins 2019). Hog tracks were also documented along the access road running from the entrance gate in the summer of 2013 and appear to have entered the facility through a downed portion of the perimeter fence (Barbour et al. 2013).

Other wildlife such as stray dogs, bats, snakes, skunks, fox and a wide variety of potentially nuisance insects (e.g., cockroaches, bees, ants, spiders) are widely distributed on the Installation.

3.0 ENVIRONMENTAL PLANNING AND MISSION SUSTAINABILITY

3.1 SUPPORTING SUSTAINABILITY OF THE MILITARY MISSION AND THE NATURAL ENVIRONMENT

3.1.1 Integration of the Military Mission and Land Use

The Marine Corps has taken a proactive approach towards integrating the military mission with concepts of sustainable land use by recognizing that efficient and effective land use planning supports military readiness and sustainability, while protecting and enhancing the natural resources for multiple use, sustained yield, and biological integrity. Development and human use are inherently limited on military lands that are kept in their natural condition to support the military mission, often resulting in lands that have extremely high ecological value. These areas may include large tracts of undisturbed habitats and diverse flora communities that are often used as retreat areas, migration stopover points, or foraging areas for threatened and endangered, and special concern fauna species. Recognizing that military mission requirements have the highest priority, the Marine Corps understands the role INRMPs play in identifying potential conflicts between a facility's mission and natural resources and identifying actions necessary to maintain the availability of mission-essential properties and acreage. An INRMP balances the management of natural resources unique to the installation with the military mission requirements and other land use activities affecting an installation's natural resources. MCLB Albany understands the importance of integrating the military mission and land use to meet the mission of military training and readiness, while managing the valuable natural resources to ensure long-term environmental sustainability.

3.1.2 Impacts to the Military Mission

The use and management of lands that support military training and readiness, and the decision-making associated with such land use, directly affect the sustainability of the ecosystem. Specific components of natural resources management at MCLB Albany include consideration of land, fish and wildlife, forestry, and outdoor recreation resources, as well as integrated ecosystems management and partnering. To protect and maintain natural resources while ensuring the continuation of the military mission, MCLB Albany has implemented an ecosystem management approach for environmental stewardship of the Installation's natural resources. The management strategy maximizes land use that supports military training while minimizing impacts to natural resources.

The major environmental constraints on the military mission and development at the Installation are:

- the need for conservation and management of federally protected species known to occur on MCLB Albany.
- the limitation on new construction in wetlands, floodplains, and riparian buffer areas.
- avoidance of historic and pre-historic features.

3.1.3 Relationship of Range Complex Management Plan or Other Operation Area Plan

MCLB Albany does not fall under a Range Complex Management Plan. This INRMP section is not applicable.

3.2 ACHIEVING NO NET LOSS

Section 101(b)(1)(I) of the Sikes Act states that each INRMP shall, to the extent appropriate and applicable, and consistent with the use of the installation to ensure the preparedness of the Armed Forces, provide for “no net loss in the capability of military installation lands to support the military mission of the installation.” It is DOD policy that appropriate management objectives to protect mission capabilities of installation lands (from which annual projects are developed) be clearly articulated and receive high priority in the INRMP planning process (HQMC 2007).

The effectiveness of this INRMP in preventing “net loss” will be evaluated annually. Mission requirements and priorities identified in this INRMP will, where applicable, be integrated into other environmental programs and policies. It is not the intent that natural resources are to be consumed by mission requirements, but rather are sustained for the use of mission requirements. In order to achieve this, the goal of this INRMP is to conserve the environment for the purpose of the military mission. There may be instances in which a “net loss” may be unavoidable in order to fulfill regulatory requirements other than the Sikes Act, such as complying with a biological opinion under the provisions of the ESA, or from the protection of wetlands under the provisions of the CWA. However, both the USFWS and USACE are required to adhere to the Sikes Act provision of no net loss. Loss of mission capability in these instances will be identified in the annual update of the INRMP and will include a discussion of measures being undertaken to recapture any net loss in mission capability.

3.3 NATURAL RESOURCES CONSULTATION REQUIREMENTS

Section 7 of the ESA requires federal agencies to formally consult with USFWS (regarding fish and wildlife) or NOAA NMFS (regarding fish or fisheries) when any proposed activity authorized, carried out, or conducted by that agency may significantly affect a listed species or designated critical habitat. As a result of consultation, USFWS or NOAA NMFS would issue a biological opinion, which includes actions that the federal agency must complete in order to conduct the proposed activity. If critical habitat is located on federal property and adequate protection and management of the critical habitat has been included in the installation’s INRMP, the ESA allows USFWS to preclude this habitat from the biological opinion. However, in order for the critical habitat to be excluded, the qualifying INRMP must address the maintenance and improvement of the primary constituent elements important to the species and must manage for the long-term conservation of the species. For minor or less than significant impacts to ESA-listed species or designated critical habitat, informal consultation with USFWS and NOAA NMFS may be appropriate.

Two federally protected species (bald eagle and wood stork), and one species under consideration for federal listing (eastern diamondback rattlesnake), have been recorded on the Installation (Barbour et al. 2013). Bald eagles and wood stork occasionally utilize habitats of the facility but are not known to breed on MCLB Albany. The eastern diamondback rattlesnake is relatively widespread on the Installation and is believed to be breed there. In addition, the federally

endangered gopher tortoise has been documented on MCLB Albany and remains were discovered during a 2013 survey as well as a few sightings of live individuals by Natural Resources staff. Although facility-wide surveys were performed recently, future surveys may identify additional ESA-listed species. The USFWS has not designated critical habitat rules for any of the federally listed species found on the Installation.

Section 7 consultation (formal or informal) is not expected to be required for any of the natural resources' management measures recommended in this document.

3.4 NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE

Passage of the SAIA brought into effect the requirement that “the Secretary of each military department shall prepare and implement an integrated natural resources management plan for each military installation in the United States under the jurisdiction of the Secretary” (HQMC 2007). The Council on Environmental Quality (CEQ) defines an INRMP as a major Federal action requiring NEPA analysis, and as a result the Navy Office of General Counsel (Installations and Environment) has established that implementation of an INRMP per SAIA requirements, necessitates the preparation of NEPA documentation prior to approval of the initial INRMP for a facility. The preparation of an EA is usually sufficient to satisfy the NEPA review requirement for most installation INRMPs; however, in cases where implementation of the INRMP would have significant impact on the environment, the preparation of an Environmental Impact Statement (EIS) is required. Annual INRMP updates and revisions are covered by the original NEPA documentation unless a major change in installation mission or programmatic objectives occurs; in which case an EA or EIS would be required.

Decisions that affect future land or resource use that are associated with an INRMP require NEPA analysis. The NRM should refer to Chapter 12 of MCO 5090.2 for basic guidance on the preparation of NEPA documents. The INRMP and associated NEPA documentation should be prepared as individual documents to ensure that the viability, integrity, and intent of each are maintained. The intent of the INRMP is to outline projects that would fulfill Marine Corps compliance and stewardship obligations, while the intent of the NEPA documentation is to analyze the impacts of the programmatic objectives outlined within the INRMP. While each of these are prepared as separate documents, they should be prepared simultaneously as it is important for installation natural resource managers to coordinate the two documents at the earliest possible stage to ensure that decisions reflect current environmental values, and avoid potential conflicts.

Preparation of the NEPA documentation should be completed early to accommodate Marine Corps decision-makers. If a comment period or public notice is required for the NEPA process, public notice and comment periods should be coordinated and integrated with the INRMP. A Finding of No Significant Impact (FONSI) must be achieved before an INRMP may be approved. If a FONSI is not achievable, the NEPA process must proceed to an EIS. One of the first steps in the NEPA process is to define the proposed action and explain its purpose and need. The proposed action is needed to develop and implement an INRMP that integrates natural resources management with the installation's military use in a manner that ensures military readiness and provides for sustainable multipurpose uses and conservation of natural resources (HQMC 2007). The purpose and need for the INRMP is to meet statutory requirements imposed by the SAIA as well as the requirements of various DOD and Marine Corps instructions. The purpose and need section of the

NEPA document can be further clarified with a brief discussion of the required plan elements (as outlined in the SAIA) applicable to the installation.

The majority of the NEPA document should focus on the discussion of relevant environmental issues and reasonable alternatives. Alternatives that are not feasible because they are inconsistent with the installation's mission, unreasonably expensive, and/or are too technically or logistically complex should not be included in the analysis. Additionally, any alternative that are associated with significant environmental impacts cannot be analyzed in an EA and would require preparation of an EIS. The CEQ defines reasonable alternatives as those that are economically and technically feasible and utilize common sense. Feasibility is a measure of whether an alternative makes sense and is achievable. The analysis should focus on the alternatives and methodologies proposed for implementing the programmatic objectives that have been established for natural resources management.

Although specific projects are not required to be analyzed in the NEPA document, a complete list of projects, including description, cost estimate, funding priority designations, and implementation schedule must be included to provide the basis of the proposed action. If agency stakeholders and the Marine Corps determine that potential projects are controversial, sufficient project details must be provided in the INRMP so that a decision can be made regarding significance as part of the NEPA analysis. Additionally, controversial projects, or projects outside the scope may require a tiered or amended NEPA document for that specific project. All projects must be consistent with the methodologies analyzed in the NEPA document, and the installation should ensure that the NEPA documentation for the INRMP is prepared such that it would accommodate for unforeseen projects, and changes to original projects.

An EA was prepared for implementation of the original INRMP for MCLB Albany in 2001 and a FONSI was issued (MCLB 2007). A subsequent NEPA analysis was presented in the updated 2007 INRMP that determined that implementation of the updated INRMP would have no significant direct, indirect, or cumulative impacts on the quality of the natural or human environment (MCLB 2007). The 2014 INRMP update was covered by the original NEPA documentation, as there had been no major changes in the Installation's mission or programmatic objectives from those presented in the 2007 INRMP (MCLB 2012a), and no significant direct, indirect, or cumulative impacts on the quality of the natural or human environment were anticipated from its implementation. Since the 2014 INRMP update went into effect there have been substantial changes to the Installation's natural resources as a result of extensive destruction caused by two natural disasters—an EF3 tornado in 2017 and Hurricane Michael in 2018. There have been major transformations to the forest composition, and accordingly, the programmatic objectives have been extensively revised. Therefore, this document constitutes a formal *revision*, rather than a simple update, to the INRMP. To satisfy NEPA requirements (HQMC 2018), an EA, is under preparation. To fulfill public review requirements, the Pre-Final Public Review INRMP revision and Pre-Final EA will be made available for public review with appropriate public notifications. Comments will be addressed as appropriate in the Final INRMP and Final EA documents.

3.5 ENCROACHMENT PARTNERING

The Navy and Marine Corps Encroachment Partnering Program was developed to proactively address encroachment at installations, ranges, and operating areas in order to maintain the ability to meet mission requirements, as well as effective testing and training capabilities per MCO 11010.22B (July 2010). Subsequently, MCO 11011.23, *Policies and Procedures of Encroachment Control Management* (2015), defined encroachment as any internal or external factors that degrade or have the potential to degrade the Marine Corps' capability to conduct current and future military testing, training, and general mission activities on its installations. Encroachment Partnering (EP) is the Marine Corps' term for a shared strategy of working with state and local agencies and private conservation organizations to prevent incompatible land use or loss of habitat that could affect current or future military operations (HQMC 2007).

Consistent with the finding of the 2009 Encroachment Control Plan (ECP), MCLB Albany's 2016 ECP Update found that encroachment was not a current or imminent threat to the MCLB Albany mission (MCLB 2016); therefore, the emphasis is on preventing encroachment. Due to changing conditions on-base and in the surrounding area, many of the former encroachment factors have been diminished, so the ECP Update addresses five issues which fall into three categories: 1) Land Use; 2) Water Supply and Quality; and 3) Natural Factors and Climate Effects.

Although the urgency for off-Installation compatible land use is low, it was deemed a high priority to continue engagement with the City of Albany, Dougherty County, and Southwest Georgia Regional Commission for ensuring future compatible zoning and land use (MCLB 2016). In the case that an unforeseen encroachment threat emerges, the Marine Corps might be able to abate the issue by partnering with the City and County, or if partnering is unsuccessful, by funding a restrictive easement. MCLB Albany also should proactively identify stakeholders with an interest in protection of lands with open space, such as the American Farmland Trust, Georgia Land Conservation Center, Georgia Agricultural Land Trust, or adjoining landowners.

Two off-Installation parcels are presently being converted from open land to industrial uses: across the street to the south of the Installation, 3,000 acres of former farm fields are in the process of being developed as a solar array; and on the north side of the Installation, Georgia Timber & Plywood Company is opening a new plant (Robbins 2019). These new landowners and uses could possibly present new encroachment issues due to the parcel no longer being available for expansion of the base, unknown impacts of habitat fragmentation, and the possibility of incompatible land use (e.g., if there is an issue related to prescribed burning or the resulting smoke). MCLB Albany might try opening communication with the landowners or developers to attempt to form agreements before any conflicts arise.

In addition to serving as buffers, the lands adjacent to MCLB Albany may also serve as future conservation lands for rare and sensitive species, especially if restored as early successional, longleaf pine forest or other priority habitats. At this time, however, protected natural resources were found not to pose an encroachment threat, as the listing of a new species does not affect operations. With a long look to the future, MCLB Albany has identified Natural Factors and Climate Effects as a high priority encroachment issue, calling for continued communication within DOD and the Marine Corps, as well as with local, state, and federal entities to incorporate guidance

on climate change adaptation into long-term planning and emergency preparedness and response planning.

4.0 NATURAL RESOURCES MANAGEMENT

This section provides detailed information on the regulatory requirements and management strategies for the five primary natural resource management areas identified for MCLB Albany. Specific INRMP projects and management actions have been developed for each to assist MCLB Albany in meeting the established INRMP goals and objectives (defined in Section 1.6). Management actions—those activities that will be conducted in-house—are identified under the resource sections to which they pertain and support. All projects that require funding for their implementation are summarized in Appendix F. In addition to the projects associated with the five target natural resource management areas, there are also specific natural resources management projects described at the end of this section that cover annual and no less often than every five-year reviews of this INRMP, and funding the NRM position. The INRMP Project Table, in Appendix F, provides additional details for each project, including project schedule, legal drivers, budget criteria, and funding sources. No impacts to the military mission are expected to occur from implementation of the objectives and recommendations described in this section.

Management practices and activities are divided into five natural resource management focus areas as follows:

- 1) Section 4. 1 - Land Management
- 2) Section 4. 2 - Fish and Wildlife Management
- 3) Section 4. 3 - Forestry Management
- 4) Section 4. 4 - Outdoor Recreation Management
- 5) Section 4. 5 - Integrated Ecosystems Management and Partnering

The natural resources management actions described in this INRMP are for the benefit of land, fish and wildlife, and outdoor recreation resources of the Installation. Each activity described in the followings sections is associated with goals, issues, objectives, strategies, and projects to help maintain a balance between the Installation’s natural resources management and the military mission.

4.1 LAND MANAGEMENT

Responsibility for the overall land management program at MCLB Albany is divided between the Public Works Officer (PWO) and the Natural Resource Manager (NRM). The PWO is responsible for ensuring that the goals and objectives for areas designated as improved and semi-improved grounds are implemented in a cost-effective manner. Typically, these duties include soil erosion control, grounds maintenance (i.e., mowing, fertilizing, and liming), weed and brush control, and landscaping. The NRM is responsible for managing the areas designated as unimproved grounds. Duties and responsibilities that are inherent with the unimproved grounds include the protection and management of federally listed threatened and endangered species; management of food plots for wildlife; fish and wildlife management; outdoor recreational programs (e.g., hunting and fishing), forestry program, and maintaining the ecological integrity of the Indian Lake Wildlife Refuge. The NRM has the primary responsibility of implementing the INRMP. Land management

activities on MCLB Albany are addressed by the following sections and subsections, and are detailed below:

- 1) Section 4.1.1 Water Resources Management
 - Section 4.1.1.1 Watershed and Floodplains Management
 - Section 4.1.1.2 Wetland and Deepwater Habitats Management
 - Section 4.1.1.3 Riparian Areas Management
 - Section 4.1.1.4 Water Quality Management
- 2) Section 4.1.2 Coastal Zone Management
- 3) Section 4.1.3 Vegetation and Habitat Management
 - Section 4.1.3.1 Invasive Plant and Noxious Weed Management
 - Section 4.1.3.2 Grounds Maintenance and Landscaping Management
- 4) Section 4.1.4 Agricultural Outlease Management
- 5) Section 4.1.5 Rare, Threatened, and Endangered Plant Species Management

4.1.1 Water Resources Management

Water resources are an important part of natural ecosystems due to the diverse biological and ecological functions they support and hydrologic functions they perform, such as improving water quality, groundwater recharge, pollutions treatment, nutrient cycling, provision of wildlife habitat and niches for flora and fauna, stormwater storage, and erosion protection (Benton et al. 2008). The ecological and human health importance of maintaining healthy water bodies at MCLB Albany is reinforced by several federal and state laws and regulations (see table below). In addition, MCO 5090.2 and DODINST 4715.03 also promote the importance of maintaining healthy water body systems on the Installation. The Marine Corps recognizes the importance of the nation's water resources, and as such is committed to supporting their conservation. Water resources management on the Installation addresses watersheds, floodplains, surface waters, wetlands, and riparian areas. The following sections provide additional detail on the specific water resources management issues, projects, and management strategies covered by this INRMP.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Water Resources Management

- Clean Water Act (CWA) Section 303, Water Impairment Identification, requires States to identify waters that do not or are not expected to meet applicable water quality standards with technology-based controls alone and to develop programs to achieve the State standards.
 - CWA Section 401, Water Quality Certification, 1986, 33 U.S.C. 1341, Requires that states certify compliance with federal permits or licenses and with state water quality requirements and other applicable state laws. Under Section 401, states have the authority to review any federal permit or license that may result in a discharge to wetlands or other waters under the state's jurisdiction to ensure that the actions would be consistent with the state's water quality requirements.
 - CWA Section 402, NPDES Program, 2002, 33 U.S.C. 1251, Controls direct discharges into navigable waters. NPDES permits, issued by either the EPA or an

- authorized state/tribe, contain industry-specific, technology-based and water quality-based limits and establish pollutant monitoring and reporting requirements.
- CWA Section 404 Permits for Dredged or Fill Materials, 1986, 33 U.S.C. 1344, Establishes a program to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands.
 - Clean Water Action Plan (27 January 1998), A presidential initiative to restore and protect America's waters by reducing nonpoint pollution, emphasizing collaborative strategies around watersheds, increasing wetlands, protecting coastal waters, providing incentives for protection of forest and grassland buffers, and promoting community-based planning.
 - EO 12962 (9 June 1995), *Recreational Fisheries*, requires Federal agencies to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities.
 - EO 11988 (24 May 1977), *Floodplain Management*, requires federal agencies to evaluate effects of action they have taken on floodplains.
 - EO 11990 (24 May 1977), Protection of Wetlands, 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.
 - EO 13112 (3 February 1999), *Invasive Species*, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
 - MCO 5090.2, Discusses natural resources management relating to wetland management. In addition, discusses natural resources management relating to NPS pollution and establishes requirements, guidelines, and standards for the assessment of damages arising from the release of oil or hazardous substances.
 - Rivers and Harbors Act, 33 U.S.C. 401 et seq, requires authorization from the USACE for the construction of any structure in or over any navigable waters of the U.S. and the excavation/dredging or deposition of material in these waters or any obstruction or alteration in navigable waters.
 - ESA, 16 U.S.C. 1531 et seq., Provides for affirmative protection for riparian areas if they occur on federal lands and provide habitat to any listed species or any species proposed for listing, or if they are within designated Critical Habitat for certain fish, mammals, birds, and reptiles.
 - Coastal Zone Management Act (CZMA), 16 U.S.C. 1451 et seq., requires riparian area protection and restoration as a means of meeting the pollution-abatement goals of the Act.
 - Federal Water Pollution Control Act, as amended by the CWA of 1977, 33 U.S.C. 1251, Describes guidelines for the control of NPS pollution.
 - CZMA Section 6217, Coastal Nonpoint Pollution Control Program, 16 U.S.C. 1451 et seq., requires states with Coastal Zone Management Programs to develop Nonpoint Pollution Control Programs with approval from NOAA and EPA.
 - Safe Drinking Water Act, 1974, 42 U.S.C. 300f et seq., protects the quality of drinking water in the U.S. whether from above ground or underground sources.
 - National Invasive Species Act, 16 U.S.C. 4701, prescribes policies to prevent the introduction and spread of non-indigenous species into U.S. waters.

- Oil Pollution Act, 1990, 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 Resource Trustees to recover damages for injury to, destruction of, or loss of natural resources resulting from the release of a hazardous substance.

4.1.1.1 Watershed and Floodplains Management

Floodplains receive protection through EO 11988, *Floodplain Management*, which directs federal agencies to reduce the risk of flood loss by not building in floodplains, and to restore and preserve the natural and beneficial values served by floodplains. Development within floodplains is regulated at the municipal level where local ordinances detail the rules and requirements for floodplain development and permits are issued accordingly.

Floodplains at the Installation are relatively minor and associated with small depressional features that fill during storm events. There are no FEMA-designated Flood Hazard Zones on MCLB Albany. All drainage from the Installation ultimately discharges to the Flint River located approximately three miles from the Installation. One intermittent tributary to the river, Piney Creek, flows through the northeastern most corner of the Installation.

Management Strategies

Management strategies related to protection of watersheds and floodplains include:

- 1) Ensure all water resources, including ditches and canals, are identified and included in the Installation's GIS database.
- 2) Avoid activities, particularly vegetation clearing and ground-disturbing activities that would adversely affect flood attenuation.
- 3) Clear future stream or drainage blockages, such as beaver dams or obstructed culverts, that could result in increased flood levels or prevent flood waters from subsiding. This effort is the responsibility of the Public Works Department, with assistance provided by the NRM.

Ecosystem Management

Maintaining healthy watersheds and floodplains provides and protects wildlife habitat and supports important ecosystem services such as water purification and control of stormwater and runoff.

Additional Sources of Information

- EPA Wetlands, Oceans, and Watersheds (<https://www.epa.gov/environmental-topics/water-topics#our-waters>)
- GDNR, Watershed Protection Division (<https://epd.georgia.gov/about-us/watershed-protection-branch>)
- Georgia Association of Floodplain Management (<http://www.gafm.clubexpress.com/>)

- GDNR, Georgia Flood M.A.P. Online Digital Flood Insurance Rate Maps (DFIRMs) (<http://map.georgiadfirm.com/>)

4.1.1.2 Wetland and Deepwater Habitats Management

Wetlands are transitional zones between the terrestrial and aquatic environment, and are characterized by physical, chemical, and biological features that indicate hydrological conditions. Deepwater habitats are the permanently flooded lands lying below the deepwater boundary of wetlands and include lakes and ponds. Wetlands and deepwater habitats are an important part of natural ecosystems due to the diverse biological and hydrologic functions they perform, such as improving water quality, groundwater recharge, pollution treatment, nutrient cycling, provision of fish and wildlife habitat and niches for unique flora and fauna, stormwater storage, and erosion protection (Benton et al. 2008).

Protection and management of the wetlands and deepwater habitats present at the Installation must be addressed according to state and federal regulations. EO 11990, *Protection of Wetlands*, and MCO 5090.2 instruct military installations to manage lands with the goal of no net loss of wetlands. All federal agencies are required by EO 11990 to use reasonable efforts to preserve and enhance the natural and beneficial values of wetlands under their stewardship. The DOD Natural Resources Conservation Program also requires military installations to inventory and manage significant or sensitive environmental features, including wetlands. The SAIA (as amended) calls for improving wetlands for the benefit of plants and animals when it is consistent with the military mission and readiness. These potential improvements are set within a broader geographic context. Much of the southeast Georgia region is affected by lowered water tables and reduced surface water flows, and droughts are occasional. Wetlands are especially sensitive to fluctuations in water availability.

There are approximately 128 acres of delineated wetlands on the Installation. These include wetlands in and surrounding lakes and ponds on the Installation (Covella Pond, Horseshoe Pond, and Robinson Pond, Indian Lake). Several of the wetlands on MCLB Albany are limited in habitat value by size, land use, or negative adjacent values (roads, etc.). However, preventing or minimizing disturbance of habitat between even small individual wetlands will help maintain their functions and provide habitat for wildlife species.

Management Strategies

Management strategies related to protection of wetlands at MCLB Albany include the following:

- 1) Use preferred federal and state standards and protocols to identify, delineate, and map wetlands and waterbodies (to include streams and ditches) on the Installation. A complete survey of wetlands and waterbodies will assist the NRM in proper management of the resources, and to identify management measures that will enhance resource functions and/or the military mission. Wetland delineations and jurisdictional determinations are usually valid for a period of 5 years, after which time the wetland delineation should be repeated to validate the status of Installation wetlands.
- 2) Establish and maintain vegetated buffers (100-foot wide minimum is preferred) around wetland and waterbodies, to include canals and ditches. Larger buffers should be established around resources determined to be of high quality.

- 3) Limit activities within buffers zones to those which would cause little or no impact on or disturbance to the wetland or waterbody. In cases where established activities already occur within buffers and cannot be reasonably changed, those wetlands and waterbodies should be subject to increased monitoring.
- 4) Avoid wetland and riparian areas during future construction of structures and other facilities, including roads, unless essential to the military mission. Locate new roads outside riparian areas, whenever possible. Design stream crossings to minimize the area disturbed, and unimproved stream crossings are prohibited.
- 5) Implement appropriate wetland mitigation for unavoidable wetland impacts, as authorized and required by the federal and state permit process and the CWA.
- 6) Monitor stormwater runoff to ensure wetlands and waterbodies are not negatively impacted by stormwater flows, sedimentation, or erosion.
- 7) Provide wetlands and waterbody identification and management training to natural resources personnel.
- 8) Restore degraded wetlands, waterbodies and/or associated riparian areas to the extent possible.
- 9) Encourage project managers, engineers, planners, and maintenance personnel to coordinate early with the Environmental Branch to determine potential adverse impacts on wetlands associated with any proposed activities.

Proper management of wetlands and deepwater habitats, understanding their functions and values, and meeting regulatory requirements when conducting activities within wetlands requires knowledge of their extent and distribution. The USACE regulates and protects wetland resources in the United States. Delineating jurisdictional wetlands is accomplished using the *1987 Corps of Engineers Wetland Delineation Manual* and the *2008 Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region*. Areas that meet the regulatory definition of a wetland are regulated by Section 404 of the CWA, and any activity that may deposit fill into a wetland requires a permit from the USACE.

Ensuring regulatory compliance and managing wetland resources to enhance their value are the primary management issues for MCLB Albany. Wetlands management generally is conducted within and around natural and human-made wetlands to protect, restore, and improve degraded wetlands. Wetlands management on the Installation includes the following management actions:

- Protecting natural wetlands from loss, or degradation by actions not related to the military mission.
- Meeting regulatory requirements for activities that unavoidably impact wetlands.
- Creating, enhancing, and restoring wetlands as mitigation for unavoidable impacts and to meet requirements of the SAIA.

Impacts to wetlands can occur directly or indirectly from daily operations, including maintaining drainage channels, vegetation management, or from directly altering the areas (fill, drain, or a change in hydrology) or altering upland areas surrounding wetlands. Mission needs and requirements may necessitate an unavoidable clearing of land and filling of wetlands to build

additional facilities. The need to comply with other environmental regulations, as well as the needs of the mission, may result in an unavoidable loss of some wetlands.

The high degree of variability in characteristics (habitat value and function) among wetlands at the Installation make management decisions more complex and require thorough consideration regarding compliance with current environmental laws and regulations, while supporting the military mission.

Section 404 of the CWA (33 U.S.C. 1344) prohibits the discharge of dredged or fill material into waters of the U.S., including wetlands, unless authorized by a USACE permit. While the USACE has primary responsibility for implementing the CWA, other agencies, including the EPA, USFWS, GDNR, and USDA NRCS play important regulatory and advisory roles. If a project will impact wetlands or other specially designated aquatic sites, the USACE has the authority to require mitigation in the form of avoidance, minimization or compensation, to minimize the adverse effects of the project.

Development of roads, installation of new culverts, and grading or fill activities are examples of impacts that have the potential to impact wetlands and waters of the U.S., and a permit may be required before implementing these activities in accordance with Section 404 of the CWA. Certain actions that have minimal adverse impact on wetlands and other water resources may qualify for a Nationwide Permit (NWP). The NWP Program was designed to streamline the Section 404 permitting process, and covers activities conducted in waters of the U.S., including maintenance activities such as repairing, rehabilitating, or replacing existing structures, and removing accumulated fill or debris from within or around existing structures. Activities associated with aquatic habitat restoration, establishment, or enhancement may also qualify for streamlined authorization under an NWP.

Impacts to wetlands (including their function) and other surface waters by planned future projects at MCLB Albany will be minimized or eliminated in accordance with EO 11990 and current Marine Corps regulations. Although a formal wetland delineation has been conducted on portions of the Installation, a formal jurisdictional wetland and water resources delineation will be needed to verify resource boundaries before undertaking activities that disturb regulated wetlands or waterbodies, and a CWA Section 404 permit may be required. If wetland impacts are unavoidable and a permit is required to authorize the activity, appropriate impact minimization and mitigation will be required and will be determined through consultation with the appropriate federal and state agencies (USACE, USFWS, and GDNR). Additionally, Section 404 may require restoration of wetlands damaged by project activities, and although in-kind replacement of wetlands is the preferred mitigation strategy, other types of mitigation that may be applied including conservation easements, mitigation banking, and other mitigation as dictated by the federal and state agencies involved in the permitting and consultation process.

MCLB Albany adheres to the requirement of ‘no net loss’ of wetlands on federal lands, as mandated by EO 11990. This order protects and restores wetland function by buffering wetlands from direct human pressures and maintaining important external natural processes that act upon wetlands. Physical vegetated buffers minimize the effects of the abrupt transition between two different habitats (edge effects) on the numbers and kinds of organisms, reduce the amount of marginal habitat for species, and mitigate water quality impacts. A buffer typically consists of a

suitably wide (minimum 50-foot, 100-foot is preferred) band of vegetation along the perimeter of a wetland or water body. An effective buffer must consider wetland functional value (e.g., level of degradation and sensitivity to disturbance), intensity of adjacent land use, buffer characteristics (i.e., vegetation density, structural complexity, and soil condition), and specific buffer functions as described in Castelle et al. (1994).

Natural wetlands and waterbodies are not to be used for water quality treatment of point or nonpoint pollution sources (Fields 1993). Untreated point source discharges to wetlands have been eliminated through the National Pollutant Discharge Elimination System (NPDES) program in Section 402 of the CWA. Remaining point source discharges are of secondarily treated effluent, which is typified by greater biochemical oxygen demand, amounts of suspended solids, and nutrient levels as compared to natural inputs. Proper management dictates that wetlands and surface waters be protected from such inputs using water quality standards promulgated by each state. Although significant nonpoint source loading to wetlands is undesirable, this issue will take time to address, and management measures will likely result in reduced, but not eliminated, loadings to wetlands.

It is important to develop and implement strategies for the long-term protection of wetlands and waterbodies on the Installation. Incorporating management and protection would involve classifying the Installation's wetland and deepwater resources according to their relative function and value and identifying specific management tasks based upon those findings. Deepwater habitat management on the Installation includes the following management:

- Gathering biological baseline data to assess function and value of wetland resources. Decisions regarding how to manage natural wetlands, enhance degraded wetlands, and analyze potential impacts can be made from this baseline data.
- Addressing erosion problems that exist along many of the drainage canals and sparsely vegetated areas, and that contribute to habitat loss and degradation of water quality.
- Regularly reviewing grounds maintenance, pest management, and construction plans to ensure that water quality is not impacted by runoff.
- Reducing nonpoint source pollution from erosion, vehicles, dumping, pest management, crop management (i.e., pecan grove), grounds maintenance, and weed control. Nonpoint source pollution from runoff can degrade wetland quality and function.
- Developing recreational opportunities within and adjacent to wetlands, such as nature trails and wildlife observation areas, to increase awareness of wetland importance.

Ecosystem Management

The management of wetlands and deepwater habitats is an essential component of ecosystem management because such a large number of plants and animals utilize these resources. Additionally, healthy, protected wetlands and waterbodies store and purify water, provide open space and aesthetic value, and provide habitats for migratory birds, fish, and other wildlife.

Additional Sources of Information

- USACE, Savanna Georgia Regulatory Division, Wetlands and Waters of the U.S. (<http://www.sas.usace.army.mil/Missions/Regulatory.aspx>)
- EPA, Wetlands, Oceans, and Watersheds (<http://water.epa.gov/type/wetlands/index.cfm>)
- EPA, Region 4 (Southeast) (<https://www.epa.gov/aboutepa/about-epa-region-4-southeast>)
- USFWS, National Wetlands Inventory (<http://www.fws.gov/wetlands/>)
- USDA NRCS – Georgia (<http://www.nrcs.usda.gov/wps/portal/nrcs/site/ga/home/>)
- Society of Wetland Scientists (<http://www.sws.org/>)
- Society for Ecological Restoration (<http://www.ser.org/>)
- GDNR, Environmental Protection Division (<http://www.georgiaepd.org/>)

4.1.1.3 Riparian Areas Management

Maintaining well-vegetated riparian buffers along streams and other waterbodies are an important part of a healthy environment and provide benefits to humans and wildlife. Riparian buffer functions include maintaining habitat for fish and wildlife, nutrient cycling, streambank stability, natural stream flow, and water quality (Muhlberg and Moore 1998, Wenger and Fowler 2000). Conserving and restoring riparian buffers minimizes erosion and subsequent loss of streambank habitat. Riparian habitats on military lands may provide critical habitat for migratory birds and provide valuable habitat for a variety of wildlife.

In accordance with the Memorandum of Understanding (MOU) established between DOD and the USFWS to promote the conservation of migratory birds (71 Federal Register 168), DOD will strive to prevent the destruction or degradation of wetlands and riparian vegetation, and will also restore those habitats, when feasible, where they have been degraded.

Riparian forest occurs along the poorly defined floodplain of Piney Woods Creek in the northeastern corner of MCLB Albany. Although limited in extent, the blackwater stream riparian forest represents an important component of the biological diversity on the base. The riparian forest community is bordered on both sides by pine-hardwood forest.

Management Strategies

Management strategies related to protection of riparian areas at MCLB Albany include the following:

- 1) Avoid and minimize impacts to vegetated buffer areas along streams and other waterbodies.
- 2) Maintain predominantly forested communities surrounding Installation streams, lakes, and ponds where possible.
- 3) Encourage diverse species composition in riparian areas, particularly canopy species; woody canopy species will more successfully survive stochastic environmental events and provide necessary stream bank stabilization.
- 4) Plan recreational development and training exercises to minimize shoreline and stream

bank erosion and mitigate unavoidable impacts.

- 5) Control nuisance species in riparian areas to the extent possible.
- 6) Limit the use of pesticides, herbicides and fertilizers in riparian areas.
- 7) Should riparian plantings be necessary, plant only native species.
- 8) Ensure riparian buffers are designated in the Installation GIS and are of appropriate size (minimum 50-feet, 100-feet is preferred).
- 9) Provide training to personnel working near resources on the importance of maintaining riparian buffers, particularly grounds maintenance personnel.

Impacts to vegetated buffer areas, including riparian buffers along streams and other waterbodies, should be avoided or minimized to maintain habitat for fish and wildlife, to protect water quality, and to provide streambank stability. Restoration and enhancement opportunities for riparian buffer habitat should be identified, and bioengineering techniques and native plantings should be used to stabilize compromised streambanks. The application of fertilizers, herbicides, and pesticides should be avoided, to the extent practicable, to protect water quality. Riparian areas will be avoided during future construction of structures and other facilities, including roads. New roads will be located outside riparian areas, whenever possible.

Ecosystem Management

Maintaining well-vegetated riparian buffers along streams and other waterbodies is an important part of a healthy environment, and support humans and wildlife by providing habitat and nutrient cycling and supporting streambank stability, natural stream flow, and water quality.

Additional Sources of Information

- USDA NRCS – Georgia (<http://www.nrcs.usda.gov/wps/portal/nrcs/site/ga/home/>)
- EPA, Riparian Zone and Stream Restoration (<https://archive.epa.gov/ada/web/html/riparian.html>)
- USFWS, A System for Mapping Riparian Areas in the Western United States (www.fws.gov/wetlands/Documents/A-System-for-Mapping-Riparian-Areas-In-The-Western-United-States-2009.pdf) Society for Ecological Restoration (<http://www.ser.org/>)
- University of Georgia’s Carl Vinson Institute (<http://www.cviog.uga.edu/>)
- Georgia Soil and Water Conservation Commission (<http://gaswcc.georgia.gov/>)

4.1.1.4 Water Quality Management

Stormwater is rain and snow melt that runs off surfaces such as rooftops, paved streets, parking lots and other impervious surfaces. As water runs off these surfaces, the runoff can pick up pollutants such as oil, fertilizers, pesticides, soil, trash, and animal waste. The runoff might flow directly into a local canal, stream, or lake, or it may go into a storm drain and continue through storm pipes until it is released untreated into a local waterway. The quality and quantity of water runoff generally depends upon the land use types and amount of impervious surfaces in an area. Minimizing impervious surfaces and retaining vegetative cover help to reduce the amount of pollutants entering waterways.

The 1987 amendments to the CWA (33 U.S.C. 1251) created the National Pollutant Discharge Elimination System stormwater program. This program regulates stormwater discharges from certain industrial activities, including airport operations. EO 12088, *Federal Compliance with Pollution Control Standards*, requires that the heads of each Executive Agency ensure that all necessary actions are taken for the prevention, control, and abatement of environmental pollution with respect to federal facilities and activities under the control of the agency. Ground disturbing projects should be covered by a site-specific Stormwater Pollution Prevention Plan (SWPPP) or an erosion and sediment control plan (ESCP) that identifies measures to reduce pollution of receiving water from stormwater runoff from a project site.

Impervious surfaces are found throughout the Installation. However, most are located on the western two-thirds of the facility and include industrial and warehouse structures, impervious lots, and administrative buildings. The eastern third of the facility is relatively undeveloped, apart from low-density residential housing and associated parking areas, when compared to the rest of MCLB Albany. A system of ditches and drainages are located throughout the Installation. The condition and maintenance of these drainage systems plays an important role in stormwater management on the facility. All drainage from MCLB Albany ultimately discharges to the Flint River, which drains into the Gulf of Mexico, so water quality management on the Installation has implications not only for the watershed but also the coastal waters.

MCLB Albany provides its own water, wells, and irrigation (MCLB 2012a). Water is provided through three deepwater wells and is distributed through the facility via a network of underground pipes. Sanitation waste for base housing is processed by a private contractor and some industrial waste is processed on base as part of the MCLB pretreatment permit with the city of Albany.

Management Strategies

Management strategies related to protection of water quality at MCLB Albany include the following:

- 1) Ensure guidelines and recommendations relating to stormwater management (MCLB 2008), and the application of chemicals (MCLB 2015b, MCLB 2013b) are adhered to.
- 2) Base-wide stormwater surveys began in 2014. Evaluate results and incorporate into Installation stormwater management strategies as appropriate.
- 3) Minimize impacts of construction activities at the Installation. All ground-disturbing activities will incorporate appropriate stormwater and erosion and sediment controls and will coordinate the timing of land-disturbing activities and implementation of erosion and sedimentation control measures to reduce nonpoint source pollution that could result from those activities. To ensure that such controls are applied consistently, an ESCP will be developed for all land-disturbing activities, as needed in accordance with state regulations.
- 4) Conduct routine (annual) water quality sampling/monitoring program on all waterbodies to prevent potential degradation in water quality from going unnoticed. Frequent water quality monitoring provides a mechanism for the early detection of potential water quality problems and makes it easier to identify the source/cause of the degradation. The data also provides the foundation from which to make future management decisions. Monitoring

should be performed in accordance with specifications outlined in the existing NPDES Stormwater Permit.

- 5) Reduce the input of pollutants and nutrient that enter water resources by establishing and maintaining vegetative buffers around all water bodies, including canals and ditches.
- 6) The most effective method of reducing pollutant levels in water bodies is to limit the use of these substances in the surrounding watershed, particularly in areas adjacent to the water bodies. Chemicals, pesticides, herbicides, and fertilizers used in landscape maintenance, crop management (i.e., pecan orchard), invasive species management, and other vegetation management activities will be applied minimally in conformance with appropriate standards, and will not be applied in areas immediately adjacent to water bodies and riparian areas. Chemicals will be applied in accordance with integrated pest management practices when specific problems are identified.
- 7) Control nuisance species to the extent possible. Algal blooms are generally the result of high nutrient concentrations (especially phosphorus) and also of increased temperatures. Algal blooms at Covella Pond and overgrowth of duckweed (*Lemna* sp.) on Indian Lake have been reported in the past. The best approach for controlling algal populations involves prevention, reducing nutrient inputs to water bodies, and controlling water temperatures by establishing or maintaining densely vegetated buffer areas around the resource. Once algal populations have begun to increase in a water body, algicides, artificial circulation, and dilution/flushing are standard control techniques that may be considered. An overabundance of aquatic plants typically requires alterations in the habitat, herbicides, or manual control measures.
- 8) Maintain proper function of stormwater control and conveyance structures by frequently removing debris. Litter and yard wastes can clog inlets, catch basins and outlets, lead to overflows, erosion, and unintended flooding, and make these devices ineffective for stormwater pollutant removal.

EO 12088, *Federal Compliance with Pollution Control Standards*, requires that the heads of each Executive Agency ensure that all necessary actions are taken for the prevention, control, and abatement of environmental pollution with respect to federal facilities and activities under the control of the agency. Soil erosion is a source of water pollution (sediment loadings) and will be controlled in compliance with this EO. A continuous cover of vegetation is the most effective way to prevent soil erosion and to minimize impacts to the environment.

Ground disturbing projects should be covered by a site-specific SWPPP or an ESCP that identifies measures to reduce pollution of receiving water from stormwater runoff from a project site. MCLB Albany prepares project-specific SWPPPs and ESCPs on an as-needed, project-specific basis, and in accordance with state regulations, which will identify potential sources of erosion and sedimentation prevention controls. The use of off-road vehicles is presently allowed for base personnel in certain areas of the Installation. These areas should be closely monitored for impact, and appropriate restrictions enforced if activities result in significant ground disturbance and erosion. Future plans to expand access to off-road vehicles should be carefully evaluated and monitored.

To protect water quality at MCLB Albany and within surrounding areas, existing and potential erosion problem areas must be identified so that appropriate measures, including sedimentation control, cleanout of detention ponds/ditches/drainages, and shoreline stabilization projects, can be implemented. MCLB Albany environmental staff must also conduct periodic assessments of the Installation for potential issues, review erosion and sedimentation control plans for construction sites, and provide oversight to ensure management practices are being applied properly and consistently for all ground-disturbing activities.

Additional stormwater retention areas should be considered if runoff is determined to be problematic on the Installation and management is needed. Properly constructed stormwater retention ponds also may increase wildlife habitat for desirable species.

Ecosystem Management

Effective management of water quality is essential to realizing the ecosystem management concept. Implementation of sound management strategies in developed, semi-developed, and unimproved areas will help protect water quality and habitat for aquatic life.

Additional Sources of Information

- EPA, Water Quality Standards for Surface Waters (<http://water.epa.gov/scitech/swguidance/standards>)
- USDA NRCS – Georgia (<http://www.nrcs.usda.gov/wps/portal/nrcs/site/ga/home/>)
- University of Georgia’s Carl Vinson Institute (<http://www.cviog.uga.edu/>)
- Georgia Soil and Water Conservation Commission (<http://gaswcc.georgia.gov/>)
- GDNR, Watershed Protection Branch (<https://epd.georgia.gov/about-us/watershed-protection-branch>)
- Georgia NPDES Stormwater General Permits (<https://epd.georgia.gov/forms-permits/watershed-protection-branch-forms-permits/storm-water-forms/npdes-industrial-storm>)
- Albany GA/Dougherty County, Stormwater Pollution Control (<https://www.albanyga.gov/about-us/city-departments/engineering-department/stormwater-pollution-control>)
- Georgia Stormwater Management Manual (<http://www.atlantaregional.com/environment/georgia-stormwater-manual>)

4.1.2 Coastal Zone Management

MCLB Albany is not located near a coastline and therefore does not fall within a coastal zone, which is defined as coastal waters and the adjacent shore lands including islands, transitional and intertidal areas, salt marshes, wetlands, and beaches. Therefore, this INRMP section is not applicable.

4.1.3 Vegetation and Habitat Management

Vegetation management is an important component of natural resources management at MCLB Albany. Management of vegetation (e.g., landscaping, forestry, prescribed burns, right-of-way management, areas along perimeter fencing, control of invasives) and oversight of Installation vegetation maintenance programs provides opportunities to enhance the visual appeal of the environment, implement beneficial landscaping concepts, increase timber yield, improve wildlife habitat, and reduce the costs of maintenance activities. This may include adopting an integrated vegetation management approach by encouraging establishment of certain vegetation communities.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Vegetation and Habitat Management

- DODINST 4715.03, *Natural Resources Conservation Program*, requires the control and removal of exotic species where appropriate and encourages the use of beneficial techniques such as using regionally native plants; using construction practices that minimize adverse effects on the natural habitat; preventing pollution by reducing fertilizers and pesticides, using Integrated Pest Management (IPM) techniques, recycling green waste, and minimizing runoff; using water-efficient practices; and creating outdoor demonstrations incorporating native plants, as well as pollution prevention and water conservation techniques, to promote awareness of the environmental and economic benefits of implementing this directive.
- 7 U.S.C. 136, Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), governs the use and application of pesticides in natural resources management plans.
- 16 U.S.C. 4701, National Invasive Species Act, prescribes policies to prevent the introduction and spread of non-indigenous species into U.S. waters.
- 33 U.S.C. 1251, Federal Water Pollution Control Act, as amended by CWA of 1977, prohibits the discharge of dredged or filled materials into waters of the U.S., including wetlands, without first obtaining a permit from the USACE (Section 404 of the CWA).
- 1994 President's Executive Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds, 60 Federal Register 40837, provides guidance developed by the interagency workgroup under the direction of the Federal Environmental Executive to assist federal agencies in the implementation of environmentally and economically beneficial landscape practices (defined within), and requires implementing landscaping practices that are intended to benefit the environment and generate long-term cost savings.
- EO 13112 (3 February 1999), *Invasive Species*, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
- EO 13834 (17 May 2018), *Efficient Federal Operations*, mandates that environmental management considerations must be a fundamental and integral component of Federal Government policies, operations, planning, and management and that sustainable management is pursued through the implementation of cost-effective, environmentally

sound landscaping practices and programs to reduce adverse impacts to the natural environment.

- MCO 5090.2, prohibits the introduction of exotic species into a natural ecosystem and requires control or eradication of exotic species and noxious weeds on federal lands. Discusses natural resources management relating to environmentally and economically beneficial landscaping.

4.1.3.1 Invasive Plant and Noxious Weed Management

Controlling nuisance and invasive plants is essential to the protection of the Installation's biodiversity (Executive Order [EO] 13112). Introduced species can displace native plants and animals, change the structure of natural communities, and impact the ecological functions of ecosystems. Nuisance plants, which may be either native or non-native species, cause inconvenience, annoyance or irritation to the general human population or damage to human property. Invasive plants are often introduced or exotic species that may cause harm to the environment, economy, or human health. Per DODINST 4715.03, natural resource guidance, invasive/exotic species are to be controlled and removed where appropriate.

Thirty-two invasive or nuisance plant species have been documented on the Installation (Barbour et al. 2013, MCLB 2013a). Of these, 10 have been identified as priority species as a result of significant negative impacts on native plant and animal communities or have the potential to significantly degrade habitat if not treated (MCLB 2013b). Although some invasive plant species are fairly widespread throughout the Installation, some common locations for invasive species include utility line right-of-way corridors, the perimeter fence line and associated maintained areas, and the edges of roads and other developed areas (Barbour et al. 2013, MCLB 2012a).

Management Strategies

The following management strategies will help to reduce the spread or introduction of invasive exotic plants species:

- 1) Follow the guidelines and recommendations provided in the MCLB Integrated Pest Management Plan and follow up recommendations (MCLB 2015b, MCLB 2013b), and in accordance with federal and state laws regulating the laws of pesticides.
- 2) Avoid disturbing the soil in locations where Japanese climbing fern is present, particularly during spoor release.
- 3) Require forestry or other heavy equipment to be cleaned prior to use on MCLB Albany.
- 4) Wash equipment that has been operated where invasive plants are located prior to moving to new locations on MCLB Albany.
- 5) Evaluate the use of, location, and content of food plots. Avoid introduction of exotic, perennial legumes such as bicolor lespedeza in food plots. In addition, if new plots are established, quality areas where there is native groundcover will be avoided.
- 6) Eliminate the use of non-native species (e.g. exotic pasture grasses) as soil stabilizers in construction projects.

- 7) Evaluate the efficacy of using nonchemical means to control invasive species. The objective is to minimize herbicide use. Nonchemical means may include pruning to prevent flowering and seed dispersal, cutting, or mowing.
- 8) Use only approved species for landscaping and eliminate the use of non-native species.
- 9) Eliminate practice of mowing rights-of-way to the woodline. This practice allows exotic pasture grasses to colonize the edges of forested stands. Treat woodlines with herbicides (i.e., Escort) in accordance with MCLB Albany invasive species management plan to allow native vegetation to become established.
- 10) Manage invasive species on the Installation by mowing, chemical control, and removal by mechanical or manual means, or a combination of control methods used to control exotic and invasive species.
- 11) Control and eradicate non-native species of plants and replace them with regionally native plants to restore wildlife habitat and native ground cover.

The NRM at MCLB Albany will use an adaptive approach to manage exotic and invasive plants and will explore alternative ways to meet management objectives, predict the outcomes of each alternative based on the current state of knowledge, implement one or more of these alternatives, and use the results to increase knowledge and adjust management actions. Over the long-term, consideration must be given to the potential affect climate change may have on the spread of or new infestations of undesirable plant species. Monitoring and control of invasive on MCLB will be necessary in order to maintain sites currently in desired condition and to rehabilitate or restore sites already degraded and will follow guidance provided in the MCLB Integrated Pest Management Plan (MCLB 2015b).

The proposed treatment for most of the priority invasive plant species will primarily be achieved through application of appropriate herbicides following the recommendations of forestry, extension specialists, or other experts (Miller et. al. 2010). Four methods of herbicide application will likely be used including basal bark spray, foliar spray, stem injection and cut and treatment of stumps. Herbicides including Garlon (triclopyr), glyphosate, Escort (metsulfuron methyl), and Arsenal (imazapyr) are commonly used to control invasive plant species in the southeast. In most cases, one or more spot treatments will likely be needed to achieve control. Widespread invasive plants, including bicolor lespedeza, Chinese privet, sacred bamboo (*Nandina domestica*), and Japanese honeysuckle (*Lonicera japonica*), Japanese climbing fern (*Lygodium japonicum*), and exotic pasture grasses cannot be completely eradicated on MCLB Albany. However, immediate treatment of these species, particularly Japanese climbing fern is required to prevent additional impacts to natural communities. Japanese climbing fern is of particular concern due to its widespread distribution on MCLB Albany and its ability to rapidly colonize new disturbed and undisturbed locations via spores. This rapid colonization is readily evident along firebreaks, rights-of-way, roadways, and food plots.

Control of native nuisance plants is also needed in order to maintain or rehabilitate key communities such as wetlands and upland pine stands. Red maple and buttonbush have invaded the margins and interior of cypress dome wetlands, including Indian Lake, and a variety of hardwood species (predominately oak, sweetgum, and cherry) have invaded upland pine stands in

the absence of regular 1- to 3-year fire rotations. These species shade out beneficial herbaceous plant species, negatively impact species diversity, and have the potential to alter ecosystems. The prolonged drought and absence of fire on MCLB Albany have accelerated growth of these species. Chemical control through herbicide will encourage herbaceous plant growth and benefit amphibian and other wetland species. Hardwood species (predominately oak, sweetgum, and cherry) have invaded upland pine stands in the absence of regular 1- to 3-year fire rotations. An aggressive prescribe burning, mechanical drum chopping, and herbicide program has been initiated on MCLB Albany to achieve control. Prescribed burning and drum chopping effectively top-kill hardwoods but allows resprouting necessitating chemical treatment, as described in the IPM Plan (MCLB 2015b), pest management recommendations (MCLB 2013b), and recommended prescribed burn practices (MCLB 2013c).

Ecosystem Management

Invasive plant and noxious weed management is consistent with an ecosystem approach since it relies on the functions and characteristics of native plant species to reduce the demand for irrigation, fertilizers, and pesticides on the Installation. Control and reduction of invasive plants and noxious weeds will help to restore wildlife habitat and groundcover on the Installation and will limit the spread of these species to areas in the region. Additionally, control of invasive plants and noxious weeds is expected to directly benefit listed species (Table 3 and Table 4).

Additional Sources of Information

- USDA, National Invasive Species Information Center, Georgia State Resources (<https://www.invasivespeciesinfo.gov/us/georgia>)
- Georgia Invasive Species Task Force (<http://www.gainvasives.org>)
- Aquatic Nuisance Species Task Force (<http://www.anstaskforce.gov>)
- Center for Invasive Species and Ecosystem Health (<http://www.bugwood.org>)
- Invasive and Exotic Species of the Thirteen Southern States (<http://www.invasive.org/seweeds.cfm>)
- National Invasive Species Council (<https://www.doi.gov/invasivespecies/>)
- Society for Ecological Restoration (<http://www.ser.org/>)
- University of Georgia, College of Agricultural and Environmental Sciences <https://www.caes.uga.edu/>
- Center for Plant Conservation (<https://saveplants.org/>)
- The Nature Conservancy (TNC), Protecting Native Plants and Animals (<http://www.nature.org/ourinitiatives/habitats/forests/howwework/protecting-native-plants-and-animals-taking-on-the-invaders.xml>)

4.1.3.2 Grounds Maintenance and Landscaping Management

Grounds maintenance and landscaping management includes measures to keep a landscape healthy, clean, safe and attractive. These landscapes typically are located within a relatively urban/developed setting and include gardens, yards, and grounds surrounding buildings and infrastructure. Management and maintenance activities include plantings and harvestings, periodic

weeding and fertilizing, other gardening, lawn care, road, driveway and path maintenance, shrub pruning, topiary, lighting, fencing, addressing runoff drainage, and irrigation, and other jobs for protecting and improving the topsoil, plants, and garden accessories. Maintenance and management may also deal with local animals and means to attract or repel them, as desired or necessary.

Maintained and managed grounds and landscaped areas are found in developed sites throughout MCLB Albany, particularly in the administrative area of the middle third of the Installation and residential areas of the eastern third of the facility (Figure 4 and Figure 7). It is the primary responsibility of the Public Works Officer (PWO) to ensure that the goals and objectives for managing and maintaining these areas are implemented and done so in a cost-effective manner. Typically, duties include soil erosion control, grounds maintenance (i.e., mowing, fertilizing and liming), weed and brush control, and other general landscaping activities. The NRM is responsible for managing lands in unimproved grounds. However, coordination between the PWO and NRM is critical to ensure the goals and objectives of this INRMP are met.

The potential exists for disturbances to wildlife habitat and nonpoint source pollution during grounds maintenance and landscaping. This potential can be reduced by designing grounds maintenance and landscaping management strategies that help to minimize capital costs, maintain an ecological balance within the region, minimize engineering, and enhance the living environment and the aesthetic qualities of the Installation.

Management Strategies

Management strategies related to grounds maintenance and landscaping the Installation include the following:

- 1) Use only approved species in plantings and maintenance activities to minimize potential for establishment by invasive species, promote wildlife habitat, and minimize erosion and runoff.
- 2) Use supplemental plantings of native trees and shrubs in maintained open areas, around buildings, and in recreational areas where consistent with current and planned land uses to help enhance habitat diversity and meet wildlife management objectives.
- 3) Use construction practices that minimize adverse effects on the natural habitat, reduce fertilizers and pesticides, apply IPM techniques, minimize runoff, and use water-efficient practices.
- 4) Ban use of all neonicotinoid pesticides to avoid adverse ecological effects, in particular, to honeybees and birds.
- 5) Create outdoor demonstrations to promote awareness of the benefits of implementing sustainable and environmentally beneficial grounds maintenance and landscaping management.
- 6) Avoid application of fertilizers because increased nutrients may result in colonization by more aggressive, nutrient demanding species. When nutrients are added to the system either by exposing new soil or through fertilization, optimum growing conditions for the specialized target flora are compromised.

- 7) Preserve ground cover and natural drainage, using drainage channels and retention ponds instead of a closed, expensive system.
- 8) Use plant material instead of manmade controls for controlling erosion.
- 9) Use native groundcover and shrubs instead of turf wherever possible to reduce maintenance and irrigation requirements.
- 10) Identify, map, and improve pollinator habitat areas (perennial flower beds, wildflower fields, perennial flowering bushes).

Recently, the Navy and U.S. Marine Corps have recognized the important ecological role played by pollinators and have encouraged installations to foster pollinator habitats. As a group, pollinators are threatened worldwide by habitat loss and fragmentation, pesticides, disease, and parasites (USDA-NRCS n.d.). According to the USDA-NRCS, native pollinators are attracted to diverse, colorful floral sources that provide a succession of flowers; however, bees prefer to visit multiple flowers of the same type on one trip, so it is important to plant in clusters or with individuals of the same species nearby one another. Providing flowers of different shapes will attract pollinators with different body sizes and mouthparts. Use of native plants is preferable since these are usually adapted to Georgia's growing conditions and native pollinators evolved with these plants. Plants will be selected based on their tolerance for the conditions present in a particular location.

In keeping with the management strategies defined above, MCLB Albany has incorporated pollinator protection from pesticides into its 2015 IPM Plan (MCLB 2015b). Furthermore, the NRP has proactively created several pollinator habitats around the base:

- Honeybee apiaries are maintained in two different areas, as described in Section 2.4.1.
- A pollinator garden, full of native flowering forbs, is planted outside of the Nature Center.
- The geothermal site has been planted with native groundcover, with wildflower seeds added.
- Some blocks of formerly mowed grass have been converted to unmowed fields of native grasses and flowers, and additional blocks of unmowed or mowed open green space will be considered for establishing pollinator habitat.

In addition, grounds/landscaping management on the Installation will also include the following new management actions:

- Plan to harvest and plant acorns from the Live Oak at the front of the base.
- Purchase wildflower seed from Roundstone Seed for pollinator management.
- Collect seeds of native forbs in-house; then get the seeds tested and provide a 50 percent return.

Ecosystem Management

Proper grounds maintenance and landscaping through construction and design practices is consistent with an ecosystem approach since it reduces the need for irrigation, pesticides, and

fertilizers, and relies on the functions and characteristics of native plant species. Reducing the demand for irrigation, fertilizers, and pesticides reduces the costs associated with grounds maintenance and reduces pollutant loading into runoff and surrounding surface waters and aquatic communities.

Additional Sources of Information

- Society for Ecological Restoration (<http://www.ser.org/>)
- University of Georgia, College of Agricultural and Environmental Sciences (<https://www.caes.uga.edu/>)
- Lady Bird Johnson Wildflower Center (<http://www.wildflower.org/organizations/search.php?state=GA>)
- Xerces fact sheets on habitat development for pollinators <http://www.xerces.org/fact-sheets/>

4.1.4 Agricultural Outlease Management

Agricultural outlease areas are those areas on which an agricultural lease with an outside entity may exist for production of hay, row crops, orchards, groves, or livestock grazing. There is often also the potential to use these areas as additional hunting areas, as long as hunting activities do not interfere with agricultural practices that occur. Agricultural outlease areas have the potential to provide food for many types of wildlife, although, these species can sometimes become problematic. In addition, outleases can generate revenue to fund INRMP projects and support the agricultural heritage of the region.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Agricultural Outlease Management

- Federal Water Pollution Control Act, as amended by the CWA of 1977, 33 U.S.C. 1251, describes guidelines for the control of NPS pollution.
- FIFRA, 7 U.S.C. 136, governs the use and application of pesticides in natural resources management plans.
- Armed Forces, Leases; non-excess property of military departments and Defense Agencies, 10 U.S.C. 2667, provides general requirements for leasing certain lands that will promote national defense or be in the public interest.
- EO 12088 (13 October 1978), *Federal Compliance with Pollution Control Standards*, as amended, ensures that all necessary actions are taken to prevent, control, and abate environmental pollution with respect to federal facilities and activities under control of the Agency.
- DODINST 4715.03, *Natural Resources Conservation Program*, requires that all installations assess lands for agricultural outlease suitability; and that all agricultural outleases support the military mission and place ecological sustainability objectives above revenue optimization goals. Each agricultural outlease requires adherence to a conservation plan and the Installation's IPM plan.

MCLB Albany’s agricultural outlease program formerly consisted of a small plot of mature pecan trees consolidated in one area within the western third of the facility. The outlease contained provisions for soil and vegetative management for erosion control, planting of new trees, removal of crowded or dead trees, grounds maintenance for aesthetics, control of weeds and noxious plants, insect and disease control and habitat improvements for wildlife. As detailed in Section 2.3.8.2.5, the agricultural outlease expired in 2014 and was not renewed; any possibility of outleasing the pecan orchard again was eliminated when a tornado destroyed most of it in 2017 (Robbins 2019).

Management Strategies

Management strategies are primarily the responsibility of the Lessee. However, if MCLB Albany should outlease any property for agricultural use again in the future, the NRM should ensure that the following strategies and measures are implemented and adhered to:

- 1) Maintain ground cover and mow three times annually (i.e., May, July, and October). Do not disk or harrow deeper than three (3) inches.
- 2) Conduct annual soil and leaf analysis tests.
- 3) Fertilize appropriately between 1 January and 1 March. The County Extension Agent may assist with the analysis.
- 4) Maintain pH between 5.6 and 6.5. Based on need indicated by soil tests domomitic limestone shall be applied during the period of October through December, when pH drops below 5.6.
- 5) Apply zinc to trees to control Rosette (zinc deficiency). Frequency, amount, and method (on soil and/or leaves) will be based on soil and leaf analysis and recommendations of the County Extension Service.
- 6) Annually during November through February, dead, broken, or diseased limbs shall be pruned back flush with the next main branch or trunk. Prune all tree limbs off within 5 feet of the ground. Sucker control is required as needed at base of living trees.
- 7) Follow prescribed insect and disease control and prevention measures. All trees will be sprayed for insects and disease in a preventive and timely manner in accordance with the specific tree variety present. Air blast or air delivery sprayers are required to assure complete tree coverage of pesticides. Spraying will be practiced in late afternoon to protect honeybees.
- 8) Control trees, brush, weeds, and other unwanted vegetation in tree “voids” as well as perimeter boundaries.
- 9) Prompt and proper cleanup of areas used by lessee, employees of the lessee, and agents will be required. All refuse and debris generated at work site will be disposed of in a manner satisfactory to the government within 48 hours.
- 10) Modify agricultural outleases to include conservation protection standards, pesticide/herbicide use restrictions and requirements.
- 11) Refurbish irrigation system at orchard (Lessee is responsible for this, but MCLB may be able to assist).

In managing future agricultural outleasings, MCLB Albany will continue to prioritize ecological sustainability objectives above revenue optimization goals as directed by DODINST 4715.03.

Ecosystem Management

Managing agricultural outleasings to limit the use of pesticides/herbicides and include conservation protection standards is consistent with an ecosystem approach since it promotes long-term ecological sustainability above revenue optimization.

Additional Sources of Information

- USDA, National Conservation Practice Standards (<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/cp/ncps/>)
- Conserving Biodiversity on Military Lands (http://www.dodbiodiversity.org/ch5/index_6.html)
- Sustainable Agriculture Network (<http://www.sare.org/>)
- University of Georgia, College of Agricultural & Environmental Sciences, Dougherty County Cooperative Extension (<http://www.caes.uga.edu/extension/dougherty/>)
- USDA, Animal and Plant Health Inspection Service (APHIS) Wildlife Services (<http://www.aphis.usda.gov/>)

4.1.5 Rare, Threatened, and Endangered Plant Species and Natural Communities Management

The ESA was enacted to conserve endangered and threatened species and the ecosystems on which these species depend. The ESA provides conservation programs for endangered and threatened species and the habitats these species are dependent on and defines the appropriate steps to be taken to conserve species protected by international treaty. Federal agencies are required to ensure that no actions undertaken by the agency will likely jeopardize the continued existence of any endangered or threatened species, except as provided within the ESA. Whenever there is a possibility that an endangered species may be present in an area affected by an action of a federal agency, that agency is required to conduct a biological assessment within the affected area to document the presence or absence of endangered or threatened species. If such species are found, the federal agency must make reasonable efforts to avoid actions that would have a detrimental impact on the endangered or threatened species. This section describes the management recommendations and benefits of this INRMP for rare, threatened, and endangered plant species and rare natural communities that are known to occur at MCLB Albany. The management of rare, threatened, and endangered wildlife species can be found in Section 4.2.7 of this INRMP.

The SAIA directs military installations to provide for sustainable use of natural resources, consistent with the military mission of the Installation. The SAIA also requires that, to the extent appropriate and applicable, military installations must provide for wetland protection, enhancement, and restoration where necessary for support of wildlife or plants.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Wildlife Management and Habitat Enhancement

- Fish and Wildlife Coordination Act, 16 U.S.C. 661-666c, authorizes the Secretaries of Agriculture and Commerce to provide assistance to and cooperate with federal and state agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife.
- National Defense Authorization Act (NDAA), Public Law 107-314, 2003, exempts the Armed Forces from the incidental taking of migratory birds during military readiness activities.
- Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703, protects migratory birds against “takings” for normal and routine operations such as Installation support functions. EO 13186 (10 January 2001), *Responsibilities of Federal Agencies to Protect Migratory Birds*, imposes substantive obligations on the U.S. for the conservation of migratory birds and their habitats.
- SAIA, 16 U.S.C. 670a–o, requires that, to the extent appropriate and applicable, military installations must provide for fish and wildlife management, fish and wildlife habitat enhancements and modifications, and wetland protection, enhancement, and restoration where necessary to support fish, wildlife, and plants.
- DODINST 4715.03, Natural Resources Conservation Program, implements policy, assigns responsibilities, and prescribes procedures for the integrated management of natural and cultural resources on property under DOD control.
- MCO 5090.2 discusses laws that govern natural resources management relating to the protection and management of fish and wildlife resources.

Management Strategies

Management strategies related to rare, threatened, and endangered plant species and natural communities at MCLB Albany include the following:

- 1) Plan for additional species-specific inventories for rare plants.
- 2) In support of the SWAP, ensure MCLB Albany natural resource data is provided to GDNR and other partner agencies as appropriate.
- 3) Provide habitat enhancement for wildlife, including habitat that supports rare, threatened, and endangered plant species.
- 4) Ensure locations of rare plants and natural communities are included in the Installation’s GIS database.
- 5) Protect key natural communities and locations of rare plants with protected buffer zones and ensure activities in these zones are restricted.
- 6) Control invasives that threaten rare plants and communities.
- 7) Utilize management tools such as prescribed burns, forestry practices, mowing, limited herbicide use, and plantings to promote rare plants and communities.

- 8) Establish conservation partnerships.
- 9) Provide training and education on the importance of rare plants and natural communities.
- 10) Assess potential vernal pool areas. Determine if any special designation or protection is warranted for those areas.

Currently, there is one State-listed plant species and no federal listed species or federally designated critical habitats known to occur on the Installation (Barbour et al. 2013, MCLB 2007). However, three State-designated high priority rare plants and three natural communities of special concern (Clayhill Longleaf Woodland, Limesink Pond/Pond Cypress Pond, South Atlantic Willow Oak Flatwoods Forest), have been confirmed on MCLB Albany (Barbour et al. 2013, GDNR 1995, MCLB 2007). Updates to the federal ESA listings, such as the listing or removal of a species or critical habitat under the ESA or a change in species or critical habitat presence at MCLB Albany, may require changes in management practices to address these changes.

Some plant surveys have been performed within the Installation. However, given the size of the facility and diversity of habitats, it is likely that additional species-focused surveys across a diversity of seasons would identify dozens of additional plant species on the Installation, some of which may be protected species. Surveys should be conducted to update MCLB Albany species inventory as necessary, and to minimize, mitigate, and monitor potential impacts. Data should be provided to appropriate partnering agencies in support of the SWAP. Where possible, military readiness and high-impact recreational activities should be located to avoid and minimize impacts on rare plants and rare natural communities.

The following species sub-sections describe more specific management recommendations and benefits of this INRMP for special concern plant species and rare natural communities known to occur at the MCLB Albany.

Crestless Plume Orchid (*Pteroglossaspis ecristata*)

Recognized as one of the rarest orchids in the Southeast and is state-listed as threatened, the crestless plume orchid is a fire-maintained species preferring the rare longleaf pine woodland community and prairies (Barbour et al. 2013). Its distribution in Georgia is widely scattered, primarily confined to the southernmost counties of the state. On MCLB Albany, 33 stems were observed under an open canopy of mature longleaf pine, in association with a mosaic of shrub thickets and herbaceous openings containing water oak, poison oak, slender bluestem, beakrush (*Rhynchospora tomentosa*), sidebeak pencilflower (*Stylosanthes biflora*), goat's-rue, and sweet goldenrod (Figure 8).

The crestless plume orchid is an erect perennial herb that grows to 170 centimeters (cm) in height arising from a thickened corm. The stem is largely leafless with two to four basally-oriented, linear-lanceolate plicate leaves (resembling saw palmetto), and up to 70 cm long. Flowers are arranged in a narrow spike on the uppermost 10–15 cm of the stem. Individual flowers grow to 10 mm long and are generally bicolored with the lower petal (lip) assuming a light to deep purplish-brown, whereas the remaining petals and sepals appearing lemon-yellow to yellow-green. The flowering season for the plume orchid in Georgia is late July through early September.

Maintaining the viability of the plume orchid will require preserving the integrity of the longleaf system in which it inhabits, through periodic burning to prevent the encroachment of woody vegetation. The crestless plume orchid is a fire-maintained species preferring open longleaf pine woodlands and prairies. Table 6 provides an overview of how several common forestry practices used on MCLB Albany may affect this species (Barbour et al. 2013). Projects described in this INRMP that benefit this species are discussed in Appendix F and include Projects 1, 2, 3, 5, 7, and 9.

Table 5. Potential Effects from Forest Management Practices on Rare Plant Species Found on MCLB Albany.

Plant Species	Fire Frequency	Season of Burn	Encroaching Hardwoods	Mechanical Treatment	Hardwood-Specific Chemical Treatment
Crestless plume orchid	Overall positive but short-term unknown	Unknown	Likely decreases growth, survivorship and/or establishment	Chopping or mulching likely harmful; brown tree cutter may be ok if used carefully	Likely ok if used carefully
Woodland poppy-mallow	Overall positive but short-term unknown	Unknown	Likely decreases growth, survivorship and/or establishment	Chopping or mulching likely harmful; brown tree cutter may be ok if used carefully	Likely ok if used carefully

Woodland Poppy-Mallow (*Callirhoe papaver*)

The woodland poppy-mallow is confined to the southwestern portion of the state where it inhabits the rare upland longleaf pine woodland natural community. Considered rare in Georgia, the plant is known only from six sites in six counties (Barbour et al. 2013). The poppy is a branched, sprawling perennial herb that grows up to 6 decimeters long, arising from a thick rootstock. Leaves are alternate, with 3-to-5 deep lobes, or occasionally un-lobed. Flowers are showy, wine-purple, cup-shaped with five sepals and five petals; approximately 4.0 cm long. The flowering season for this species in Georgia is late May through July.

On MCLB Albany the taxon is represented by two small populations on the far eastern end of the property (Figure 8). Apart from Alachua County, Florida, the occurrences of woodland poppy-mallow on the Base and southwest Georgia serve as the easternmost limits of the species, assuming a greater abundance in the Midwest.

The primary management concerns identified for the poppy-mallow on MCLB Albany are the lack of effective fire and the low frequency of fire (Barbour et al. 2013). The long-term preservation of the woodland poppy-mallow is best accomplished through maintenance of the upland longleaf

pine woodlands which it inhabits. The periodic employment of prescribed burning during the growing season is recommended to inhibit the growth of woody vegetation, and to release nutrients back in the soil essential for growth and reproduction. Table 6 provides an overview of how several common forestry practices used on MCLB Albany may affect this species (Barbour et al. 2013). Projects described in this INRMP that benefit and conserve woodland poppy-mallow habitat are discussed in Appendix F and include Projects 1, 2, 3, 5, 7, and 9.

Although a full-scale detailed investigation of the natural communities of the Installation has not been conducted, suitable examples of three rare or otherwise globally imperiled plant assemblages have been documented (Barbour et al. 2013) on MCLB Albany. Opportunities to apply practices that would help to promote or restore these communities are below.

Clayhill Longleaf Woodland

On MCLB Albany this association is distinguished from other upland pine communities found on the MCLB Albany in that it is comprised of both longleaf pine and wiregrass; key indicators of fire-maintained habitats. Historically, these communities were subject to relatively frequent and high intensity fire which resulted in an open canopy, widely spaced trees with a diverse understory of low growing shrubs, forbs, and grasses. This community is represented on MCLB Albany, by only a few scattered remnants of the former community (Figure 7 and Figure 8), which originally covered much of the sandy soil types throughout the southeastern United States. And, as a result of insufficient fire, the communities found on the Installation generally have closed canopies and an understory with dense growth of woody vegetation and lack of a substantial herbaceous layer.

As detailed in the Longleaf Pine Restoration Plan, there is significant potential to improve this community type on MCLB Albany (Barbour et al. 2013). Table 7 provides a condensed summary of how the various practices discussed in the plan are expected to affect structural components of the longleaf pine community (Barbour et al. 2013). Prior to implementing management activities, the NRM should carefully assess the condition and needs of each community to plan the specific activities needed to facilitate the desired result. NRM should ensure all activities are conducted in a manner that does not significantly negatively affect other species that are dependent on these communities.

Table 6. Potential Effects from Forest Management Practices on Longleaf Pine Communities.

Longleaf Pine Community	Fire Frequency	Season of Burn	Encroaching Hardwoods	Mechanical Treatment	Hardwood-Specific Chemical Treatment
Longleaf Regeneration	No fire year 1, sometimes year 2, depending on growth & then regular fire regime; too little fire results in litter accumulation and brown spot fungus	Growing season burn prior to seedfall good; previous dormant season ok	Likely decreases growth and survivorship; increases probability of brown spot	Chopping or mulching harmful; brown tree cutter ok if used carefully	OK if used carefully
Longleaf Adults	Little influence if no duff present	Avoid burning in fall	Little/no effect	OK if kept away from root zone	OK if used carefully
Wiregrass	Frequent fire; too little fire results in litter accumulation and might lower establishment	Growing season burns necessary for flowering	Likely decreases growth, survivorship and/or establishment	Chopping or mulching harmful; brown tree cutter ok if used carefully and fuel load created not too extreme	OK if used carefully
Other Bunch Grasses	Frequent fire; too little fire results in litter accumulation and might lower establishment	Growing season burns may increase flowering	Likely decreases growth, survivorship and/or establishment	Chopping or mulching harmful; brown tree cutter ok if used carefully & fuel load created not too extreme	OK if used carefully

Limesink Pond/Pond Cypress Pond

Limesink ponds provides important habitat for many of the rare, threatened and endangered species found on the MCLB Albany. In addition, preserving this natural community is vital to the continued protection of water quality and the hydrologic integrity of the MCLB’s associated watersheds. Activities with the potential to disrupt the ecological function of this area or critical habitats would be avoided. In some stands, management activities may be implemented to improve stand quality. Timber stand improvements may include selective thinning and/or removal of undesirable trees, application of herbicide, and other timber stand improvement practices.

In general, Limesink Pond/Pond Cypress Pond habitat will be managed through a combination of any of the following activities:

- 1) Timber Harvest (generally thinning for timber stand improvement purposes only)
- 2) Regeneration by planting seedlings and/or natural regeneration
- 3) Chemical application (herbicides and pesticides, in the case of insect attack).
- 4) Interplanting of desirable plant species.

South Atlantic Willow Oak Flatwoods Forest

This community type typically occurs as shallow depressions scattered throughout MCLB Albany. These shallow depressions form seasonal forested wetlands. The best example of this community type at MCLB Albany occurs along either side of East Shaw Road in the eastern portion of the Base (Figure 7 and Figure 8). It is important to conserve and promote the willow oak flatwoods forest because of the vital habitat it provides for seasonal wetlands species such as the Eastern tiger salamander (see Section 4.2.2.7.2).

To enhance and maintain this rare natural community type, a forest core or buffer surrounding the willow oak flatwoods forest should be maintained to help protect the hydrology of the seasonal wetlands. Prescribed fire should be allowed to burn into the wetlands when water levels are naturally low. For more detail on the management strategies for Forested Wetlands, refer to Section 4.2.3.4.

Ecosystem Management

Baseline biological data and the periodic assessment of the data will help develop efficient management and research programs for wildlife resources and to ensure those in place are effective and meeting Installation goals and objectives. Such programs should include information about development and improvement of habitat for optimum conditions, need, and means to restore desired species abundances, wildlife control as necessary, and protection of wildlife resources. Improvements to wildlife habitat must be conducted in consideration of military readiness needs and requirements. General wildlife management projects and practices would benefit many of the rare species likely to utilize the Installation including many USFWS BCC species and those protected under the MBTA.

In addition, when conducted with specific species habitat requirements and communities in mind, management activities can benefit populations of species of special concern including three rare plants (woodland poppy-mallow, beakrush, crestless plume orchid), wildlife species of special conservation concern (eastern tiger salamander, yellow-crowned night heron, northern bobwhite, loggerhead shrike), the state-listed Bachman's sparrow, and the three significant natural communities found on the Installation (Barbour et al. 2013).

Additional Sources of Information

- USFWS, Georgia Field Offices (<http://www.fws.gov/georgia/>)
- GDNR, Wildlife Division (<http://www.georgiawildlife.org/>)
- University of Georgia, Museum of Natural History (<https://naturalhistory.uga.edu/>)
- Georgia Chapter of The Wildlife Society (<http://wildlife.org/georgia/>)

- Georgia Soils and Water Commission, Partners in Fish and Wildlife (<http://gaswcc.georgia.gov/partners-fish-and-wildlife>)
- Georgia Cooperative Fish and Wildlife Research Unit (<http://www.coopunits.org/Georgia/>)
- TNC, Georgia (<https://www.nature.org/en-us/about-us/where-we-work/united-states/georgia/>)
- University of Georgia, Warnell School of Forestry and Natural Resources (<http://www.warnell.uga.edu/>)
- The Association of Fish and Wildlife Agencies (<http://www.fishwildlife.org/>)
- NatureServe (<http://www.natureserve.org/>)
- Georgia Wildlife Federation (<http://www.gwf.org/>)

4.2 FISH AND WILDLIFE MANAGEMENT

MCO 5090.2 defines fish and wildlife management as those actions designed to preserve, enhance, and regulate indigenous wildlife and its habitats, including conservation of protected species and non-game species, management and harvest of game species, and animal damage control. This section addresses the development and implementation of techniques and programs for managing fish and wildlife. The fish and wildlife management activities of this INRMP are addressed by the following, and are detailed below:

- 1) Section 4.2.1 – Wildlife Management and Habitat Enhancement
- 2) Section 4.2.2 – Migratory Bird Management
- 3) Section 4.2.3 – Fisheries and Aquatic Species Management
- 4) Section 4.2.4 – BASH Reduction
- 5) Section 4.2.5 – Invasive and Nuisance Wildlife Management
- 6) Section 4.2.6 – Zoonosis Prevention
- 7) Section 4.2.7 – Rare, Threatened, and Endangered Wildlife Species Management
- 8) Section 4.2.7.1 – Federally Listed and Candidate Species
- 9) Section 4.2.7.2 – State Listed Species
- 10) Section 4.2.7.3 – Other Species of Special Concern

4.2.1 Wildlife Management and Habitat Enhancement

In 2001 and 2002, Congress established the Wildlife Conservation and Restoration Program and State Wildlife Grant Program. These programs were developed to provide financial assistance to state and tribal fish and wildlife entities for the conservation of a multitude of wildlife species, including threatened and endangered species. Prior to these programs, there was little financial assistance available to states for conservation efforts targeting non-game wildlife species. In order

to be eligible for federal grants and to adhere to the requirements for participating in the State Wildlife Grant program, each state was required to develop and submit for approval a statewide wildlife action plan or similar plan by October of 2005. The purpose of these plans was to summarize the abundance and distribution of each state's wildlife resources, identify Species of Greatest Conservation Need (SGCN), threats to SGCN, and key habitats. In addition, the plans were to include conservation actions designed to address the threats to SGCN.

Georgia's Comprehensive Wildlife Conservation Strategy report (later termed, *State Wildlife Action Plan*, or SWAP) was approved by USFWS in October 2005 (GDNR 2005). The SWAP was revised in 2015, and the 2015 SWAP was approved in September 2016 (GDNR 2015). The intent of the SWAP is to assist GDNR and its conservation partners with the development of nongame initiatives and goals that will address the needs of animal species and habitats.

The SAIA directs military installations to provide for sustainable use of natural resources, including wildlife. These uses can be consumptive (hunting, fishing) or non-consumptive (wildlife viewing, nature education), as long as such uses do not cause conflict with the military readiness of the installation or adversely affect the natural resources under the stewardship of the DOD. The SAIA also requires that, to the extent appropriate and applicable, military installations must provide for wildlife management; wildlife habitat enhancements or modifications; and wetland protection, enhancement, and restoration where necessary for support of wildlife or plants.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Wildlife Management and Habitat Enhancement

- Fish and Wildlife Coordination Act, 16 U.S.C. 661-666c, authorizes the Secretaries of Agriculture and Commerce to provide assistance to and cooperate with federal and state agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife.
- National Defense Authorization Act (NDAA), Public Law 107-314, 2003, exempts the Armed Forces from the incidental taking of migratory birds during military readiness activities.
- Migratory Bird Treaty Act (MBTA), 16 U.S.C. 703, protects migratory birds against "takings" for normal and routine operations such as installation support functions. EO 13186 (10 January 2001), *Responsibilities of Federal Agencies to Protect Migratory Birds*, imposes substantive obligations on the U.S. for the conservation of migratory birds and their habitats.
- SAIA, 16 U.S.C. 670a-o, requires that, to the extent appropriate and applicable, military installations must provide for fish and wildlife management, fish and wildlife habitat enhancements and modifications, and wetland protection, enhancement, and restoration where necessary to support fish, wildlife, and plants.
- DODINST 4715.03, Natural Resources Conservation Program, implements policy, assigns responsibilities, and prescribes procedures for the integrated management of natural and cultural resources on property under DOD control.

- MCO 5090.2 discusses laws that govern natural resources management relating to the protection and management of fish and wildlife resources.

Management Strategies

Management strategies related to wildlife management and habitat enhancement at MCLB Albany include the following:

- 1) Conduct censuses of wildlife populations as necessary to monitor the effectiveness of management activities in reaching management goals. These surveys should document the relative abundance of selected species that are indicators of healthy, self-sustaining ecosystems.
- 2) In support of SWAP, ensure MCLB Albany natural resource data is provided to GDNR and other partner agencies as appropriate.
- 3) Provide habitat enhancement for wildlife, including habitat that supports rare, threatened, and endangered species as well as migratory birds, while ensuring military training needs are met.
- 4) Manage and protect key habitats such as wetlands with protected buffer zones.
- 5) Control invasive species that threaten key wildlife habitats.
- 6) Promote growth and retention of individual trees of high wildlife value (e.g., snags, trees with a high mast production), as well as trees in important wildlife habitats, such as riparian areas and wintering sites will be maintained.
- 7) Utilize management tools such as prescribed burns, forestry practices, mowing, limited herbicide use, and plantings to promote habitat abundance and diversity.
- 8) Minimize potentially intrusive recreational activities within key habitats and sensitive resource areas such as wetlands and water bodies.
- 9) Establish conservation partnerships.
- 10) Provide training and education on the importance of key habitat areas.
- 11) Establish pollinator habitat areas.
- 12) Update fish and wildlife species list through focused surveys and inventories
- 13) Conduct annual or biannual surveys for target species of special interest or management concern.

Wildlife has been surveyed on MCLB Albany between 1990-1992, 1995, and 2013 (GDNR 1993, MCLB 2007, Barbour et al. 2013). Additionally, many species have been incidentally documented on the facility by trained professionals (Barbour et al. 2013, MCLB 2012a, 2013e). Formal and comprehensive wildlife surveys should be conducted to update MCLB Albany's species inventory as necessary, and to minimize, mitigate, and monitor the takes of wildlife species, especially migratory birds, at the facility. Data should be provided to appropriate partnering agencies in support of the SWAP. Natural resources management should look into opportunities to enter into additional conservation partnerships with federal, state, and local agencies, and NGOs to improve the diversity and health of wildlife habitat at the Installation. Where possible, military readiness

and high-impact recreational activities should be located to avoid and minimize impacts on wildlife species and habitat.

Many of the mammals, birds, and reptiles found on or near MCLB Albany benefit from the diversity of woodland, field, wetland and edge habitats found across the Installation and the surrounding area. Proper stewardship requires that this diversity be maintained consistent with SAIA and the military mission. Natural resource management actions occurring on MCLB Albany should take into consideration the initiatives and goals set forth in the SWAP to adequately address nongame species and habitats. The INRMP management measures identified in this document will provide both direct and indirect benefits to state listed wildlife species. Further, the SAIA, as amended, requires that, to the extent appropriate and applicable, military installations must provide for wildlife management; wildlife habitat enhancements and modifications; and wetland protection, enhancement, and restoration where necessary to support wildlife, and plants. These actions are to be planned and conducted in cooperation with federal and state wildlife agencies.

Opportunities exist for sustainable uses and stewardship of both game and non-game wildlife populations at MCLB Albany, as provided in the SAIA. Stewardship of wildlife resources has high public relations value, and provides educational and partnership opportunities to local civic, conservation and youth groups. Consistent with SWAP goals and objectives, MCLB Albany intends to manage wildlife habitat to restore and maintain indigenous wildlife species through the use of integrated ecosystem management principles, while accommodating military training needs. This includes management of species for both non-consumptive (e.g., watchable wildlife, photography) and consumptive uses (e.g., fishing, hunting). Furthermore, the wildlife resources and habitats will be managed in compliance with federal (Sikes Act, ESA, CWA) and state laws, and Marine Corps regulations and guidance. The management of specific habitat types for the benefit of wildlife on the Installation (in accordance with the SWAP) is discussed in Section 4.3.6.

Wildlife management at MCLB is the responsibility of the Conservation Officer/Game Warden. The Conservation Officer also collects and disposes of roadkill. In addition to managing wildlife by improving and restoring native forest habitat at MCLB Albany, the Installation is undertaking the following wildlife management actions:

- Rebuild a new game warden compound.
- Monitor several bat houses that have been installed on-base for species and abundance.

Ecosystem Management

Baseline biological data and the periodic assessment of the data will help develop efficient management and research programs for wildlife resources and to ensure those in place are effective and meeting Installation goals and objectives. Such programs should include information about development and improvement of habitat for optimum conditions, need, and means to restore desired species abundances, wildlife control as necessary, and protection of wildlife resources. Improvements to wildlife habitat must be conducted in consideration of military readiness needs and requirements. General wildlife management projects and practices would benefit many of the species likely to utilize the Installation including many USFWS BCC species and those protected under the MBTA. In addition, when conducted with specific species habitat requirements and communities in mind, management activities can benefit populations of species of special concern

including three rare plants (woodland poppy-mallow, beakrush, crestless plume orchid), wildlife species of special conservation concern (eastern tiger salamander, yellow-crowned night heron, northern bobwhite, loggerhead shrike), the state listed Bachman's sparrow, and the three significant natural communities found on the Installation (Barbour et al. 2013).

Additional Sources of Information

- USFWS, Georgia Field Offices (<http://www.fws.gov/georgia/>)
- GDNR, Wildlife Division (<http://www.georgiawildlife.org/>)
- University of Georgia, Museum of Natural History (<https://naturalhistory.uga.edu/>)
- Georgia Chapter of The Wildlife Society (<http://wildlife.org/georgia/>)
- Georgia Soils and Water Commission (<http://gaswcc.georgia.gov/partners-fish-and-wildlife>)
- Georgia Cooperative Fish and Wildlife Research Unit (<http://www.coopunits.org/Georgia/>)
- The Nature Conservancy (TNC), Georgia (<https://www.nature.org/en-us/about-us/where-we-work/united-states/georgia/>)
- University of Georgia, Warnell School of Forestry and Natural Resources (<http://www.warnell.uga.edu/>)
- The Association of Fish and Wildlife Agencies (<http://www.fishwildlife.org/>)
- NatureServe (<http://www.natureserve.org/>)
- Georgia Wildlife Federation (<http://www.gwf.org/>)

4.2.2 Migratory Bird Management

Migratory birds face serious challenges that have resulted in species declines, including reductions in habitat quality and quantity, direct bird mortality attributable to human activities, invasive species, collisions with artificial structures, and environmental contaminants. Because migratory birds cross the boundaries of nations, watersheds, and ecosystems, protecting them requires a coordinated effort involving multiple jurisdictions and interests.

The 2003 NDAA exempts the Armed Forces 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. The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703–712) 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.

In 2004, Congress mandated the DOD Migratory Bird conservation revision to the MBTA through language in the 2004 NDAA. The Secretary of Interior was charged with developing an incidental take process for migratory birds on DOD lands involving military mission activities (e.g., training, research and development). DOD and the USFWS (on behalf of the Secretary of Interior)

developed cooperative guidance, and the 2006 MOU for Migratory Bird Conservation, before the USFWS completed the Final Rule (2007) for Migratory Bird Conservation on Military Lands (Final Rule). The Final Rule governs the incidental take on military installations in mission areas where training, research and development occur, whereas the MOU governs the cantonment areas and non-mission areas (e.g., family housing, post exchanges, laundry facilities). The Final Rule requires that military installations evaluate any proposed action in the mission areas that may impact any migratory bird population (through NEPA analysis) and consult with the USFWS if the military determines that a potential effect may occur.

Protection of ecologically sensitive areas is provided by SAIA under the provisions of wildlife and fish habitat enhancement in support of managing these populations. Lands under the management of MCLB Albany include a diverse assemblage of plant communities providing excellent habitat for a variety of both migratory and resident birds, mammals, reptiles and insects. The sensitivity of the areas and their importance to avian populations requires the proper management of this complex of communities and is central to the wildlife management program at the Installation. All of these areas are sensitive to human activities and must be carefully managed to prevent degradation or loss of valuable ecosystems.

The MBTA of 1918, as amended and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, protects migratory birds. The MBTA makes it illegal to take any migratory bird, except as allowed by the implementing regulations; takes for normal and routine operations, such as Installation support functions, are prohibited. 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. DOD guidance also requires each military installation with an INRMP to ensure that they incorporate migratory bird conservation into the INRMP and implement such elements as necessary and minimize, mitigate, and monitor the take of migratory birds from military readiness activities at the Installation.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Migratory Bird Management

- ESA, 16 U.S.C. 1531 et seq., as amended, provides for the identification and protection of threatened and endangered species of plants and their critical habitats and requires federal agencies to ensure that no agency action is likely to jeopardize the continued existence of a threatened or endangered species.
- MBTA, 16 U.S.C. 703-712, protects migratory birds against “takings” for normal and routine operations such as installation support functions.
- NDAA, Public Law 107-314, 2003, exempts the Armed Forces from the incidental taking of migratory birds during military readiness activities.
- 50 CFR Part 22, Bald and Golden Eagle Protection Act, protects eagles from commercial exploitation and safeguards their survival in the U.S.
- EO 13186 (10 January 2001), *Responsibilities of Federal Agencies to Protect Migratory Birds*, imposes substantive obligations on the U.S. for the conservation of migratory birds and their habitats.

- MCO 5090.2 discusses laws that govern natural resources management relating to the protection and management of fish and wildlife resources.

Management Strategies

Management strategies related to protection of migratory bird species at MCLB Albany include the following:

- 1) Reduce pesticide use on the Installation.
- 2) Implement habitat enhancement and maintain habitat diversity for migratory bird species, consistent with military readiness requirements. Recommendations for habitat enhancement should be made to attract birds and other wildlife away from operations areas. Additionally, modification to habitat should also take into consideration bird nesting and breeding seasons so as not to conflict with the MBTA.
- 3) Conduct focused avian surveys as needed to develop and confirm the facility avian species list. This may include more intensive surveys, surveys to document use outside of seasons already surveyed, and surveys to target specific guilds or secretive, nocturnal or crepuscular species that may not have been addressed in prior survey efforts.
- 4) Control invasive bird species that compete with native migratory bird species and their habitats.
- 5) Locate military readiness activities to avoid or minimize impacts on migratory birds, where possible. If evidence is found of a take as a result of military readiness activities, the NRM will document the take, evaluate these activities, and where practicable, reduce or eliminate the take of migratory birds.
- 6) Maintain compliance with the MBTA for all non-military readiness activities.
- 7) Request assistance from the DOD PIF Work Group, as needed, to assist and support military installations in migratory bird conservation while protecting the military mission.
- 8) Develop partnerships with federal, state, and local agencies, universities, and NGOs such as the National Audubon Society to enter into conservation partnerships, allow for bird research on the Installation, conduct monitoring surveys, and participate in International Migratory Bird Day.
- 9) Enter avian data into DOD's Coordinated Bird Monitoring Plan (CBMP) Avian Knowledge Network (AKN) database.

To ensure compliance with the MBTA, before routine Installation support actions and management actions presented in this INRMP are implemented, the NRM should be informed and potential impacts to migratory birds should be assessed to determine if any adjustments need to be made. Illegal takes under the MBTA could include mortality, pesticide application, nest and egg removal, and in some cases tree removal. However, habitat removal as a result of timber sales, or nest removal outside of nesting season, would not constitute a take.

MCLB Albany will give consideration to the potential impacts to migratory birds from Installation operations, as well as the natural resource management and maintenance activities. Management practices will protect, conserve, and promote habitat for migratory species where possible, which

in turn will benefit MCLB Albany ecosystems and may provide recreational opportunities (e.g., bird watching, photography).

Migratory bird management on the Installation includes the following management actions:

- Construct an observation blind at Indian Lake for wildlife viewing.
- Update wood duck boxes at Indian Lake.
- Within duck habitat, control buttonbush by 90 percent.
- Replace purple martin houses.
- Install and maintain “bluebird boxes” (approximately 174).

Ecosystem Management

Bird surveys should be conducted to monitor the bird populations and to minimize, mitigate, and monitor the take of migratory birds at MCLB Albany, and to collect data on sensitive species. Where possible, military readiness activities will be located to avoid and minimize impacts on migratory birds. If clear evidence of bird take is noted, such as the sight of numerous dead or injured birds, MCLB Albany would consider modifying its activities, as practicable, to reduce take of migratory birds.

The Installation will also seek out opportunities to enter into conservation partnerships with federal, state, and local agencies and NGOs to improve habitat and allow for bird research at MCLB Albany. Baseline biological data and the periodic assessment of the data will help develop efficient management and research programs for wildlife resources and to ensure those in place are effective and meeting Installation goals and objectives. The general management projects and practices implemented for migratory bird species would also benefit USFWS BCC species and bird species of special conservation concern, including northern bobwhite, loggerhead shrike, yellow-crowned night heron, and the state-listed Bachman’s sparrow (Barbour et al. 2013).

Additional Sources of Information

- USDA NRCS Migratory Bird Habitat Initiative (<https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/initiatives/?cid=steldevb1027669>)
- USFWS, Southeast Region Migratory Bird Program (<https://www.fws.gov/southeast/birds/migratory-birds/>)
- USFWS Birds of Conservation Concern (<https://digitalmedia.fws.gov/digital/collection/document/id/1249/rec/1>)
- DOD PIF (<http://www.dodpif.org/>)
- eBird (<https://ebird.org/home>)
- NatureServe (<http://www.natureserve.org/>)
- Georgia Ornithological Society (<http://www.gos.org/>)
- Audubon, Georgia (http://www.n-georgia.com/audubon_society.htm)

- TNC Migratory Bird Program (<http://my.nature.org/birds/>)

4.2.3 Fisheries and Aquatic Species Management

The Sikes Act provides for cooperation by the DOD with the USFWS and state wildlife agencies in planning, development, and maintenance of fish resources on military installations and requires the cooperative development and implementation of an INRMP on installations with sufficient resources. In addition, EO 12962, *Recreational Fisheries*, encourages the development and enhancement of recreational fisheries by federal agencies.

Essential Fish Habitat (EFH) is defined in the Magnuson-Stevens Fisheries Conservation and Management Act as those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity. Waters are defined as the aquatic area with all associated physical, chemical and biological properties. Substrate is defined as sediment, hard bottom, structures underlying the waters and associated biological communities. The National Marine Fisheries Service (NMFS) is responsible for identifying EFH and assisting federal agencies needing to conduct activities in EFH to minimize impacts to the EFH. No EFH or Coral Reef Protection properties exist on MCLB Albany.

The SAIA directs military installations to provide for sustainable use of natural resources, including fisheries and aquatic species, consistent with the military mission of the Installation. These uses can be consumptive (hunting, fishing) or non-consumptive (wildlife viewing, nature education), as long as such uses do not cause conflict with the military readiness of the Installation or adversely affect the natural resources under the stewardship of the DOD. The SAIA also requires that, to the extent appropriate and applicable, military installations must provide for fish and aquatic species management; fish and aquatic habitat enhancements or modifications; and wetland protection, enhancement, and restoration where necessary for support of fish or aquatic species.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Fisheries and Aquatic Species Management

- Fish and Wildlife Coordination Act, 16 U.S.C. 661–666c, authorizes the Secretaries of Agriculture and Commerce to provide assistance to and cooperate with federal and state agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife.
- CWA Section 303, Water Impairment Identification, requires States to identify waters that do not or are not expected to meet applicable water quality standards with technology-based controls alone and to develop programs to achieve the State standards.
- Federal Water Pollution Control Act, as amended by the CWA of 1977, 33 U.S.C. 1251, describes guidelines for the control of NPS pollution.
- National Invasive Species Act, 16 U.S.C. 4701, prescribes policies to prevent the introduction and spread of non-indigenous species into U.S. waters.

- EO 12962 (9 June 1995), *Recreational Fisheries*, requires Federal agencies to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities.
- SAIA, 16 U.S.C. 670a–o, requires that, to the extent appropriate and applicable, military installations must provide for fish and wildlife management, fish and wildlife habitat enhancements and modifications, and wetland protection, enhancement, and restoration where necessary to support fish, wildlife, and plants.
- MCO 5090.2, and the U.S. Marine Corps *Handbook for Preparing, Revising, and Implementing Integrated Natural Resources Management Plans on Marine Corps Installations* (2007) discusses laws that govern natural resources management relating to the protection and management of fish and wildlife resources, and discusses natural resources management relating to NPS pollution and establishes requirements, guidelines, and standards for the assessment of damages arising from the release of oil or hazardous substances.

Management Strategies

Management strategies related to protection of fish and other aquatic species at MCLB Albany include the following:

- 1) Monitor water bodies to determine if supplemental water should be used to maintain water levels to support fisheries.
- 2) Ensure a minimum 100-foot vegetative buffer is maintained around water bodies to protect water quality. Ground disturbance should be minimized allowed within these buffer areas.
- 3) Identify and locate jurisdictional waters of the U.S., including wetlands, that have the potential to be impacted by activities associated with the military mission, as directed by the CWA.
- 4) Minimize impacts of construction activities. All ground-disturbing activities will incorporate appropriate stormwater and erosion and sediment controls and will coordinate the timing of land-disturbing activities and implementation of erosion and sedimentation control measures to reduce nonpoint source pollution that could result from those activities. To ensure that such controls are applied consistently, an ESCP will be developed for all land-disturbing activities, as needed in accordance with state regulations.
- 5) Maintain routine monitoring in accordance with specifications outlined in the existing NPDES Stormwater Permit.
- 6) Minimize the impacts of fertilizers and pesticides on water quality using management practices that balance the desire to have aesthetically pleasing grounds while protecting water quality.
- 7) Maintain proper function of stormwater control and conveyance structures by frequently removing debris. Litter and yard wastes can clog inlets, catch basins and outlets, lead to overflows, erosion, and unintended flooding, and make these devices ineffective for stormwater pollutant removal.

- 8) Conduct annual erosion surveys to identify soil erosion problem areas. Surveys should be focused in areas prone to erosion, such as areas along roadways, areas of recent ground disturbance, areas containing moderate to steep slopes, and areas adjacent to surface waters and wetlands.
- 9) Identify any additional non-native/introduced species and encourage native species via management, especially when stocking ponds.
- 10) Conduct amphibian survey in aquatic areas.
- 11) Conduct darter survey at ponds.

Opportunities exist for sustainable uses and stewardship of fishery and aquatic resources at MCLB Albany, as provided in the SAIA. Stewardship of fish and aquatic resources has high public relations value, and provides educational and partnership opportunities to local civic, conservation and youth groups. Fishing and aquatic species management at MCLB Albany includes actions that provide general benefit to aquatic habitats and the species that utilize them, but also includes the management of those resources to provide recreational opportunities. Recreational (i.e., fishing) opportunities are discussed in Section 4.4.

As detailed in Section 2.3.7.4, three human-made ponds (Robinson Pond [0.6 acres], Covella Pond [5.2 acres], Horseshoe Pond [2.1 acres]), and one naturally occurring cypress pond (Indian Lake [66.0 acres]) provide habitat for fish and other aquatic species and recreational opportunities at MCLB (MCLB 2013d). The portion of Piney Woods Creek on the Installation is dry most of the year and does not provide substantial habitat for fish or other aquatic species (Barbour et al. 2013).

Ecosystem Management

Baseline biological data will help develop efficient management and research programs for fish and aquatic resources at MCLB Albany. Such programs should include information about development and improvement of habitat for optimum conditions, need, and means to restore desired species abundances, fish control as necessary, and protection of fish and aquatic resources.

Additional Sources of Information

- GDNR, Fishing (<http://www.georgiawildlife.com/fishing/>)
- Georgia Chapter of the American Fisheries Society (<http://gaafs.org/>)
- University of Georgia, College of Agriculture and Environmental Sciences, Pond Management (<https://extension.uga.edu/county-offices/jackson/agriculture-and-natural-resources/pond-mangement.html>)
- Georgia Cooperative Fish and Wildlife Research Unit (<http://www.coopunits.org/Georgia/>)

4.2.4 BASH Reduction

There are no airfields on MCLB Albany. Therefore, Bird Air Strike Hazard (BASH) reduction is not applicable to this INRMP.

4.2.5 Invasive and Nuisance Wildlife Management

Invasive and nuisance wildlife species can displace native plants and animals, change the structure of natural communities, impact the ecological functions of ecosystems, and spread infectious diseases among wildlife species, and in some cases spread zoonosis (i.e., diseases communicable from animals to humans under natural conditions). Controlling these species is essential to the protection of the Installation's biodiversity. Invasive (i.e., exotic) wildlife species include non-native animals that may move into, or are introduced to, an area and disturb the habitat of a similar native species or a non-similar species that depends upon the territory or food source claimed by the invasive species. Nuisance wildlife, are native species that cause inconvenience, annoyance or irritation to the general human population or damage to property. The level of inconvenience or annoyance can range from relatively minor, such as reducing the aesthetic qualities of an area, to causing actual physical or economic damage to buildings, landscaped areas and other structures. Nuisance wildlife also may act as a vector for human disease.

The CNO Policy Letter of January 2002 on Preventing Feral Cat and Dog Populations on Navy Property states installations must adopt proactive pet management procedures that prevent the establishment of free-roaming cat and dog populations. Additionally, installations must ensure the humane capture and removal of feral cats and dogs, and efforts should be made to find homes for adoptable animals (Department of the Navy 2002). The Armed Forces Pest Management Board Technical Guide No. 37, Integrated Management of Stray Animals on Military Installations (Armed Forces Pest Management Board 2012) provides additional guidance for installations in addressing feral cat control issues.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Invasive Plant and Noxious Weed Management

- DODINST 4150.07: DOD Pest Management Program. Implements policy, assigns responsibility, and prescribes procedures for the Department of Defense pest management program. Outlines the DOD Measures of Merit.
http://www.afpmb.org/pubs/dir_inst/dod4150.7-i.pdf
- OPNAVINST 6250.4 (series): Pest Management Programs. Provides Navy and Marine Corps policies and procedures for implementing pest management programs.
<http://doni.daps.dla.mil/OPNAV.aspx>
- EO 13112 (3 February 1999), *Invasive Species*, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
- Georgia Animal Cruelty Criminal Provisions, Official Code of Georgia Annotated 16-12-4.
- Georgia Animal Protection Act Section 5.1 in the Georgia Code requires all animals in animal shelters be euthanized in a humane manner with only one method by a licensed veterinarian or certified technician: administering sodium pentobarbital.
- Armed Forces Pest Management Board Technical Guide No. 37, Integrated Management of Stray Animals on Military Installations, provides guidance for installations in addressing feral cats (Armed Forces Pest Management Board 2012).

- CNO Policy Letter of January 2002 on Preventing Feral Cat and Dog Populations on Navy Property, provides recommendations for pet management procedures to prevent the establishment of free-roaming cat and dog populations (Department of the Navy 2002).
- MCO 5090.2 prohibits the introduction of exotic species into a natural ecosystem and requires control or eradication of exotic species and noxious weeds on federal lands.

Management Strategies

The following management strategies will help to reduce the spread or introduction of invasive and nuisance wildlife species:

- 1) Maintain a hunting program and monitor to determine if modifications are needed to control excessive number of potentially nuisance species. Feral hogs should be managed by hunting, trapping and shooting by authorized agents.
- 2) Educate base personnel on the importance of keeping house cats indoors and to identify a human process for the removal of unwanted/abandoned cats.
- 3) Educate base personnel on the guidelines and resources identified in the IPM Plan (MCLB 2015b), which includes the importance of not feeding wildlife, the proper storage and handling garbage and potential food sources, and the resources available to personnel to control pests.
- 4) Assess perimeter fencing and address any areas where the fence has been compromised.
- 5) Develop an informational pamphlet on the zoonosis diseases of concern for the Installation and highlighting measures to prevent their spread. Identify a system for alerting Installation residents and employees of any public health alerts as they arise
- 6) Establish cooperative agreements (Dougherty County, Humane Society, USDA APHIS) to address the removal and processing of nuisance species.
- 7) Develop a plan to address feral cat and stray dog (and issues with other nuisance species that may come up) either through the County or possibly through USDA APHIS program. APHIS may be the preferred measure since they would address all nuisance issues.
- 8) Conduct biannual monitoring, or more frequently as needed, of invasive animals and nuisance wildlife to determine whether wildlife removal, relocation, other remedial actions are necessary to protect natural resources and/or human health and safety.

Multiple military services (Army, Navy, and Marine Corps) and entities on MCLB Albany address the management of nuisance wildlife. Insect pests or vermin occupying structures, impacting food stores, and mosquito surveillance and control on MCLB Albany are handled through MCLB Albany's Public Works Branch, the U.S. Army Medical Department, the U.S. Naval Branch Health Clinic, or contractors. The Natural Resources Branch responds to all other nuisance wildlife or domestic animal complaints. Funded by the USDA Wildlife Services, the Wildlife Biologist in the Natural Resource Branch will work on continuously removing nuisance wildlife such as raccoons, feral and domestic dogs and others known to be predators of rare and threatened species. In the past, animal control efforts only focused on individual nuisance animals but because these animals

quickly rebound when efforts of control are halted, a more comprehensive removal program is needed to reduce their populations.

The most notable pests on MCLB requiring management include stray dogs, cats, snakes and bats. Stray domestic animals are taken to local animal shelters and/or held for short periods of time while efforts are made to contact owners. The kennel facility for temporarily holding stray animals was constructed in FY14. Other species could become problematic (e.g., a wide variety of insects, hogs, skunks, etc.) and would be addressed on a case-by-case basis. The MCLB IPM Plan (MCLB 2015b) provides the management strategy and specific guidelines and recommendation for management of problematic wildlife including recommendations that would significantly reduce the potential for species to become problematic. Common zoonosis concerns include rabies, Lyme borreliosis, Rocky Mountain spotted fever, human ehrlichiosis, murine typhus, plague, mosquito-borne encephalitis, brucellosis, salmonellosis, and anthrax. There have been no reported incidents of zoonosis for the Installation (MCLB 2012a). However, zoonosis issues should be monitored and programs for promoting public awareness regarding the issues of concern associated with zoonosis prevention should be considered.

For medium sized mammals (e.g., feral and domestic dogs, fox, skunks, raccoons, coyotes, armadillos, gray and red foxes), access to dumpsters and other sources of food, denning locations, and cover have led to large populations of these species being present on the Installation. Of particular concern is the impact of these species on rare or threatened species such as the gopher tortoise. Thus, active management of some species, is required on a relatively regular basis on the Installation (MCLB 2012a).

Nuisance issues related to honeybees (*Apis* spp.) are handled by a Master Beekeeper in coordination with Natural Resources Program personnel. Where possible, the colony is captured live and removed to an appropriate location either on or off installation. All honeybees that are captured and moved are required to be tested by the Georgia Department of Agriculture to ensure that they are not Africanized honeybees.

Ecosystem Management

The NRM at MCLB Albany will use an adaptive approach to manage exotic and invasive wildlife and will explore alternative ways to meet management objectives, predict the outcomes of each alternative based on the current state of knowledge, implement one or more of these alternatives, and use the results to increase knowledge and adjust management actions. In cases where resources such as time, money, and staff are limited, management planning will ensure that MCLB Albany uses resources wisely to manage exotic and invasive wildlife for the long term.

Consideration must be given to the potential effect climate change may have on the spread, or new infestations, of undesirable wildlife species and zoonosis. Monitoring, prevention, and implementation of control and remediation measures will be key in order to maintain desired conditions and will follow guidance provided in the MCLB IPM Plan (MCLB 2015b). Control and reduction of invasive and nuisance wildlife when necessary will help to promote high quality habitats, limit the spread of these species to other areas, reduce the threat of zoonosis, limit the possibility of human infection, and reduce human wildlife conflicts.

Additional Sources of Information

- USDA, National Invasive Species Information Center, Georgia State Resources (<https://www.invasivespeciesinfo.gov/us/georgia>)
- Georgia Invasive Species Task Force (<http://www.gainvasives.org>)
- Aquatic Nuisance Species Task Force (<http://www.anstaskforce.gov>)
- National Invasive Species Council (<https://www.doi.gov/invasivespecies/>)
- Georgia Department of Agriculture (<http://agr.georgia.gov/>)
- Georgia Department of Health (<http://health.state.ga.us/>)
- Georgia Cooperative Extension Office (<http://www.caes.uga.edu/extension/>)

4.2.6 Zoonosis Prevention

There have been no documented cases of zoonosis on MCLB Albany to warrant a specific management strategy for this issue. The projects and management strategies presented in Section 4.2.2.5, Invasive and Nuisance Wildlife Management, will help to reduce the threat of zoonosis on the Installation.

4.2.7 Rare, Threatened, and Endangered Wildlife Species Management

This subsection describes the management of rare, threatened and endangered wildlife species identified on MCLB Albany. The ESA was enacted to conserve endangered and threatened species and the ecosystems on which these species depend. The ESA requires federal agencies to review their actions to determine whether they are likely to jeopardize the continued existence of any rare, endangered or threatened species; or result in the destruction or adverse modification of federally designated critical habitat. If such review reveals the potential for effects, the federal agency must consult with the USFWS (terrestrial species), NOAA NMFS (marine species), and/or the appropriate state agency, which in this case is GDNR.

Federal agencies are required to ensure that no actions undertaken by the agency will likely jeopardize the continued existence of any endangered or threatened species, except as provided within the ESA. Whenever there is a possibility that an endangered species may be present in an area affected by an action of a federal agency, that agency is required to conduct a biological assessment within the affected area to document the presence or absence of endangered or threatened species. If such species are found, the federal agency must make reasonable efforts to avoid actions that would have a detrimental impact on the endangered or threatened species.

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

- ESA, 16 U.S.C. 1531 et seq., as amended, provides for the identification and protection of threatened and endangered species of plants and their critical habitats and requires federal agencies to ensure that no agency action is likely to jeopardize the continued existence of a threatened or endangered species.
- MBTA, 16 U.S.C. 703–712, prohibits the taking or harming of a migratory bird, its eggs, nests, or young without the appropriate permit.

- 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.
- Fish and Wildlife Coordination Act, 16 U.S.C. 661–666c, authorizes the Secretaries of Agriculture and Commerce to provide assistance to and cooperate with federal and state agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife.
- NDAA, Public Law 107-314, 2003, exempts the Armed Forces from the incidental taking of migratory birds during military readiness activities.
- 50 CFR 17, Endangered and Threatened Wildlife and Plants, prescribes policies for the conservation and restoration of endangered and threatened wildlife and plants.
- EO 13112 (3 February 1999), *Invasive Species*, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
- EO 13186 (10 January 2001), *Responsibilities of Federal Agencies to Protect Migratory Birds*, imposes substantive obligations on the U.S. for the conservation of migratory birds and their habitats.
- Georgia Administrative Code, Sections 27-3-130 to 133, contains laws and regulations pertaining to endangered or threatened animal species, and prohibits the taking, possession, transportation, or sale of any of the animal species designated by state law as endangered or threatened without the issuance of a permit.
- SAIA, 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, to provide its personnel with professional training in fish and wildlife management.
- MCO 5090.2, and the U.S. Marine Corps *Handbook for Preparing, Revising, and Implementing Integrated Natural Resources Management Plans on Marine Corps Installations* (HQMC 2007) discusses natural resources management relative to the protection and management of fish and wildlife resources.

Management Strategies

Management strategies related to protection of rare, threatened, and endangered wildlife species at MCLB Albany include the following:

- 1) Continue to evaluate management practices and their effects on ecosystems and wildlife habitat, and continue programs to protect rare, threatened, and endangered wildlife species and their habitats known to occur at MCLB Albany.
- 2) Review management recommendations identified in wildlife survey reports to determine if additional management measures should be implemented for protection of rare, threatened, and endangered wildlife species known to occur at MCLB Albany.

- 3) Seek additional management guidance and recommendations from federal, state, and Navy wildlife biologists for protection of rare, threatened, and endangered wildlife species and their habitats known to occur at MCLB Albany.
- 4) Continue to conduct monitoring programs for wildlife and natural communities at MCLB Albany, to keep these inventories up to date.
- 5) Coordinate with the Public Works Engineering Section during the planning process for all construction projects at MCLB Albany. Review the location and footprint of the project and an analysis of the project against known occurrences of rare, threatened, and endangered species.
- 6) Coordinate with the USFWS and/or GDNR as appropriate to determine if Installation actions are likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species.
- 7) Assess potential impacts of management practices and tools such as prescribed burns, forestry measures, and invasive species control and adapt as needed to minimize impacts to, or to the benefit of, RTE species.
- 8) Update the fish and wildlife species inventory on MCLB Albany as needed.
- 9) Provide materials for the outdoor education program at MCLB Albany that showcases natural resources projects implemented by the Marine Corps. The program will also identify and encourage participation in natural resources activities such as International Migratory Bird Day, National Public Lands Day, and National Arbor Day.
- 10) Data should be provided to appropriate partnering agencies in support of the SWAP. Where possible, military readiness and high-impact recreational activities should be located to avoid and minimize impacts on rare wildlife.
- 11) Provide training for environmental staff and grounds maintenance staff for identification of sensitive species and habitats identified in this INRMP for conservation and protection.
- 12) Conduct annual focused RTE surveys and/or monitoring species as needed to fill data gaps (e.g., Bachman's sparrow).

As described in Section 2.4.6, biological inventories for rare species were conducted on MCLB Albany by GDNR between 1990-1992, and again in 1995 (GDNR 1995, MCLB 2007). Subsequent inventories were performed by ANHP in 2013 (Barbour et al. 2013). These surveys confirmed use of the Installation by thirteen federally or state protected species and species of special concern. Updates to the federal ESA listings, such as the listing or removal of a species under the ESA, or a change in species presence at MCLB Albany, may require changes in management practices to address these changes. Surveys should be conducted to update MCLB Albany species inventory as necessary, and to minimize, mitigate, and monitor potential impacts. Data should be provided to appropriate partnering agencies in support of the SWAP. Where possible, military readiness and high-impact recreational activities should be located to avoid and minimize impacts on rare, threatened, and endangered wildlife species.

Ecosystem Management

Management of the federally listed species known to occur at MCLB Albany is an important component of ecosystem management at the Installation. MCLB Albany will actively manage areas and natural communities to provide habitat for rare, threatened, and endangered species that are known to occur on the properties and will continue to monitor populations of rare species, and protected plants.

The NRM will undertake measures, as appropriate, to ensure activities and actions conducted within the Installation are not detrimental to rare, threatened, and endangered species or the habitats they depend on. Those species dependent upon wetlands and fire-dependent communities are the focus of most management activities at the Installation. However, all-natural communities will be managed with a goal of sustaining and enhancing fish and wildlife resources consistent with the military mission. Some specific management strategies to accomplish this include:

- Preserve portions of stands to provide suitable large snags and trees for den and cavity 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 undermines 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/or territorial displays.
- Maintain hardwood areas for foraging activities.
- Seed cleared areas (associated with silvicultural activities, i.e., logging decks) with wildlife food plants to prevent erosion and provide forage.
- Avoid impacts to wetlands.

The species sub-sections that follow describe more specific management recommendations and benefits of this INRMP for rare, threatened, and endangered species and species of special concern known to occur at the MCLB Albany.

Additional Sources of Information

- USFWS, Endangered Species Program (<http://www.fws.gov/endangered/laws-policies/index.html>)
- USFWS Birds of Conservation Concern (<https://digitalmedia.fws.gov/digital/collection/document/id/1249/rec/1>)
- USFWS, Migratory Bird Center (<https://www.fws.gov/birds/surveys-and-data/migratory-bird-data-center.php>) GDNR, Protected Wildlife Species (<https://georgiawildlife.com/species>)
- DOD PIF (<http://www.partnersinflight.org/>)
- TNC, Migratory Bird Program (<http://my.nature.org/birds/about/>)

4.2.7.1 Federally Listed and Candidate Species

Bald Eagle (*Haliaeetus leucocephalus*)

Legal Status: Protected under the Bald and Golden Eagle Protection Act (Federal), Threatened (State)

Bald eagles forage on fish, so they almost always nest near large rivers or water bodies, preferentially in isolated sites. The nest is usually in a large, open-topped pine—or occasionally a cypress—near open water, often on high ground if available (Ozier et al. 2019). The greatest threat posed to the bald eagle is the presence of persistent toxic chemicals such as PCBs, mercury, and other pesticides and herbicides, which can either poison the bird directly or impair its ability to reproduce.

Although bald eagles appear to be transient species at MCLB Albany, the ponds on the base could provide potential foraging habitat. Therefore, management for this species should include activities to maintain the integrity and hydrology of wetlands and open water areas associated with Indian Lake and Horseshoe Pond. These areas should be protected by minimizing the amount of artificial drainage, avoiding the use of aquatic herbicides or pesticides, and providing substantial forest buffers around this area. Exposure to toxic chemicals such as PCBs or mercury is detrimental, and consumption of poisoned baits can also be fatal (Ozier et al. 2019), so. Projects described in this INRMP that benefit and conserve bald eagles and their habitat are discussed in Appendix F and include Projects 1, 3, 4, 7, and 9.

Eastern Diamondback Rattlesnake (*Crotalus adamanteus*)

Legal Status: Candidate Species for Listing, Under Review (Federal)

Specific habitats for the eastern diamondback rattlesnake on MCLB Albany include dry uplands with open canopy, especially longleaf pine forests; also, open canopy mixed pine hardwood stands; bottomland hardwoods only if adjacent to open uplands; and brushy pasture (Barbour et al. 2013).

The primary management concerns for the rattlesnake on MCLB Albany are the lack of effective fire and the low frequency of fire (Barbour et al. 2013).

Suitable habitat for eastern diamondback rattlesnakes can be maintained and enhanced by continued forest management practices emphasizing prescribed burning and restoration of longleaf pine. Efforts should also be made to retain coarse woody debris, stump holes, and exposed roots and cavities formed by blown down trees during any harvest activity. The main problem for this species is the deliberate killing of individuals encountered. Therefore, public education programs to promote tolerance and reduce the deliberate killing of individual snakes, particularly in the non-developed areas on base, appears to be the best way to ensure long-term preservation of this species. Table 8 provides an overview of how several common forestry practices used on MCLB Albany may affect this species (Barbour et al. 2013). Projects described in this INRMP that benefit and conserve rattlesnakes and their habitat are discussed in Appendix F and include Projects 1, 3, 4, 5, 7, 8, and 9.

Gopher Tortoise (*Gopherus polyphemus*)

Legal Status: Candidate Species for Listing (Federal) and Threatened (State)

With possibly only two individual gopher tortoises present on the Base, the population density is well below the values suggested to indicate loss of reproductive viability (Styrsky et al. 2010). Guidelines for estimating space requirements for gopher tortoises developed by Cox et al. (1987) suggested a reserve area of 10 to 20 ha (or sufficient area to encompass 80 burrows) was required to maintain a viable population. Subsequent research has resulted in substantially larger estimates of the minimum area needed to maintain a viable population. Eubanks et al. (2002) estimated a minimum area requirement of 25 to 81 ha based on home range analysis and 19 to 41 ha based on burrow density. McCoy and Mushinsky (2007) estimated that minimum patch size would need to be at least 100 ha. The current gopher tortoise population contained within MCLBA is not viable in and of itself, and MCLBA does not have data on the number of individuals or amount of suitable habitat area surrounding the Base. Therefore, MCLBA's NRP is focused on conservation of the extant population of gopher tortoises and enhancement of their habitat.

Active management to maintain and enhance the gopher tortoise population is being undertaken by a Wildlife Biologist through MCLB Albany's Resource program and funded by the USDA Wildlife Services. The Wildlife Biologist will work with MCLB's NRP on enhancing gopher tortoise habitat through a prescribed burning program with a two-year fire return interval (Section 4.3.7), chemical treatment and removal of undesirable vegetation (as described in Section 4.1.3.1), thinning of timber stands (Section 4.3.4), and restoration of native ground cover (Section 4.1.3.2). In addition, the USDA Wildlife Biologist works with the NRP to control and remove feral and nuisance animals that pose a predatory threat to gopher tortoises. Generally, this INRMP protects habitat for the gopher tortoise through active management practices such as those identified in Table 7. Overall, multiple INRMP projects benefit and conserve gopher tortoises and their habitat. They are discussed in Appendix F and include Projects 1, 3, 4, 5, 7, 8, and 9.

Wood Stork (*Mycteria americana*)

Legal Status: Threatened (Federal); Endangered (State)

To ensure long-term survival and recovery of this population, wood storks require a mosaic of wetlands with varying climatological and seasonal conditions around colonies and within the wintering habitat in the coastal plain of the Southeast United States. Although preventing loss of wood stork nesting habitat and foraging wetlands within a colony’s core foraging area is of the highest priority, winter foraging habitat also is important to recovery, as it may determine the carrying capacity of the U.S. breeding population of wood storks.

The wetland habitat on the Installation may not be critical foraging habitat for the species, but any wetland that provides a foraging area for wood storks is important since the loss of wetlands continues to be threat for the species. Providing and managing for post-breeding individuals could enhance individual survival and lead to population growth (Coulter et al. 1999). Indian Lake and Horseshoe Pond should be managed to maintain the integrity and hydrology of these wetlands. These areas should be protected by minimizing the amount of artificial drainage, providing substantial forest buffers around the area, and the careful and selective use of aquatic herbicides when their use is required to meet management objectives. When the application of herbicides is desirable or necessary (e.g., to remove invasive plants), follow the label instructions carefully, use the minimal amount necessary, and give preference to individual stem treatment or spot application to reduce the amount used and area treated. Projects described in this INRMP that benefit and conserve wood storks and their habitat are discussed in Appendix F and include Projects 1, 3, 4, 7, and 9.

Table 7. Overview of Potential Forest Management Techniques for Federal and State-listed Wildlife Species of MCLB Albany.

Species	Fire Frequency	Season of Burn	Encroaching Hardwoods	Mechanical Treatment	Hardwood-Specific Chemical Treatment
Eastern tiger salamander	Overall positive but short-term unknown	Fire may be negative during breeding season (Dec–Feb)	Likely negative effect	Unknown; do not use during breeding season (Dec–Feb)	OK if used carefully & away from breeding areas
Eastern diamondback rattlesnake	Overall positive but short-term unknown	Do not burn on warm winter or spring days when snakes may be out of den but sluggish	Likely negative effect	Avoid mechanical treatment during May–September	OK if used carefully

Species	Fire Frequency	Season of Burn	Encroaching Hardwoods	Mechanical Treatment	Hardwood-Specific Chemical Treatment
Northern bobwhite	Known to benefit from very frequent fires (every 1–2 years)	Burns during the growing season increase insect (food) abundance; species re-nests after burns	Likely negative effect	Unknown; do not use during nesting (May–Aug)	OK if used carefully
Loggerhead shrike	Benefits from frequent burns (every 2 years) but short-term effect unknown	Growing season fire helps create more foraging habitat	Likely negative effect for foraging but shrikes will nest in hardwood shrubs	Benefits from low grass conditions; avoid mechanical treatment during May–September	OK if used carefully
Bachman’s sparrow	Benefits from frequent fires. Habitat becomes less suitable 1–3 years after a burn	Growing season burns improved nest site conditions	Negative effect	Do not use during breeding season (May–Aug)	OK if used carefully
Gopher tortoise	Benefits from frequent fires (every 2 to 3 years)	Growing season burns improve foraging habitat	Negative effect	Avoid mechanical treatment during May to September	OK if used carefully
Wood stork	N/A	N/A	Neutral or positive	N/A	OK if used carefully

4.2.7.2 *State Listed Species*

Bachman's Sparrow (*Peucaea aestivalis*)

Legal Status: Rare (State)

Bachman's sparrow is an inhabitant of mature pine woods and open habitats with a dense ground layer of grasses and forbs, and an open understory with few dense shrubs (Dunning and Watts 1990, Dunning 1993). Historically, it was most common in mature, open pine forests where wiregrass (*Aristia* sp.) or broomsedge (*Andropogon* sp.) dominates the ground cover. Intensive forestry practices and other land use conversions have greatly reduced this habitat type throughout the species range, so it is now primarily found in open grassy habitats such as clear-cuts or utility rights-of-way where the grassy conditions it prefers still exist. Specific potential habitats identified for this species on MCLB Albany include open grasslands or open-canopy pine savannas (Barbour et al. 2013). Surveillance studies of Bachman's sparrow nests have found that predators include a wide variety of snakes and large mammals (Malone et al. 2019).

The Georgia Department of Natural Resources (1995) reported Bachman's sparrow on MCLB Albany from a single individual in an open stand of pines south of the tank testing track on the west end of the base (Figure 8). ANHP also detected a single individual during the 2013 surveys, but in an open pine stand in the north portion of Area 3 (Figure 8).

The primary management concerns for Bachman's sparrow on MCLB Albany are the lack of effective fire and the low frequency of fire (Barbour et al. 2013). This species can benefit greatly from forest management practices on the Installation. As detailed in the MCLB Albany 2013 rare, threatened and endangered species summary report, several areas have high potential for this species if managed properly (Barbour et al. 2013). Regularly occurring fires and in some cases chemical or mechanical techniques are needed to remove hardwood species in the understory and keep hardwood vegetation suppressed. This INRMP promotes habitat for Bachman's sparrow through the use of active management practices such as those presented in Table 7. Projects described in this INRMP that benefit and conserve Bachman's sparrow habitat are discussed in Appendix F and include Projects 1, 2, 3, 4, 5, and 8.

4.2.7.3 *Other Species of Special Concern (not state or federally protected)*

Species of special concern are not officially protected under federal or state endangered species laws. However, their rarity warrants management consideration and further evaluation to determine their protection status. Species include those identified by GDNR or NatureServe (NatureServe 2013) as species of concern (Barbour et al. 2013), as well as a host of bird species identified by the USFWS as Birds of Conservation Concern (BCC) (USFWS 2008).

Eastern Tiger Salamander (*Ambystoma tigrinum*)

Legal Status: None

Eastern tiger salamanders have been observed migrating across the northern perimeter road at MCLB Albany. The primary threat to this species is habitat loss of both its upland habitat and breeding ponds to urban sprawl and other land use changes. Roads between breeding sites and upland habitats can cause extremely high mortality (Wentz 2001). The key habitats available for

tiger salamander on MCLB Albany include pine woods in proximity to temporary, fish-free, pools with grassy edges (Barbour et al. 2013). The primary management concerns identified for the tiger salamander on MCLB Albany are the disruption of landscape connecting upland pine habitat and breeding pools, and the lack of effective fire (Barbour et al. 2013).

Management opportunities exist to promote habitat for this species on the Installation. The vegetation in which many reptiles and amphibians forage, nest, and shelter is often fire-dependent or fire-adapted so continued use of prescribed fire in the upland areas on the base is highly recommended and prescribed fire should be allowed to burn into the wetlands when water levels are naturally low. A forest core or buffer surrounding the seasonal wetlands (limesink ponds and willow oak flatwoods) should be maintained to help protect the hydrology of the wetlands. Table 7 provides an overview of how several common forestry practices used on MCLB Albany may be used to benefit this species (Barbour et al. 2013). Projects described in this INRMP that benefit and conserve tiger salamanders and their habitat are discussed in Appendix F and include Projects 1, 3, 4, and 5.

Loggerhead Shrike (*Lanius ludovicianus*)

Legal Status: None

Loggerhead shrikes inhabit open habitats such as grasslands, pastures with fence rows, mowed roadsides, and open woodlands and nests in shrubs or small trees (Yosef 1996). Loggerhead shrikes prefer open habitats characterized by low grasses and forbs interspersed with bare ground and scattered shrubs or low trees, particularly thorny species. In addition to open areas they require suitable perches for hunting (Yosef and Grubb 1994). Shrikes feed primarily on large invertebrates, but also take small vertebrates such as small birds, lizards, frogs, and rodents. The key habitats available for loggerhead shrike on MCLB Albany include most open habitats (i.e., clearings, mowed road edges, the golf course, etc.), as well as orchards, riparian areas, and open woodlands (Barbour et al. 2013). A single loggerhead shrike was frequently observed during the 2013 surveys on the edge of the forested area just east of the main gate (Figure 8).

Loggerhead shrike populations have declined throughout their continent-wide distribution (Yosef 1996). The major factors contributing to this decline appear to be changes in human land use practices, the spraying of biocides, and competition with species that are more tolerant of human-induced changes. The primary management concerns identified for shrike on MCLB Albany are the lack of effective fire and low frequency of fire (Barbour et al. 2013).

As detailed in the MCLB Albany rare, threatened and endangered species summary report, several areas have high potential for this species if managed properly (Barbour et al. 2013). Management for this species should include maintaining medium-height grass in favorable areas such as the unmowed area south of the golf course, continued use of prescribed fire in pine woods, maintaining brush and scattered trees in the open grass areas, and the judicious use of biocides (i.e. use the minimum amount necessary, give preference to individual stem treatment or spot application over broadcasting, etc.) when they are necessary to achieve management objectives. Table 7 provides an overview of how several common forestry practices used on MCLB Albany may be used to benefit affect this species (Barbour et al. 2013). Projects described in this INRMP that benefit and

conserve loggerhead shrikes and their habitat are discussed in Appendix F and include Projects 1, 2, 3, 4, and 5.

Northern Bobwhite (*Colinus virginianus*)

Legal Status: None

Northern bobwhites require early successional habitats that can be found across a wide variety of vegetation types including pine forests, fields, shrubby areas, and grasslands (Roseberry and Kimstra 1984). At MCLB Albany, they were detected in most of the recently burned pine forests. Northern bobwhite populations have declined significantly since the 1960's with every broad-scale population index of bobwhite indicating a significant downward trend (Brennan 1991, Williams et al. 2004). This decline is largely a result of habitat loss due to land use changes that reduced the amount of high quality early successional habitats. The key habitats available for northern bobwhite on MCLB Albany include open pine woods with grass-forb dominated ground layer (Barbour et al. 2013). The primary management concerns identified for the quail on MCLB Albany are the lack of effective fire and low frequency of fire (Barbour et al. 2013).

This species can benefit greatly from forest management practices on the Installation. As detailed in the MCLB Albany 2013 rare, threatened and endangered species summary report, several areas have high potential for this species if managed properly (Barbour et al. 2013). Prescribed burning is one of the most cost-effective and efficient tools available for managing quail habitat. Bobwhite respond well to areas managed with prescribed fire, which helps to maintain an open, grassy ground layer. Table 7 provides an overview of how several common forestry practices used on MCLB Albany may affect this species (Barbour et al. 2013). Projects described in this INRMP that benefit and conserve Bachman's sparrows and their habitat are discussed in Appendix F and include Projects 1, 3, 4, and 5.

Yellow-crowned Night-Heron (*Nyctanassa violacea*)

Legal Status: None

Yellow-crowned night-herons were confirmed present only along the shoreline of Indian Lake at MCLB Albany. The yellow-crowned night-heron primarily inhabits forested wetlands, swamps, and bayous (Watts 1995). Its foraging areas are nearly always associated with high concentrations of crustaceans, and in inland areas such as those found on the Installation, where it forages along shallow creeks, rivers, ponds, lakes, and swamps. Habitat loss (wetland loss) and degradation are the primary threat for this species.

Management for this species should include actions to maintain the integrity and hydrology of the wetlands and habitat structure of Indian Lake. This area should be protected by minimizing the amount of artificial drainage, avoiding the use of aquatic herbicides or pesticides, and providing substantial forest buffers around this area. An evaluation of factors contributing to the water loss at Indian Lake is recommended. Projects described in this INRMP that benefit and conserve yellow-crowned night heron and their habitat are discussed in Appendix F and include Projects 1, 3, 4, and 5.

Ecosystem Management

Ecosystem management is a holistic, adaptive management concept that transcends human-made boundaries, both internal and external to MCLB Albany. Management of rare, threatened, and endangered species known to occur at MCLB Albany will promote sustainable ecosystems, and includes monitoring, maintaining habitat requirements for these species, and educational outreach. Furthering knowledge of federally listed wildlife species occurring at MCLB Albany through research projects will promote conservation of these species beyond the boundaries of the Installation and ensures Marine Corps stewardship requirements and compliance with the ESA.

Participation in proper management actions for protection of rare, threatened, and endangered wildlife species of MCLB Albany is the responsibility of all individuals potentially affecting these species. Ecosystem management for protection of listed wildlife species requires periodic adjustments in management principles and practices to respond to new knowledge and dynamic conditions. Management strategies and INRMP projects identified in this INRMP will ensure ecosystem management principles are applied to management of rare, threatened, and endangered wildlife species that occur at MCLB Albany.

4.3 FORESTRY MANAGEMENT

Forest management at MCLB Albany includes activities conducted to manage stands for commercial product as well to the benefit of flora and fauna species. Measures used to manage Installation forestlands include general forestry management practices (i.e., silvicultural) as well as the use and/or suppression of fires. The forestlands are managed for multiple uses, such as wildlife habitat, aesthetics, soil erosion control, threatened and endangered species, outdoor recreation, and timber production. The use of fire for the protection and maintenance of upland habitats is addressed in the MCLB Albany Wildfire Protection Plan (USACE 2010). Forest management activities on MCLB Albany are addressed by the following, and are detailed below:

- 1) Section 4.3.1 Forest Inventory
- 2) Section 4.3.2 Forest Stands Compartments
- 3) Section 4.3.3 GIS Database development and Maintenance
- 4) Section 4.3.4 Management by Forest Cover Type
- 5) Section 4.3.5 Forest Protection and Health
- 6) Section 4.3.6 Incorporation of the Statewide Wildlife Action Plan
- 7) Section 4.3.7 Fire Management

MCO 5090.2 defines forest management as, “a coordinated program of actions for ensuring that, the health, vigor, and diversity of forest ecosystems are maintained while providing a diverse, quality military training environment and sustaining the production of forest products.” Forestry management generally involves actions for the commercial production and sale of forest products, including practices such as timber management, timber sales, reforestation, timber stand improvement, and other directly related functions. Forest management applies scientific principles to accomplish the objectives described below which have been chosen to support the training mission while conserving native biological diversity and ecosystem integrity as outlined in DODINST 4715.03.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Forestry Management

- Resources Planning Act, Public Law 93-378, 1974, requires a complete national assessment or inventory of all forest, rangeland resources, and public needs every ten years, along with a plan to meet those needs.
- MCO 5090.2 requires installations with forests or lands with potential forest production to provide for optimum sustainable yield of forest products and improvements of forest resources consistent with the military mission and the Installation's INRMP.

A healthy, well-managed, sustainable forest is a primary objective of forest management at MCLB Albany. Forest management practices when implemented appropriately can complement the goals and objectives of natural resources management at MCLB Albany. The overall goal of forest management on MCLB Albany is to incorporate a multiple-use strategy that provides for sustainable timber operations and supports the Marine Corps mission. This multiple use strategy seeks balance amongst the following objectives:

- Practicing sound management to provide for the sustainable harvest of quality timber products
- Conserving and restoring ecological significant communities and habitat for rare, threatened or endangered species and other wildlife
- Enhancing outdoor recreational opportunities including hunting and wildlife watching
- Protecting culturally or historically significant resources
- Protecting and promoting air quality and soil conservation practices
- Protection of wetland habitats, riparian zones, and water quality
- Control of invasive plant and animal species
- Continued support of MCLB Albany's military mission

Ecologically sound stewardship of forestland involves managing for various components, including forest products (i.e., timber), wildlife habitat, aesthetics, and recreation. Components of the annual work plan generally include firebreak management, prescribed burning, timber sales, timber inventory, site preparation, reforestation, forest roadwork, and equipment operation and maintenance.

Forest management emphasis will be placed on the sustainable production of quality timber products through timber harvests, timber stand improvements, prescribed burning, protection from wildfire, insects and disease, and regeneration of appropriate tree species. Specific objectives include:

- Increasing the distribution of stand ages through timber harvest and regeneration
- Timely thinning of timber stands to promote timber growth and support multiple uses
- Continuing prescribed burning on a 1–3 year rotation to enhance stand access, aesthetics, timber health, and enhance wildlife habitat

- Planting or enhancing existing stands of longleaf pine and associated ground cover such as wiregrass and promoting habitat for rare, threatened or endangered species.
- Continued protection of riparian zones and wetlands
- Continued implementation of best management forestry practices that promote soil conservation and reduce the spread of invasive species
- Compliance with Federal Laws

Mechanical treatments that disrupt the soil (e.g., chopping) are commonly used in efforts to control encroaching small hardwood stems. Although these treatments may be effective in improving habitat structure in the short-term, they likely are not appropriate treatments when native ground cover species are present. Mechanical treatment that disturbs soil (especially the roots of wiregrass and other bunchgrasses) should be limited to sites that do not currently support native ground cover. Many herbaceous plants in native ground cover do not readily recover from soil disturbances except when the area of a disturbance is smaller than a few square feet and re-colonization by seed is possible. Most native grasses have shallow roots and many types of mechanical treatment disturb soil and/or roots of these species. Bunchgrasses and many other native grasses are slow to expand clonally (vegetatively), unlike pasture and many lawn grasses. Disking and even roller chopping at any time of the year can have a significant negative effect on the integrity of native ground cover. Bunchgrasses provide a critical component of fine fuel that is, in turn, required for effective application of prescribed fire, especially any burning that is done in the growing season. When mechanical treatment is mandated a mulcher, Brown Tree Cutter, or similar equipment is preferable, especially when followed by herbicide then fire.

4.3.1 Forest Inventory

A complete forest inventory was conducted on MCLB Albany in 2006. An updated inventory was completed in 2014 (MCLB 2015c). Forest inventories obtain estimates of timber volumes, stand conditions, timber types, size or product classes, and other general information needed for planning purposes for commercial timberlands. Table 8 provides the most current available estimates of timber (pine species) acreage by age class. In general, MCLB Albany’s commercial timberlands contain a variety of wood products including poles, sawtimber (> 14 inch diameter breast height [dbh]), chip-n-saw (10–13 inch dbh) and pulpwood (6–9 inch dbh with a minimum 3 inch top). Approximately 306.4 acres are considered pre-commercial (i.e., less than 15 years in age).

Table 8. Stand Ages and Acreage by Pine Species on MCLB Albany.

Stand Age	Acres Loblolly	Acres Slash	Acres Longleaf	Acres Mixed Loblolly / Longleaf	Acres Mixed Pine/ Hardwood	Total Acres
1920–1929			5.0			5.0
1930–1939						
1940–1949	31.6		7.1			38.7
1950–1959	124.1	71.8				195.9
1960–1969	72.8	262.5		9.7	56.3	401.3
1970–1979	53.6	114.1			16.8	184.5
1980–1989	14.2					14.2

Stand Age	Acres Loblolly	Acres Slash	Acres Longleaf	Acres Mixed Loblolly / Longleaf	Acres Mixed Pine/ Hardwood	Total Acres
1990–1999						
2000–2009		7.2	38.9			46.1
2010–current		32.1	224.3		3.9	260.3
Unknown	6.4					6.4
TOTAL	302.7	487.7	275.3	9.7	77.0	1152.4

4.3.2 Forest Stands Compartments

Vegetative cover types are further divided into 161 individual stands. Stands include a group of trees occupying a given area and sufficiently uniform in species composition, age, structure, site quality, and condition so-as to be distinguishable from the forest on adjoining areas. The stand numbering system is not continuous (1–161) as a result of stands being converted to non-forestry uses. For management purposes, MCLB Albany is divided into 31 forest compartments. The compartment boundaries are based on hydrologic features, roads, and other natural or artificial divisions. While the stand remains the basic unit of forest management on MCLB Albany, forest compartments are convenient for organizing information, expediting the planning process, and facilitate the preparation of reports and other documents such as prescribed burn plans and operational management plans.

4.3.3 GIS Database Development and Maintenance

The Marine Corps has been making an effort to standardize data layers and attributes. Since 2014, MCLB Albany has worked to update and complete the appropriate forestry data layers and attributes. These GIS data which have been incorporated into this INRMP revision.

The MCLB Albany Data Dictionary is the primary adaptation to the GEOFidelis Data Model 3.0.0.2 Regional Data Dictionary for Marine Corps Installations Command (MCIEAST), referred to as the MCIEAST Data Dictionary for MCLB Albany Installation Geospatial Information and Services (IGI&S) geospatial data. The data dictionary provides data standard consistency that incorporates enough breadth for mission execution and the ability to record data in a consistent manner aboard MCLB Albany. Based on the MCIEAST Data Dictionary 3.0.0.2, this Data Dictionary maintains an MCLB Albany IGI&S data standard that provides the Installation with a common structure for data layers and attributes. MCLB Albany will implement this Data Dictionary to enhance interoperability and enterprise integration.

The MCLB Albany adaptation of the MCIEAST Data Dictionary is consistent with U.S. Marine Corps and DOD policy for IGI&S:

- Meets the policy and goals set forth in Marine Corps Order (MCO) 11000.25, Installation Geospatial Information and Services.
- Meets the policy set forth by IGI&S and DODI 8130.01.

- Compliance with the goals and DoD enterprise objectives set forth in the Office of the Under Secretary of Defense (OUSD) memorandum dated April 14, 2009 – Installation Geospatial Information and Services Guidance.
- Follows DoD interoperability strategy set forth in the OUSD guidance dated May 11, 2011 – Guidance for the Adaptation of SDSFIE 3.0 Albany adaptation of the GEOFidelis Data Dictionary is consistent with U.S. Marine Corps and DOD policy for IGI&S.

4.3.4 Management by Forest Cover Type

Upland Pine

Currently, MCLB Albany possesses approximately 48 acres of pine plantations that would be considered pre-commercial (15 years old or younger). The remainder of the acreage in planted pine is considered commercial, producing a variety of timber products including pulpwood, chip-n-saw, sawtimber, and some poles. Acreages by age category and species are listed in Table 8. The longleaf plantations in the 0–10 year age class consist of stands with good to excellent survival, slight hardwood competition, and are dominated by a grass-forb-shrub understory. Typical understory vegetation found in these stands consists of blackberry (*Rubus* spp.), broomsedge (*Andropogon* spp.). These stands were treated with herbicide at planting and maintained by periodic mowing and prescribed fire (FY 2013).

Approximately 86% of the planted pine plantations on MCLB Albany were planted between 1960 and 1979 with an average stand age of approximately 48 years old. The majority of these have been thinned twice. Past thinnings consisted of either selective thinning or row thinning operations. Basal areas of the stands that were thinned vary widely as do understory characteristics. Most stands thinned at least once contain a mix of pulpwood, chip-n-saw and some sawtimber size classes. Older age loblolly and slash pine stands (stands 30 or more years old) contain mostly chip-n-saw, sawtimber, and few pulpwood or pole-sized trees.

In general, Upland Pines will be managed through a combination of any of the following activities:

- 1) Timber Harvest (thinning, salvage harvest, clear cutting, etc.)
- 2) Regeneration by planting seedlings and/or natural regeneration
- 3) Prescribed burning (1–3 year rotation generally, including growing season and or dormant season burns)
- 4) Chopping, mowing, and/or rotational disking to control understory vegetation
- 5) Chemical application (herbicides and pesticides)
- 6) Interplanting of desirable fire-tolerant upland tree species such as post oak

Longleaf

The longleaf pine and its associated understory was once a defining feature of southwest Georgia. Due to conversion of forestlands to agriculture, a reduction in the frequency of natural and prescribed fires, and other factors, this ecosystem now occupies less than 3% of its former range. As a result, the longleaf pine forest is home to a variety of rare, threatened, and endangered plants and animals. Historic maps and remnant longleaf indicate that this forest type formerly composed

a significant portion of the forestlands. Restoration of this ecosystem and its associated flora and fauna is therefore an important management objective. Restoring longleaf will enhance biodiversity and provide additional small-game hunting opportunities, particularly for northern bobwhite. Longleaf pine forests, with their open-park like appearance and fire-tolerance, provide an ideal venue for quail hunting, as well as other recreational pursuits such as bird watching and hiking.

Restoration of some portion of the forestlands to longleaf pine forest is a major priority. The determination of which slash and loblolly stands to convert will be made on the basis of soil characteristics instituting the recommendations of the subject matter experts.

A variety of methods will be employed to convert slash and loblolly stands including clearcutting and replanting either bareroot or containerized longleaf seedlings, clearing linear corridors within slash and loblolly stands and replanting with longleaf, creating small patches of longleaf generation, and interplanting longleaf in thinned slash and loblolly stands. With the two later approaches, additional longleaf would be planted each time the slash and loblolly stands were thinned and/or at the time of the loblolly or slash trees were completely harvested.

An approach similar to the Stoddard-Neel System would be used to manage the majority of the longleaf stands on MCLB Albany. Under this system, longleaf stands are managed using an uneven-aged timber rotation. Selective thinnings generally occur every 7–10 years once the longleaf reach merchantable size. The volume of trees removed during a thinning represents some determined portion of the stand growth that occurs in the intervening periods between thinnings. Removal focuses on diseased, forked, damaged or otherwise suppressed trees. Ideally, this system would result in uneven aged stands of longleaf with basal areas in the range of 30 to 90 ft.²/acre and an open park-like understory. A small portion of the longleaf pine stands may be managed under an even-aged timber rotation for demonstration purposes. Such stands would be created by clearcutting existing slash and loblolly pine stands and replanting to longleaf. These stands would be managed similarly to the even-aged slash and loblolly pine plantations on the WMA.

The establishment of fire-tolerant upland hardwoods such as post oak and southern red oak would also be encouraged in longleaf pine stands. Techniques to establish upland hardwoods within longleaf and/or pine plantations may include underplanting seedlings, establishing linear corridors of seedlings within stands during or after timber operations, releasing trees from competition through selective harvests, mechanical means, and/or herbicides and other techniques as appropriate. Many of these upland hardwoods have been replaced within upland sites by less desirable hardwood species such as sweetgum and water oak as a result of past silvicultural and management practices. Upland hardwoods are more desirable as these trees are more fire-tolerant and produce mast, forage, and cover for a variety of wildlife. Additionally, components of the native ground cover that once occupied similar sites may be restored in conjunction with the longleaf. This native ground cover may or may not include wiregrass (*Aristida* spp.), bluestem grasses (*Andropogon* spp.), native legumes, and others based on the expert opinion of representatives from the GDNR Nongame and Natural Heritage Section, Auburn University, the Joseph Jones Ecological Research Center and others. One of the main objectives of these restoration efforts is to create a diverse fire-maintained upland plant community that provides ideal wildlife habitat for a myriad of species. Seed sources for native plants are few but emphasis will

be placed on obtaining seed from nearby donor sites such as Fort Benning or stands on MCLB Albany. Some seed may be available commercially although preference will be given to purchasing seed from Georgia, Florida and/or Alabama. Restoration of native ground cover may involve chemical or mechanical control of the existing vegetation, site preparation using bulldozers and tractors, hand- or machine planting, and follow-up control of competing vegetation.

Slash and Loblolly

In order to maintain a diversity of pine stand ages, as well as a potential source of annual income, part of MCLB Albany's forestlands will be maintained in even-aged slash and loblolly pine production. The juxtaposition of different stand ages and associated differences in understory, midstory, and overstory characteristics is favorable to the management of game and non-game species. The specific amount of acreage in either slash or loblolly pine will be determined on the basis of the site index for each stand as well as other factors. Ideally, a mixture of age classes of pine plantations would be established. Offsite slash or loblolly will be converted to the appropriate tree species. Loblolly and slash stands will be managed on an average 50-year old rotation, although the actual rotation will vary due to any number of potential factors. In order to promote biological diversity within these stands and improve mast production, fire-tolerant upland hardwoods such as post oak, red oak, hickory, and dogwood will be encouraged by removing undesirable hardwood competitors and or interplanting these species among slash and loblolly where appropriate.

Mixed Pine Hardwood

This forest cover type consists of stands containing one or more species of pine (loblolly pine, longleaf pine, slash pine) interspersed with hardwood species such as water oak, laurel oak, southern red oak, cherry and sweetgum. This cover type was likely found in association with the ecotone between upland pine sites and forested wetlands historically but also occurs on drier sites on MCLB Albany where previous management practices such as fire exclusion and nonchemical site preparation allowed the intrusion of hardwoods. The management of this forest cover type will depend upon the desired future forest conditions of the individual stands. Mixed Pine Hardwood stands dominated by undesirable hardwoods such as sweetgum and water oak will be converted to Upland Pine. Sites containing longleaf pine, remnant native ground cover, and upland hardwoods such as southern red oak will remain mixed pine hardwood stands with the goal of removing undesirable species to create open, savannah habitat conditions. Removal of undesirable hardwoods would likely occur through application of appropriate herbicides and/or mechanical removal. These stands would be managed through prescribed burning on a slightly longer rotation than for upland pine sites. The exact fire return interval would be determined on the basis of the understory response.

In general, Mixed Pine Hardwoods will be managed through a combination of any of the following activities:

- 1) Timber Harvest (thinning, salvage harvest, clear cutting, etc.) or selective removal of individual or small groups of trees.
- 2) Regeneration by planting seedlings and/or natural regeneration.
- 3) Prescribed burning (2–5 year rotation generally, including growing season and or dormant season burns).

- 4) Chopping and/or rotational disking to control understory vegetation.
- 5) Chemical application (herbicides control of undesirable species and pesticides, in the case of insect attack).
- 6) Interplanting of desirable fire-tolerant upland hardwoods such as post oak.

Upland Hardwood

Upland hardwood stands will be restored through timber stand improvement harvests, planting, or mechanical and chemical means and may be managed through any of the techniques outlined below:

- 1) Timber harvest (thinning, salvage harvest, clear cutting, etc.).
- 2) Regeneration by planting seedlings and/or natural regeneration.
- 3) Chopping and/or rotational disking to control understory vegetation.
- 4) Chemical application (herbicides and pesticides, in the case of insect attack).
- 5) Interplanting of desirable upland hardwoods such as white oak, beech, and magnolia.

Forested Wetland

Forested wetlands (a.k.a. bottomland hardwoods) provide ideal habitat for many of the game and nongame species and are critical to protecting the water quality and hydrologic integrity of the area. Effort would be made to limit activities with the potential to impact bottomland hardwood habitats, including the construction of new roads, firebreaks, and/or wildlife openings. The transition zones between bottomland hardwood and upland pine and/or mixed pine hardwood stands have been traditional locations for firebreaks. Where possible, firebreaks would be eliminated to allow fire access to these transition zones. Periodic prescribed burning of these sites would promote several fire-dependent rare, threatened, and/or endangered plants found on the management area.

In regenerating hardwood stands and other bottomland hardwood stands, some management to improve stand quality may occur. Timber stand improvements may include selective thinning and/or removal of undesirable trees, application of herbicide, and other timber stand improvement practices. Through timber stand improvement activities, desirable hardwood species, particularly mast-producing trees, would be promoted and succession accelerated.

In general, forested wetlands will be managed through a combination of any of the following activities:

- 1) Timber harvest (generally thinning for timber stand improvement purposes only).
- 2) Regeneration by planting seedlings and/or natural regeneration.
- 3) Prescribed burning of transition areas between upland and bottomland stands (2–3 year rotation generally, including growing season and or dormant season burns).
- 4) Chopping and/or rotational disking to control understory vegetation where necessary.
- 5) Chemical application (herbicides and pesticides, in the case of insect attack).

- 6) Interplanting of desirable hardwoods or other plant species.
- 7) Maintain bottomland hardwoods by using a combination of approaches outlined in #1–6.

Pecan Orchard

A pecan specialist conducted an initial evaluation of the pecan grove in 2013. The recommendations provided by the specialist included short-term and long-term improvements including installation of an irrigation system, thinning tree crowns, removal of overcrowded, diseased, or otherwise unhealthy trees, implementation of a systematic fertilization, insect and disease management program, planting cover crops to improve soil fertility, planting skips and replacing trees with pecan varieties with proven disease resistance, yields, size and quality. The orchard is not currently irrigated, although an unused well and electrical hook-up are available for future development.

MCLB Albany manages the 7.5 acres of pecan orchard that remain after the tornado of 2017. The small, fragmented stands of remaining pecan orchard will be maintained for wildlife habitat and to provide for recreational nut production. Further planting of pecan trees has been discontinued.

Open Land

Open lands on the base are maintained by periodic mowing, herbicide application to control weeds, and other practices by Public Works Division or contractors. Other open land areas are maintained by a combination of practices such as herbicide, mechanical means, and prescribed burning. These areas are maintained by either Natural Resources or Public Works Division. Wildlife openings are managed with a combination of cool or warm season plantings of small grains, clover, and other preferred forages in addition to native vegetation.

4.3.5 Forest Protection and Health

Maintaining a healthy forest includes actively monitoring stands for insect, disease, or wildlife-related damage, controlling exotic or invasive species, managing understory vegetation through prescribed fire, mechanical or chemical means to reduce fuel loads and diminish conditions that promote forest pests, conducting periodic timber harvests and regenerating tree species appropriate to site conditions, and employing forestry Best Management Practices. General practices which protect or promote forest health employed on MCLB Albany include:

- Periodic surveillance of forested areas for signs of insect, disease or wildlife-related damage and mortality with particular attention to pine beetles (e.g., southern pine, ips, and black turpentine beetles) and fusiform rust (*Cronartium fusiforme*).
- Use of silvicultural treatments to promote stand and individual tree vigor.
- Removal of infected individual, groups, or stands of trees depending upon the severity of the infestation and damage.
- Contacting appropriate resources or reviewing literature for recommendations on implementing monitoring and control strategies.
- An integrated pest management approach will be employed when managing forest pests. Such an approach focuses on early detection, priority setting based on predicted losses, and

assessing the impacts of actions. This system recognizes the changing relationship between forest pests and trees from seedling to maturity.

A significant concern on MCLB Albany is the spread of and/or introduction of exotic plant species as a result of soil disturbance created by forestry equipment during activities such as timber harvesting, maintenance of firebreaks, or mechanical understory control. Controlling the spread of invasive plants includes measures to prevent introduction from outside sources (contractors, timber harvesting equipment) and from Base-side activities and is more cost effective than treatment. These measures will include:

- Identification of the location and size of invasive species of particular concern and regular monitoring of them.
- Development of a GIS database to track infestations of invasive plant species.
- Treatment of affected areas with emphasis on locations of future expected disturbances (timber harvest locations, firebreaks, rights-of-way, and wildlife openings).
- Periodic monitoring for new infestations following disturbances.
- Requiring vehicles and equipment to be free of soil, vegetation or other debris prior to work within forestlands and/or before moving equipment from infested areas to additional work locations.
- Requiring vehicles and equipment to be washed in a designated location.
- Requiring the use of weed free soil, fill, and mulch in construction projects adjacent to and within forestlands and follow-up monitoring of sites where potentially infested materials were used.
- Maintaining desirable species along roadsides and disturbed areas to prevent or slow the establishment of invasive plants.

4.3.6 Incorporation of the Statewide Wildlife Action Plan

As discussed in Section 4.2.1, the Georgia SWAP (GDNR 2015) details a comprehensive strategy for addressing Georgia's conservation needs. This strategy included a review of the abundance, distribution, and status of wildlife species in Georgia and their associated habitats. Of particular focus were species identified as high priority species, including those known to be rare and/or declining. The SWAP also identified existing and potential threats to these species and habitats, addressed research and survey, habitat restoration, and monitoring needs, and evaluated existing policies and programs for wildlife conservation. Through this planning and evaluation process, a list of conservation goals, strategies, and partnerships were developed. Statewide wildlife conservation themes and strategies identified in the plan focus on 1) Climate Change; 2) Other Emerging Issues; 3) Regional Conservation Partnerships; 4) Wildlife Conservation on Public Lands; 5) Assessment of High Priority Habitats and Species; 6) Conservation of High Priority Habitats and Species; 7) Education, Outreach, and Communications; 8) Increasing Capacity for Wildlife Conservation; 9) Reducing Impacts from Development and Other Activities; 10) Wildlife Laws and Regulations; and 11) Monitoring and Adaptive Management. These themes and strategies are further detailed by ecoregion.

**The *Georgia State Wildlife Action Plan* of 2015 is available at
<https://georgiawildlife.com/WildlifeActionPlan>**

MCLB Albany is located in the Southeastern Plain Ecoregion. In addition, two high priority habitats including Forested Depressional Wetlands and Longleaf Pine-Wiregrass Savanna are present on MCLB Albany. High priority plant and animal species, including Bachman's sparrow and gopher tortoise, are also present on MCLB Albany. Management objectives outlined in the INRMP are consistent with many of the themes, strategies, and actions outlined in the Georgia State Wildlife Action Plan, including statewide conservation priorities and those specific to the Southeastern Plains Ecoregion. Examples of priority strategies and actions which will occur on the Base include the maintenance of prescribed burning programs, restoration of longleaf pine and associated native understory vegetation, control of exotic species, and continued protection of the forested wetlands present on the Base.

The Installation provides habitat for numerous and varied species of mammals, birds, amphibians, reptiles, and fish. The elements of the SWAP, as well as the INRMP management measures to be taken specifically for the benefit of wildlife on the Base, are described in Section 4.2.1. In addition, the Base will consider the initiatives and goals set forth in the SWAP for the Southeastern Plain Ecoregion in the planning of its natural resources management actions to ensure that high-priority habitats that occur or could occur on the Base will be adequately promoted and conserved. The INRMP management measures identified in this document will provide both direct and indirect benefits (e.g., habitat enhancement) to state- and federally listed wildlife species that have been identified at the Base.

Management Strategies

Management strategies related to forestry at the Installation include the following:

- 1) Periodic assessments to determine the desired forest condition. Perform updates to forest management/habitat improvement plans.
- 2) Insure the conservation, restoration, and/or maintenance of native ecosystem integrity and native biological diversity, to the maximum extent practicable, with consideration of the military mission.
- 3) Conduct regular inventories of forest stands for species composition and volume.
- 4) Ensure GIS databases and other forest management planning tools are updated regularly with forest stand data.
- 5) Develop a standardized timber assessment form (include insect damages on form).
- 6) Develop and implement a longleaf pine restoration plan (see Barbour et al. 2013).
- 7) Prepare and implement a prescribed burn plan. Conduct annual prescribed burn reviews and update burn plans accordingly.

MCLB Albany's NRP should consider opportunities to enter into conservation partnerships with federal, state, and local agencies, and NGOs, to improve wildlife habitat at the Base. Where possible, military readiness activities should be located, to the extent practical, to avoid and minimize impacts on wildlife species and habitat.

Ecosystem Management

Proper forest stand management improves stand conditions while improving wildlife habitat and outdoor recreation opportunities. INRMPs are required by Marine Corps Order to use ecosystem management principles to protect and enhance natural resources. Therefore, forests on MCLB Albany cannot be managed solely for, or to the exclusion of, forest products.

Additional Sources of Information

- Georgia Department of Natural Resources, State Wildlife Action Plan (<https://georgiawildlife.com/WildlifeActionPlan>)
- U.S. Forest Service (<http://www.fs.fed.us>)
- Georgia Forestry Commission (<http://www.gfc.state.ga.us/forest-management/>)
- University of Georgia, College of Agricultural & Environmental Science, Forest Stewardship Program (<https://extension.uga.edu/topic-areas/environment-natural-resources/forestry.html>)

4.3.7 Fire Management

Fire is a natural element of many ecosystems and is beneficial for natural vegetation and wildlife. Fire management at MCLB Albany consists of wildfire prevention and control as well as prescribed fire management. Fires, whether prescribed or natural, provides opportunities to control vegetative growth, manage wildlife habitat, reduce hazardous fuel accumulations, prepare sites for reforestation by creating planting space, and reduce competitive vegetation. Burns of the appropriate intensity, duration and frequency can potentially benefit populations of three rare plants and five rare wildlife species on the Installation (Barbour et al. 2013). The control of a prescribed fire is very similar to the suppression of a natural wildfire and can also provide a valuable training opportunity for firefighters. Prescribed burning can serve all of these purposes at MCLB Albany and be a valuable element of the forest and wildlife management programs. Prescribed burning and wildfire management are addressed in the MCLB Wildfire Protection Plan (USACE 2010) and the Burn Plan (MCLB 2019b).

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Wildland Fire Management

- The Forest Service Directive System consists of the Forest Service Manual and Handbooks, which codify the agency's policy, practice, and procedure. The system serves as the primary basis for the internal management and control of all programs and the primary source of administrative direction to Forest Service employees.
- The Guidance for Implementation of Federal Wildland Fire Management Policy (USDA and U.S. Department of the Interior 2009) provides for consistent implementation of the 1995/2001 Federal Fire Policy, as directed by the Wildland Fire Leadership Council. This guidance also calls for increased dialogue and collaboration between federal agencies and

tribal, local, and state agencies as plans are updated and implemented to manage wildfires in order to accomplish resource and protection objectives.

- DODINST 6055.6, DOD Fire and Emergency Services Program establishes a comprehensive Fire and Emergency Services Program and prescribes policies to prevent and minimize loss of DOD lives and damage to property and the environment.
- 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. DOD is presently exploring the possibility of seeking membership in the NWCG. The NWCG is made up of all Federal agencies (except 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. 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.

Prescribed fire is an integral part of the management of southern pine forests and the associated early successional vegetation. Appropriate application of fire can control hardwood intrusion and growth in upland pine stands and perpetuate early successional habitat. Prescribed burning is beneficial in many other ways including reducing fuel levels, improving access into stands, reducing population of pest species such as ticks or pine beetles, improving pine health and vigor, and for aesthetic reasons. Without prescribed fire stand fuel levels can build to the point where accidental, intentional, or natural fires may produce catastrophic results causing property or timber damage and loss of wildlife habitat. Alternative methods to prescribed burning for managing early successional habitat such as mowing, chopping, or herbicide treatment are time consuming and costly.

Prior to European settlement southern pines forests burned frequently as a result of Native American activities and due to lightning strikes. Plant communities such as the longleaf pine-wiregrass forest that dominated southwest Georgia and the associated animal communities were well-adapted to the fire regime. Adaptations included protective covering on bark or sensitive buds, use of burrows or cavities for refuges, and reproductive strategies that gave species the ability to rapidly recolonize or recover following a burn. After European settlement, much of the longleaf pine-wiregrass forest was converted to agricultural, intensive forestry, industrial, or other uses and today less than 2% of this forest plant community remains. Some of the residual longleaf pine-wiregrass was perpetuated in southwest Georgia in turpentine plantations for the naval stores industry, cattle ranches, and later on quail plantations. These residual stands of longleaf pine are generally associated with a diversity of plant species rivaling that of tropical rainforests. Small remnant pockets of longleaf pine-wiregrass forest exist on MCLB Albany with the largest stand occurring along Fleming Road adjacent to the temporary test track. The vast majority of upland pine forests in southwest Georgia are now dominated by planted loblolly and slash pine plantations. These species are less fire-adapted and significantly shorter-lived than longleaf but are generally faster growing on sites with higher soil indices (productivity). The majority of upland pine sites on MCLB Albany consist of planted slash pine or loblolly pine established between 1960 and 1970.

Upland pine sites (including longleaf, slash, and loblolly) will readily convert to mixed pine hardwood and eventually hardwood if fire is precluded through the process of vegetative succession. As succession occurs, the herbaceous understory vegetation, including grasses such as wiregrass, broomsedge, bluestem and legumes such as partridge pea and beggarweed, become overshadowed by hardwood competitors (e.g., oak, sweetgum, maple, cherry, etc.) and disappear. Due to the relatively long growing season in southwest Georgia succession proceeds rapidly. Herbaceous plants provide habitat for game species such as northern bobwhite, white-tailed deer, and turkeys and nongame species such as gopher tortoises, indigo snakes, and Bachman's sparrows. Collectively animals that utilize this herbaceous plant community are known as early successional species. As this habitat type has declined, so have numbers of northern bobwhite, rabbits, and other early successional obligate species.

Management Strategies

Management strategies related to wildland fire at MCLB Albany include the following:

- 1) Conduct fire management activities per the guidelines and recommendations presented in the MCLB Albany Wildfire Protection Plan (USACE 2010).
- 2) Update the Wildfire Protection Plan as site conditions warrant.
- 3) Control wildland fires with fire breaks and understory vegetation management. Soil conditions should be investigated prior to establishment of firebreaks so as not to increase soil erosion problems. Firebreaks should be located where they will not encourage colonization or spread of exotic or nuisance vegetation. Use roads as natural firebreaks where suitable.
- 4) Implement prescribed burns where consistent with the mission, sound ecological practices, and safety considerations.
- 5) Implement prescribed burns in consideration of locations of upland pine communities.
- 6) Wildfire conditions must be monitored regularly so that when wildfires do occur, Installation personnel are aware of fire danger conditions and can make informed decisions regarding the threat posed to developed areas on and off the Installation and the degree of control that each merits.

Generally, southern pine forests are prescribed burned on a 1–3 year rotation. Longer rotations allow hardwood competitors to become well-established and degrade the quality of early successional habitat. Ideally larger timber stands should be broken into multiple blocks of < 25 acres in size and burned on an alternating basis so that $\frac{1}{2}$ to $\frac{1}{3}$ of the timber is burned each year. Burning in smaller blocks creates a juxtaposition of different burn ages in stands and is favorable to wildlife.

Prescribed fires conducted to reduce fuel loads are generally conducted during the dormant season (winter) when temperatures are lower and the weather is more predictable. They also minimize damage to desirable vegetation. The dormant season is typically defined as the period between the first frost and spring green-up which is November to March in Georgia. Most land managers usually begin burning after deer season ends on January 16th. Growing season (summer) prescribed fires are conducted to reduce mid-story hardwood trees and encourage the reproduction and growth

of herbaceous vegetation. Over the past decade, growing season fire (April–August in Georgia) has been increasingly recognized for its benefits in promoting the seeding and reproduction of species such as wiregrass and greater effectiveness in controlling hardwood competition. Additionally, burning during the summer season more closely mimics natural fire regimes. Prescribed burning does not eliminate all hardwoods within an upland pine stand, however, desirable hardwoods (large live oaks) within upland pine stands, can be damaged by repeated prescribed burning activities. Such desirable hardwoods can be protected by installing firebreaks or by removing vegetation around the base of the tree to reduce fire intensity.

The disadvantage of relying entirely on dormant season fire is that while it does a good job top-killing hardwood, it does not kill the root system, and the hardwoods simply re-sprout from rootstock the following spring. Over a period of years, the hardwoods outcompete the herbaceous understory plants and become the predominant understory and mid-story vegetation. As this occurs, the burn fuel composition changes and hardwood leaves become more predominant. Many hardwood leaves do not carry fire well. This is an advantage to the hardwoods as fire intensity is lessened and more hardwoods survive subsequent fires. More intense fires can burn through pine stands with heavy hardwood under- and midstories. However, as fire intensity increases so does the opportunity for damage to the desirable trees to occur or for other issues (embers spotting fire into adjoining stands, etc.) to arise. Due to the condition of the understory and midstory in the majority of pine stands, fires of moderate intensity are anticipated. Occasional hot spots will be unavoidable—especially where debris has been piled along rights-of-way. Tree mortality will likely be observed in these hot spots.

At MCLB Albany, the NRP goal is to burn stands on a 2-year rotation and a combination of dormant and growing season fire is implemented. Typically, burn season on the Installation begins in January and finishes up in June. The program has been focused more on burns in late March to June because the best hardwood control can be achieved at this time and it encourages flowering and seed production of beneficial understory plants. However, personnel constraints, equipment issues, and weather factors have constrained the amount of prescribed burning conducted over the past 5 years (Table 9). The limited application of fire is readily apparent by the presence of midstory hardwoods (3'–20' heights) or loblolly and slash pine regeneration in upland pine stands. The vast majority, if not all, of previous burning focused on dormant season fire. As part of a solution to this, the new Wildlife Biologist position in the Natural Resources branch will work on a prescribed burning program with a two-year fire return interval, chemical treatment and removal of undesirable vegetation, thinning of timber stands, and restoration of native ground cover. The goal for these burns will be to increase early successional and pine savannah habitats which will benefit the gopher tortoise population and other species like the Bachman's sparrow and northern bobwhite quail.

Table 9. Prescribed Burn Data for Marine Corps Logistics Base Albany.

Year	Acreage
2015	314.4 acres
2016	613.7 acres
2017	812.0 acres
2018	119.5 acres

Year	Acreage
2019	382.0 acres

Prescribed fires are managed by the Environmental Branch, Natural Resources Section, at MCLB Albany, and for each burn they follow a Job Hazard Analysis and a Wildfire Protection Plan (WPP) (USACE 2010). Burn permits are obtained from the Georgia Forestry Commission and are scheduled according to environmental, weather and fuel load conditions as detailed in the Installation’s WPP. The responsibility of a prescribed fire generally lies with the Burn Boss who will coordinate all aspects of the fire but should closely coordinate with the NRM.

Approximately 32 acres of orchards and 1,523 acres of forestland are found on MCLB Albany. Much of this habitat surrounds key military infrastructure, administrative areas, and residential housing of the Installation (Figure 4 and Figure 7). Fire management of the Installation is based on burn units, which are comprised of one to several different stands of timber consolidated based upon: (1) presence of existing firebreaks and/or roads on at least one side of the unit (2) access to the unit, (3) size, and (4) the cohesiveness of the unit (e.g., limit the number of roads/firebreaks within the unit) (Figure 4 and Figure 7). An assessment of each upland pine stand on MCLB Albany is conducted during October through January to determine suitability for prescribed burning. During this assessment the condition of the understory, midstory and overstory vegetation and fuel levels are documented.

There are some stands or portions of stands on MCLB Albany where fire exclusion has occurred to the point that a fire will not likely carry through the stand unless mechanical (mowing or chopping) or chemical (herbicide) treatment occurs. Such stands have been identified during the evaluation process and treatment initiated in FY13. Many of these stands are located adjacent to administrative buildings. Timber sales, focusing on thinning, will help reduce fuel levels and may improve access into many of these stands so that additional management measures can be utilized to improve aesthetics and manage habitat.

Generally, not all proposed areas in a given year will be prescribed burned due to limiting factors such as appropriate weather conditions and personnel shortages. Stands will be selected for prescribed burning on appropriate burn days based upon weather parameters such as wind direction, fuel loads, etc. On the day of a prescribed burn, the designated Burn Boss checks weather conditions and contacts the Georgia Forestry Commission to obtain a Burn Permit. Once the permit is attained, a safety briefing is conducted with the burn crew. Also, a Base Wild Card is sent informing those aboard the Base the location of the burn and the Base Fire Department and MCPD are notified as to the location of the burn(s). The crew is provided information relative to weather conditions, stand conditions, safety hazards, communications, and escape routes. At the site of the controlled burn, a small test fire is often lit to determine fire behavior. A back fire is lit soon after so that the flames burn into the prevailing wind direction. Flame lengths and fire intensity are fairly low during backfires. The back fire is allowed to burn approximately 30 yards into the stand to create a solid blackline. Once the blackline is well-established a variety of techniques could be employed to burn the remaining stand including head fires, strip fires, spot fires, and flank fires. Rarely would a ring fire be employed—with the exception of burning brush piles. Fire lines and fire behavior are continuously monitored during the prescribed burn. Fire lines are maintained by 50-gallon skid units on UTVs and the 1,000-gallon water trailer. If needed, smoke signs will be

put up. Natural Resources utilizes features such as maintained grass, canals, and roadways as firebreaks. Just a small amount of water sprayed onto the ground in maintained grass areas can create an effective fire line. In FY13 the existing firebreak system on MCLB Albany was renovated by contracting the Georgia Forestry Commission. This break system includes 18.2 miles of plowed firebreaks.

Ecosystem Management

Prescribed fires, implemented through annual updates to the MCLB burn plan, are an ecosystem-based management tool that can prevent wildfires, improve wildlife habitat, and restore natural ground cover. Additionally, prescribed burns of the appropriate intensity, duration and frequency can potentially benefit populations of three rare plants—crestless plume orchid, beak rush, and woodland poppy-mallow—and six rare wildlife species—eastern tiger salamander, eastern diamondback rattlesnake, eastern indigo snake (*Drymarchon couperi*), northern bobwhite, loggerhead shrike, and Bachman’s sparrow—and would significantly benefit longleaf pine woodlands, a significant natural community (Table 3, Table 4, Table 6, and Table 7) (Barbour et al. 2013).

Additional Sources of Information

- U.S. Forest Service, Fire and Aviation Management (<http://www.fs.fed.us/fire/safety/index.html>)
- U.S. Forest Service, Fire Effects Information System (<https://www.feis-crs.org/feis/>)
- National Interagency Fire Center (<http://www.nifc.gov/>)
- Georgia Forestry Commission, Prescribed Fire (<http://www.gfc.state.ga.us/forest-management/prescribed-fire/>)
- Georgia Prescribed Fire Council, (<http://www.garxfire.com/>)

4.4 OUTDOOR RECREATION MANAGEMENT

One of the goals and purpose of this INRMP is to provide for effective stewardship and management of MCLB Albany’s natural resources, which includes promoting outdoor recreation and education under the requirements of SAIA, while meeting military mission requirements.

This section addresses the development and implementation of techniques and programs for managing outdoor recreation resources at MCLB Albany and providing educational outreach and includes the following management focus areas:

- 1) Section 4.4.1 – Fishing and Hunting Management
- 2) Section 4.4.2 – Public Access
- 3) Section 4.4.3 – Educational Outreach

4.4.1 Fishing and Hunting Management

Hunting and fishing programs at MCLB Albany are managed by the NRM. Hunting is a natural resource program, and as stated in the SAIA, DODD 4700.4, and MCO 5090.2 management of natural resources shall be carried out by professionally trained natural resource personnel. The Sikes Act 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 consistent with the needs of the fish and wildlife resources, or with safety and military security requirements.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Fishing and Hunting Management

- EO 11644 (8 February 1972), Off-Road Vehicles on Public Lands, which establishes policies and provides for procedures that will ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands.
- EO 11989, Section 9 (24 May 1977), Off-Road Vehicles on Public Lands, which allows agencies to restrict the use of off-road vehicles (including all vehicles used in hunting and other outdoor activities when off paved surfaces) on lands under their management, when it is determined that the use of off-road vehicles will cause, or is causing, considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat or cultural or historic resources of particular areas or trails of the public lands.
- EO 12962 (9 June 1995), *Recreational Fisheries*, requires Federal agencies to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities.
- EO 13443 (18 January 2007), *Facilitation of Hunting Heritage and Wildlife Conservation*, directs Federal agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.
- Georgia Parks and Wildlife Code, prescribes general provisions for hunting and fishing in Georgia.
- Armed Forces, Military Reservations and Facilities: Hunting, Fishing, and Trapping, 10 U.S.C. 2671, provides general requirements for hunting, fishing, and trapping on military reservations and facilities.
- SAIA of 1997, 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.
- SAIA of 1997, 16 U.S.C. 670c defines a program for developing facilities for outdoor recreation in cooperation with federal and state agencies.
- DODD 4700.4, Natural Resources Management Program, prescribes policies and procedures for an integrated program for multiple-use management of natural resources on DOD property.

- MCO 5090.2 discusses natural resources management relative to the protection and management of outdoor recreational resources.

Hunting and fishing is authorized for all persons on the Installation who are active duty military personnel stationed at MCLB Albany, their dependents and guests; retired military personnel and their dependents; and, civilian personnel that are employed at the Installation. Three human-made ponds—Robinson Pond (0.58 acres), Covella Pond (5.18 acres), and Horseshoe Pond (2.1 acres)—and one naturally occurring cypress pond, Indian Lake (66.0 acres), provide angling and other recreational opportunities at MCLB Albany (Figure 6 and Figure 9). All hunting and fishing on the Base must be in compliance with the provisions listed in Base Order 1720.17R, *Hunting, Fishing, and Boating Regulations*, as well as with the applicable portions of the Georgia State Hunting and Fishing Regulations.

Hunting for white-tailed deer (*Odocoileus virginianus*), mourning dove, northern bobwhite, eastern cottontail rabbit, and eastern gray squirrel is permitted on the undeveloped portions of the Installation that are under the forestry program (Figure 9). Deer hunting is limited to archery only using bows with a minimum pull of 40 pounds, and shotguns of 12 gauge or smaller are permitted for small game.

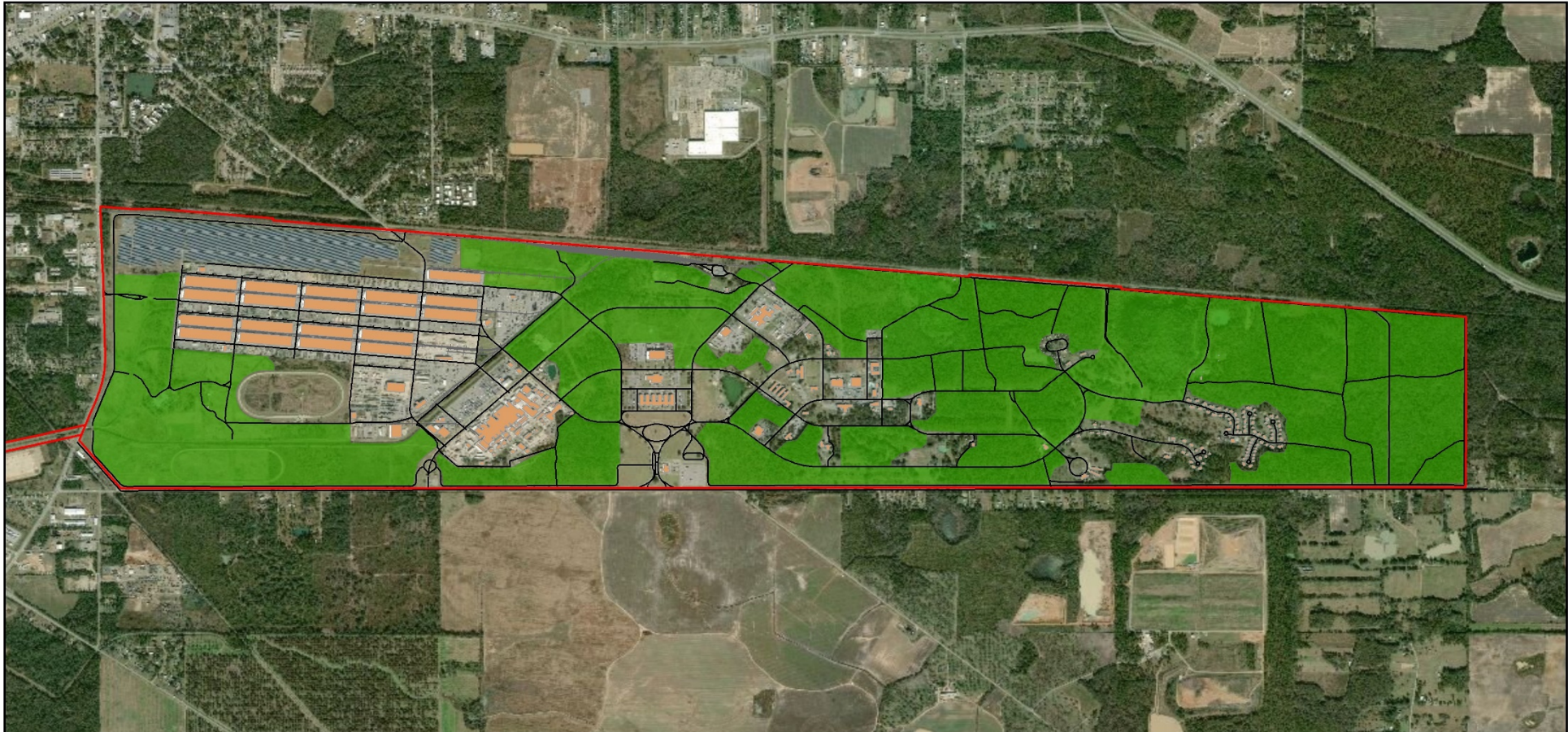
All hunters and anglers must purchase MCLB Albany hunting and fishing permits. Retired military who are over age 65 and their dependents, and 100-percent disabled veterans who possess a State of Georgia Honorary Hunting and/or Fishing License will be issued an honorary MCLB Albany Hunting and/or Fishing Permit free of charge. Hunting and fishing activities at MCLB Albany require continual management. Harvest limits should be reviewed annually, and regulations should be updated as needed to remain consistent with land use decisions, as well as to provide for sustainable fish and wildlife management.

Management Strategies

Management strategies related to fishing and hunting at MCLB Albany include the following.

- 1) Maintain current fishing and hunting logs for the Installation.
- 2) Evaluate hunting and fishing data annually to identify opportunities to expand fishing and hunting activities.
- 3) Monitor invasive and nuisance wildlife to determine whether wildlife removal, relocation, other remedial actions are necessary to protect natural resources and/or human health and safety. Assess if hunting may be expanded to target invasive and nuisance wildlife to facilitate control of the species.
- 4) Ensure all hunters pass the National Bowhunters Education Foundation course before granted a permit to hunt on the Installation.
- 5) Identify opportunities to partner with outside entities (e.g., GDNR, Abraham Baldwin Agricultural College) to facilitate collection of data on hunting and fisheries resources.
- 6) Conduct annual surveys as needed to facilitate species management and implement management activities.

- 7) Conduct annual fall deer census. Use annual harvest data, spotlight surveys, game cameras to study deer populations, update management plans annually, and implement needed management actions.



- Legend**
- MCLB Albany Installation Area
 - Building
 - Road
 - Hunting Permitted

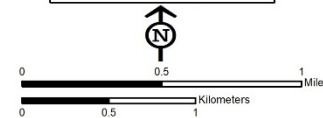


Figure 9. Hunting Areas
 Marine Corps Logistics Base Albany
 Albany, GA

DRAWN BY M. MASON	DATE 02/05/20
APPROVED BY S. BUCHANAN	DATE 02/25/20

SOURCE: MCLB Albany 2020. Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Hunting

To ensure that deer hunters are proficient, they must qualify on an annual basis. The Base Game Warden instructs hunters in safe hunting techniques that will help to ensure a safe and successful hunting season. Since all deer hunting must be done from an elevated stand, hunters must qualify by shooting from a deer stand. Targets are placed at 30 yards from the platform and the hunter must be able to place two out of three arrows in the kill zone of each target in order to qualify. Hunters who fail to qualify are given another opportunity, approximately one week later. The hunting seasons on base comply with hunting seasons established by the GDNR. All hunters are required to possess a Georgia hunting license, a MCLB Albany Hunting Permit, and a MCLB Albany Area Pass. The MCLB Albany Area Pass can be obtained from the Game Warden prior to hunting and allows the hunter to hunt in a specific area. No more than 10 hunters are permitted to hunt in any one area. All hunters must check in and out daily with the duty Game Warden.

A fall census of the deer population determines the harvest that will be allowed during the hunting season. Does and bucks are permitted to be taken, but bucks must have antlers with a 14” inside spread or 17” main beam length (Table 10). Seasons and bag limits for all species will be set each year and published in a MCLB Albany Hunting Base Bulletin in August of each year.

Table 10. Hunter Harvest Data.¹

Season	Bucks	Antlerless	Total
2000/2001	7	14	21
2001/2002	7	16	23
2002/2003	3	10	13
2003/2004	5	17	22
2004/2005	10	12	22
2005/2006	11	27	38
2006/2007	12	30	42
2007/2008	13	19	32
2008/2009	8	40	48
2009/2010	11	27	38
2010/2011	18	26	44
2011/2012	11	41	52
2012/2013	8	34	42
2013/2014	12	34	46
2014/2015	7	20	27
2015/2016	14	16	30
2016/2017	16	24	40
2017/2018	12	20	32
2018/2019	16	12	28

¹ Data from the 2000/2001 to 2006/2007 seasons has been corrected from the harvests reported in the 2007 INRMP to omit deer deaths that were not due to hunting.

Fishing

The four water bodies on MCLB Albany are managed per recommendations of the MCLB Albany Pond Management Plan (MCLB Albany 2012b) to ensure water quality, fish populations, stocking, harvest strategies, feeding rates, and pond renovation activities to support high quality aquatic habitat and associated recreational fisheries (Table 11). The ponds are generally open year-round, although, some are closed in late fall for restocking and occasionally longer-term for pond renovation. Fishing from the banks is permitted for all of the ponds and boats with electric trolling motors can be used on Indian Lake. John boats are available for rent from MCCA.

Table 11. Creel Limits

Species	Size Limit (inches)	Daily Limit
Largemouth bass	12	10
Bream	None	50
Catfish	None	No limit
Crappie	None	30

Source: eRegulations. 2020.

Covella Pond

Covella Pond provides fishing opportunity for channel catfish and hybrid striped bass. The pond was renovated in December 2012 following a fish-kill associated with the protozoan ectoparasite, *Ichthyophthirius multifiliis*, and to remove competitive fish species including bluegill, shiners, and grass carp. Channel catfish and hybrid striped bass populations are monitored through harvest records and fish will be re-stocked annually as needed during the fall/winter. Automatic fish feeders were installed in FY13 help to ensure a consistent source of food and improve fish growth rates. Facilities improvements for Covella Pond include new information boards and sign-in kiosks installed in October 2013. Handicap fishing access areas are being planned to be installed in order to accommodate wheelchair bound anglers.

In addition to open fishing opportunities, each June the Buddy Fishing Tournament is held at Covella Pond. The event is sponsored by MCLB Albany for military dependents and community children under the age of sixteen, to promote natural resources awareness and enable the local community to interact with the Marines. The overall planning and management of the tournament is handled by the Natural Resource section and the Environmental Branch.

Robinson Pond

Robinson Pond was initially dug and used as an irrigation pond for the golf course aboard MCLB. Three wells supplied water to the pond, although now only one well is operational. Following closure of the golf course, the pond remained idle until tests could confirm that pesticides used on the golf course were not present in the fish. Following the recommendations prepared by the pond management consultants Robinson Pond was designated as a youth fishing pond in FY13. The pond provides catch and release fishing opportunity for bluegill, hybrid striped bass, largemouth bass, and channel catfish. An inaugural stocking of rainbow trout occurred in November 2013 and provided catch-and-release opportunity through February, after which time youth anglers were allowed to remove up to seven trout daily until all trout were removed.

Due to the small size of the pond and steep banks, a fishing pier was installed in FY13 and provides the only fishing access to the pond. The fishing pier is large enough to accommodate multiple families. A fence was installed in FY14 to prevent access to the pond banks and improve safety. A pavilion, picnic tables, benches, new message center, and sign-in kiosk were installed in FY13. These amenities will provide a more family-friendly venue and encourage youth participation in outdoor activities on MCLB.

Robinson Pond experienced a significant fish-kill due to aquatic weed (slender naiad and filamentous algae) die-off in June of 2013. Grass carp, channel catfish, bluegill and bass > 5 inches in length died off as a result of oxygen depletion following a rapid build-up and die-off of the aquatic weeds. Following the fish kill, an aerator was permanently moved to the pond to supplement oxygen levels and two treatments of aquatic herbicides (Cutrine Plus and Reward) were applied to remove residual aquatic weed growth. Grass carp were restocked in September 2013 to provide additional control of aquatic weeds. Channel catfish and hybrid striped bass will be restocked in FY14. Periodic monitoring will be necessary to ensure that a proper balance of bluegill and bass is achieved, and aquatic weeds are controlled. The automatic fish feeders installed along the shore ensure adequate growth of fish to support the fishery.

Horseshoe Pond

Following management plan recommendations, a well was installed in Horseshoe Pond in FY14 in an effort to control water levels. Future renovation efforts at the pond will include removing the existing fish population and restocking with channel catfish, hybrid striped bass, and grass carp. During the winter months, rainbow trout will be stocked to provide additional angling opportunity. Automatic fish feeders will be installed to ensure a consistent source of food and improve fish growth rates. Facility improvements include new picnic tables (including an Americans with Disabilities Act table), benches, and kiosks.

Indian Lake

Indian Lake supports limited fish populations due to adverse water quality conditions including low dissolved oxygen levels and lower than ideal pH levels. The large amounts of aquatic vegetation and other organic matter that naturally accumulate in cypress domes depletes oxygen levels and limits fish species to those that can tolerate such conditions. Surveys of the fish species located in Indian Lake have found spotted gar, bullhead catfish, flier, and bowfin. These species provide limited angling opportunities. Reducing the amount of organic matter by prescribed burning or excavating may temporarily improve fishing in Indian Lake; however, neither technique is recommended or provides long-term benefits. The focus of recreational activities associated with Indian Lake will be wildlife watching.

Periodic herbicide application will be used to maintain open water areas and reduce the amount of water lilies and other aquatic vegetation. These open water areas will provide the majority of the fishing opportunity as well as providing wildlife viewing locations.

Ecosystem Management

Ecosystem management practices are enhanced by environmental stewardship and by providing authorized personnel with outdoor recreational opportunities. By providing natural recreational opportunities on the Installation, MCLB Albany would help promote public awareness of vital

environmental resource issues, including management measures in federally listed wildlife species, and improve the quality of life for DOD personnel.

Additional Sources of Information

- International Hunter Education Association (<http://ihea-usa.org/hunting-and-shooting/requirements/hunter-education-requirements>)
- GDNR, Hunting Regulations (<http://www.eregulations.com/georgia/hunting/>)
- GDNR, Fishing Regulations (<http://www.georgiawildlife.com/fishing/regulations>)
- GDNR, Hunter Education (<https://georgiawildlife.com/hunting/huntereducation>)

4.4.2 Public Access

The military mission of MCLB Albany limits public access to most areas of the Installation; however, controlled public access is allowed for participation in some outdoor recreation and education activities (e.g. specific events like the Buddy Fishing Tournament).

Marine Corps policy is to permit access to outdoor recreation resources to the greatest degree possible, consistent with the installation's safety and security requirements and its available manpower and natural resources to support such activities without degradation or impairment of environmental qualities. The degree of public access for recreational purposes will be dependent on the area of the Installation being considered. Any limitation or regulation required will be based on mission, security, and safety requirements.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Public Access

- SAIA of 1997, 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.
- SAIA of 1997, 16 U.S.C. 670c, defines a program for developing facilities for outdoor recreation in cooperation with federal and state agencies.
- MCO 5090.2 discusses natural resources management relating to the protection and management of outdoor recreational resources.

Management Strategies

Management strategies related to public access at MCLB Albany include the following:

- 1) Assess the feasibility of developing an outdoor education programs available to the public that showcases natural resources projects implemented by the U.S. Marine Corps. The program will identify and encourage participation in natural resources activities such as International Migratory Bird Day, National Public Lands Day, Christmas Bird Counts, and National Arbor Day.
- 2) Work with Public Affairs to provide for public access for use of natural resources consistent with SAIA requirements, subject to safety and military security considerations.

- 3) Review issues that currently affect public access to outdoor recreational resources and modify access to provide for greater recreational opportunities to the extent possible based on security and mission requirements.

In accordance with the SAIA, an INRMP shall, to the extent appropriate and applicable, provide for public access to an installation for the use of natural resources, including outdoor recreation, subject to safety, military security considerations, and the military mission. Additionally, public access for the use of the natural resources for outdoor recreation should not result in degradation of the installation's natural resources. In addition to traditional outdoor recreation activities such as hiking, wildlife watching, fishing, and hunting, outdoor recreation activities can include educational programs that foster a sense of responsible stewardship for military personnel and the general public who are authorized access to an installation for these recreational purposes.

The military mission of the Installation restricts public access, and, therefore, long-term management of public access issues is concentrated on providing public access in relation to education and stewardship purposes.

Ecosystem Management

Ecosystem management practices are enhanced by environmental stewardship and by educating the general public about environmental conservation issues, problems, and solutions. Natural recreational and educational opportunities on the Installation would help promote public awareness of vital environmental resource issues, including federally protected resources, thus providing a regionally limited educational resource. In addition, the Installation will provide opportunities for educating the public on the values and characteristics of a healthy environment, identify some of the problems and solutions associated with human use of the environment, and showcase the measures the Navy has adopted for protection of natural resources under their jurisdiction, including federally listed plant and animals species known to occur at the MCLB Albany.

Additional Sources of Information

- Albany Georgia, Recreation and Parks Department (<https://www.albanyga.gov/about-us/city-departments/recreation-parks-department>)

4.4.3 Educational Outreach

Educational programs foster a sense of responsible stewardship in military personnel and the general public who use the wildlife recreational opportunities of an installation. Educational outreach may include coordination with local, regional, state, national, or international organizations or public groups.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Educational Outreach

- SAIA of 1997, 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.
- SAIA of 1997, 16 U.S.C. 670c defines a program for developing facilities for outdoor recreation in cooperation with federal and state agencies.

- MCO 5090.2 discusses natural resources management relating to the protection and management of outdoor recreational resources.

Management Strategies

Management strategies related to educational outreach at the Installation include the following:

- 1) Continue to coordinate the development and implementation of the outdoor recreation and educational program covered by this INRMP with the MCCA.
- 2) Develop an outdoor education program to showcase the Marine Corps' stewardship of natural resources, and to emphasize that this stewardship is important to the military mission and habitat conservation.
- 3) Seek out partnerships with USFWS, GDNR, USDA NRCS, Audubon Society, Nature Conservancy, DOD PIF, and other local agencies and organizations, to provide educational opportunities at MCLB Albany.
- 4) Create a Natural and Cultural Resource Center: house displays, taxidermy, artifacts, long leaf pine fire history, and artwork.
- 5) Create an interpretive trail with signage.
- 6) Develop informational handouts containing species lists, photos, and descriptions of RTE species.

The MCLB Albany MCCA and Natural Resources Program are responsible for developing and coordinating the outdoor recreation and educational programs as part of implementation of this INRMP. An active outdoor education program is important in fostering in the general public an appreciation and a sense of stewardship for the plants, animals, and ecosystems of a region.

The Installation provides unique opportunities for scientific study. Cooperative agreements with local or regional fish and wildlife agencies, conservation organizations, and education organizations have been initiated in the past and will continue to be supported.

Ecosystem Management

Ecosystem management practices are enhanced by environmental stewardship and by educating the general public and Installation personnel about environmental conservation issues, problems, and solutions. By providing natural recreational and educational opportunities on the facility, MCLB Albany would help promote public awareness of vital environmental resource issues, including protection and conservation measures in place for rare, threatened and endangered species and actions conducted to promote/restore significant natural communities. In addition, MCLB Albany will promote activities that teach the values and characteristics of a healthy environment and responsible use of the environment.

Additional Sources of Information

- The Parks at Chehaw (<http://chehaw.org/>)
- GDNR, Education (<http://www.gadnr.org/education>)
- Georgia Natural Resources Foundation (<http://georgianrf.org/>)

- Atlanta Audubon Society (<https://www.atlantaaudubon.org/>)
- TNC, Georgia, Growing the Next Generation of Conservation Leaders (<https://www.nature.org/en-us/about-us/where-we-work/united-states/georgia/explore/growing-the-next-generation-of-conservation-leaders.xml>)

4.5 INTEGRATED ECOSYSTEMS MANAGEMENT AND PARTNERING

This section addresses the development and implementation of integrated ecosystems management and partnering. The integrated ecosystems management and partnering activities of this INRMP include:

- 1) Section 4.5.1 - Training of Natural Resources Personnel
- 2) Section 4.5.2 - Natural Resources Law Enforcement
- 3) Section 4.5.3 - GIS, Data Integration, Access, and Reporting
- 4) Section 4.5.4 - Partnering with Federal and State Agencies, Universities, and NGOs

4.5.1 Training of Natural Resources Personnel

Marine Corps regulations require that every person in a natural resources program receive comprehensive natural resources training specific to their job assignment and maintain continued professional training needed for the work (MCO 5090.2). Furthermore, the SAIA, as amended, requires that a sufficient number of professionally trained natural resources managers are available to implement this INRMP for MCLB Albany.

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

- SAIA, 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 and to provide its personnel with professional training in fish and wildlife management.
- DODD 4700.4, Natural Resources Management Program, prescribes policies and procedures for an integrated program for multiple-use management of natural resources on DOD property.
- MCO 5090.2 requires that every person in a natural resources program receive comprehensive natural resources training specific to their job assignment and maintain continued professional training needed for the work.

Natural resources personnel on the Installation should receive training in all areas of environmental management. Management of water resources, soil, vegetation, landscaping, forests, wildlife, outdoor recreation, and GIS are all interrelated. Specific training needs for natural resources personnel at MCLB Albany include:

- Erosion and sediment control, water quality protection, and use of effective management practices.
- Identification of wetlands and other sensitive habitats and species.

- Pesticide applicator certification training.
- Field techniques for invasive plant management.
- Techniques for grounds maintenance, landscape, and agricultural outlease management.
- Prescribed burning for wildland fire management.
- Conservation biology.
- GPS and GIS training.

Receipt of adequate natural resources training that covers the broad range of natural resources issues associated with the Installation will improve coordination and ensure natural resources conflicts can be resolved within the confines of regulatory requirements and the military mission. MCLB Albany currently funds the NRM position to provide for oversight of natural resources management at the Installation.

Management Strategies

Management strategies related to training of natural resources personnel include:

- 1) Monitor and assess staffing and equipment needs. Provide adequate staffing, equipment, technology, and training for the NRM and environmental staff to ensure successful implementation of projects and management strategies identified in this INRMP.
- 2) As a cost savings measure, evaluate opportunities to procure equipment or work in partnership with other agencies to accomplish natural resource management needs.
- 3) Assess training needs for Installation personnel who may be conducting actions that directly affect the natural resources addressed in this INRMP (i.e., grounds maintenance, public works).
- 4) Encourage staff training via courses offered through collaborating agencies, including Field Techniques for Invasive Plant Management, Conservation Biology (offered by the USFWS National Conservation Training Center), and Pest Applicator Certification Training (offered by the Armed Forces Pest Management Board).

The NRM and other natural resources personnel are encouraged to attend local classes, workshops, and seminars as appropriate, especially as new regulations and management techniques are developed for natural resources management.

Ecosystem Management

Ecosystem management is a holistic, adaptive-management concept that transcends human-made boundaries. Management for a sustainable ecosystem requires awareness, education, training, and responsible participation of individuals potentially affecting the ecosystem, as well as adjustments in management principles and practices to respond to new knowledge and dynamic conditions.

Plans and programs for maintaining and managing natural resources at the Installation need to fully consider the interrelationships among resources on the Installation and assure no net loss of the military mission. The input and cooperation of regulatory agencies and other experts will best facilitate the success of these plans and programs.

Additional Sources of Information

- USFWS National Conservation Training Center (<http://nctc.fws.gov/>)
- Air Force Certification Programs (https://www.acq.osd.mil/eie/afpmb/training_courses.html)
- Navy Public Health Training Center (<http://www.med.navy.mil/sites/nmcphc/nepmu-6/Pages/education-and-training.aspx>)
- EPA, Education (<http://www.epa.gov/osw/education/train.htm>)

4.5.2 Natural Resources Law Enforcement

Section 107 of the Sikes Act (16 U.S.C. 670e-2) requires sufficient numbers of professionally trained natural resources management personnel and natural resources law enforcement personnel to be available and assigned responsibility to perform tasks necessary to carry out Title I of the Sikes Act, including the preparation and implementation of INRMPs. The control of the use of available natural resources within MCLB Albany should be stringent enough to monitor and regulate their safe and judicious use, but not restrictive to the point of deviating from the designated use of the facilities.

MCLB Albany has an established natural resources conservation law enforcement officer's position, within the Conservation Law Enforcement Program as outlined in MCO 5090.4A (2007), which outlines the Marine Corps Conservation Law Program and roles and responsibilities of law enforcement officers. Per this MCO, MCLB Albany's conservation officer is responsible for, but not limited, to the following activities relating to violations under nine federal conservation laws identified in MOA 2003: enforcement of all hunting and fishing regulations; investigating fish and wildlife crimes; patrolling, surveillance, and searches; interviewing witnesses and interrogating suspects; seizure of contraband, vehicles and equipment; serving warrants; making arrests; and testifying in courts. Hunting and fishing regulations for MCLB Albany are outlined in Section

In addition, all federal and state game wardens are allowed to enter any appropriate portion of the Installation for inspection of compliance with appropriate hunting and fishing requirements.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Natural Resources Law Enforcement

- SAIA of 1997, 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. SAIA of 1997, 16 U.S.C. 670c defines a program for developing facilities for outdoor recreation in cooperation with federal and state agencies.
- SAIA of 1997, 16 U.S.C. 670e.1 provides authority to the Secretary of Defense to enforce all Federal laws governing management of natural resources on military installations and the secretary of each military department to ensure a sufficient staffing of professionally trained natural resource law enforcement personnel.
- CFR, Part 32, Section 190.4(j) states enforcement of laws primarily aimed at protecting natural resources is an integral part of a natural resource program and is an inherently governmental function.

- CFR, Part 32, Section 190.7.B.3.(g) states that whenever hunting, fishing, or trapping is allowed on DOD installations, enforcement of wildlife laws shall be addressed in fish and wildlife management plans and executed by trained conservation officers.
- DODINST 4715.03, Enclosure 3, Section l.j.
- MCO 5090.4A (2007), discusses the Marine Corps Conservation Law Enforcement Program, defines the roles and responsibilities of law enforcement officers, and provides procedural guidance to establish and implement such a program.
- MOU (2003) - USFWS and the Marine Corps, identifies nine federal conservation statutes that fall under Marine Corps Conservation Law Program jurisdiction.
- MCO P5530.14A provides authority to physical security specialists (CLEOs) to have access to restricted areas with critical assets.
- MCO 5090.2 discusses natural resources management relative to the protection and management of outdoor recreational resources.
- SECNAVINST 5090.8, Paragraph 1.
- SECNAVINST 5822.1A.
- SECNAVINST 5090.8 Paragraph 1.
- SECNAVINST 5090.2A, Chapter 11, Section 2.

Management Strategies

Management strategies related to natural resources law enforcement at MCLB Albany include the following:

- 1) Monitor the wildlife law enforcement program to ensure goals and objective are being met and ensure that personnel are qualified and trained to carry out all assigned duties and responsibilities.
- 2) Enforce federal, state, and Installation laws and regulations pertaining to natural and cultural resources.
- 3) Build interagency relationships with National Military Fish and Wildlife Association and USFWS to support the natural resources conservation law enforcement program.
- 4) Identify staffing needs to manage hunting, fishing, GIS and natural resources management programs.

Effective enforcement of laws and regulations applicable to natural resources enhances the overall natural resources program, protects the natural and cultural resources, and provides public safety by enforcing off-limit areas and protecting against criminal destruction of natural resources (i.e., activities such as trespassing, poaching, and illegal dumping).

Although the Installation operates under exclusive federal jurisdiction, the penal laws of Georgia relative to fish and game concerning bag limits, seasons, and other conservation measures are operative under the Assimilative Crimes Act of 1948 (18 US 13), and thus are enforceable by federal officials. Violations of these game laws on MCLB Albany could result in prosecution in

the United State Federal District Court or by court martial. All Georgia State laws and base regulations are enforced by the MCLB Albany Game Warden/Conservation Officer who patrols the wildlife areas periodically. Violators are issued ticket and are required to appear before the Conservation Board for a hearing and possible disciplinary action.

Ecosystem Management

Enforcement of fish and wildlife laws and regulations is a necessary ecosystem management practice that enhances environmental stewardship and educates the general public about environmental conservation issues, problems, and solutions. By enforcing fish and wildlife laws and regulations on the facility, MCLB Albany would help promote public awareness of vital environmental resource issues.

Additional Sources of Information

- National Military Fish and Wildlife Association (<https://www.nmfwa.org/>) GDNR, Fishing (<http://www.georgiawildlife.com/fishing/>)
- GDNR, Hunter Education (<https://georgiawildlife.com/hunting/huntereducation>)
- USFWS, Law Enforcement (<http://www.fws.gov/southwest/lawenforcement/index.htm>)

4.5.3 GIS, Data Integration, Access, and Reporting

GIS is an integral part of natural resources and environmental protection and planning. This powerful management tool provides natural resources managers with a comprehensive database that includes a spatial component. Information such as aerial photographs, survey and monitoring data, and various other natural resources data are all tied to a geographical coordinate system. Availability of this information enhances an installation's ability to effectively coordinate and ensure that current and planned mission activities do not adversely impact watersheds, wetlands, floodplains, natural landscapes, soils, forests, vegetation and wildlife, prime and unique farmland, and other natural resources that must be protected, conserved, and managed using an ecosystem approach. Additionally, efficient and effective land use planning supports readiness and sustainability, while protecting and enhancing the natural resources for multiple use, sustained yield, and biological integrity. Examples of baseline environmental data layers include:

- Property boundaries
- Topography
- Soils
- Vegetation cover
- Forest stands
- Wetlands
- Floodplains
- Stormwater detention ponds
- Sensitive natural resources

- Hunting compartments
- Hiking trails

Laws, EOs, Regulations, Directives, and Memoranda Relevant to GIS, Data Integration, Access, and Reporting

- MCO 5090.2 encourages natural resources managers to use GIS as the basis of INRMP implementation.

The figures presented in this INRMP were developed using existing digital data files provided by the Marine Corps and from other GIS databases available to the public. An ESRI map service was used, which includes i-cubed Nationwide Prime high-resolution (approximately 3 feet or greater) imagery for the contiguous United States. The i-cubed Nationwide Prime service is a seamless, color mosaic of various commercial and government imagery sources, including Aerials Express 0.3–0.6 meter resolution imagery for metropolitan areas and the best available USDA National Agriculture Imagery Program imagery and enhanced versions of USGS Digital Ortho Quarter Quad imagery for other areas. The imagery is projected to Universal Transverse Mercator, Zone 14 North, North American Datum of 1983. All GIS data created or modified for use in this INRMP will be submitted to NAVFAC Southeast and MCLB Albany upon completion of this project.

The Commander, NAVFAC Southeast GeoReadiness Center, is the single, authoritative source and distribution point for all geospatial information within the area of responsibility of NAVFAC Southeast. The GeoReadiness Center houses the most current geospatial information (including aerial photography) for the entire NAVFAC Southeast region and provides access to the comprehensive dataset and analysis tools to regional and DOD decision-makers/managers, sponsored contractors, and other sponsored individuals via a secure government Internet site. All GIS layers should conform to the GEOFidelis Data Model 3.0 Regional Data Dictionary for Marine Corps Installations Command (MCIEAST), referred to as the MCIEAST Data Dictionary for MCLB Albany Installation Geospatial Information and Services (IGI&S) geospatial data. The data dictionary provides data standard consistency that incorporates enough breadth for mission execution and the ability to record data in a consistent manner aboard MCLB Albany. Based on the MCIEAST Data Dictionary 3.0, this Data Dictionary maintains a MCLB Albany IGI&S data standard that provides the Installation with a common structure for data layers and attributes.

The MCLB Albany adaptation of the MCIEAST Data Dictionary is consistent with U.S. Marine Corps and DOD policy for IGI&S; specifically, it:

- Meets the policy and goals set forth in Marine Corps Order (MCO) 11000.25, Installation Geospatial Information and Services.
- Compliance with goals and DOD enterprise objectives set forth in the Office of the Under Secretary of Defense (OUSD) memorandum dated April 14, 2009 “Installation Geospatial Information and Services Guidance.”
- Follows DOD interoperability strategy set forth in the OUSD guidance dated May 11, 2011 “Guidance for the Adaptation of SDSFIE 3.0.”

- Conforms to the SDSFIE Adaptation Rules and Guidelines outlined in the GEOFidelis Implementations Roles and Responsibilities Guide Version 1.2 dated July 25, 2011.

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 NEPA, ESA, and CWA. For NEPA compliance, all impacts on federal land from a proposed project must be considered before the project can be implemented. 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.

Ecosystem Management

Ecosystem management requires the use of GIS, data integration, access, and reporting to ensure that appropriate decisions and strategies are adopted in the implementation of this INRMP. GIS data can also be used to evaluate regulatory compliance issues, such as a project's impact to wetlands, federally listed species and their habitats, and other natural resources.

Additional Sources of Information

- EPA Environmental Dataset Gateway (<https://edg.epa.gov/metadata/catalog/main/home.page>)
- USFWS National GIS Datasets (<http://www.fws.gov/gis/data/national/index.html>)
- USDA NRCS Geospatial Data Gateway (<http://datagateway.nrcs.usda.gov/>)
- USGS, Geospatial and Map Resources for the South Atlantic Region (<http://ga.water.usgs.gov/infodata/gisdata.html>)
- GDNR Outdoor Maps (<https://georgiaoutdoormap.com/>)
- NAVFAC GeoReadiness Center (<http://proceedings.esri.com/library/userconf/eucom-africom10/papers/georeadiness-program.pdf>)

4.5.4 Partnering with Federal and State Agencies, Universities, and NGOs

A cooperative agreement is used to acquire goods or services or stimulate an activity that will be implemented for the public good. Section 103a of the Sikes Act (16 U.S.C. 670c-1) provides the authority to enter into cooperative agreements with state and local governments, NGOs, and individuals to provide for the maintenance and improvement of natural resources on, or to benefit natural and historic research on, DOD installations. In addition to a standard cooperative agreement, examples of other agreements include MOUs, and Cooperative Assistance Agreement. Funds appropriated for multiyear agreements during a fiscal year may be obligated to cover the cost of goods and services provided under a cooperative agreement entered into or through an agency agreement during any 18-month period beginning in that fiscal year, without regard to whether the agreement crosses fiscal years (31 U.S.C. §1535). Cooperative agreements entered into are subject to the availability of funds.

Laws, EOs, Regulations, Directives, and Memoranda Relevant to Partnering with Federal and State Agencies, Universities, and NGOs

- EO 13352 (26 August 2004), *Facilitation of Cooperative Conservation*, directs that the Secretaries of the Interior, Agriculture, Commerce, and Defense; and the Administrator of the EPA shall, to the extent permitted by law and subject to the availability of appropriations and in coordination with each other as appropriate:
 - carry out the programs, projects, and activities of the agency that they respectively head that implement laws relating to the environment and natural resources in a manner that facilitates cooperative conservation;
 - take appropriate account of and respects the interests of persons with ownership or other legally recognized interests in land and other natural resources;
 - properly accommodate local participation in federal decision making; and
 - provides that the programs, projects, and activities are consistent with protecting public health and safety.
- 32 CFR 190 establishes DOD policies for the development of integrated natural resources management plans.

Cooperating federal and state agencies, universities, and NGOs can provide a beneficial exchange of technical information, services, and field assistance to accomplish natural resources objectives at MCLB Albany. Technical assistance may be provided by USDA NRCS, USFWS, USGS, GDNR, University of Georgia, and others. For example, a past collaboration with Auburn University saw the completion of a rare species survey on the Installation (Barbour et al. 2013) and the data on species occurrence proved valuable for the 2014 INRMP. Future collaboration would occur with NGOs such as TNC, Audubon, other non-profit entities, and universities, to further protect and conserve natural resources, maintain environmental compliance, and enhance the Marine Corps' ability to meet its mission-critical objectives. Additionally, ecosystems cross political boundaries, making the need for cooperation, coordination, and partnerships essential for managing ecosystems.

The Marine Corps solicits input during the development and update of this INRMP from cooperating federal and state agencies, the USFWS and GDNR (Table 1 and Appendix G). In addition, cooperative agreements with local or regional fish and wildlife agencies, conservation organizations, and education organizations have been initiated in the past and will continue to be supported by the Installation. These partnerships and agreements include, but are not limited to DOD, PIF, USDA/APHIS, USDA/NRCS, USDA/Forest Service, Georgia Forestry Commission, Dougherty County, GDNR, the Humane Society and Shawnee Tribe. MCLB Albany and the Shawnee Tribe approved a MOU in 2012 to establish formal procedures for consultation and communication, protection of information and stewardship of the cultural resources.

MCLB Albany is also working to establish partnerships with several additional entities to promote research/outdoor education/public outreach on base, including the Joseph Jones Ecological Resource Institute, Albany Audubon Society, Boy Scouts of America, Girl Scouts of America, Albany State University, Chehaw Conservation Lands and Wild Animal Park, Abraham Baldwin Agricultural College, and state-recognized Native American Indian tribes.

Management Strategies

Management strategies related to partnering with federal and state agencies, universities, and NGOs at MCLB Albany include the following:

- 1) Develop partnerships with federal, state, and local agencies, NGOs, and universities to implement wildlife monitoring and protection programs.
- 2) Continue to promote the ongoing collaborative efforts with local entities such as Albany Audubon Society and Abraham Baldwin Agricultural College to assist in natural resource monitoring and data collection efforts. Collaborative efforts with GDNR for surveys on base.
- 3) Develop a volunteer network of personnel approved for access onto the Installation, identify opportunities to use volunteer pool on specific projects and management strategies.
- 4) Coordinate with GA forestry commission to assist in firebreak installation and maintenance, prescribed burning, and forest management activities.
- 5) Team with Audubon Society, DOD Partners in Flight, and local birders to assist in base birding events and the development of a bird species list for the base.
- 6) Coordination with local, state and federal agencies regarding management of natural resources on base.
- 7) Conduct annual INRMP updates in accordance with Sikes Act requirements.
- 8) Conduct a no less often than every five-year review and update of the INRMP in accordance with Sikes Act requirements.

MCLB Albany will continue to seek out cooperative agreements, memoranda, and other agreements between the Installation and federal and state agencies that oversee and regulate natural resources protection. The NRM is responsible for ensuring that the Installation has up-to-date agreements in place. The NRM will also consult federal, state, university, NGO, and Marine Corps experts as needed to ensure regulatory compliance and adequate management measures are in place for rare, threatened, and endangered flora and fauna associated with MCLB Albany. In the following section, partnering with federal and state agencies and NGOs is further discussed with respect to climate change vulnerability assessments and adaptation.

Ecosystem Management

Plans and programs for maintaining and managing natural resources on the Installation need to fully consider the interrelationships among resources on the Installation and assure no net loss of the military mission. The input and cooperation of regulatory agencies and other experts will best facilitate the success of these plans and program, including protection of federally listed species known to occur at MCLB Albany.

Additional Sources of Information

- DOD, Natural Resource Programs and INRMP Implementation: Partnering Tools (http://www.dodworkshops.org/files/Training/SikesModules/Mod8_PartnerTools_FINAL_july09.pdf)

- Natural Resources Funding Manual (September 2009), (http://www.dodnaturalresources.net/files/AEC_EcoFunding_Manual_082010_FINAL_VERSION.pdf)

4.5.5 Climate Change Management Strategies

The ecosystem effects of climate change will be incremental and challenging to distinguish and assess, so DOD's analysis to assess potential impacts should be predictive in nature, relying on models to plan for probable complex and indirect changes that are likely to happen in the future. DOD components will require an adaptive process of validating and improving forecast models to develop new and improve existing natural resources management strategies to address global climate change impacts.

Projected climate changes and effects, as described in Section 2.3.1.1, could result in significant impacts to protected or sensitive species and their habitats. The effects of climate change on wildlife are highly variable, including geographic range shifts, changes in relative species abundance, phenology, and other ecological aspects of their biotic communities. There is already evidence of disruptions in community dynamics, such as predator-prey and plant-insect interactions, alterations in biogeochemical cycles, and increased disease, pest, and non-native species invasions. The rapid pace of recent environmental change has increased the threat of extinction, as species are not able to adapt to changing environments quickly enough. Specific climate change stressors that can impact threatened and endangered species include habitat loss; increases in surface and water temperatures; increases in carbon dioxide concentrations; changes in precipitation; increases in diseases, pests, and non-native species; and increases in the frequency and severity of storm events (Society for Ecological Restoration International 2009).

Biodiversity conservation supports ecosystem stability and enables sustained human use of the environments required for mission activities. Species that are lacking adequate suitable habitat are often the most vulnerable. To study and better anticipate the impacts of climate change on vulnerable species, MCLB Albany might be able to partner with GDNR, a nearby academic research institution (e.g., University of Georgia, Auburn University), and DOD Partners in Amphibian and Reptile Conservation (PARC), to carry out a vulnerability assessment of the amphibian and reptilian species of concern with known occurrence on the Installation. This could be one component of Project 4 (Appendix F), and its completion would fulfill one of the recommendations in the SWAP. A similar study could also be undertaken to assess the vulnerability of migratory bird species at MCLB Albany, in coordination with regional partners.

Although sea level rise is a concern particular to low-relief coastal zones, and unlikely to impact wildlife at MCLB Albany in the foreseeable future, sea level rise has indirect implications for the Installation's sustainability. MCLB Albany serves as a Co-op Evacuation Area for coastal Marine Corps installations including Marine Corps Recruit Depot Parris Island; Marine Corps Support Facility Blount Island; Camp Blanding, Florida; and Marine Aviation Training Support Group 21, Pensacola. If any of these installations are overtaken by flooding or threatened by a hurricane, troops are evacuated to safe shelter at MCLB Albany where they are temporarily housed in a warehouse. If necessary, a tent city would be set up on the golf course (Robbins 2020). The Marine Corps should evaluate the potential impact on MCLB Albany's operations that would result if the

need for activation as a Co-op Evacuation Area continues to increase, with consideration of the Installation's sustained ability to carry out its military mission.

Other climate change impacts that could affect MCLB Albany include:

- flooding;
- drying up of seasonal ponds due to changes in precipitation patterns;
- increase in the frequency and intensity of wildfires; and
- increase in susceptibility to pests and invasive species of plants and wildlife.

These possible ecological changes have implications for the management of water resources, outdoor recreation, amphibians and reptiles, forestry, protected and rare species, invasive plants and noxious weeds, and invasive and nuisance wildlife species. The management strategies specific to those resources are discussed under each of the corresponding sections of this chapter.

Management Strategies

Management strategies related to climate change at MCLB Albany include the following:

- 1) Conduct a vulnerability assessment of species of interest (e.g., reptiles and amphibians, migratory birds) and how those vulnerabilities may impact Installation mission.
- 2) Collaborate with other federal agencies and regional installations in developing common regional goals.
- 3) Utilize the guide, *Climate Adaptation for DOD Natural Resource Managers* (Stein et al. 2019), the resources of the U.S. Forest Service (USFS) Climate Change Resource Center, and the other tools and resources developed by DOD and USFWS.
- 4) Include climate change among the threats considered to the natural resources described in this INRMP, as pertinent.
- 5) Consider scheduling a comprehensive a climate change vulnerability assessment and adaptation plan, in partnership with the South Atlantic Landscape Conservation Cooperative (LCC), Southeast Climate Adaptation Science Centers (CASC), and other DOD installations or agencies in the region.

In order to be eligible for funding beyond the Installation's NRP operating budget, the vulnerability assessments and climate adaptation plan suggested above would need to be included in the INRMP Projects Table (Appendix F) and scheduled for implementation.

5.0 INRMP IMPLEMENTATION

Implementation of this INRMP will follow an annual strategy that addresses legal requirements, DOD and Marine Corps directive or policy requirements, funding, implementation responsibilities, technical assistance, labor resources, and technological enhancements. In order for this INRMP to be considered implemented, the following actions will need to be completed:

- 1) Funding is secured for completion of all projects.
- 2) Installation is staffed with a sufficient number of professionally trained environmental personnel needed to perform the tasks required by the INRMP.
- 3) Annual coordination with all cooperating offices is performed.
- 4) Specific INRMP action accomplishments that are undertaken are documented each year.

The following sections provide an overview of the role that implementation of this INRMP would play in: supporting the sustainability of the military mission and the natural environment; meeting natural resources consultation requirements; achieving no net loss; attaining NEPA compliance; understanding project development and classification; identifying funding sources; establishing commitment; and endorsing the use of cooperative agreements. The INRMP projects identified in Section 4.0 are summarized in Appendix F to include information for the implementation schedule, prime legal driver and initiative, class, Navy assessment level, cost estimate, and funding source for each of the projects proposed in this INRMP.

5.1 PROJECT DEVELOPMENT AND CLASSIFICATION

This INRMP is a public document that requires the mutual agreement of MCLB Albany, USFWS, and GDNR. It is crucial, therefore, that these entities reach a common understanding as to which projects are most likely to be funded through the sources identified in Section 6.2. An annual strategy must be adopted for INRMP funding that addresses MCLB Albany's legal requirements.

The Marine Corps programming hierarchy is based on the following DOD funding level classifications:

- **Class 0: Recurring natural and cultural resources conservation management requirements.** Includes activities needed to cover the recurring administrative, personnel, and other costs associated with managing DOD's conservation program that are necessary to meet applicable compliance requirements (federal and state laws, regulations, presidential EOs, and DOD policies), or which are in direct support of the military mission.
- **Class I: Current compliance.** Includes projects and activities needed because an installation is currently out of compliance (has received an enforcement action from a duly authorized federal or state agency, or local authority); has a signed compliance agreement or has received a consent order; or has not met requirements based on applicable federal or state laws, regulations, standards, presidential EOs, or DOD policies, and/or are immediate and essential to maintain operational integrity or sustain readiness of the military mission. "Class I" also includes projects and activities needed that are not currently out of compliance (deadlines or requirements have been established by applicable laws,

regulations, standards, DOD policies, or presidential EOs, but deadlines have not passed or requirements are not in force) but shall be if projects or activities are not implemented in the current program year.

- **Class II: Maintenance requirements.** Includes those projects and activities that are not currently out of compliance (deadlines or requirements have been established by applicable laws, regulations, standards, presidential EOs, or DOD policies, but deadlines have not passed or requirements are not in force), but shall be out of compliance if projects or activities are not implemented in time to meet an established deadline beyond the current program year.
- **Class III: Enhancement or actions beyond compliance.** Includes those projects and activities that enhance conservation resources or the integrity of the installation's mission, or are needed to address overall environmental goals and objectives but are not specifically required under regulation or EO and are not of an immediate nature.

The list of projects described in this INRMP consists of both “must fund” compliance-type projects, and stewardship-type projects. “Must fund” compliance project requirements are for those projects and activities that are required to meet recurring natural and cultural resources conservation management requirements or current legal compliance needs, including EOs. Examples of “must fund” and stewardship-type projects are provided below; however, the lists are not all inclusive and are meant only to provide examples of the types of projects that could qualify under each.

“Must fund” projects could include:

- Developing, updating, and revising INRMPs.
- Salaries and annual training of professional personnel, in accordance with Individual Development Plans, involved in the development and implementation of INRMPs.
- Terms and conditions of Biological Opinions issued by USFWS or NMFS.
- Baseline surveys to keep INRMPs current.
- Biological surveys to determine population status of endangered, threatened, and sensitive species.
- Survey and monitoring programs to support the MBTA and related permits.
- Wetland surveys for planning, monitoring and/or permit applications.
- Erosion control measures required in order to remain in compliance with natural resources protection regulations and to maintain land condition for realistic training operations.
- Support of leadership roles or executive agent responsibilities for regional conservation organizations.
- Memorandums of Agreement/Understanding commitments.

Examples of stewardship projects could include:

- Community outreach activities, such as Earth Day and Migratory Bird Day activities.
- Education and public awareness projects such as interpretive displays, oral histories, Watchable Wildlife Areas, nature trails, wildlife checklists, and conservation teaching materials.
- Biological surveys or habitat protection for non-listed species.
- Management and execution of volunteer and partnership programs.
- Demonstration plantings of native plant materials.
- Experimental conservation techniques.
- Agriculture outlease improvements.
- Forest stand improvements and other management efforts.
- Wildlife management efforts.

All INRMP projects will be entered into the Marine Corps Environmental Compliance and Operational Reporting (ENCORE) web based project and budget tracking system. ENCORE allows Marine Corps staff users (both at the Installation and Headquarters level) to validate project data, receive approval up the chain of command, and add/manage users.

5.2 FUNDING SOURCES

Once INRMP projects have been validated and entered into ENCORE, they are evaluated and programmed in for funding based on their priority and availability of funds. Some projects may be funded through the ENCORE web-based system, whereas others may require alternate sources of funding. Some of the primary sources for funding Marine Corps natural resources projects are:

- Operations and Maintenance, Marine Corps (O&M, MC) Funds
- Legacy Resource Management Program (Legacy Program) Funds
- Navy and Marine Corps Encroachment Partnering Program
- Forestry Revenues
- Agricultural Outleasing
- Fish and Wildlife Fees
- Recycling Funds
- Strategic Environmental Research and Development Program (SERDP) Funds
- Other Non-DOD Grant and Partnership Funds

5.2.1 O&M, MC Funds

A majority of natural resource projects are funded with O&M, MC funds, and are primarily restricted to support “must-fund” environmental compliance projects. Other limitations for the use of O&M, MC funds include the following.

- Only the initial procurement, construction, and modification of a facility or project are considered valid environmental funding requirements. The subsequent operation, modification due to mission requirements, maintenance, repair, and eventual replacement is considered a Real Property Maintenance funding requirement.
- When natural resource requirements are tied to a specific construction project or other action, funds for the natural resource requirements should be included in the overall project costs.

O&M, MC Funds are expected to be the primary source of funding for MCLB Albany INRMP Environmental Compliance projects.

5.2.2 The Legacy Resource Management Program

The Legacy Program was part of a special Congressional mandated initiative for funding military conservation projects. Although the Legacy Program was originally funded from 1991 to 1996 only, funds for new projects have continued to be available through this program. Legacy Program funds can be used for a variety of conservation projects, such as regional ecosystem management initiatives, habitat preservation efforts, archaeological investigations, invasive species control, monitoring and predicting migratory patterns of birds and animals, and national partnerships and initiatives, such as National Public Lands Day. More information on requirements for Legacy Program applications can be found at: <http://www.dodlegacy.org/>.

Requests for Legacy funds should consider the following:

- The availability of Legacy Program funds is generally uncertain early in the year.
- Pre-proposals for Legacy Program projects are due in March and submitted using the Legacy Program Tracker Website: <http://www.dodlegacy.org/>.
- Project proposals are reviewed by the Marine Corps and Navy chain of command before being submitted to the DOD Legacy Resources Management Office for final project selection.
- The Legacy Program website provides further guidance on the proposal process and types of projects requested.

Legacy Program funds should be considered as a potential funding source for MCLB Albany INRMP projects.

5.2.3 Natural Resources Conservation Compliance Program

The Department of Defense's (DOD) Natural Resources Conservation Compliance Program (NR Program) supports the military's testing and training mission by protecting its biological resources. The NR Program provides policy, guidance, and oversight for management of natural resources on military land, air, and water resources owned or operated by DOD. The NR Program's goal is to support the military's combat readiness mission by ensuring continued access to realistic habitat conditions, while simultaneously working to ensure the long-term sustainability of the nation's natural heritage. Information and resources are available at the following website: <http://www.dodnaturalresources.net/Candidate-Resources.html>.

The program does not provide direct funding support but provides resources for managers at MCLB Albany to address issues relating to candidate species, endangered species, invasives, and environmental training and education on the Installation.

5.2.4 Forestry Revenues

Forestry Revenues originate from the sale of forest products on Marine Corps lands and can be used to fund forestry and potentially other natural resources management programs. Forestry revenues are given preference for funding the Annual Marine Corps Forestry Funds and the DOD Forestry Reserve Account per Marine Corps Financial Execution Procedures MCO 7300.21B. Annual Marine Corps Forestry Funds are used to support commercial forestry operations at installations. Forestry Revenues are first used to reimburse commercial forestry expenses, then, as directed by DOD Financial Management Regulation 7000.14-R Volume 11A, 40 percent of net proceeds for the fiscal year for the installation are distributed to the state in which the installation resides. The state usually uses these funds to support road systems and schools. Once the commercial forestry expenses are reimbursed, and proceeds are distributed among the state counties, any remaining amount is transferred to a holding account known as the DOD Forestry Reserve Account.

Forestry Revenues also can be used to fund the improvement of forested lands; fund unanticipated contingencies associated with administration of forested lands and production of forest products, for which other sources of funds are not available; and natural resources management for implementation of approved plans and agreements. In order for a natural resources project to be eligible for funding from Forestry Revenues, it must:

- 1) Be specifically included in an approved management plan, such as an INRMP.
- 2) Provide for at least one of the following:
 - a. Fish and wildlife habitat improvements or modifications;
 - b. Range rehabilitation where necessary for support of wildlife;
 - c. Control of off-road vehicle traffic;
 - d. Specific habitat improvement projects and related activities; and
 - e. Adequate protection for species of fish, wildlife, and plants considered threatened or endangered.

The amount of funds available through Forestry Revenues varies from year to year. It is important to note that the amount of funds remaining for natural resources management is relatively small, and although installations are not required to have a timber harvesting plan to be eligible for funds from the DOD Forestry Reserve Account, Reserve Account funds cannot be used for “must fund” environmental compliance projects.

DOD Forestry Reserve Account funds are a potential source of funding for MCLB Albany INRMP projects that are not classified as environmental compliance projects.

5.2.5 Agricultural Outleasing

Agricultural Outleasing funds are collected through the leasing of Marine Corps-owned property for agricultural use. This money is directed back into Marine Corps Natural Resources Program by Marine Corps Headquarters. Agricultural Outleasing funds are primarily allocated for

agricultural outlease improvements but may also potentially be used for natural resources management and stewardship projects once the primary objective is met. In addition to projects related to agricultural outleasing, these funds can be used for implementation of INRMP stewardship projects. Although funds available through Agricultural Outleasing varies from year to year, this funding source is one of the more consistent sources for implementing INRMP projects that do not have must fund requirements.

Agricultural Outleasing funds should be considered as a potential funding source for MCLB Albany INRMP projects that are not classified as environmental compliance projects.

5.2.6 Fish and Wildlife Fees

Fish and Wildlife Fees are primarily collected as part of installation hunting, or fishing programs. These fees are deposited and used in accordance with the Sikes Act and DOD financial management regulations. The Sikes Act specifies that user fees collected for hunting or fishing shall be used only on the installation where they are collected and be used exclusively for fish and wildlife conservation and management at the installation where collected. Fish and Wildlife Fees collected as part of MCLB Albany's hunting and fishing programs are used in providing support of natural resource management projects.

5.2.7 Recycling Funds

Installations that have a Qualified Recycling Program (QRP) may use their proceeds for some types of natural resource projects. Any proceeds collected as part of the installation QRP must first be used to cover QRP costs, and then up to 50 percent of the net proceeds can be for pollution abatement, pollution prevention, composting, alternative fueled vehicle infrastructure support, vehicle conversion, energy conversion, or occupational safety and health projects, with first consideration given to projects included in the installation's pollution-prevention plans. Remaining funds may be transferred to the non-appropriated MCCA account for approved programs or retained to cover anticipated future program costs.

MCLB Albany has a QRP but it only generates enough funds to be self-sufficient, so Recycling Funds are not expected to play a significant role in support of the natural resource project recommended in this INRMP.

5.2.8 Strategic Environmental Research and Development Program (SERDP) Funds

SERDP is DOD's corporate environmental research and development program, planned and executing in full partnership with the United States Department of Energy and EPA, with participation by numerous other federal and non-federal organizations (SERDP 2014). SERDP funds are allocated for environmental and conservation projects through a competitive selection process. SERDP program areas include Energy and Water, Environmental Restoration, Munitions Response, Resource Conservation and Climate Change, and Weapons Systems and Platforms. More information about the annual solicitation and proposal process is available at <https://www.serdp-estcp.org/Funding-Opportunities/SERDP-Solicitations>.

5.2.9 Non-DOD Funds

Non-DOD Funds, such as those received from federal, state, and non-governmental grant and partnership programs, are available to fund Installation natural resources management projects, and are detailed in the DOD Natural Resources Funding Manual (Hamilton 2009). The information in the manual was compiled by the U.S. Army Environmental Command to assist all DOD installations in identifying potential resources for conserving natural resources in the vicinity of their borders. However, the availability of funds and eligibility requirements vary year to year and each target source would need to be assessed prior to application submittal. Some of the federally funded programs available and most applicable to MCLB Albany include:

- National Wetlands Program Development Grant
- Habitat Conservation Planning Assistance Grants
- Neotropical Migratory Bird Conservation Act Grants Program
- The North American Wetlands Conservation Act Grant Program

Grant programs typically require non-federal matching funds. However, installations can partner with other groups for preparing proposals for eligible projects. MCLB Albany should consider grant funding and partnerships outlined in the manual as additional potential funding sources for INRMP natural resources projects.

5.3 COMMITMENT

This INRMP will require formal adoption by the MCLB Albany Commanding Officer to ensure commitment for pursuing funding, and to execute all “must fund” projects, subject to the availability of funding. Funding of “must-fund” projects should be pursued within the specific timeframes identified in the INRMP Projects Table provided in Appendix F.

6.0 REFERENCES

- Albany Convention & Visitors Bureau. 2013. History of Albany. Available online at: <https://visitalbanyga.com/about-albany/history-of-albany> (Accessed 10 August 2020).
- Aresco, M. J. and C. Guyer. 2004. Gopher tortoise, *Gopherus polyphemus*. Pages 82–83 in Mirarchi, R. A., M. A. Bailey, T. M. Haggerty, and T. L. Best, editors. Alabama Wildlife. Volume 3. Imperiled amphibians, reptiles, birds, and mammals. Tuscaloosa, Alabama: The University of Alabama Press. 225 pages.
- Armed Forces Pest Management Board. 2012. Technical Guide No. 37, Integrated Management of Stray Animals on Military Installations. Information Services Division, Walter Reed Army Medical Center, Washington, District of Columbia; 25 May. 23 pages.
- Barbour, M. S., A. R. Schotz, S. M. Hermann, and J. S. Kush. 2013. Marine Corps Logistics Base Albany, Georgia - Biological Survey Final Report. September. Auburn, Alabama: Alabama Natural Heritage Program / Auburn University. 141 pages.
- Benton, N., J. D. Ripley, and F. Powledge, eds. 2008. Conserving Biodiversity on Military Lands: A Guide for Natural Resources Managers. Arlington, Virginia: NatureServe. Available online at: <http://www.dodbiodiversity.org> (Accessed 06 April 2020).
- Bhate Environmental Associates, Inc. (BEA). 1998. Draft Final Environmental Assessment for the Transportation, Unpacking, Inspection, Repair, Repacking, and Storage of Containers Associated with the United States Army Prepositioning Effort, Marine Corps Logistics Base, Albany, Georgia. Prepared for the Department of the Navy. Bhate Environmental Associates, Inc., Brentwood, Tennessee.
- Biodiversity Information Serving our Nation (BISON). 2013. Avian Knowledge Network (AKN) data from Great Backyard Bird Counts, records for MCLB Albany. United States Geological Service. Available online at: <https://bison.usgs.gov/> (Accessed 10 August 2020).
- Brennan, L. A. 1991. How Can we Reverse the Northern Bobwhite Population Decline? *Wildlife Society Bulletin* 19:544–555.
- Buhlman, K., T. Tuberville, and W. Gibbons. 2008. Turtles of the Southeast. The University of Georgia Press, Athens, Georgia. 252 pages.
- Butterfly and Moth Information Network. 2019. Butterflies and Moths of North America (BAMONA). Available online at: <https://www.butterfliesandmoths.org/about> (Accessed 4 May 2020).
- Castelle, A. J., A. W. Johnson, C. Conolly. 1994. Wetland and Stream Buffer Size Requirements – A Review. *J. Environ Qual.* Vol. 23(5):878–893.

- Centers for Disease Control and Prevention (CDC). 2017. Dichlorodiphenyltrichloroethane (DDT) Factsheet. Available online at: https://www.cdc.gov/biomonitoring/DDT_FactSheet.html (Accessed 06 April 2020).
- Chafin, L. 2019. *Rhynchospora decurrens*. Chapman. Decurrent Beakrush. [Species Profile.] November. Available on Georgia Biodiversity Portal: https://georgiabiodiversity.a2hosted.com/natels/profile?es_id=21032 (Accessed 06 April 2020).
- Chafin, L. 2020. *Pteroglossaspis ecristata* (Fern.) Rolfe. Wild Coco. [Species Profile.] March. Available on Georgia Biodiversity Portal: https://georgiabiodiversity.a2hosted.com/natels/profile?es_id=18632 (Accessed 06 April 2020).
- Cowardin, L. M., V. Carter, F. C. Golet, and E. LaRoe. 1992. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31. U.S. Fish and Wildlife Service, Washington, District of Columbia.
- Coulter, M. C., J. A. Rodgers, J. C. Ogden and F. C. Depkin. 1999. Wood Stork (*Mycteria americana*). In *The Birds of North America*, No. 409 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, Pennsylvania. 28 pages.
- Cox, J., Inkley, D., and R. Kautz. 1987. Ecology and Habitat Protection Needs of Gopher Tortoise (*Gopherus polyphemus*) Populations Found on Lands Slated for Large-scale Development in Florida. Florida Game and Fresh Water Fish Commission Nongame Wildlife Program Technical Report #4.
- CZR Incorporated. 1996. Jurisdictional Wetlands of Marine Corps Logistics Base Albany, Georgia Narrative Report. Unpublished report submitted to SOUTHNAVFACENGCOM, Charleston, South Carolina. CZR Incorporated, Jacksonville, Florida. 5 pages + appendices.
- Dauphine, N. and R. Cooper. 2009. Impacts of Free-ranging Domestic Cats (*Felis catus*) on Birds in the United States: A Review of Recent Research with Conservation and Management Recommendations. Proceedings of the 4th International Partners in Flight Conference: Tundra to Tropics, pp. 205–219, 15 pages.
- Department of Defense [DOD]. 2013. DOD Manual: Natural Resources Conservation Program. DODM 4715.03. Incorporating Change 2 August 31, 2018. Department of Defense. Washington, District of Colombia. 41 pages. March 18.
- Department of Defense [DOD]. 2011. DOD Instruction: Natural Resources Conservation Program. DODINST 4715.03. Change 2 (31 August 2018). Department of Defense. Washington, District of Colombia. 41 pages. March 18.

- Department of the Navy. 2002. Policy Letter from William Mattheis, Environmental Deputy Director, Preventing Feral Cat and Dog Populations on Navy Property (5090Ser N456M/1U595820), 10 January. 4 pages.
- Dunning, J. B. and D. D. Watts. 1990. Regional Differences in Habitat Occupancy by Bachman's Sparrow. *Auk* 107:463-472.
- Dunning, J. B. 1993. Bachman's Sparrow (*Aimophila aestivalis*). In *The Birds of North America*, No. 161 (A. Poole and F. Gill, editors). The Academy of Natural Sciences, Philadelphia, Pennsylvania, and The American Ornithologists' Union, Washington, District of Columbia. 16 pages.
- eBird. 2012. eBird: An online database of bird distribution and abundance [Web application]. eBird, Ithaca, New York. Available online at: <http://www.ebird.org> (Accessed 06 April 2020).
- Eagle Permits, 50 CFR §22. 2020.
- Endangered and Threatened Wildlife and Plants, 50 CFR §17. 2020. Subpart B §17.11 Endangered and threatened wildlife.
- eRegulations. 2020. Georgia Sport Fishing. General Regulations. [Web site]. J.F. Griffin Publishing. Available online at: <http://www.eregulations.com/georgia/fishing/general-regulations/> (Accessed 06 April 2020).
- Eubanks, J. O., J. W. Hollister, C. Guyer, and W. K. Michener. 2002. Reserve Area Requirements for Gopher Tortoises (*Gopherus polyphemus*). *Chelonian Conservation and Biology* 4:464-471.
- Explore Southern History. 2013. Albany Georgia, Historic City on the Flint River. Available online at: <http://www.exploresouthernhistory.com/albany.html> (Accessed 06 April 2020).
- Federal Emergency Management Agency (FEMA). 2013. Flood Insurance Rate Map (FIRM) database, Dougherty County, Georgia. Available online at: http://www.floodsmart.gov/floodsmart/pages/flooding_flood_risks/understanding_flood_maps.jsp (Accessed 06 April 2020).
- Fields, S. 1993. Regulations and Policies Relating to the Use of Wetlands for Nonpoint Source Pollution Control. Pages 151–158. In: R.K. Olson (ed.), *Created and Natural Wetlands for Controlling Nonpoint Source Pollution*. C.K. Smoley, CRC Press, Boca Raton, FL.
- Florida Fish and Wildlife Conservation Commission. 2007. Draft Gopher Tortoise Management Plan, *Gopherus polyphemus*. Tallahassee, Florida. 107 pages.

Georgia Complete Rules and Regulations, Rule 391-4-10-.09. 2020. Protected Species of Plants and Animals. (3)(h) Gopher tortoise. Georgia Administrative Code, Department 391, Chapter 4, Subject 10, Protection of Endangered, Threatened, Rare or Unusual Species. February 6. Available online at: <http://rules.sos.ga.gov/GAC/391-4-10-.09> (Accessed 25 February 2020).

Georgia Department of Natural Resources (GDNR). 1995. A Survey of Rare Species and Natural Communities at the Marine Corps Logistics Base Albany, Georgia. Georgia Department of Natural Resources, Wildlife Resources Division, Georgia Natural Heritage Program, Social Circle, Georgia.

Georgia Department of Natural Resources (GDNR). 2005. A Comprehensive Wildlife Conservation Strategy for Georgia. Georgia Department of Natural Resources, Wildlife Resources Division. Social Circle, Georgia.

Georgia Department of Natural Resources (GDNR). 2010. Rare Bird Species Profile: Wood Stork (*Mycteria Americana*). Georgia Department of Natural Resources, Wildlife Resources Division.

Georgia Department of Natural Resources (GDNR). 2015. *Georgia State Wildlife Action Plan*. Social Circle, Georgia: Georgia Department of Natural Resources. Available online at: <https://georgiawildlife.com/WildlifeActionPlan> (Accessed 07 July 2020).

Georgia Department of Natural Resources (GDNR). 2016. Alligator Fact Sheet. Available online at: https://georgiawildlife.com/sites/default/files/wrd/pdf/fact-sheets/2016_alligator.pdf (Accessed 25 February 2020).

Georgia Department of Natural Resources. 2020a. All Tracked Natural Elements With or Without Protection Status. [Web-based Database.] Georgia Biodiversity Portal. Wildlife Resources Division, Wildlife Conservation Section, Social Circle, Georgia. Available online at: https://georgiabiodiversity.a2hosted.com/natels/element_lists?group=all_groups (Accessed 8 May 2020).

Georgia Department of Natural Resources. 2020b. About Georgia Biodiversity Conservation Data. Georgia Biodiversity Portal. Wildlife Resources Division, Wildlife Conservation Section, Social Circle, Georgia. Available online at: <https://georgiabiodiversity.a2hosted.com/natels/about-this-data> (Accessed 8 May 2020).

Guyer, C. and M. A. Bailey. 1993. Amphibians and Reptiles of Longleaf Pine Communities. Pages 139-158 *in*: Hermann, S.M., editor. The longleaf pine ecosystem: ecology, restoration and management. Proceedings of the 18th Tall Timbers Fire Ecology Conference. Tall Timbers Research, Inc., Tallahassee, Florida.

- Guyer, C., S. Glenos, S. Hermann, and J. Stober. 2011. The Status of Gopher Tortoises (*Gopherus polyphemus*) in Alabama, with Special Reference to Three Important Public Properties. Report submitted to Alabama Department of Natural Resources, Division of Wildlife and Freshwater Fisheries. Auburn, Alabama: Auburn University. 28 pages.
- Hamilton, B. 2009. Department of Defense Natural Resources Funding Manual. Army Environmental Command, DOD Legacy Resource Management Program Project 08-399. Available online at: http://www.dodnaturalresources.net/files/AEC_EcoFunding_Manual_082010_FINAL_VERSION.pdf
- Harris, M., B. Winn, J. C. Ozier, T. M. Schneider, and A. Day. 2019. *Mycteria americana* (Linnaeus, 1758) Wood Stork. [Species Profile.] Georgia Biodiversity Portal, Wildlife Resources Division, Wildlife Conservation Section, Social Circle, Georgia. Available online at https://georgiabiodiversity.a2hosted.com/natels/profile?es_id=21244 (Accessed 08 August 2020).
- Headquarters, United States Marine Corps (HQMC). 2007. Handbook for Preparing, Revising, and Implementing Integrated Natural Resources Management Plans on Marine Corps Installations. U.S. Marine Corps Headquarters, Land Use & Military Construction Branch, Natural Resources Section. 456 pages. October.
- Headquarters, U.S. Marine Corps (HQMC). 2013. Environmental Compliance and Protection Manual. MCO P5090.2A. Change 3. Department of the Navy. Washington, District of Columbia. 791 pages. 26 August.
- Headquarters, U.S. Marine Corps (HQMC). 2018. Environmental Compliance and Protection Manual. MCO 5090.2. Department of the Navy. Washington, District of Columbia. 1182 pages. 11 June.
- Invasive Species Specialist Group (ISSG). 2010. *Felis catus*. International Union for Conservation of Nature, Global Invasive Species Database. Available online at: <http://www.issg.org/database/species/ecology.asp?si=24&fr=1&sts=sss>
- Jensen, J., G. Krakow, and K. Owers. 2018. *Gopherus polyphemus* (Daudin, 1802) Gopher Tortoise. [Species Profile.] Georgia Biodiversity Portal, Wildlife Resources Division, Wildlife Conservation Section, Social Circle, Georgia. Available online at https://georgiabiodiversity.a2hosted.com/natels/profile?es_id=20476 (Accessed 08 August 2020).
- Jensen, J. 2020. *Ambystoma tigrinum* (Green, 1825) Eastern Tiger Salamander. [Species Profile.] Georgia Biodiversity Portal, Wildlife Resources Division, Wildlife Conservation Section, Social Circle, Georgia. Available online at https://georgiabiodiversity.a2hosted.com/natels/profile?es_id=33438 (Accessed 08 August 2020).

- Kobilinsky, D. 2016. JWM study: Fire, nest locations affect gopher tortoise predation. The Wildlife Society. [Web page.] Available online at: <https://wildlife.org/jwm-study-fire-nest-locations-affect-gopher-tortoise-predation/>. (Accessed 03 April 2020).
- Loss, S., T. Will and P. Marra. 2013. The Impact of Free-ranging Domestic Cats on Wildlife of the United States. Joint manuscript, Migratory Bird Center, Smithsonian Conservation Biology Institute, and the U.S. Fish and Wildlife Service, Division of Migratory Birds, Midwest Regional Office.
- Major, C. M. 2004. Wood stork, *Mycteria americana* (Linnaeus). Pages 124–125 in Mirarchi, R. A., M. A. Bailey, T. M. Haggerty, and T. L. Best, editors. *Alabama Wildlife*. Volume 3: Imperiled amphibians, reptiles, birds, and mammals. Tuscaloosa, Alabama: The University of Alabama Press. 225 pages.
- Malone, K. M., H. H. Jones, A. M. Betancourt, T. M. Terhune II, and K. E. Sieving. 2019. Video documentation of predators and nest defense at Bachman's Sparrow nests. *Avian Conservation and Ecology* 14(2):6. Available online at <https://doi.org/10.5751/ACE-01409-140206> (Accessed 08 April 2020).
- Marine Corps Logistics Base (MCLB) Albany. 2007. Final Integrated Natural Resources Management Plan 2007–2011, Marine Corps Logistics Base, Albany, Georgia. Prepared by Aerostar Environmental Services, Inc. Mobile, Alabama. May.
- Marine Corps Logistics Base (MCLB) Albany. 2008. Final Stormwater Management Plan. Marine Corps Logistics Base, Albany, Georgia.
- Marine Corps Logistics Base (MCLB) Albany. 2012a. Integrated Natural Resource Management Plan Kick Off Meeting and Site Visit. Held at Office of Natural Resources, Environmental Division, Marine Corps Logistics Base, Albany, Georgia, on 6 and 7 November 2012.
- Marine Corps Logistics Base (MCLB) Albany. 2012b. MCLB Pond Management Observations and Recommendations, Prepared by Custom Outdoor Services, LLC, Leesburg, Georgia.
- Marine Corps Logistics Base (MCLB) Albany. 2013a. Geographic Information Systems (GIS) Data for MCLB Albany. Marine Corps Logistics Base, Albany, Georgia.
- Marine Corps Logistics Base (MCLB) Albany. 2013b. Environmental Resources Division Staff Circular: Invasive Pest Management Recommendations. Environmental Division, Marine Corps Logistics Base, Albany, Georgia.
- Marine Corps Logistics Base (MCLB) Albany. 2013c. Environmental Resources Division Staff Circular: Prescribed Burn Measures. Environmental Division, Marine Corps Logistics Base, Albany, Georgia.

- Marine Corps Logistics Base (MCLB) Albany. 2013d. Environmental Resources Division Staff Circular: Lake and Pond Management. Environmental Division, Marine Corps Logistics Base, Albany, Georgia.
- Marine Corps Logistics Base (MCLB) Albany. 2013e. Environmental Resources Division Staff Circular: List of Flora and Fauna Likely to Occur on MCLB Albany. Environmental Division, Marine Corps Logistics Base, Albany, Georgia.
- Marine Corps Logistics Base (MCLB) Albany. 2014. Final Integrated Natural Resources Management Plan for Marine Corps Logistics Base, Albany. October 2014. Prepared for NAVFAC Southeast by Tetra Tech, Inc. Arlington, Virginia. 383 pages.
- Marine Corps Logistics Base (MCLB) Albany. 2015a. Final Encroachment Factor Assessment for Marine Corps Logistics Base Albany, Georgia. 28 pages.
- Marine Corps Logistics Base (MCLB) Albany. 2015b. Integrated Pest Management Plan. Marine Corps Logistics Base, Albany, Georgia.
- Marine Corps Logistics Base (MCLB) Albany. 2015c. Forest Management Plan. Marine Corps Logistics Base, Albany, Georgia.
- Marine Corps Logistics Base (MCLB) Albany. 2015d. Integrated Cultural Resources Management Plan, Fiscal Years 2015-2020. Marine Corps Logistics Base, Albany, Georgia.
- Marine Corps Logistics Base (MCLB) Albany. 2016. Final Encroachment Control Plan Update for Marine Corps Logistics Base Albany, Georgia. Prepared for Government and External Affairs, G-7, Marine Corps Logistics Base Albany. Contract # N62470-14-D-9003-FZ08. 84 pages.
- Marine Corps Logistics Base (MCLB) Albany. 2019a. Environmental Resources Division Staff Circular: Invasive Plants Occurring and Management on MCLB Albany. Environmental Division, Marine Corps Logistics Base, Albany, Georgia.
- Marine Corps Logistics Base (MCLB) Albany. 2019b. MCLB Albany Burn Plan. Environmental Division, Marine Corps Logistics Base, Albany, Georgia.
- Marine Corps Logistics Base (MCLB) Albany. 2019c. MCLB Albany Salamanders – Sign. Environmental Division, Marine Corps Logistics Base, Albany, Georgia.
- McCoy, E. D. and H. R. Mushinsky. 2007. Estimates of Minimum Patch Size Depend on the Method of Estimation and the Condition of the Habitat. *Ecology* 88:1401–1407.
- Means, D. B. 2004. Eastern Diamondback Rattlesnake *Crotalus adamanteus* Beauvois. Pages 73-74 in Mirarchi, R. A., M. A. Bailey, T. M. Haggerty, and T. L. Best, editors. Alabama

- Wildlife. Volume 3. Imperiled Amphibians, Reptiles, Birds, and Mammals. The University of Alabama Press, Tuscaloosa, Alabama. 225 pages.
- Miller, J. H., S. Manning, T. Steven, and S. Enloe. 2010. A Management Guide for Invasive Plants in Southern Forests. Gen. Tech. Rep. SRS–131. Asheville, North Carolina: U.S. Department of Agriculture Forest Service, Southern Research Station.
- Muhlberg, G. A., and N. J. Moore. 1998. Streambank Revegetation and Protection; a Guide for Alaska. Technical Report No. 98-3.
- NatureServe. 2019. NatureServe Web Service. Arlington, Virginia. Available online at: <https://www.natureserve.org/> (Accessed 18 February 2019).
- National Oceanic & Atmospheric Administration (NOAA). 2013. Annual Climatological Survey: Albany, 3 SE, GA. US National Climatic Data Center, Asheville, NC. Available at: <http://www.ncdc.noaa.gov/cdo-web/datatools/normals> (Accessed October 2014).
- National Oceanic & Atmospheric Administration (NOAA). 2020. Annual Average Number of Tornadoes per State (1985-2014). NOAA's National Weather Service, Storm Prediction Center, Norman, OK. Available at: <http://www.spc.noaa.gov/wcm/#torclim> (Accessed 07 April 2020).
- National Oceanic and Atmospheric Administration (NOAA) National Climate Data Center (NCDC). 2020a. Climate at a Glance. Regional Time Series. [Web site]. Available at: https://www.ncdc.noaa.gov/cag/regional/time-series/115/tavg/ann/3/1895-2020?base_prd=true&begbaseyear=1901&endbaseyear=2000 (Accessed 7 April 2020).
- National Oceanic and Atmospheric Administration (NOAA) National Climate Data Center (NCDC). 2020b. Temp, Precip, and Drought National Trends. [Web site]. Available at: <https://www.ncdc.noaa.gov/temp-and-precip/us-trends/> (Accessed 7 April 2020).
- Office of the Under Secretary of Defense. 2006. Memorandum: Integrated Natural Resource Management Plan (INRMP) Template. 14 August. 6 pages. Available at: https://www.denix.osd.mil/nr/focus-areas/integrated-natural-resource-management-plans-inrmpls/guidance/dod-inrmp-template/10_INRMP-TEMPLATE.PDF. (Accessed 10 August 2020).
- Ozier, J. C., T. M. Schneider, and K. Owers. 2019. Species profile for *Haliaeetus leucocephalus*. Bald Eagle. Georgia Biodiversity Portal, Wildlife Resources Division, Wildlife Conservation Section, Social Circle, Georgia. Available online at https://georgiabiodiversity.a2hosted.com/natels/profile?es_id=19713 (Accessed 8 April 2020).
- Robbins, J. 2019. Personal communication [during INRMP Kick-off Site Visit at MCLB Albany]. 2 October.
- Robbins, J. 2020. Personal communication by telephone. 27 February.

- Roseberry, J. L. and W. D. Kimstra. 1984. Population ecology of the bobwhite. Southern Illinois University Press, Carbondale, Illinois. 304 pages.
- Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM). 2006. Master Plan for Marine Corps Logistics Base Albany, Georgia. SOUTHNAVFACENGCOM, North Charleston, South Carolina.
- Stein, B. A., D. M. Lawson, P. Glick, C. M. Wolf, and C. Enquist. 2019. *Climate Adaptation for DoD Natural Resource Managers: A Guide to Incorporating Climate Considerations into Integrated Natural Resource Management Plans*. Washington, D.C.: National Wildlife Federation. 128 pages.
- Strategic Environmental Research and Development Program (SERDP) and Environmental Security Technology Certification Program (ESTCP). 2014. SERDP Solicitations. [Web site.] Available online at <https://www.serdp-estcp.org/Funding-Opportunities/SERDP-Solicitations> (Accessed 10 August 2020).
- Styrsky, J. N., C. Guyer, H. Balbach, and A. Turkmen. 2010. The Relationship Between Burrow Abundance and Area as a Predictor of Gopher Tortoise Population Size. *Herpetologica* 66:403–410.
- United States Army Corps of Engineers (USACE). 2010. Wildfire Protection Plan for the Marine Corps Logistics Base, Albany, Dougherty County, Georgia. Prepared by Aerostar, Contract W91278-08-D-0023 Task Order 0008.
- United States Department of Agriculture (USDA) and United States Department of Interior. 2009. Guidance for Implementation of Federal Wildland Fire Management Policy. Available online at: http://www.nifc.gov/policies/policies_documents/GIFWFMP.pdf (Accessed 10 August 2020).
- USDA-NRCS (U.S. Department of Agriculture – Natural Resources Conservation Service). n.d. Insects & Pollinators. [Web site]. <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/plantsanimals/pollinate/> (Accessed 07 April 2020).
- United States Department of Agriculture (USDA). 2012. Soil Survey Geographic (SSURGO) Database and Online Soil Mapper for (Dougherty County, Georgia). USDA, Natural Resources Conservation Service (NRCS). Available online at <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm> (Accessed 10 August 2020).
- United States Fish and Wildlife Service (USFWS). 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. Available online at <https://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php/> (Accessed 19 February 2020).

- United States Fish and Wildlife Service (USFWS). 2011a. Migratory Birds: Birds Protected by the Migratory Bird Treaty Act. In The Migratory Bird Program. Last Updated 11 April 2011. Available online at <http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/mbtintro.html> (Accessed 10 October 2013).
- United States Fish and Wildlife Service (USFWS). 2011b. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List the Gopher Tortoise as Threatened in the Eastern Portion of Its Range. *Federal Register* 76: 45130. Available online at: <https://www.govinfo.gov/content/pkg/FR-2011-07-27/pdf/2011-18856.pdf#page=1> (Accessed 25 February 2020).
- United States Fish and Wildlife Service (USFWS). 2012a. National Wetland Inventory (NWI) database and online wetland mapper. Available online at: <http://www.fws.gov/wetlands/Data/Mapper.html> (Accessed 24 September 2013).
- United States Fish and Wildlife Service (USFWS). 2012b. Endangered and Threatened Wildlife and Plants; 90-day Finding on a Petition to List the Eastern Diamondback Rattlesnake as Threatened. *Federal Register* 77(91): 27403–27411.
- United States Fish and Wildlife Service (USFWS). 2014a. Endangered and Threatened Wildlife and Plants; Reclassification of the U.S. Breeding Population of the Wood Stork from Endangered to Threatened. Final Rule. *Federal Register* 79(125): 37077–37103.
- United States Fish and Wildlife Service (USFWS). 2014b. Endangered and Threatened Wildlife and Plants; 90-Day Findings on Two Petitions; Review of Petition to List the Monarch Butterfly as a Threatened Species Under the Act. *Federal Register* 79(250): 78775-78778.
- United States Fish and Wildlife Services (USFWS). 2015. Bald & Golden Eagle Information. Available online at: <https://www.fws.gov/birds/management/managed-species/bald-and-golden-eagle-information.php> (Accessed 25 February 2020).
- United States Fish and Wildlife Service (USFWS). 2018. FAQs – USFWS Upgrades the U.S. Breeding Population of the Wood Stork Status from Endangered to Threatened. Available online at: https://www.fws.gov/northflorida/WoodStorks/2014_Status_Upgrade/20140626_faq_Wood_Stork_Status_Upgrade_FAQs.htm (Accessed 26 February 2020).
- United States Fish and Wildlife Service (USFWS). 2019a. Conserving South Carolina’s At-Risk Species: Species facing threats to their survival, Eastern Diamondback Rattlesnake. Available online at: <https://www.fws.gov/southeast/pdf/fact-sheet/eastern-diamondback-rattlesnake.pdf>
- United States Fish and Wildlife Service (USFWS). 2019b. Gopher Tortoise (*Gopherus Polyphemus*) Fact Sheet. Available online at: https://www.fws.gov/northflorida/GopherTortoise/Gopher_Tortoise_Fact_Sheet_web.pdf

- United States Fish and Wildlife Service (USFWS). 2020. Endangered and Threatened Species Listings and Occurrences for Georgia. Available online at: <https://ecos.fws.gov/ecp0/reports/ad-hoc-species-report-input> (Accessed 18 February 2020).
- United States Geological Survey (USGS). 1999. Apalachicola-Chattahoochee-Flint River Basin NAWQA Study - Description of the ACF River Basin Study Area.
- University of Georgia (UGA). 2018. Monarch Butterflies & Georgia's Gardeners. State Botanical Garden of Georgia, University of Georgia. Available online at: <https://botgarden.uga.edu/wp-content/uploads/2018/03/milkweedinformation.pdf> (Accessed 8 May 2020).
- Watts, B. D. 1995. Yellow-crowned Night-heron (*Nyctanassa violacea*). In *The Birds of North America*, No. 161 (A. Poole and F. Gill, editors). The Academy of Natural Sciences, Philadelphia, Pennsylvania, and The American Ornithologists' Union, Washington, District of Columbia. 24 pages.
- Wenger, S. J. and L. Fowler. 2000. Protecting Stream and River Corridors: Creating Effective Local Riparian Buffer Ordinances. Carl Vinson Institute of Government, University of Georgia. ISBN 0-89854-198-0. Available online at: http://www.rivercenter.uga.edu/publications/pdf/riparian_buffer_guidebook.pdf (Accessed 8 October 2013).
- Wentz, A. 2001. "*Ambystoma tigrinum*" (On-line), Animal Diversity Web. Available online at http://animaldiversity.ummz.umich.edu/accounts/Ambystoma_tigrinum/ (Accessed 27 August 2013).
- Western Regional Climate Center. 2017. Albany 3 SE, Georgia (090140). Period of Record Monthly Climate Summary. [Web site]. Available at: <https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ga0140> (Accessed 7 April 2020).
- Williams, C. K., F. S. Guthery, R. D. Applegate, and M. J. Peterson. 2004. The Northern Bobwhite Decline: Scaling our Management for the Twenty-first Century. *Wildlife Society Bulletin* 32:961–969.
- Winter, L. 2006. Impacts of Feral and Free-ranging Cats on Bird Species of Conservation Concern: A Five State Review of NY, NJ, FL, CA and HI. American Bird Conservancy, via funding from the National Fish and Wildlife Foundation. May. 28 pages.
- Yosef, R. 1996. Loggerhead Shrike (*Lanius ludovicianus*). In *The Birds of North America*, No. 161 (A. Poole and F. Gill, editors). The Academy of Natural Sciences, Philadelphia, Pennsylvania, and The American Ornithologists' Union, Washington, District of Columbia. 28 pages.

Yosef, R., and T. C. Grubb, Jr. 1994. Resource Dependence and Territory Size in Loggerhead Shrikes (*Lanius ludovicianus*). *Auk* 111:465–469.

APPENDICES

APPENDIX A	ACRONYMS AND ABBREVIATIONS	A-1
APPENDIX B	APPLICABLE REGULATIONS AND PUBLIC LAWS	B-1
APPENDIX C	FLORA AND FAUNA SPECIES LISTS	C-1
APPENDIX D	PROTECTED SPECIES FACT SHEETS	D-1
APPENDIX E	INTERNET RESOURCES	E-1
APPENDIX F	INRMP PROJECT DATA	F-1
APPENDIX G	EXTERNAL STAKEHOLDER CORRESPONDENCE	G-1

This page intentionally left blank.

APPENDIX A

Acronyms and Abbreviations

This page intentionally left blank.

~	approximately
>	greater than
<	less than
%	percent
°F	degrees Fahrenheit
AKN	Avian Knowledge Network
ANHP	Alabama Natural Heritage Program
APHIS	Animal and Plant Health Inspection Service
AQCR 59	Southeast Georgia Control Region
BASH	bird/wildlife aircraft strike hazard
BCC	birds of conservation concern
BMP	best management practice
CARDF	Critical Asset Rapid Distribution Facility
CBD	Central Business District
CBMP	Coordinated Bird Monitoring Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Ch	Change(s)
cm	centimeter(s)
CNIC	Commander, Navy Installations Command
CNO	Chief of Naval Operations
CWA	Clean Water Act
dbh	diameter breast height
DDAG	Defense Distribution Depot Albany, Georgia
DDT	dichloro diphenyl trichloroethane
DOD	Department of Defense
DODINST	Department of Defense Instruction
DRMO/DRMS	Defense Reutilization and Marketing Service
EA	Environmental Assessment
EAP	Environmental Action Plan
EFH	essential fish habitat
EIS	Environmental Impact Statement
ENCORE	Marine Corps Environmental Compliance and Operational Reporting
EO	Executive Order

EP	Encroachment Partnering
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESCP	erosion and sediment control plan
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FONSI	Finding of No Significant Impact
ft.	feet or foot
FY	fiscal year
GDNR	Georgia Department of Natural Resources
GIS	Geographic Information System
GPS	global positioning system
ha	hectare(s)
HAP-EP	Humanitarian Assistance-Excess Property Program
HQMC	Headquarters, United States Marine Corps
I&E	Installation and Environment [Division]
IGI&S	Installation Geospatial Information and Services
INRMP	Integrated Natural Resources Management Plan
Installation	Marine Corps Logistics Base Albany
IPM	integrated pest management
JEAP	Joint Equipment Assessment Program
m	meter(s)
MBTA	Migratory Bird Treaty Act
MCIEAST	Marine Corps Installations Command
MCLB	Marine Corps Logistics Base
MDMC	Marine Depot Maintenance Command
mm	millimeter(s)
MOU	Memorandum of Understanding
MCCS	Marine Corps Community Services
NAVFAC	Naval Facilities Engineering Command
Navy	U.S. Department of the Navy
NCIS	Naval Criminal Investigative Service
NDAA	National Defense Authorization Act

NEPA	National Environmental Policy Act
NGO	non-governmental organization
NGVD	National Geodetic Vertical Datum
NMFS	National Marine Fisheries Service
No.	Number
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	non-point source
NRCS	Natural Resources Conservation Service
NRM	natural resources manager
NRP	Natural Resources Program
NWCG	National Wildfire Coordination Group
OICC/ROICC	Naval Facilities Contracts Office
O&M, MC	Operations and Maintenance, Marine Corps
OPNAVINST	Chief of Naval Operations Instructions
OSD	Office of the Secretary of Defense
PARC	Partners in Amphibian and Reptile Conservation
PIF	Partners in Flight
PWO	Public Works Office
QRP	Qualified Recycling Program
RTE	Rare, Threatened and Endangered
SAIA	Sikes Act Improvement Act
SERDP	Strategic Environmental Research and Development Program
SGCN	Species of Greatest Conservation Need
SWAP	State Wildlife Action Plan
SWPPP	Storm Water Pollution Prevention Plan
SYSCOM	Marine Corps Systems Command
TNC	The Nature Conservancy
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service

USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WMA	Wildlife Management Area

APPENDIX B

Applicable Regulations and Public Laws

This page intentionally left blank.

Number	Title	Description	Applicable Resource
Federal			
7 United States Code (U.S.C.) §136	Federal Insecticide, Fungicide and Rodenticide Act	Governs the use and application of pesticides in natural resources management plans.	Rare, Threatened, and Endangered (RTE) species; Nuisance and Invasive Plants; Water Resources; Agricultural Outleashes; Terrestrial Vegetation and Communities
10 U.S.C. §2667	Armed Forces, Leases; non-excess property of military departments and Defense Agencies	Provides general requirements for leasing certain lands that will promote national defense or be in the public interest.	Agricultural Outleashes
10 U.S.C. §2671	Armed Forces, Military Reservations and Facilities: Hunting, Fishing, and Trapping	Provides general requirements for hunting, fishing, and trapping on military reservations and facilities.	Fish and Wildlife
16 U.S.C. §670c	Program for public outdoor recreation	Defines a program for developing facilities for outdoor recreation in accordance with INRMPs and in cooperation with federal and state agencies.	Fish and Wildlife; Land Resources
16 U.S.C. 661-666c	Fish and Wildlife Coordination Act	Authorizes the Secretaries of Agriculture and Commerce to provide assistance to and cooperate with federal and state agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife.	Fish and Wildlife; Water Resources
16 U.S.C. §670a-o	Sikes Act	Requires that military installations provide for conservation and rehabilitation of natural resources; and that each Military Department prepare and implement an Integrated Natural Resources Management Plan (INRMP) for installations that contain significant natural resources.	All

Number	Title	Description	Applicable Resource
16 U.S.C. §703-712	Migratory Bird Treaty Act	Prohibits taking or harming a migratory bird, its eggs, nest, young, or feathers without the appropriate permit. It implements Conventions between the U.S. and Canada, Mexico, Japan and Russia.	Fish and Wildlife – Birds; RTE Species
16 U.S.C. 1361-1407	Marine Mammal Protection Act	Prohibits the taking or harming of marine mammals without the appropriate permit.	N/A
16 U.S.C. §1451 et seq.	Coastal Zone Management Act of 1972	Provides for management of the nation’s coastal resources, including the Great Lakes, and balances economic development with environmental consideration. Outlines two national programs, the National Coastal Zone Management Program and the National Estuarine Research Reserve System.	Coastal Zone, Water Resources
16 U.S.C. §1531 - 1544	Endangered Species Act	Provides for the conservation 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.	Fish and Wildlife
16 U.S.C. §1801 et seq.	Magnuson–Stevens Fisheries Conservation and Management Act	Establishes policies for the sustainable management of fishery resources and the protection of essential fish habitats. It is the primary law governing marine fisheries.	Fish and Aquatic Species
16 U.S.C. §4701-4751	National Invasive Species Act	Prescribes policies to prevent the introduction and spread of non-indigenous species into U.S. waters.	Aquatic Nuisance Species
31 U.S.C. §1535	Money and Finance – The Budget Process – Agency Agreements	Provides policy on how an agency or major organizational unit within an agency may place an order with a major organization within the same agency or another agency for goods or services.	All – Management of Natural Resources

Number	Title	Description	Applicable Resource
33 U.S.C. §401 et seq.	Rivers and Harbors Act	Requires authorization from the U.S. Army Corps of Engineers for the construction of any structure in or over any navigable waters of the U.S. and the excavation/dredging or deposition of material in these waters or any obstruction or alteration in a navigable water.	Aquatic Habitat, Wetland Habitat
33 U.S.C. §1251-1388	Clean Water Act	Aims to restore and maintain waters; and to control direct discharges of pollutants into navigable waters and placement of fill materials into waters of the U.S., including wetlands, by requiring permits.	Groundwater, Wetland Habitats, Aquatic Habitats
33 U.S.C. §2701-2719	Oil Pollution Act	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.	All.
33 U.S.C. §1341	Water Quality Certification	Requires that states certify compliance with federal permits or licenses and with state water quality requirements and other applicable state laws.	Water Resources
33 U.S.C. §1344	Permits for Dredged or Fill Material	Establishes a program to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands.	Water Resources
42 U.S.C. §300f-j	Safe Drinking Water Act	Protects the quality of drinking water in the U.S. whether from above ground or underground sources.	Groundwater; Aquatic Habitats
42 U.S.C. §9601-9675	Comprehensive, Environmental Response, Compensation and Liability Act (CERCLA or Superfund)	Authorizes Natural Resource Trustees to recover damages for injury to, destruction of, or loss of natural resources resulting from the release of a hazardous substance which occurred by uncontrolled or accidental means.	All

Number	Title	Description	Applicable Resource
Public Law 93-378 in 16 U.S.C. §1600	Forest and Rangeland Renewable Resources Planning Act, as amended	Requires a complete national assessment or inventory of all forest, rangeland resources, and public needs every ten years, along with a plan to meet those needs.	Forestry
Public Law 105-85 in 16 U.S.C. §670a-o	Sikes Act Improvement Act (SAIA) of 1997 (passed as an amendment to the Sikes Act of 1960)	Requires the development of integrated natural resources management plans (INRMPs) on relevant installations in collaboration with U.S. Fish and Wildlife and state fish and wildlife agencies. The INRMPs are to provide for the sustainable use of natural resources, to the extent that the use is not inconsistent with the needs of fish and wildlife resources. The Secretary of the Interior, in consultation with state fish and wildlife agencies, must submit a report annually on the amounts expended by Interior and state fish and wildlife agencies on activities conducted pursuant to INRMPs to respective Congressional committees with oversight responsibilities.	All
Public Law 107-314 in 16 U.S.C. §703	Bob Stump National Defense Authorization Act for Fiscal Year 2003	Exempts the Armed Forces from the incidental taking of migratory birds during military readiness activities.	Birds
32 Code of Federal Regulations (CFR) Part 190, currently Reserved (as of February 24, 2020)	Natural Resources Management Program	Provides Department of Defense (DOD) policy on natural resources management.	All – Management of Natural Resources
40 CFR Part 70.1-70.14	EPA State Operating Permit Programs	Establishes comprehensive air quality permitting systems for the states to be consistent with title V of the Clean Air Act.	Air

Number	Title	Description	Applicable Resource
50 CFR Part 17	Endangered and Threatened Wildlife and Plants	Prescribes policies for the conservation and restoration of endangered and threatened wildlife and plants.	RTE Species
50 CFR 22; 16 U.S.C. 668(a)	Bald and Golden Eagle Protection Act	Prohibits taking, possessing, and transporting bald eagles and golden eagles and importing and exporting their parts, nests, or eggs.	Birds
Executive Order (EO) 11644	Off-Road Vehicles on Public Lands	Allows agencies to restrict the use of off-road vehicles on lands under their management when it is determined that the use of off-road vehicles will cause, or is causing considerable adverse effects on the soil vegetation, wildlife, wildlife habitat, or cultural or historic resources of particular areas or trails of the public lands.	Soils, Agricultural Outleasements, Terrestrial Vegetation and Communities, Sensitive Habitats and Rare Ecosystems, RTE Species, Conservation Lands, Fish and Wildlife
EO 11988	Floodplain Management	Requires federal agencies to evaluate effects of action they have taken on floodplains.	Floodplains
EOs 11989, amending EO 11644	Off-Road Vehicles on Public Lands	Gives authority to respective agencies to restrict the use of off-road vehicles (including all vehicles used in hunting and other outdoor activities) .	Soils, Agricultural Outleasements, Terrestrial Vegetation and Communities, Sensitive Habitats and Rare Ecosystems, RTE Species, Conservation Lands, Fish and Wildlife
EO 11990	Protection of Wetlands	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	Wetland Habitats
EO 12088	Federal Compliance with Pollution Control Standards	Ensures that Executive agency heads take necessary actions to prevent, control, and abate environmental pollution with respect to federal facilities and activities under control of the Agency.	All

Number	Title	Description	Applicable Resource
EO 12962, amended by EO 13474	Recreational Fisheries	Requires Federal agencies to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities.	Fisheries; Wetland Habitats; Aquatic Habitats
EO 13112, amended by EO 13751	Invasive Species	Requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.	Nuisance and Invasive Species
EO 13834	Efficient Federal Operations	Mandates that agencies meet statutory requirements to increase efficiency, and eliminate use of unnecessary resources to protect the environment including reducing building energy use, using renewable energy, reducing water consumption, following sustainable design principles for buildings, and waste prevention. Metrics will be implemented to follow progress in achieving goals.	Water Resources; Energy; Land Use
EO 13186	Responsibilities of Federal Agencies to Protect Migratory Birds	Imposes substantive obligations on the U.S. for the conservation of migratory birds and their habitats.	Birds
EO 13352	Facilitation of Cooperative Conservation	Requires that the Secretaries of the Interior, Agriculture, Commerce, and Defense and the Administrator of the EPA shall carry out the programs, projects, and activities of the agency in a manner that facilitates cooperative conservation.	All - Management of Natural Resources
EO 13443	Facilitation of Hunting Heritage and Wildlife Conservation	Directs Federal agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.	Fish and Wildlife

Number	Title	Description	Applicable Resource
60 FR 40837	President's Executive Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds	Provides guidance developed by the interagency workgroup under the direction of the Federal Environmental Executive to assist federal agencies in the implementation of environmentally and economically beneficial landscape practices, and requires implementing landscaping practices that are intended to benefit the environment and generate long-term cost savings. Directs agencies to use Integrated Pest Management.	Land Use; Terrestrial Vegetation and Communities; Water Resources; Soils; Invasive and Nuisance Species
71 FR 168	Memorandum of Understanding Between DOD and USFWS to Promote the Conservation of Migratory Birds	Outlines a collaborative approach to promote the conservation of migratory bird populations, identifies specific activities where cooperation between the parties will contribute substantially to the conservation of migratory birds and their habitats.	Birds
State of Georgia			
Georgia Code (GAC) Title 16, Chapter 12, Article 1 (§16-12-4)	Criminal Animal Cruelty	Contains laws and regulations relating to criminal animal cruelty.	Terrestrial Wildlife
GAC Title 27, Chapter 3, Article 5 (§27-3-130 to 133)	Protection of Endangered Wildlife	Contains laws and regulations pertaining to endangered or threatened animal species, and prohibits the taking, possession, transportation, or sale of any of the animal species designated by state law as endangered or threatened without the issuance of a permit.	RTE Species
GAC Title 4, Ch. 11, Article 1 (§4-11-5.1)	Georgia Animal Protection Act Section 5.1	Requires all animals in animal shelters be euthanized in a humane manner with only one method by a licensed veterinarian or certified technician: administering sodium pentobarbital..	Wildlife

Number	Title	Description	Applicable Resource
U.S. Marine Corps			
Marine Corps Order (MCO) 5090.2	Marine Corps Environmental Compliance and Protection Program	Directs the Marine Corps to be accountable to environmental laws and sets programs for the preservation of their training areas, operational readiness, public health, and to preserve environmental quality of their installations and surrounding communities. Volume 11 identifies Marine Corps policies on natural resources management, Volume 14 is Integrated Pest Management. The program summarizes all relevant federal environmental statutes, regulations, executive orders (EOs), and military mandates for environmental compliance.	All
MCO 7300.21B	Marine Corps Financial Management Standard Operating Procedure Manual	Provides comptrollers and fund managers with standard operating procedures related to preparation, recording, reconciling, reporting and maintenance of financial records through all stages of funds management.	All – Financial Management of Natural Resources
MCO 11011.23	Marine Corps Encroachment Management Program	Provides guidance to identify and limit factors that degrade or have the potential to degrade the capability of an installation, operational range, training area, etc., where the Marine Corps conducts current and plans future military testing, training, and general mission activities.	All

Number	Title	Description	Applicable Resource
U.S. Department of the Navy			
CNO Policy Letter	Chief of Naval Operations (CNO) Policy Letter Preventing Feral Cat and Dog Populations on Navy Property	States that installations must adopt proactive pet management procedures that prevent the establishment of free-roaming cat and dog populations. Additionally, installations must ensure the humane capture and removal of feral cats and dogs, and efforts should be made to find homes for adoptable animals.	Wildlife; Invasive and Nuisance Species
NAVFAC P-73	Real Estate Operations and Natural Resources Management Procedural Manual - Volumes 1 and II	Addresses all CNO natural resources program requirements, guidelines, and standards.	Land Use
OPNAVINST 6250.4C	Pest Management Program	Provides Nave and Marine Corps policies and procedures for implementing pest management programs.	Nuisance and Invasive Species
SECNAVINST 5090.8B	Environmental Planning for Department of the Navy Actions	Provides comprehensive program of environmental planning and stewardship in support of the readiness of the US naval forces.	All
OPNAVINST 5090.1E	Environmental Readiness Program Manual	To ensure that the U.S. Navy forces train, test, and operate in an environmentally responsible manner to ensure access to land, air and sea.	All
Department of Defense (DOD)			
DOD Directive 4715.21	Climate Change Adaptation and Resilience	Facilitates efforts across the country to improve climate preparedness and resilience by implementing the 2014 DOD <i>Climate Change Adaptation Roadmap</i> and provide for continuation of DOD operations.	Climate

Number	Title	Description	Applicable Resource
DOD Memorandum for Assistant Secretary of the Army, Assistant Secretary of the Navy, Assistant Secretary of the Air Force (dated June 3, 2019)	Climate Adaptation for Department of Department Natural Resources Managers	Releases guide, Climate Adaptation for Department of Defense (DoD) Natural Resources Managers, which overviews how changing climate may affect military resources and offers a six-step process for incorporating adaptation strategies into INRMPs.	Climate
DOD Financial Management Regulation 7000.14-R	Reimbursable Operations, Policy, and Procedures (Volume 11A)	Provides general reimbursement procedures for when DOD Components perform work or sell property within the DOD, to other US government agencies and to private parties.	All – Financial Management of Natural Resources
DOD Instruction (DODINST) 4150.07	DOD Pest Management Program	Implements policy, assigns responsibility, and prescribes procedures for the DOD Pest Management Program by using integrated pest management and EPA registered pesticides to prevent pests and disease vectors.	Nuisance and Invasive Species
DOD-I,-Manual (M) 4715.03	Natural Resources Conservation Program, Instruction and Manual	Implements policy, assigns responsibilities, and prescribes procedures for the integrated management of natural and cultural resources on property under DOD control.	All – Guidance on INRMPs
DODINST 6055.06	DOD Fire and Emergency Services Program	Establishes a comprehensive Fire and Emergency Services Program and prescribes policies to prevent and minimize loss of DOD lives and damage to property and the environment.	Land Resources; Fish and Wildlife Resources
DOD Technical Guide No. 37	Armed Forces Pest Management Board, Integrated Management of Stray Animals on Military Installations	Provides additional guidance for installations in addressing feral cat control issues.	Nuisance and Invasive Species

Number	Title	Description	Applicable Resource
Other			
National Wildlife Coordinating Group	Guidance for Implementation of Federal Wildland Fire Management Policy	Provides for consistent implementation of the 1995/2001 Federal Fire Policy, as directed by the Wildland Fire Leadership Council. This guidance also calls for increased dialogue and collaboration between federal agencies and tribal, local, and state agencies as plans are updated and implemented to manage wildfires in order to accomplish resource and protection objectives.	Land Resources; Fire Management
Forest Service	Forest Service Directive System, Forest Service Manual and Handbooks	Codifies the agency's policy, practice, and procedures. The system serves as the primary basis for the internal management and control of all programs and the primary source of administrative direction to Forest Service employees.	Land Resources; Fire Management
Memorandum of Agreement (MOA)	MOA (2003) USFWS and the Marine Corps	Identifies nine federal conservation statutes that fall under Marine Corps Conservation Law Program jurisdiction.	All

This page intentionally left blank.

APPENDIX C

Flora and Fauna Species Lists

This page intentionally left blank.

	Common Family Name	Species	Common Name	Confirmed on MCLB	Legal Status ^{1,2}	High Priority Species ³	Invasive Species ⁴
Aceraceae	Maple Family	<i>Acer rubrum</i>	Red maple	Yes			
		<i>Acer barbatum</i>	Florida Maple	Unknown			
Anacardiaceae	Cashew Family	<i>Rhus copallina</i>	Winged Sumac	Yes			
		<i>Toxicodendron vernix</i>	Poison Sumac	Unknown			
Aquifoliaceae	Holly Family	<i>Ilex ambigua</i>	Carolina Holly	Unknown			
		<i>Ilex coriacea</i>	Large Gallberry	Unknown			
		<i>Ilex decidua</i>	Possumhaw	Unknown			
		<i>Ilex myrtifolia</i>	Myrtle-leaved Holly	Unknown			
		<i>Ilex opaca</i>	American Holly	Unknown			
		<i>Ilex vomitoria</i>	Yaupon	Unknown			
Araliaceae	Ginseng Family	<i>Aralia spinosa</i>	Devil's-walkingstick	Unknown			
Betulaceae	Birch Family	<i>Alnus serrulata</i>	Hazel Alder	Unknown			
		<i>Betula nigra</i>	River Birch	Unknown			
		<i>Carpinus caroliniana</i>	Ironwood	Unknown			
		<i>Ostrya virginiana</i>	Hophornbeam	Unknown			
Caprifoliaceae	Honeysuckle Family	<i>Sambucus canadensis</i>	Elderberry	Unknown			
		<i>Viburnum nudum</i>	Possumhaw Viburnum	Unknown			
		<i>Viburnum obovatum</i>	Small-leaf Viburnum	Unknown			
		<i>Viburnum rufidulum</i>	Rusty Blackhaw	Unknown			
Castanea	Chestnut Family	<i>Castanea pumila</i>	Allegheny Chinquapin	Unknown			
		<i>Fagus grandifolia</i>	American Beech	Unknown			
Cornaceae	Dogwood Family	<i>Cornus florida</i>	Flowering Dogwood	Yes			
		<i>Cornus stricta</i>	Swamp Dogwood	Unknown			
Cupressaceae	Cypress Family	<i>Juniperus virginiana</i>	Eastern Red-cedar	Yes			
Cyrillaceae	Cyrilla Family	<i>Cliftonia monophylla</i>	Titi	Unknown			
		<i>Cliftonia racemiflora</i>	Red Titi	Unknown			
Ebenaceae	Ebony Family	<i>Diospyros virginia</i>	Persimmon	Yes			
Ericaceae	Heath Family	<i>Vaccinium arboreum</i>	Sparkleberry	Unknown			
Fabaceae	Legume Family	<i>Cercis canadensis</i>	Redbud	Unknown			
		<i>Quercus alba</i>	White Oak	Yes			
		<i>Quercus arkansana</i>	Arkansas Oak	Unknown			
		<i>Quercus austrina</i>	Bluff Oak	Unknown			
		<i>Quercus falcata</i>	Southern Red Oak	Yes			
		<i>Quercus geminata</i>	Sand Live Oak	Unknown			
		<i>Quercus hemisphaerica</i>	Laurel Oak	Yes			
		<i>Quercus incana</i>	Bluejack Oak	Unknown			
		<i>Quercus laevis</i>	Turkey Oak	Unknown			
<i>Quercus laurifolia</i>	Swamp Laurel Oak	Unknown					

Fagaceae	Oak Family	<i>Quercus lyrata</i>	Overcup Oak	Unknown		
		<i>Quercus margaretta</i>	Sand Post Oak	Unknown		
		<i>Quercus marilandica</i>	Blackjack Oak	Unknown		
		<i>Quercus michauxii</i>	Swamp Chesnut Oak	Unknown		
		<i>Quercus muehlenbergii</i>	Chinquapin Oak	Unknown		
		<i>Quercus nigra</i>	Water Oak	Yes		
		<i>Quercus pagoda</i>	Cherrybark Oak	Unknown		
		<i>Quercus phellos</i>	Willow Oak	Unknown		
		<i>Quercus shumardii</i>	Shumard Oak	Unknown		
		<i>Quercus stellata</i>	Post Oak	Unknown		
		<i>Quercus velutina</i>	Black Oak	Unknown		
		<i>Quercus virginiana</i>	Live Oak	Yes		
Hamamelidaceae	Witch-Hazel Family	<i>Hamamelis virginiana</i>	Witch-Hazel	Unknown		
		<i>Liquidambar styraciflua</i>	Sweetgum	Yes		
Hippocastanaceae	Buckeye Family	<i>Aesculus pavia</i>	Red Buckeye	Yes		
Juglandaceae	Walnut Family	<i>Carya aquatica</i>	Water Hickory	Unknown		
		<i>Carya cordiformis</i>	Bitternut Hickory	Unknown		
		<i>Carya glabra</i>	Pignut Hickory	Unknown		
		<i>Carya tomentosa</i>	Mockernut Hickory	Unknown		
		<i>Juglans nigra</i>	Black Walnut	Unknown		
Lauraceae	Laurel Family	<i>Persea borbonia</i>	Red Bay	Unknown		
		<i>Sassafras albidum</i>	Sassafras	Yes		
Magnoliaceae	Magnolia Family	<i>Liriodendron tulipifera</i>	Tulip-poplar	Yes		
		<i>Magnolia grandiflora</i>	Southern Magnolia	Yes		
		<i>Magnolia virginiana</i>	Sweetbay	Unknown		
Moraceae	Mulberry Family	<i>Morus rubra</i>	Red Mulberry	Unknown		
Myricaceae	Wax Myrtle Family	<i>Myrica cerifera</i>	Waxmyrtle	Yes		
		<i>Myrica heterophylla</i>	Evergreen Bayberry	Unknown		
Nyssaceae	Tupelo Family	<i>Nyssa aquatica</i>	Water Tulpelo	Unknown		
		<i>Nyssa sylvatica</i>	Blackgum	Yes		
		<i>Nyssa sylvatica var. biflora</i>	Swamp Blackgum	Unknown		
Oleaceae	Olive Family	<i>Chionanthus virginicus</i>	Fringe Tree	Unknown		
		<i>Fraxinus americana</i>	White Ash	Unknown		
		<i>Fraxinus caroliniana</i>	Carolina Ash	Unknown		
		<i>Fraxinus pennsylvanica</i>	Green Ash	Unknown		
		<i>Osmanthus americanus</i>	Devilwood	Unknown		
Pinaceae	Pine Family	<i>Pinus echinata</i>	Shortleaf Pine	Unknown		
		<i>Pinus elliotii</i>	Slash Pine	Yes		
		<i>Pinus glabra</i>	Spruce Pine	Unknown		
		<i>Pinus palustris</i>	Longleaf Pine	Yes		

		<i>Pinus serotina</i>	Pond Pine	Unknown		
		<i>Pinus taeda</i>	Loblolly Pine	Yes		
Platanaceae	Sycamore Family	<i>Plantus occidentalis</i>	Sycamore	Unknown		
Rosaceae	Rose Family	<i>Amelanchier arborea</i>	Downy Serviceberry	Unknown		
		<i>Crateagus sp.</i>	Hawthorns	Yes		
		<i>Malus angustifolia</i>	Southern Crab Apple	Unknown		
		<i>Prunus americana</i>	American Plum	Unknown		
		<i>Prunus angustifolia</i>	Chickasaw Plum	Unknown		
		<i>Prunus caroliniana</i>	Carolina Laurel Cherry	Yes		
		<i>Prunus serotina</i>	Black Cherry	Yes		
		<i>Prunus umbellata</i>	Flatwoods Plum	Unknown		
Rubiaceae	Madder Family	<i>Cephalanthus occidentalis</i>	Buttonbush	Yes		
		<i>Pinckneya bracteata</i>	Pinckneya	Unknown		
Rutaceae	Rue Family	<i>Ptelea trifoliata</i>	Common Hoptree	Unknown		
		<i>Zanthoxylum clava-herculis</i>	Hercules'-club	Unknown		
Salicaceae	Willow Family	<i>Populus deltoides</i>	Eastern Cottonwood	Unknown		
		<i>Salix caroliniana</i>	Coastal Plain Willow	Unknown		
		<i>Salix nigra</i>	Black Willow	Yes		
Sapotaceae	Sapodilla Family	<i>Bumelia lanuginosa</i>	Gum Bumelia	Unknown		
Styracaceae	Storax Family	<i>Halesia carolina</i>	Carolina Silverbell	Unknown		
		<i>Halesia diptera</i>	Two-wing Silverbell	Unknown		
		<i>Styrax americanus</i>	American Silverbell	Unknown		
		<i>Styrax grandifolius</i>	Bigleaf Silverbell	Unknown		
Symplocaceae	Symplocos Family	<i>Symplocos tinctoria</i>	Horse-sugar	Unknown		
Taxodiaceae	Taxodium Family	<i>Taxodium distichum</i>	Bald Cypress	Unknown		
		<i>Taxodium ascendens</i>	Pond Cypress	Unknown		
Tiliaceae	Basswood Family	<i>Tilia americana</i>	Basswood	Unknown		
Theaceae	Tea Family	<i>Gordonia lasianthus</i>	Loblolly-bay	Unknown		
		<i>Stewartia malacodendron</i>	Virginia Stewartia	Unknown	r	Yes
Ulmaceae	Elm Family	<i>Celtis laevigata</i>	Sugarberry	Unknown		
		<i>Planera aquatica</i>	Water-elm	Unknown		
		<i>Ulmus americana</i>	American Elm	Yes		
Forbs		<i>Agalinis georgiana</i>	Georgia Purple Foxglove	Unknown		Yes
		<i>Agrimonia incisa</i>	Incised Groove-Bur	Yes		
		<i>Ailanthus altissima</i>	Tree-of-Heaven	Yes		Yes
		<i>Albizia julibrissin</i>	Mimosa	Yes		Yes
		<i>Alternanthera philoxeroides</i>	Alligatorweed	Yes		Yes
		<i>Andropogon virginicus</i>	Virginia broomsedge	Yes		
		<i>Angelica dentata</i>	Sandhill Angelica	Unknown		

<i>Aristida stricta</i>	Wiregrass	Yes			
<i>Asplenium heteroresiliens</i>	Wagner Spleenwort	Unknown	t	Yes	
<i>Balduina atropurpurea</i>	Purple Honeycomb Head	Unknown	r	Yes	
<i>Boehmeria cylindrica</i>	Clearweed	Yes			
<i>Callirhoe papaver</i>	Woodland Poppy-mallow	Yes			
<i>Carex dasycarpa</i>	Velvet Sedge	Unknown	r	Yes	
<i>Carex glaucescens</i>	Waxy Sedge	Yes			
<i>Carex godfreyi</i>	Godfrey's Sedge	Unknown		Yes	
<i>Carex lupulina</i>	Hop Sedge	Yes			
<i>Carex striata</i>	Pocosin sedge	Yes			
<i>Chamaecrista deeringiana</i>	Florida Senna	Unknown		Yes	
<i>Cnidoscolus stimulosus</i>	Tread-softly	Yes			
<i>Coleataenia rigidula ssp. rigidula</i>	Redtop panicgrass	Yes			
<i>Commelina communis</i>	Asiatic dayflower	Yes			Yes
<i>Croton elliotii</i>	Elliott Croton	Unknown		Yes	
<i>Cynodon sp.</i>	Bermuda grass	Yes			Yes
<i>Desmodium ochroleucum</i>	Cream-Flowered Tick-trefoil	Unknown	t	Yes	
<i>Dichantheium hirstii</i>	Hirst's Panic Grass	Unknown	e	Yes	
<i>Drosera tracyi</i>	Tracy's Dew-threads	Unknown			
<i>Dyschoriste oblongifolia</i>	Oblong-leaf Twinflower	Yes			
<i>Elaeagnus umbellate</i>	Autumn Olive	Yes			Yes
<i>Elyonurus tripsacoides</i>	Pan-American Balsamscale	Unknown		Yes	
<i>Epidendrum magnoliae</i>	Green-Fly Orchid	Unknown	u		
<i>Eupatorium leptophyllum</i>	False Fennel	Yes			
<i>Eustachys floridana</i>	Florida Finger Grass	Unknown		Yes	
<i>Fimbristylis perpusilla</i>	Harper Fimbry	Unknown	UR,e	Yes	
<i>Fothergilla gardenii</i>	Dwarf Witch-Alder	Unknown	t	Yes	
<i>Habenaria quinqueseta var. quinqueseta</i>	Michaux Orchid	Unknown	t	Yes	
<i>Itea virginica</i>	Virginia willow	Yes			
<i>Justicia angusta</i>	Narrowleaf Water-willow	Unknown		Yes	
<i>Lachnocaulon beyrichianum</i>	Southern Bog-button	Unknown		Yes	
<i>Lagerstroemia indica</i>	Crapemyrtle	Yes			Yes
<i>Lantana sp.</i>	Lantana	Yes			Yes
<i>Lespedeza bicolor</i>	Bicolor Lespedeza	Yes			Yes
<i>Ligustrum japonicum</i>	Glossy Privet	Yes			Yes
<i>Ligustrum sinense</i>	Chinese Privet	Yes			Yes
<i>Lindera melissifolia</i>	Pond Spicebush or Pondberry	Unknown	E,e	Yes	

<i>Listera australis</i>	Southern Twayblade	Unknown			
<i>Litsea aestivalis</i>	Pond Spice	Unknown	r	Yes	
<i>Lobelia boykinii</i>	Boykin Lobelia	Unknown	UR	Yes	
<i>Lonicera japonica</i>	Japanese Honeysuckle	Yes			Yes
<i>Lygodium japonicum</i>	Japanese Climbing Fern	Yes			Yes
<i>Macranthera flammea</i>	Hummingbird Flower	Unknown	t	Yes	
<i>Mahonia bealei</i>	Leatherleaf mahonia	Yes			Yes
<i>Matelea pubiflora</i>	Trailing Milkvine	Unknown	r		
<i>Melia azadarach</i>	Chinaberry	Yes			Yes
<i>Muhlenbergia capillaris</i>	Hairawn muhly	Yes			
<i>Nandina domestica</i>	Nandina/Sacred Bamboo	Yes			Yes
<i>Oxypolis canbyi</i>	Canby Dropwort	Unknown	E,e	Yes	
<i>Oxypolis ternata</i>	Savanna Cowbane	Unknown		Yes	
<i>Panicum hemitomum</i>	Maidencane	Yes			
<i>Panicum verrucosum</i>	Warty Panicgrass	Yes			
<i>Paspalum notatum</i>	Bahiagrass	Yes			Yes
<i>Paspalum urvillei</i>	Vaseygrass	Yes			Yes
<i>Penstemon australis</i>	Southern beardtongue	Yes			
<i>Phaseolus polystachios var. sinuatus</i>	Trailing Bean-Vine	Unknown			
<i>Phlox amoena</i>	Hairy phlox	Yes			
<i>Phyllanthus urinaria</i>	Chamberbitter	Yes			Yes
<i>Phyllostachys aurea</i>	Golden Bamboo	Yes			Yes
<i>Pityopsis graminifolia var. graminifolia</i>	Grass-leaf golden-aster	Yes			
<i>Platanthera blephariglottis var. conspicua</i>	Southern White Fringed-orchid	Unknown		Yes	
<i>Platanthera chapmanii</i>	Chapman's Fringed-orchid	Unknown		Yes	
<i>Platanthera integra</i>	Yellow Fringeless Orchid	Unknown		Yes	
<i>Platanthera nivea</i>	Snowy Orchid	Unknown			
<i>Pluchea camphorata</i>	Camphorweed	Yes			
<i>Polygala baldunii</i>	White Milkwort	Unknown			
<i>Polygala leptostachys</i>	Georgia Milkwort	Unknown			
<i>Pteridium aquilinum var. pseudocaudatum</i>	Bracken fern	Yes			
<i>Pteroglossaspis ecristata</i>	Crestless Plume Orchid	Yes	t	Yes	
<i>Pueraria montana</i>	Kudzu	Yes			Yes
<i>Rhexia aristosa</i>	Awned Meadowbeauty	Unknown		Yes	
<i>Rhynchospora punctata</i>	Spotted Beakrush	Unknown		Yes	
<i>Rhynchospora solitaria</i>	Solitary Beakrush	Unknown	e	Yes	
<i>Rhynchospora spp.</i>	Beakrush	Yes		Yes	

<i>Salvia azurea</i>	Blue sage	Yes			
<i>Sarracenia flava</i>	Yellow Flytrap	Unknown	u		
<i>Sarracenia leucophylla</i>	Whitetop Pitcherplant	Unknown	e	Yes	
<i>Sarracenia minor var. minor</i>	Hooded Pitcherplant	Unknown	u		
<i>Sarracenia psittacina</i>	Parrot Pitcherplant	Unknown	t	Yes	
<i>Saururus cernuus</i>	Lizard's-tail	Yes			
<i>Schizachyrium tenerum</i>	Slender bluestem	Yes			
<i>Schwalbea americana</i>	Chaffseed	Unknown	E,e	Yes	
<i>Scirpus cyperinus</i>	Woolgrass	Yes			
<i>Scirpus hallii</i>	Hall Bulrush	Unknown			
<i>Scutellaria multiglandulosa</i>	Small's Skullcap	Yes			
<i>Sesbania</i>	Unknown	Yes			Yes
<i>Sesbania punicea</i>	Rattlebox, Spanish Gold	Yes			Yes
<i>Sideroxylon sp. 1</i>	Dwarf Buckthorn	Unknown			
<i>Sideroxylon thornei</i>	Swamp Buckthorn	Unknown	UR,r	Yes	
<i>Smilax rotundifolia</i>	Round-leaf greenbrier	Yes			
<i>Solidago odora</i>	Sweet Goldenrod	Yes			
<i>Sorghum halepense</i>	Johnsongrass	Yes			Yes
<i>Sporobolus teretifolius</i>	Wire-Leaf Dropseed	Unknown	UR	Yes	
<i>Stokesia laevis</i>	Stokes Aster	Unknown		Yes	
<i>Symphyotrichum adnatum</i>	Scaleleaf Aster	Yes			
<i>Tephrosia virginiana</i>	Goat's-rue	Yes			
<i>Thalictrum cooleyi</i>	Cooley Meadowrue	Unknown	E,e	Yes	
<i>Toxicodendron pubescens</i>	Poison Oak	Yes			
<i>Toxicodendron radicans</i>	Poison Ivy	Yes			
<i>Triadica sebbifera</i>	Chinese tallow tree	Yes			Yes
<i>Trillium reliquum</i>	Relict Trillium	Unknown	E,e	Yes	
<i>Vaccinium myrsinites</i>	Shiny Blueberry	Yes			
<i>Vaccinium stamineum</i>	Deerberry	Yes			
<i>Verbascum blattaria L.</i>	Moth mullein	Yes			Yes
<i>Verbena brasiliensis</i>	Brazilian Vervain	Yes			Yes
<i>Verbena tenuisecta</i>	Moss Verbena	Yes			Yes
<i>Vernicia fordii</i>	Tung Oil Tree	Yes			Yes
<i>Vernonia angustifolia</i>	Narrow-leaved Ironweed	Yes			
<i>Wisteria sp.</i>	Wisteria	Yes			Yes
<i>Woodwardia virginica</i>	Virginia chain fern	Yes			
<i>Xyris drummondii</i>	Drummond's Yellow-eyed Grass	Unknown		Yes	
<i>Xyris scabrifolia</i>	Harper Yellow-eyed Grass	Unknown		Yes	

¹ E = Federally Endangered Species; e = State Endangered Species
T = Federally Threatened Species; t = State Threatened Species

r = State Rare Species

u = State Unusual Species (subject to commercial exploitation and deserving of special consideration)

C = Candidate for Federal Listing

UR = Under Review for Federal Listing

² Source: GDNr 2020; USFWS 2020.

³ Source: GDNr 2015

⁴ Source: MCLB 2019

	Common Family Name	Species	Common Name	Confirmed on MCLB	Legal Status ^{1,2}	High Priority Species ³
		<i>Ambystoma opacum</i>	Marbled Salamander	Unknown		
		<i>Ambystoma bishopi</i>	Reticulated Flatwoods Salamander	No	E,e	Yes
		<i>Ambystoma cingulatum</i>	Frosted Flatwoods Salamander	Unknown	T	Yes
		<i>Ambystoma talpoideum</i>	Mole Salamander	Unknown		
		<i>Ambystoma tigrinum</i>	Tiger Salamander	Yes		Yes
Amphiumidae	Amphiumas	<i>Amphiuma means</i>	Two-toed Amphiuma	Yes		
		<i>Desmognathus auriculatus</i>	Southern Dusky Salamander	Unknown		Yes
		<i>Eurycea bislineata complex</i>	Two-lined Salamander	Unknown		
		<i>Eurycea guttolineata</i>	Three-lined Salamander	Unknown		
		<i>Eurycea quadridigitata complex</i>	Dwarf Salamander	Yes		
		<i>Hemidactylium scutatum</i>	Four-toed Salamander	Unknown		
		<i>Plethodon glutinosus complex</i>	Slimy Salamander	Yes		
		<i>Pseudotriton montanus</i>	Mud Salamander	Unknown		
Salamandridae	Newts	<i>Notophthalmus perstriatus</i>	Striped Newt	Unknown	t	Yes
		<i>Notophthalmus viridescens</i>	Eastern Newt	Unknown		
		<i>Pseudobranchius striatus</i>	Northern Dwarf Siren	Unknown		
Sirenidae	Sirens	<i>Siren intermedia</i>	Lesser Siren	Unknown		
		<i>Siren lacertina</i>	Greater Siren	Unknown		
		<i>Bufo fowleri</i>	Fowler's Toad	Unknown		
Bufonidae	True Toads	<i>Bufo quercicus</i>	Oak Toad	Unknown		
		<i>Bufo terrestris</i>	Southern Toad	Yes		
		<i>Acris crepitans</i>	Northern Cricket Frog	Yes		
		<i>Acris gryllus</i>	Southern Cricket Frog	Unknown		
		<i>Hyla avivoca</i>	Bird-voiced Treefrog	Unknown		
		<i>Hyla chrysoscelis</i>	Cope's Gray Treefrog	Yes		
		<i>Hyla cinerea</i>	Green Treefrog	Yes		
		<i>Hyla femoralis</i>	Pine Woods Treefrog	Unknown		
		<i>Hyla gratiosa</i>	Barking Treefrog	Yes		
		<i>Hyla squirella</i>	Squirrel Treefrog	Yes		
		<i>Pseudacris crucifer</i>	Spring Peeper	Yes		
		<i>Pseudacris feriarum</i>	Upland Chorus Frog	Yes		
		<i>Pseudacris nigrita</i>	Southern Chorus Frog	Unknown		
		<i>Pseudacris ocularis</i>	Little Grass Frog	Unknown		
		<i>Pseudacris ornata</i>	Ornate Chorus Frog	Yes		
Microhylidae	Narrow-mouthed Toads	<i>Gastrophryne carolinensis</i>	Eastern Narrow-mouthed Toad	Yes		
Pelobatidae	Spadefoots	<i>Scaphiopus holbrookii</i>	Eastern Spadefoot	Yes		
		<i>Lithobates capito</i>	Gopher Frog	Unknown	UR,r	Yes
		<i>Rana catesbeiana</i>	Bullfrog	Yes		

Ranidae	True Frogs	<i>Rana calmitans</i>	Green Frog	Yes		
		<i>Rana grylio</i>	Pig Frog	Yes		
		<i>Rana heckscheri</i>	River Frog	Unknown		
		<i>Rana sphenocephala</i>	Southern Leopard Frog	Yes		

¹ E = Federally Endangered Species; e = State Endangered Species
T = Federally Threatened Species; t = State Threatened Species
r = State Rare Species
C = Candidate for Federal Listing
UR = Under Review for Federal Listing

² Source: GDNR 2020; USFWS 2020.

³ Source: GDNR 2015

	Common Family Name	Species	Common Name	Confirmed on MCLB	Legal Status ^{1, 2}	High Priority Species ³
ALLIGATORS						
Alligatoridae	Alligators	<i>Alligator mississippiensis</i>	American alligator	Yes	SA	
LIZARDS						
Anguidae	Glass & Alligator Lizards	<i>Ophisaurus attenuatus</i>	Slender Glass Lizard	Unknown		
		<i>Ophisaurus mimicus</i>	Mimic Glass Lizard	Unknown	r	Yes
		<i>Ophisaurus ventralis</i>	Eastern Glass Lizard	Unknown		
Gekkonidae	Geckos	<i>Hemidactylus turcicus</i>	Mediterranean Gecko	Yes		
Phrynosomatidae	Fence & Horned Lizards	<i>Sceloporus undulatus</i>	Eastern Fence Lizard	Unknown		
Polychrotidae	Anoles	<i>Anolis carolinensis</i>	Green Anole	Yes		
Scincidae	Skinks	<i>Eumeces egregius</i>	Mole Skink	Unknown		
		<i>Eumeces fasciatus</i>	Five-lined Skink	Unknown		
		<i>Eumeces inexpectatus</i>	Southeastern Five-lined Skink	Unknown		
		<i>Eumeces laticeps</i>	Broadhead Skink	Yes		
		<i>Scincella lateralis</i>	Ground Skink	Yes		
Teiidae	Racerunners & Whiptails	<i>Cnemidophorus sexlineatus</i>	Six-lined Racerunner	Yes		
SNAKES						
Colubridae	Colubrid Snakes	<i>Cemophora coccinea</i>	Scarlet Snake	Unknown		
		<i>Coluber constrictor</i>	Black Racer	Yes		
		<i>Diadophis punctatus</i>	Ringneck Snake	Unknown		
		<i>Drymarchon cooperi</i>	Eastern Indigo Snake	No	T	Yes
		<i>Elaphe guttata</i>	Corn Snake	Unknown		
		<i>Elaphe obsoleta</i>	Rat Snake	Yes		
		<i>Farancia abacura</i>	Mud Snake	Yes		
		<i>Farancia erythrogramma</i>	Rainbow Snake	Unknown		
		<i>Heterodon platirhinos</i>	Eastern Hognose Snake	Yes		
		<i>Heterodon simus</i>	Southern Hognose Snake	Unknown	t	Yes
		<i>Lampropeltis getula</i>	Common Kingsnake	Yes		
		<i>Lampropeltis triangulum elapsoides</i>	Scarlet Kingsnake	Unknown		
		<i>Masticophis flagellum</i>	Coachwhip	Unknown		
		<i>Nerodia erythrogaster</i>	Plain-bellied Watersnake	Unknown		
		<i>Nerodia fasciata</i>	Banded Watersnake	Yes		
		<i>Nerodia floridana</i>	Eastern Green Watersnake	Unknown		
		<i>Nerodia sipedon</i>	Northern Watersnake	Unknown		
		<i>Nerodia taxispilota</i>	Brown Watersnake	Unknown		
		<i>Opheodrys aestivus</i>	Rough Green Snake	Unknown		
		<i>Pituophis melanoleucus</i>	Pine Snake	Unknown		Yes
		<i>Regina rigida</i>	Glossy Crayfish Snake	Unknown		
		<i>Regina septemvittata</i>	Queen Snake	Unknown		
		<i>Seminatrix pygaea</i>	Black Swamp Snake	Unknown		
<i>Storeria dekayi</i>	Brown Snake	Unknown				

		<i>Storeria occipitomaculata</i>	Red-bellied Snake	Yes		
		<i>Thamnophis sauritus</i>	Eastern Ribbon Snake	Unknown		
		<i>Thamnophis sirtalis</i>	Common Garter Snake	Yes		
		<i>Virginia striatula</i>	Rough Earth Snake	Unknown		
		<i>Virginia valeriae</i>	Smooth Earth Snake	Unknown		
Elapidae	Elapid Snakes	<i>Micrurus fulvius</i>	Eastern Coral Snake	Unknown		
Viperidae	Vipers	<i>Agkistrodon contortrix</i>	Copperhead	Unknown		
		<i>Agkistrodon piscivorus</i>	Cottonmouth	Yes		
		<i>Crotalus adamanteus</i>	Eastern Diamondback Rattlesnake	Yes	UR	Yes
		<i>Crotalus horridus</i>	Timber Rattlesnake	Unknown		
		<i>Sistrurus miliarius</i>	Pigmy Rattlesnake	Unknown		
TURTLES						
Chelydridae	Snapping Turtles	<i>Chelydra serpentina</i>	Common Snapping Turtle	Yes		
Emydidae	Common Water Turtles	<i>Clemmys guttata</i>	Spotted Turtle	Unknown	UR,u	Yes
		<i>Deirochelys reticularia</i>	Chicken Turtle	Unknown		
		<i>Pseudemys floridana</i>	Florida Cooter	Yes		
		<i>Terrapene carolina</i>	Eastern Box Turtle	Yes		
		<i>Trachemys scripta</i>	Pond Slider	Yes		
Kinosternidae	Mud and Musk Turtles	<i>Kinosternon baurii</i>	Striped Mud Turtle	Unknown		
		<i>Kinosternon subrubrum</i>	Eastern Mud Turtle	Yes		
		<i>Sternotherus minor</i>	Loggerhead Musk Turtle	Unknown		
		<i>Sternotherus odoratus</i>	Common Musk Turtle	Unknown		
Testudinidae	Tortoises	<i>Gopherus polyphemus</i>	Gopher Tortoise	Yes	C,t	Yes
Trionychidae	Softshell Turtles	<i>Apalone ferox</i>	Florida Softshell	Unknown		
		<i>Apalone spinifera</i>	Spiny Softshell	Unknown		

¹ E = Federally Endangered Species; e = State Endangered Species

T = Federally Threatened Species; t = State Threatened Species

r = State Rare Species

C = Candidate for Federal Listing

u = State Unusual Species

UR = Under Review for Federal Listing

SA = Similarity of Appearance (Threatened)

² Source: GDNR 2020; USFWS 2020.

³ Source: GDNR 2015

	Mammals	Common Family Name	Species	Common Name	Confirmed on MCLB	Legal Status ^{1,2}	High Priority Species ³
Artiodactyla	Cervidae	Deer	<i>Odocoileus virginianus</i>	White-tailed Deer	Yes		
	Suidae	Old World Swine	<i>Sus scrofa</i>	Wild Boar	Yes		
Carnivora	Canidae	Wolves, Foxes & Coyotes	<i>Canis latrans</i>	Coyote	Yes		
			<i>Urocyon cinereoargenteus</i>	Gray Fox	Yes		
			<i>Vulpes vulpes</i>	Red Fox	Yes		
	Felidae	Cats	<i>Lynx rufus</i>	Bobcat	Yes		
	Mustelidae	Weasels, Skunks, Badgers & Otters	<i>Lontra canadensis</i>	River Otter	Unknown		
			<i>Mephitis mephitis</i>	Striped Skunk	Yes		
			<i>Mustela frenata</i>	Long-tailed Weasel	Unknown		
			<i>Mustela vison</i>	Mink	Unknown		
	<i>Spilogale putorius</i>	Spotted Skunk	Unknown		Yes		
Procyonidae	Raccoons, Ringtails & Coatis	<i>Procyon lotor</i>	Raccoon	Yes			
Chiroptera	Molossidae	Free-tailed Bats	<i>Tadarida brasiliensis</i>	Brazilian Free-tailed Bat	Unknown		
	Vespertilionidae	Evening Bats	<i>Eptesicus fuscus</i>	Big Brown Bat	Unknown		
			<i>Lasiurus borealis</i>	Red Bat	Unknown		
			<i>Lasiurus cinereus</i>	Hoary Bat	Unknown		
			<i>Lasiurus intermedius</i>	Northern Yellow Bat	Unknown		Yes
			<i>Lasiurus seminolus</i>	Seminole Bat	Unknown		
			<i>Myotis austroriparius</i>	Southeastern Myotis	Unknown		Yes
			<i>Myotis lucifugus</i>	Little Brown Myotis	Unknown	UR	Yes
			<i>Nycticeius humeralis</i>	Evening Bat	Unknown		
<i>Pipistrellus subflavus</i>	Eastern Pipistrelle	Unknown					
<i>Plecotus rafinesquii</i>	Rafinesque's Big-eared Bat	Unknown					
Lagomorpha	Leporidae	Rabbits and Hares	<i>Sylvilagus aquaticus</i>	Swamp Rabbit	Unknown		
			<i>Sylvilagus floridanus</i>	Eastern Cottontail	Unknown		
			<i>Sylvilagus palustris</i>	Marsh Rabbit	Unknown		
Marsupialia	Didelphidae	Opossums	<i>Didelphis virginiana</i>	Virginia Opossum	Yes		
Rodentia	Castoridae	Beavers	<i>Castor canadensis</i>	Beaver	Yes		
	Cricetidae	New World Rats & Mice	<i>Microtus pinetorum</i>	Woodland Vole	Unknown		
			<i>Neotoma floridana</i>	Eastern Woodrat	Unknown		
			<i>Ochrotomys nuttalli</i>	Golden Mouse	Unknown		
			<i>Ondatra zibethicus</i>	Muskrat	Unknown		
			<i>Oryzomys palustris</i>	Marsh Rice Rat	Unknown		
			<i>Peromyscus gossypinus</i>	Cotton Mouse	Unknown		
			<i>Peromyscus polionotus</i>	Oldfield Mouse	Unknown		
			<i>Reithrodontomys humulis</i>	Eastern Harvest Mouse	Unknown		
	<i>Sigmodon hispidus</i>	Hispid Cotton Rat	Unknown				
	Geomyidae	Pocket Gophers	<i>Geomys pinetis</i>	Southeastern Pocket Gopher	Unknown	t	Yes
Muridae	Old World Rats & Mice	<i>Mus musculus</i>	House Mouse	Yes			
		<i>Rattus norvegicus</i>	Norway Rat	Yes			
		<i>Rattus rattus</i>	Black Rat	Unknown			

	Sciuridae	Squirrels	<i>Glaucomys volans</i>	Southern Flying Squirrel	Yes		
			<i>Sciurus carolinensis</i>	Gray Squirrel	Yes		
			<i>Sciurus niger</i>	Fox Squirrel	Yes		
			<i>Tamias striatus</i>	Eastern Chipmunk	Unknown		
Insectivora	Soricidae	Shrews	<i>Blarina carolinensis</i>	Southern Short-tailed Shrew	Yes		
			<i>Cryptotis parva</i>	Least Shrew	Unknown		
			<i>Sorex longirostris</i>	Southeastern Shrew	Unknown		
	Talpidae	Moles	<i>Scalopus aquaticus</i>	Eastern Mole	Unknown		
Xenarthra	Dasypodidae	Armadillos	<i>Dasybus novemcinctus</i>	Nine-banded Armadillo	Yes		

¹ E = Federally Endangered Species; e = State Endangered Species
T = Federally Threatened Species; t = State Threatened Species
r = State Rare Species
C = Candidate for Federal Listing
UR = Under Review for Federal Listing

² Source: GDNR 2020; USFWS 2020.

³ Source: GDNR 2015

Common Family Name	Species	Common Name	Confirmed on MCLB	Legal Status ^{1,2}	High Priority Species ³	BCC Species ⁴	MBTA Species	When Found on Installation	
Accipitridae	Kites, Eagles & Hawks	<i>Pandion haliaetus</i>	Osprey	Unknown				Year-Round	
		<i>Elanoides forficatus</i>	Swallow-tailed Kite	Unknown	r	Yes	Yes	Yes	Migrant
		<i>Ictinia mississippiensis</i>	Mississippi Kite	Yes					Year-Round
		<i>Haliaeetus leucocephalus</i>	Bald Eagle	Yes	GBE,t	Yes	Yes	Yes	Year-Round
		<i>Circus cyaneus</i>	Northern Harrier	Yes					Winter
		<i>Accipiter striatus</i>	Sharp-shinned Hawk	Yes					Winter
		<i>Accipiter cooperii</i>	Cooper's Hawk	Unknown					Year-Round
		<i>Buteo lineatus</i>	Red-shouldered Hawk	Yes					Year-Round
		<i>Buteo platypterus</i>	Broad-winged Hawk	Yes					Summer
		<i>Buteo jamaicensis</i>	Red-tailed Hawk	Yes					Year-Round
		<i>Aquila chrysaetos</i>	Golden Eagle	Unknown	GBE			Migrant	
Alaudidae	Larks	<i>Eremophila alpestris</i>	Horned Lark	Unknown				Winter	
Alcedinidae	Kingfishers	<i>Ceryle alcyon</i>	Belted Kingfisher	Yes				Year-Round	
Anatidae	Waterfowl	<i>Aix sponsa</i>	Wood Duck	Yes				Year-Round	
		<i>Anas acuta</i>	Northern Pintail	Unknown				Winter	
		<i>Anas americana</i>	American Wigeon	Unknown				Winter	
		<i>Anas clypeata</i>	Northern Shoveler	Unknown				Winter	
		<i>Anas crecca</i>	Green-winged Teal	Yes				Winter	
		<i>Anas discors</i>	Blue-winged Teal	Yes				Winter	
		<i>Anas platyrhynchos</i>	Mallard	Yes				Year-Round	
		<i>Anas rubripes</i>	American Black Duck	Unknown				Winter	
		<i>Anas strepera</i>	Gadwall	Unknown				Winter	
		<i>Anser albifrons</i>	Greater White-fronted Goose	Unknown				Winter	
		<i>Aythya affinis</i>	Lesser Scaup	Unknown				Winter	
		<i>Aythya americana</i>	Redhead	Unknown				Winter	
		<i>Aythya collaris</i>	Ring-necked Duck	Unknown				Winter	
		<i>Aythya marila</i>	Greater Scaup	Unknown				Winter	
		<i>Aythya valisineria</i>	Canvasback	Unknown				Winter	
		<i>Branta canadensis</i>	Canada Goose	Yes				Year-Round	
		<i>Bucephala albeola</i>	Bufflehead	Unknown				Winter	
		<i>Bucephala clangula</i>	Common Goldeneye	Unknown				Winter	
		<i>Chen caerulescens</i>	Snow Goose	Yes				Winter	
		<i>Chen rossii</i>	Ross's Goose	Unknown				Winter	
		<i>Dendrocygna autumnalis</i>	Black-bellied Whistling-Duck	Unknown				Winter	
		<i>Dendrocygna bicolor</i>	Fulvous Whistling-Duck	Unknown				Winter	
		<i>Lophodytes cucullatus</i>	Hooded Merganser	Yes				Winter	
<i>Melanitta perspicillata</i>	Surf Scoter	Unknown				Migrant			
<i>Mergus serrator</i>	Red-breasted Merganser	Unknown				Winter			
<i>Oxyura jamaicensis</i>	Ruddy Duck	Unknown				Winter			
Anhingidae	Anhingas	<i>Anhinga anhinga</i>	Anhinga	Yes				Year-Round	
Apodidae	Swifts	<i>Chaetura pelagica</i>	Chimney Swift	Yes				Summer	
		<i>Botaurus lentiginosus</i>	American Bittern	Unknown		Yes		Winter	
		<i>Ixobrychus exilis</i>	Least Bittern	Unknown	Yes	Yes		Summer	
		<i>Ardea herodias</i>	Great Blue Heron	Yes				Year-Round	
		<i>Ardea alba</i>	Great Egret	Yes				Year-round	

Ardeidae	Bitterns, Herons & Egrets	<i>Egretta thula</i>	Snowy Egret	Yes					Summer
		<i>Egretta caerulea</i>	Little Blue Heron	Yes		Yes			Summer
		<i>Egretta tricolor</i>	Tricolored Heron	Unknown		Yes			Migrant
		<i>Bubulcus ibis</i>	Cattle Egret	Unknown					Summer
		<i>Butorides virescens</i>	Green Heron	Yes					Summer
		<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	Unknown					Year-Round
		<i>Nyctanassa violacea</i>	Yellow-crowned Night Heron	Yes					Summer
Bombycillidae	Waxwings	<i>Bombycilla cedrorum</i>	Cedar Waxwing	Yes					Winter
Caprimulgidae	Nightjars	<i>Caprimulgus carolinensis</i>	Chuck-will's-widow	Yes			Yes		Summer
		<i>Caprimulgus vociferus</i>	Whip-poor-will	Unknown			Yes		Migrant
		<i>Chordeiles minor</i>	Common Nighthawk	Yes					Summer
Cardinalidae	Cardinals & Grosbeaks	<i>Cardinalis cardinalis</i>	Northern Cardinal	Yes					Year-Round
		<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak	Yes					Migrant
		<i>Passerina caerulea</i>	Blue Grosbeak	Yes					Summer
		<i>Passerina cyanea</i>	Indigo Bunting	Yes					Summer
		<i>Passerina ciris</i>	Painted Bunting	Unknown		Yes	Yes		Summer
		<i>Spiza americana</i>	Dickcissel	Unknown					Migrant
Cathartidae	New World Vultures	<i>Coragyps atratus</i>	Black Vulture	Yes					Year-Round
		<i>Cathartes aura</i>	Turkey Vulture	Yes					Year-Round
Certhiidae	Creepers	<i>Certhia americana</i>	Brown Creeper	Yes					Winter
Charadriidae	Plovers	<i>Charadrius semipalmatus</i>	Semipalmated Plover	Unknown					Migrant
		<i>Charadrius vociferus</i>	Killdeer	Yes					Year-Round
		<i>Pluvialis dominica</i>	American Golden-Plover	Unknown					Migrant
		<i>Pluvialis squatarola</i>	Black-Bellied Plover	Unknown					Migrant
Ciconiidae	Storks	<i>Mycteria americana</i>	Wood Stork	Yes	T,e	Yes			Migrant
Columbidae	Pigeons & Doves	<i>Columba livia</i>	Rock Pigeon	Yes					Year-Round
		<i>Streptopelia decaocto</i>	Eurasian Collared-Dove	Yes					Year-Round
		<i>Zenaida asiatica</i>	White-winged Dove	Unknown					Migrant
		<i>Zenaida macroura</i>	Mourning Dove	Yes					Year-Round
		<i>Columbina passerina</i>	Common Ground-Dove	Yes				Yes	Yes
Corvidae	Jays & Crows	<i>Cyanocitta cristata</i>	Blue Jay	Yes					Year-Round
		<i>Corvus brachyrhynchos</i>	American Crow	Yes					Year-Round
		<i>Corvus ossifragus</i>	Fish Crow	Yes					Year-Round
Cuculidae	Cuckoos & Anis	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	Unknown					Migrant
		<i>Coccyzus americanus</i>	Yellow-billed Cuckoo	Yes					Summer
Emberizidae	Sparrows	<i>Pipilo erythrophthalmus</i>	Eastern Towhee	Yes					Year-Round
		<i>Peucaea aestivalis</i>	Bachman's Sparrow	Yes	r	Yes	Yes		Year-Round
		<i>Spizella passerina</i>	Chipping Sparrow	Yes					Winter
		<i>Spizella pallida</i>	Clay-colored Sparrow	Unknown					Migrant
		<i>Spizella pusilla</i>	Field Sparrow	Yes					Year-Round
		<i>Pooecetes gramineus</i>	Vesper Sparrow	Yes					Winter
		<i>Chondestes grammacus</i>	Lark Sparrow	Unknown					Migrant
		<i>Passerculus sandwichensis</i>	Savannah Sparrow	Yes					Winter
		<i>Ammodramus savannarum</i>	Grasshopper Sparrow	Yes		Yes			Winter
		<i>Ammodramus henslowii</i>	Henslow's Sparrow	Unknown	r	Yes	Yes		Winter
		<i>Ammodramus leconteii</i>	Le Conte's Sparrow	Unknown			Yes		Winter
		<i>Ammodramus nelsoni</i>	Nelson's Sharp-tailed Sparrow	Unknown		Yes	Yes		Migrant

		<i>Passerella iliaca</i>	Fox Sparrow	Yes					Winter	
		<i>Melospiza melodia</i>	Song Sparrow	Yes					Winter	
		<i>Melospiza lincolni</i>	Lincoln's Sparrow	Unknown					Migrant	
		<i>Melospiza georgiana</i>	Swamp Sparrow	Yes					Winter	
		<i>Zonotrichia albicollis</i>	White-throated Sparrow	Yes					Winter	
		<i>Zonotrichia leucophrys</i>	White-crowned Sparrow	Yes					Winter	
		<i>Junco hyemalis</i>	Dark-eyed Junco	Yes					Winter	
Falconidae	Falcons	<i>Falco sparverius sparverius</i>	American Kestrel	Yes				Yes	Winter	
		<i>Falco sparverius paulus</i>	Southeastern Kestrel	Unknown	r	Yes	Yes		Year-Round	
		<i>Falco columbarius</i>	Merlin	Unknown						Migrant
Fringillidae	Finches	<i>Haemorhous purpureus</i>	Purple Finch	Yes					Migrant	
		<i>Haemorhous mexicanus</i>	House Finch	Yes					Year-Round	
		<i>Spinus pinus</i>	Pine Siskin	Yes						Migrant
		<i>Spinus tristis</i>	American Goldfinch	Yes						Year-Round
		<i>Coccothraustes vespertinus</i>	Evening Grosbeak	Unknown						Migrant
Gaviidae	Loons	<i>Gavia immer</i>	Common Loon	Unknown					Winter	
Gruidae	Cranes	<i>Grus canadensis</i>	Sandhill Crane	Unknown					Migrant	
		<i>Grus americana</i>	Whooping Crane	No		Yes			Migrant	
Hirundinidae	Swallows	<i>Progne subis</i>	Purple Martin	Yes					Summer	
		<i>Tachycineta bicolor</i>	Tree Swallow	Yes					Migrant	
		<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow	Yes						Summer
		<i>Riparia riparia</i>	Bank Swallow	Unknown						Migrant
		<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	Unknown						Migrant
		<i>Hirundo rustica</i>	Barn Swallow	Yes						Summer
		Icteridae	Blackbirds & Orioles	<i>Dolichonyx oryzivorus</i>	Bobolink	Unknown				
<i>Agelaius phoeniceus</i>	Red-winged Blackbird			Yes					Year-Round	
<i>Sturnella magna</i>	Eastern Meadowlark			Yes						Year-Round
<i>Xanthocephalus xanthocephalus</i>	Yellow-headed Blackbird			Unknown						Migrant
<i>Euphagus carolinus</i>	Rusty Blackbird			Yes		Yes	Yes	Yes		Winter
<i>Euphagus cyanocephalus</i>	Brewer's Blackbird			Yes						Winter
<i>Quiscalus quiscula</i>	Common Grackle			Yes						Year-Round
<i>Molothrus ater</i>	Brown-headed Cowbird			Yes						Year-Round
<i>Icterus spurius</i>	Orchard Oriole			Yes						Summer
<i>Icterus galbula</i>	Baltimore Oriole	Unknown						Migrant		
Laniidae	Shrikes	<i>Lanius ludovicianus</i>	Loggerhead Shrike	Yes		Yes	Yes		Year-Round	
Laridae	Gulls & Terns	<i>Leucophaeus atricilla</i>	Laughing Gull	Unknown					Migrant	
		<i>Leucophaeus pipixcan</i>	Franklin's Gull	Unknown					Migrant	
		<i>Chroicocephalus philadelphia</i>	Bonaparte's Gull	Unknown						Winter
		<i>Larus delawarensis</i>	Ring-billed Gull	Unknown						Winter
		<i>Larus argentatus</i>	Herring Gull	Unknown						Migrant
		<i>Hydroprogne caspia</i>	Caspian Tern	Unknown						Migrant
		<i>Sterna hirundo</i>	Common Tern	Unknown						Migrant
		<i>Sterna forsteri</i>	Forester's Tern	Unknown						Migrant
		<i>Sternula antillarum</i>	Least Tern	Unknown	r	Yes				Summer
		<i>Chlidonias niger</i>	Black Tern	Unknown						Migrant
Mimidae	Mockingbirds & Thrashers	<i>Dumetella carolinensis</i>	Gray Catbird	Yes					Year-Round	
		<i>Mimus polyglottos</i>	Northern Mockingbird	Yes					Year-Round	

	Titmice	<i>Toxostoma rufum</i>	Brown Thrasher	Yes					Year-Round
Motacillidae	Pipits	<i>Anthus rubescens</i>	American Pipit	Yes					Winter
Odontophoridae	New World Quail	<i>Colinus virginianus</i>	Northern Bobwhite	Yes		Yes			Year-Round
Paridae	Chickadees & Titmice	<i>Poecile carolinensis</i>	Carolina Chickadee	Yes					Year-Round
		<i>Baeolophus bicolor</i>	Tufted Titmouse	Yes					Year-Round
Parulidae	Wood-warblers	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	Unknown			Yes		Migrant
		<i>Vermivora chrysoptera</i>	Golden-winged Warbler	Unknown	UR,e	Yes			Migrant
		<i>Oreothlypis peregrina</i>	Tennessee Warbler	Yes					Migrant
		<i>Oreothlypis celata</i>	Orange-crowned Warbler	Unknown					Winter
		<i>Oreothlypis ruficapilla</i>	Nashville Warbler	Unknown					Migrant
		<i>Setophaga americana</i>	Northern Parula	Yes					Summer
		<i>Setophaga petechia</i>	Yellow Warbler	Yes					Migrant
		<i>Setophaga pensylvanica</i>	Chestnut-sided Warbler	Yes					Migrant
		<i>Setophaga magnolia</i>	Magnolia Warbler	Yes					Migrant
		<i>Setophaga tigrina</i>	Cape May Warbler	Unknown					Migrant
		<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	Unknown					Migrant
		<i>Setophaga coronata</i>	Yellow-rumped Warbler	Yes					Winter
		<i>Setophaga virens</i>	Black-throated Green Warbler	Yes			Yes		Migrant
		<i>Setophaga fusca</i>	Blackburnian Warbler	Unknown					Migrant
		<i>Setophaga dominica</i>	Yellow-throated Warbler	Yes					Summer
		<i>Setophaga pinus</i>	Pine Warbler	Yes					Year-Round
		<i>Setophaga discolor</i>	Prairie Warbler	Yes			Yes	Yes	Summer
		<i>Setophaga palmarum</i>	Palm Warbler	Yes					Winter
		<i>Setophaga castanea</i>	Bay-breasted Warbler	Yes					Migrant
		<i>Setophaga striata</i>	Blackpoll Warbler	Unknown					Migrant
		<i>Setophaga cerulea</i>	Cerulean Warbler	Unknown	r	Yes	Yes	Yes	Migrant
		<i>Mniotilta varia</i>	Black-and-white Warbler	Yes					Migrant
		<i>Setophaga ruticilla</i>	American Redstart	Yes					Migrant
		<i>Protonotaria citrea</i>	Prothonotary Warbler	Yes		Yes	Yes	Yes	Summer
		<i>Helmitheros vermivora</i>	Worm-eating Warbler	Unknown					Migrant
		<i>Limnothlypis swainsonii</i>	Swainson's Warbler	Unknown		Yes	Yes		Summer
		<i>Seiurus aurocapilla</i>	Ovenbird	Unknown					Migrant
		<i>Parkesia noveboracensis</i>	Northern Waterthrush	Unknown					Migrant
		<i>Parkesia motacilla</i>	Louisiana Waterthrush	Yes					Summer
		<i>Geothlypis formosus</i>	Kentucky Warbler	Yes			Yes	Yes	Summer
		<i>Oporornis agilis</i>	Connecticut Warbler	Unknown					Migrant
		<i>Geothlypis philadelphia</i>	Mourning Warbler	Unknown					Migrant
		<i>Geothlypis trichas</i>	Common Yellowthroat	Yes					Year-Round
<i>Setophaga citrina</i>	Hooded Warbler	Yes					Summer		
<i>Cardellina pusilla</i>	Wilson's Warbler	Unknown					Migrant		
<i>Cardellina canadensis</i>	Canada Warbler	Unknown					Migrant		
<i>Icteria virens</i>	Yellow-breasted Chat	Yes					Summer		
Passeridae	Old World Sparrows	<i>Passer domesticus</i>	House Sparrow	Yes				Year-Round	
Phalacrocoracidae	Cormorants	<i>Phalacrocorax auritus</i>	Double-crested Cormorant	Yes				Year-Round	
Phasianidae	Grouse & Turkeys	<i>Meleagris gallopavo</i>	Wild Turkey	Yes				Year-Round	
		<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	Yes		Yes	Yes	Year-Round	
		<i>Melanerpes carolinus</i>	Red-bellied Woodpecker	Yes				Year-Round	

Picidae	Woodpeckers	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	Yes				Winter	
		<i>Picoides pubescens</i>	Downy Woodpecker	Yes				Year-Round	
		<i>Picoides villosus</i>	Hairy Woodpecker	Yes				Year-Round	
		<i>Picoides borealis</i>	Red-cockaded Woodpecker	No	E,e	Yes		Year-Round	
		<i>Colaptes auratus</i>	Northern Flicker	Yes				Year-Round	
		<i>Dryocopus pileatus</i>	Pileated Woodpecker	Yes				Year-Round	
Podicipedidae	Grebes	<i>Podiceps auritus</i>	Horned Grebe	Unknown				Winter	
		<i>Podiceps nigricollis</i>	Eared Grebe	Unknown				Migrant	
		<i>Podilymbus podiceps</i>	Pied-billed Grebe	Yes				Year-Round	
Rallidae	Rails	<i>Laterallus jamaicensis</i>	Black Rail	Unknown		Yes	Yes	Migrant	
		<i>Rallus elegans</i>	King Rail	Unknown		Yes		Year-Round	
		<i>Rallus limicola</i>	Virginia Rail	Unknown				Winter	
		<i>Porzana carolina</i>	Sora	Unknown				Winter	
		<i>Porphyrio martinica</i>	Purple Gallinule	Unknown				Summer	
		<i>Gallinula galeata</i>	Common Gallinule	Unknown				Year-Round	
		<i>Fulica americana</i>	American Coot	Unknown				Winter	
Recurvirostridae	Stilts & Avocets	<i>Himantopus mexicanus</i>	Black-necked Stilt	Unknown		Yes		Migrant	
		<i>Recurvirostra americana</i>	American Avocet	Unknown				Migrant	
Regulidae	Kinglets	<i>Regulus satrapa</i>	Golden-crowned Kinglet	Yes				Winter	
		<i>Regulus calendula</i>	Ruby-crowned Kinglet	Yes				Winter	
Scolopacidae	Sandpipers & Phalaropes	<i>Tringa melanoleuca</i>	Greater Yellowlegs	Unknown				Winter	
		<i>Tringa flavipes</i>	Lesser Yellowlegs	Unknown			Yes	Migrant	
		<i>Tringa solitaria</i>	Solitary Sandpiper	Yes			Yes	Migrant	
		<i>Tringa semipalmatus</i>	Willet	Unknown				Migrant	
		<i>Actitis macularius</i>	Spotted Sandpiper	Unknown				Migrant	
		<i>Bartramia longicauda</i>	Upland Sandpiper	Unknown			Yes	Migrant	
		<i>Arenaria interpres</i>	Ruddy Turnstone	Unknown				Migrant	
		<i>Calidris alba</i>	Sanderling	Unknown				Migrant	
		<i>Calidris pusilla</i>	Semipalmated Sandpiper	Unknown				Yes	Migrant
		<i>Calidris mauri</i>	Western Sandpiper	Unknown				Migrant	
		<i>Calidris minutilla</i>	Least Sandpiper	Unknown				Winter	
		<i>Calidris fuscicollis</i>	White-rumped Sandpiper	Unknown				Migrant	
		<i>Calidris bairdii</i>	Baird's Sandpiper	Unknown				Migrant	
		<i>Calidris melanotos</i>	Pectoral Sandpiper	Unknown				Migrant	
		<i>Calidris alpina</i>	Dunlin	Unknown				Migrant	
		<i>Calidris himantopus</i>	Stilt Sandpiper	Unknown				Migrant	
		<i>Calidris subruficollis</i>	Buff-breasted Sandpiper	Unknown			Yes	Migrant	
		<i>Limnodromus griseus</i>	Short-billed Dowitcher	Unknown			Yes	Yes	Migrant
		<i>Limnodromus scolopaceus</i>	Long-billed Dowitcher	Unknown				Migrant	
		<i>Gallinago delicata</i>	Wilson's Snipe	Unknown				Winter	
		<i>Scolopax minor</i>	American Woodcock	Unknown				Year-Round	
		<i>Phalaropus tricolor</i>	Wilson's Phalarope	Unknown				Migrant	
		<i>Phalaropus lobatus</i>	Red-necked Phalarope	Unknown				Migrant	
<i>Phalaropus fulicarius</i>	Red Phalarope	Unknown				Migrant			
Sittidae	Nuthatches	<i>Sitta canadensis</i>	Red-breasted Nuthatch	Unknown				Winter	
		<i>Sitta carolinensis</i>	White-breasted Nuthatch	Yes				Year-Round	
		<i>Sitta pusilla</i>	Brown-headed Nuthatch	Yes			Yes	Year-Round	

Strigidae	Typical Owls	<i>Megascops asio</i>	Eastern Screech-Owl	Unknown				Year-Round
		<i>Bubo virginianus</i>	Great Horned Owl	Yes				Year-Round
		<i>Strix varia</i>	Barred Owl	Unknown				Year-Round
		<i>Asio flammeus</i>	Short-eared Owl	Unknown				Winter
Sturnidae	Starlings	<i>Sturnus vulgaris</i>	European Starling	Yes			Year-Round	
Sylviidae	Gnatcatchers	<i>Polioptila caerulea</i>	Blue-gray Gnatcatcher	Yes			Year-Round	
Thraupidae	Tanagers	<i>Piranga rubra</i>	Summer Tanager	Yes			Summer	
		<i>Piranga olivacea</i>	Scarlet Tanager	Yes			Migrant	
Threskiornithidae	Ibises & Spoonbills	<i>Eudocimus albus</i>	White Ibis	Yes			Summer	
Trochilidae	Hummingbirds	<i>Archilochus colubris</i>	Ruby-throated Hummingbird	Yes			Summer	
		<i>Archilochus alexandri</i>	Black-chinned Hummingbird	Unknown			Winter	
		<i>Selasphorus rufus</i>	Rufous Hummingbird	Unknown			Winter	
Troglodytidae	Wrens	<i>Thryothorus ludovicianus</i>	Carolina Wren	Yes			Year-Round	
		<i>Troglodytes aedon</i>	House Wren	Yes			Winter	
		<i>Troglodytes troglodytes</i>	Winter Wren	Yes			Winter	
		<i>Cistothorus platensis</i>	Sedge Wren	Unknown		Yes		Winter
		<i>Cistothorus palustris</i>	Marsh Wren	Yes				Winter
Turdidae	Thrushes	<i>Sialia sialis</i>	Eastern Bluebird	Yes			Year-Round	
		<i>Catharus fuscescens</i>	Veery	Unknown			Migrant	
		<i>Catharus minimus</i>	Gray-checked Thrush	Yes			Migrant	
		<i>Catharus ustulatus</i>	Swainson's Thrush	Yes			Migrant	
		<i>Catharus guttatus</i>	Hermit Thrush	Yes			Winter	
		<i>Hylocichla mustelina</i>	Wood Thrush	Yes		Yes	Yes	Summer
		<i>Turdus migratorius</i>	American Robin	Yes			Year-Round	
Tyrannidae	Flycatchers	<i>Contopus cooperi</i>	Olive-sided Flycatcher	Unknown			Migrant	
		<i>Contopus virens</i>	Eastern Wood-Pewee	Yes			Summer	
		<i>Empidonax flaviventris</i>	Yellow-bellied Flycatcher	Unknown			Migrant	
		<i>Empidonax virescens</i>	Acadian Flycatcher	Yes			Summer	
		<i>Empidonax traillii</i>	Willow Flycatcher	Unknown			Migrant	
		<i>Empidonax minimus</i>	Least Flycatcher	Yes			Migrant	
		<i>Sayornis phoebe</i>	Eastern Phoebe	Yes			Winter	
		<i>Pyrocephalus rubinus</i>	Vermilion Flycatcher	Unknown			Migrant	
		<i>Myiarchus crinitus</i>	Great Crested Flycatcher	Yes			Summer	
		<i>Tyrannus verticalis</i>	Western Kingbird	Unknown			Migrant	
		<i>Tyrannus tyrannus</i>	Eastern Kingbird	Yes			Summer	
		<i>Tyrannus forficatus</i>	Scissor-tailed Kingbird	Unknown			Migrant	
Tytonidae	Barn Owls	<i>Tyto alba</i>	Barn Owl	Unknown		Yes	Year-Round	
Vireonidae	Vireos	<i>Vireo griseus</i>	White-eyed Vireo	Yes			Year-Round	
		<i>Vireo flavifrons</i>	Yellow-throated Vireo	Yes			Migrant	
		<i>Vireo solitarius</i>	Blue-headed Vireo	Yes			Winter	
		<i>Vireo gilvus</i>	Warbling Vireo	Unknown			Migrant	
		<i>Vireo philadelphicus</i>	Philadelphia Vireo	Unknown			Migrant	
		<i>Vireo olivaceus</i>	Red-eyed Vireo	Yes			Summer	

¹ E = Federally Endangered Species; e = State Endangered Species
T = Federally Threatened Species; t = State Threatened Species
r = State Rare Species
GBE = Protected under Bald and Golden Eagle Act

² Source: GDNR 2020; USFWS 2020.

³ Source: GDNR 2015

⁴ Source: USFWS 2008.

Family	Species	Common Name	Confirmed on MCLB	Legal Status ^{1,2}	High Priority Species ³	Stocked Species
Amiidae	<i>Amia calva</i>	Bowfin	Yes			
Centrarchidae	<i>Centrarchus macropterus</i>	Flier	Yes			
	<i>Lepomis macrochirus</i>	Bluegill	Yes			
	<i>Morone chrysops x Morone saxatilis</i>	Hybrid Striped Bass	Yes			Yes
	<i>Micropterus salmoides</i>	Largemouth Bass	Yes			
Cyprinidae	<i>Ctenopharyngodon idella</i>	Grass Carp	Yes			Yes
	<i>Notropis texanus</i>	Weed Shiner	Yes			
Ictaluridae	<i>Ameiurus nebulosus</i>	Brown Bullhead	Yes			
	<i>Ictalurus punctatus</i>	Channel Catfish	Yes			Yes
Lepisoteidae	<i>Lepisosteus oculatus</i>	Spotted Gar	Yes			
Salmonidae	<i>Oncorhynchus mykiss</i>	Rainbow Trout	Yes			Yes

¹ E = Federally Endangered Species; e = State Endangered Species

T = Federally Threatened Species; t = State Threatened Species

r = State Rare Species

C = Candidate for Federal Listing

² Source: GDNR 2020; USFWS 2020.

³ Source: GDNR 2015

APPENDIX D

Fact Sheets for Rare, Threatened, and Endangered Species Confirmed to Occur at Marine Corps Logistics Base Albany

This page intentionally left blank.

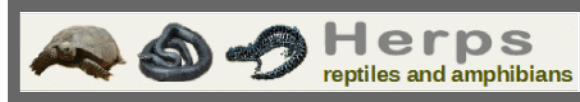


Photo by Jim Flynn. Image may be subject to copyright.

Gopherus polyphemus (Daudin, 1802)

Gopher Tortoise

Federal Protection: Candidate

State Protection: Threatened

Global Rank: G3

State Rank: S3

SWAP High Priority Species (SGCN): Yes

Element Occurrences (EOs) in Georgia: 311

Habitat Summary for element in Georgia: Sandhills; dry hammocks; longleaf pine-turkey oak woods; old fields

Description

The official state reptile of Georgia, the gopher tortoise is a relatively large terrestrial turtle, obtaining a maximum carapace length of 38 cm (15 inches), though averaging 23-28 cm (9-11 inches). Its oblong carapace is unkeeled and domed, somewhat flattened, and brown or gray in color. Distinctive growth annuli are evident in juveniles and young adults, usually becoming obscured later in life. The yellowish plastron is hingeless and has conspicuous elongated gular scutes (especially long on males). With the exception of the yellowish limb sockets, the scaly skin of adults is typically dark gray. Perhaps the most characteristic features of gopher tortoises are the elephantine hind limbs and the flattened, shovel-like forelimbs. The head is wide and rounded, with a pair of seasonally swollen mental glands on the chin. Hatchlings have yellowish skin as well as yellow-centered scutes, both of which gradually darken with age. Males have slightly concave plastrons.

Similar Species

No native species should be confused with the gopher tortoise

Habitat

Along with sandy soil for burrowing, sunlight availability and abundant herbaceous vegetation are the key habitat requirements for this reptile. Gopher tortoises are a characteristic species of the rapidly disappearing longleaf pine and wiregrass community, which includes sandhills, dry flatwoods, and turkey oak scrub. Historically, this community was represented by an open-canopied forest that allowed abundant sunlight penetration and conditions favorable for a rich growth of herbaceous vegetation. Unfortunately, very little of this naturally occurring habitat still exists; therefore, many tortoises have been forced into artificial habitats, such as roadsides and old fields, that retain the three key requirements.

Diet

A wide variety of succulent grasses and forbs; fruits, such as those of legumes, are eaten in season. Carrion is occasionally taken.

Life History

Gopher tortoises dig unbranched burrows up to, and sometimes greater than, 10 m (33 feet) long. The burrows are excavated wide enough to allow room for the tortoise to turn around at any point and may have an enlarged terminal chamber. A single tortoise may dig more than one burrow each season, and occupancy of a burrow by more than one tortoise may occur, at least temporarily. These characteristics make population estimates based on burrow counts obviously difficult. Burrows provide winter hibernacula, retreats from the summer heat, and shelter from fire for not only the tortoise, but also for hundreds of invertebrate and vertebrate animal species. Tortoises also benefit plant life by returning leached nutrients to the surface, creating bare, competition-free areas of soil; and by dispersing seeds through fruit consumption and subsequent defecation elsewhere. For these reasons, the gopher tortoise has been termed a "keystone species" of the longleaf pine community, meaning its existence is critical to the existence of many other species. Courtship and mating occur from April through early June. Nesting reaches a peak in early June but may last until mid-July. Females, which may not attain sexual maturity until 19-20 years of age, produce only once clutch each year and usually construct nests in the burrow mounds. An average of six white, nearly spherical eggs are deposited, and hatching follows an incubation period of 97-106 days. Nests and hatchlings are preyed upon by a variety of mammals and snakes, though raccoons are apparently the chief predators at most sites.

Survey Recommendations

Gopher tortoises are best located by conducting pedestrian searches for their distinctive burrows. Burrow openings are half-moon shaped and an apron of excavated sand fans out in front of the opening. Active burrows (those most likely to have a resident tortoise) have aprons mostly devoid of plants and debris, do not have spider webs within, may show tracks or slides from the tortoise, and may have scat in and around them.

Range

Gopher tortoises occur in the Coastal Plain from southern South Carolina south and westward to extreme eastern Louisiana. Extant or historical localities in Georgia are known throughout the southern half of the state below the Fall Line. They are absent from the Okefenokee Swamp and most barrier islands. Tortoises observed or collected from St. Simons Island, and possibly Cumberland Island, were likely of an introduced origin rather than naturally occurring. In 1994, a large number of tortoises was salvaged from an industrial park development site in Bulloch County and relocated to St. Catherine's Island, where successful reproduction has occurred. Tortoises observed or collected from the Piedmont and mountains of Georgia are undoubtedly released or escaped animals.

Threats

The loss and alteration of the longleaf pine-wiregrass community through agricultural and silvicultural activities, urban sprawl, and fire suppression has eliminated many populations and isolated most others. It has been estimated that the average female gopher tortoise in Georgia has an effective rate of reproduction of about 5.8 hatchlings per 10 years, assuming annual egg laying. This naturally low fecundity is only worsened by isolation, unnaturally high populations of certain predators, suboptimal habitat conditions, and other factors. Tortoises forced into roadside habitats due to a lack of suitable surrounding land are obviously more vulnerable to vehicle impacts and collection by humans. In the past, tortoise populations in many areas were heavily decimated by human exploitation for food, a practice now illegal but which may continue in some areas. The introduction of gasoline into the burrows of gopher tortoises ("gassing") is a technique used by

some rattlesnake hunters to force the snakes to the surface. This illegal practice is typically fatal to all burrow inhabitants.

Georgia Conservation Status

Gopher tortoise populations are found on many public lands in the Coastal Plain. Those with large populations include Ft. Stewart Military Reservation, Ft. Benning Military Reservation, General Coffee State Park, Seminole State Park, George L. Smith State Park, Reed Bingham State Park, Alapaha River WMA, Alligator Creek WMA, Ochoopee Dunes WMA, and Doerun Pitcherplant Bog WMA. Other large protected populations are found on several The Nature Conservancy preserves, as well as at [Joseph W. Jones Ecological Research Center at Ichauway] (http://www.jonesctr.org/conservation/monitoring_mapping/rcw_restoration_study_area.html).

Conservation Management Recommendations

A priority should be placed upon the protection of remaining natural longleaf pine forests, which will not only benefit the gopher tortoise but a large suite of rare animals and plants as well. The use of periodic controlled burns should be practiced to reduce hardwood vegetation and promote grasses and forbs. Subsidized predators may need to be controlled in areas of high human activity, such as state parks.

References

- Auffenberg, W., and R. Franz. 1982. The status and distribution of the gopher tortoise (*Gopherus polyphemus*). Pages 95-126 in Bury, R. B., ed. North American tortoises: conservation and ecology. U.S. Fish and Wildlife Service, Wildlife Resources Report 12.
- Birkhead, R., and T. D. Tuberville. 2008. Gopher tortoise *Gopherus polyphemus*. Pp. 514-516 in Jensen, J. B., C. D. Camp, J. W. Gibbons, and M. J. Elliott (eds.). Amphibians and Reptiles of Georgia. University of Georgia Press, Athens. 575 pp.
- Birkhead, R. D., C. Guyer, S. M. Hermann, W. K. Michener. 2005. Species composition and seasonal abundance of seeds ingested by gopher tortoises (*Gopherus polyphemus*) in a southeastern pine savanna. American Midland Naturalist 154:143-151.
- Boglioli, M. D., W. K. Michener, and C. Guyer. 2000. Habitat selection and modification by the gopher tortoise, *Gopherus polyphemus*, in Georgia longleaf pine forest. Chelonian Conservation and Biology 3: 699-705.
- Diemer, J. E. 1986. The ecology and management of the gopher tortoise in the southeastern United States. Herpetologica 42: 125-133.
- Diemer, J. E.. 1992. Gopher tortoise. Pages 123-127 in Moler, P. E., ed. Rare and endangered biota of Florida. Vol. 3. Amphibians and Reptiles. University Press of Florida, Gainesville. 291pp.
- Eubanks, J. O., W. K. Michener, and C. Guyer. 2003. Patterns of movement and burrow use in a population of gopher tortoises (*Gopherus polyphemus*). Herpetologica 59: 311-321.
- Landers, J. L., J. A. Garner, and W. A. McRae. 1980. Reproduction of gopher tortoises (*Gopherus polyphemus*) in southwestern Georgia. Herpetologica 36: 351-361
- Speake, D. W. 1986. Gopher tortoise. Pages 41-42 in Mount, R. H., ed. Vertebrate animals of Alabama in need of special attention. Alabama Agricultural Experiment Station, Auburn University, Auburn. 124 pp.
- Tuberville, T. D., E. E. Clark, K. A. Buhlmann, and J. W. Gibbons. 2005. Translocation as a conservation tool: site fidelity and movements of repatriated gopher tortoises (*Gopherus polyphemus*). Animal Conservation 8: 349-358.
- Vitt, L. J. 1981. A survey of the status, distribution and abundance of potentially threatened and endangered vertebrate species in Georgia, Part II: reptiles and amphibians. Unpublished Report to Georgia Department of Natural Resources. 210 pp.

Authors of Account

John B. Jensen

Date Compiled or Updated

J. Jensen, Dec. 2007: original account

K. Owers, Sept. 2009: updated status and ranks, added pictures

G. Krakow, July 2011: update federal status

J. Jensen, Apr. 2018: updated text



Photo by Dirk Stevenson. Image may be subject to copyright.



Georgia DNR – Wildlife Resources



Photo by Tim Keyes. (Georgia DNR – Wildlife Resources).

Peucaea aestivalis (Lichtenstein, 1823)

Bachman's Sparrow

Federal Protection: No US federal protection

State Protection: Rare

Global Rank: G3

State Rank: S2

SWAP High Priority Species (SGCN): Yes

Element Occurrences (EOs) in Georgia: 339

Habitat Summary for element in Georgia: Open pine or oak woods; old fields; brushy areas, young large grassy pine regeneration areas

Description

The Bachman's sparrow is 12.5-15.2 cm (4.9-6.0 in) in length and weighs 18-22 grams (0.65-0.8 oz).

Adult birds have a gray face with a reddish-brown cap on the top of the head and a thin reddish-brown stripe that runs from the back of the eye to the nape. The cheek, throat, and upper breast are buff to grayish. The lower breast and abdomen are lighter buff to whitish. Alternating reddish-brown and gray vertical stripes run down the nape of the neck and back to the top of the rump.

Wing feathers and the feathers of its long, rounded tail are reddish-brown. Legs are yellow to brownish-gray in color and the bill is grayish to dull grayish-brown.

Similar Species

The Bachman's Sparrow could be confused with the rufous form of the field sparrow (*Spizella pusilla*) and the immature swamp sparrow (*Melospiza georgiana*). The field sparrow differs by having a very distinct white eye-ring, pink bill, white wing bars, gray nape, and reddish-brown back with thin black stripes rather than reddish-brown and gray stripes. Immature swamp sparrows have a dark brown cap, gray face and nape, thin dark stripe behind the eye that does not extend to the nape, and a whitish chin with a thin black malar (mustache) stripe. The back is reddish-brown with wide, dark striping that does not extend up the neck. Wing and tail feathers are a dark rufous color. Field sparrows often use some of the same microhabitats as Bachman's sparrows while most often swamp sparrows inhabit damp or wet brushy areas in fields and open woods.

Habitat

Mature open pinewoods, regenerating clear-cuts (both pine and hardwood), utility rights-of-way, and old pastures with a dense ground cover of grasses (particularly wiregrass, bluestem, or broomsedge) and forbs, or palmetto scrub. This sparrow is often associated with open, mature pine forests where red-cockaded woodpeckers are found, since this habitat often provides the thick grassy ground cover this sparrow prefers. However, it will be lost from these sites well before the red-cockaded woodpecker if burning is not frequent enough since it does not tolerate encroachment by hardwood trees and shrubs.

Diet

Invertebrates, including beetles and weevils, grasshoppers, Lepidoptera, crickets, millipedes, snails, and spiders; seeds of grasses (especially *Panicum*), sedges, and some forbs gleaned from the ground surface.

Life History

The Bachman's sparrow is secretive and shy most of the year and due to its habit of stealthily running on the ground through dense cover it is difficult to see. Territorial singing by males may start as early as February in the Coastal Plain and often continues through the summer. Singing activity declines as nesting progresses, though later increases as subsequent nesting attempts are made. Males will sing from the ground, low shrubs, and the lower branches of pine trees. Their distinctive song is a series of whistles and trills. Nesting usually starts in April and can last through August. The female lays 3 or 4 eggs (range 2-5) in a nest she constructs at the base of a grass clump, small shrub, or pine seedling. The nest, made of grasses, forbs, and rootlets, is usually domed. Eggs take 12-14 days to hatch and fledging occurs 9-10 days later. The female does all of the incubating and brooding, but both parents feed the young, which disperse from the natal area three weeks to a month after fledging. This species will usually have two, and possibly three, broods per year.

Survey Recommendations

The most effective survey method for this species during the breeding season is the use of point counts, particularly the aural component which includes listening for singing males as they advertise their territories. These counts can be conducted along transects, such as roads, to increase efficiency and maximize the number of points covered. Territorial singing is most consistent during the first three hours after sunrise on sunny days from March through June.

Another method, call playback, can be effective during the breeding season and throughout the year in good habitat where this sparrow may remain territorial year-round. From 2006-2008 Wildlife Conservation Section staff conducted baseline surveys for Bachman's sparrows at several sites on state conservation lands slated for habitat restoration. These lands included Dawson Forest, Tuckahoe, Yuchi, Di-Lane, Clarks Hill, Ocmulgee, Rum Creek, Sandhills, Chickasawatchee, Doerun Pitcherplant Bog, and Silver Lake WMAs. Baseline surveys provided data used to gauge changes in habitat suitability after restoration. Follow up surveys were conducted at many of these

sites in 2018-2019 to help determine whether these restoration efforts were effective in increasing Bachman's sparrow numbers. Additional surveys will be run at many of these sites, as well as other sites, in coming years.

Range

Found throughout much of the southeastern United States, this species was once much more common and widely distributed within this region. In the late 1800s and early 1900s, populations expanded northward, probably in response to creation of suitable habitat conditions as forests were cleared and farms abandoned, and it could be found as far north as southwestern Pennsylvania, southern Ohio, Indiana, and Illinois. In Georgia this bird is primarily found in the Coastal Plain with scattered sites across the southern Piedmont and occasional reports from the northern Piedmont and mountains.

Threats

The Bachman's sparrow has become increasingly rare with changes in agriculture and forestry.

Much of this decline is probably 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. Continued expansion of these practices to areas of suitable habitat will lead to further reduction of Bachman's sparrow populations.

Georgia Conservation Status

Major concentrations occur at quail plantations in the southwest corner of the state, particularly the Red Hills region, at Joseph Jones Ecological Research Center, Ft. Benning, Ft. Stewart, Okefenokee and Piedmont National Wildlife Refuges, and Oconee National Forest. Additional populations are found at Dawson Forest, Yuchi, Di-Lane, Clarks Hill, Moody Forest, Sprewell Bluff, Rum Creek, Chickasawhatchee, Mayhaw, River Creek, Sandhills, Doerun Pitcherplant Bog, and Silver Lake WMAs.

Conservation Management Recommendations

Breeding Bird Survey (BBS) data indicate declining population trends of 1.9% and 3.4% per year from 1966-2015 in Georgia and survey-wide, respectively. While some caution needs to be exercised when interpreting these results due to the low numbers of birds detected along most routes, other surveys and anecdotal evidence also suggest significant population declines in recent decades. The Partners in Flight conservation initiative has designated this bird an extremely high priority species warranting conservation attention further supporting the need for conservation action.

Bachman's sparrows are most often found in older pine stands (60-plus years) with widely spaced trees; however, maintaining lower basal areas within younger stands can provide suitable conditions for grass and forb growth, and consequently for this sparrow. Regular burning is needed in pine woods habitats, and often in fields, to control shrub and sapling growth that would inhibit herbaceous ground cover. A burning cycle of 2-3 years in pine woods habitat will usually give the best results. Managers on private timberlands can provide suitable habitat by thinning and burning middle-aged pine plantations. Clear-cuts that are not too densely restocked can also provide suitable habitat for several years after planting. Research conducted in replanted loblolly pine (*Pinus taeda*) plantations in the Piedmont suggests that Bachman's sparrows only use larger (>35 ha) stands that are very young (<3 years old) in this forest type. Due to the rapid growth of these pines the canopy quickly closes leaving a very limited temporal window where the habitat is suitable for this species. In comparison, regenerating longleaf pine habitat usually remains suitable for several years and Bachman's sparrows are able to use much smaller stands. This difference seems to be a function of tree structure, as young longleaf pines shoot up in a "rocket phase" where there is very little lateral growth, allowing for a much longer window before canopy closure and a denser ground cover of grasses and forbs. Additionally, young longleaf pines can be burned much sooner after establishment than loblolly or slash pine (*Pinus elliottii*).

References

Brennan, L. A., J. L. Cooper, K. E. Lucas, B. D. Leopold, and G. A. Hurst. 1995. Assessing the influence of Red-cockaded Woodpecker colony site management on non-target forest vertebrates in loblolly pine forests of Mississippi: Study design and preliminary results. Pp. 309-319 in D. L. Kulhavy, R. G. Hooper, and R. Costa, eds., Red-cockaded Woodpecker: Recovery, Ecology, and Management. Center for Applied Studies in Forestry, College of Forestry, Stephen F. Austin State University, Nacogdoches, TX.

- Burleigh, T. D. 1958. Georgia Birds. University of Oklahoma Press, Norman. 746pp.
- Dunning, J. B., and B. D. Watts. 1990. Regional differences in habitat occupancy by Bachman's sparrow. *Auk* 107: 463-472.
- Dunning, J. B., Jr. P. Pyle, and M. A. Patten. 2018. Bachman's Sparrow (*Peucaea aestivalis*), version 3.1. *In* The Birds of North America (P. G. Rodewald, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA.
- Gobris, N. M. 1992. Habitat occupancy during the breeding season by Bachman's sparrow at Piedmont National Wildlife Refuge in Central Georgia. M.S. Thesis, University Georgia, Athens. 45pp.
- Gobris, N. M. 2010. Bachman's Sparrow (*Aimophila aestivalis*). Pp. 374–375 *in* T. M. Schneider, G. Beaton, T. S. Keyes, and N. A. Klaus, eds. The Breeding Bird Atlas of Georgia. University of Georgia Press, Athens.
- Hunter, W. C. 1990. Handbook for Nongame Bird Management in the Southeast Region. U.S. Fish and Wildlife Service, Atlanta, GA. 178pp.
- Partners in Flight. 2016. Partners in Flight watch list. <http://partnersinflight.org/resources/pif-watch-list-table-2016/>
- Plentovich, S., J. Tucker, N. R. Holler, and G. Hill. 1998. Enhancing Bachman's Sparrow habitat via management of Red-cockaded Woodpeckers. *Journal of Wildlife Management* 62:347-354.
- Sauer, J. R., D. K. Niven, J. E. Hines, D. J. Ziolkowski, Jr, K. L. Pardieck, J. E. Fallon, and W. A. Link. 2017. The North American Breeding Bird Survey, Results and Analysis 1966-2015. Version 2.07.2017 USGS Patuxent Wildlife Research Center, Laurel, MD.
- Schneider, T. M. 1999. Bachman's Sparrow (*Aimophila aestivalis*). Pp. 32–33 *in* T. W. Johnson, J. C. Ozier, J. L. Bohannon, J. B. Jensen, and C. Skelton, eds., Protected Animals of Georgia. Georgia Department of Natural Resources, Wildlife Resources Division, Nongame Wildlife–Natural Heritage Section, Social Circle.
- Tucker, J. W. Jr., G. E. Hill, and N. R. Holler. 1998. Managing mid-rotation pine plantations to enhance Bachman's Sparrow habitat. *Wildlife Society Bulletin* 26:342–348.

Authors of Account

Todd M. Schneider and Timothy S. Keyes

Date Compiled or Updated

T. Schneider, 1999: original account

T. Schneider and T. Keyes, July 2010: modified and edited text

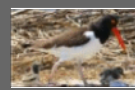
K. Owers, July 2010: updated status and ranks, added picture

T. Schneider, April 2019: added photos

T. Schneider, 21 Decemembr, 2019: modified and edited text



Photo by Tim Keyes. (Georgia DNR – Wildlife Resources).



*profile under revision



© Phillip Jordan

Photo by Phillip Jordan. Image may be subject to copyright.

Haliaeetus leucocephalus (Linnaeus, 1766)

Bald Eagle

Federal Protection: No US federal protection

State Protection: Threatened

Global Rank: G5

State Rank: S3

SWAP High Priority Species (SGCN): Yes

Element Occurrences (EOs) in Georgia: 267

Habitat Summary for element in Georgia: Edges of lakes and large rivers; seacoasts

Description

Adult bald eagles are easily recognized by their familiar dark brown body and contrasting white head and tail. The bill, eyes, legs, and feet are yellow. Immature birds vary slightly in appearance depending on their age. They are generally dark brown with varying light patches, and the eyes and bill are dark. Full adult plumage is not attained until sexual maturity at about 5 years of age. The total length ranges from 76 to 109 cm (30-43 in), the wingspread from 182 to 249 cm (72-98 in), and the weight from 3.6 to 5.4 kg (8-12 lbs). Females are noticeably larger than males, and the average size of both sexes increases with latitude such that birds nesting in the northern states and Canada are significantly larger than birds nesting in southern states. Although there appears to be a continuous size gradient and no real genetic differences nor distinct breeding ranges, southern

eagles are considered to be of the subspecies *H. l. leucocephalus* and northern eagles of the subspecies *H. l. alascensis*.

Similar Species

Golden eagles (*Aquila chrysaetos*) can look similar to juvenile and sub-adult bald eagles. Juvenile golden eagles have distinct white patches on the upper and lower wings near the tips and the base of the tail is white on both the upper and lower side with a distinct broad, dark band on the trailing edge. Juvenile and sub-adult bald eagles have varying amounts of white on the undersides of their wings, but it is more mottled in appearance and usually concentrated closer to the body. Sub-adult bald eagles often have white mottling on the breast and often on the back and upper wings near the body as well. The tails of both juvenile and sub-adult bald eagles also have varying amounts of white on the underside and often some white on the upper surface. Usually there is a narrow band of dark brown on the trailing edge of the tail, but this band is much narrower and less distinct than that of the golden eagle. Golden eagles of all ages will have a golden-brown head whereas juvenile and sub-adult bald eagles will have a dark brown head often with various amounts of white mottling.

Habitat

Juvenile bald eagles and non-nesting adults can be seen throughout Georgia, but known nesting activity is concentrated mostly along the coast and near major rivers, wetlands, and reservoirs in the southern and central parts of the state. Like other members of the "fish eagle" group, bald eagles almost always nest near open water. The coastal area, including the barrier islands, marsh islands, and nearby mainland, has always provided good eagle nesting habitat historically and still supports the greatest population density. However, construction of reservoirs such as Seminole, Walter F. George, Oconee, Allatoona, Carters, Clarks Hill, Nottley and West Point, has increased suitable inland nesting habitat. Bald eagles prefer isolated sites for nesting but are adapting to the presence of human disturbance in some areas. The nest is usually in a large, open-topped pine near open water, often on high ground if available. Occasionally cypress trees are used.

Diet

Fish; waterfowl, particularly coots during the eagle nesting season, and other birds; turtles; small mammals; and carrion.

Life History

Eagles form permanent pair bonds, but individuals will find another mate if the original is lost. They construct large stick nests in tall trees near water; used year after year, the nest can become quite large over time. Periodically, an eagle pair might construct and move into a new nest near the original one. In Georgia, courtship and nest-building typically occur in October and November. Two to three eggs are then laid in December or January and incubated for about 35 days. Both parents participate in incubation and caring for the 1-2 (rarely 3) young. The eaglets fledge at about 12 weeks, typically in late March or April, but they remain under parental care for several more weeks. Nesting chronology throughout the state varies by several weeks and seems to be dependent primarily upon the habits of individual pairs and secondarily upon latitude. Bald eagles do not reach maturity until their fifth year, when they attain their adult plumage characterized by the white head and tail. Sub-adult birds sometimes pair with adults but usually do not nest successfully. Many juvenile eagles from the southeastern U. S. migrate northward during their first summer and return before winter. A smaller proportion of older age-class juveniles head north each season. Adults from Georgia are essentially non-migratory, but they might wander away from the nesting area until the next nesting season.

Survey Recommendations

Helicopter surveys of known nesting sites should be conducted in January to determine territory occupancy and second flights in March to determine nest productivity. Additionally, searches for new nest sites should be made in areas reported to have significant bald eagle activity during the breeding season and in other likely areas.

Range

Bald eagles are found throughout most of the U. S. and Canada and very northern Mexico. Nesting occurs at scattered sites throughout their range with only a few nests documented in Mexico. Until the last few decades, nesting eagles in Georgia were reported primarily from the coastal area with only one non-coastal nest reported (in the Okefenokee Swamp in 1936). In recent decades their

breeding range has spread throughout the state with about one-third of all nests still located in the six coastal counties, but significant numbers scattered across the Coastal Plain and Piedmont. A few nests now occur in the mountains. Inland impoundments have greatly increased the amount of suitable habitat in the state and nesting occurs on almost all major reservoirs. Additionally, eagle nests are now found on several smaller reservoirs, along some stretches of major rivers, on natural ponds in the extreme south-central part of the state, and near some Coastal Plain aquaculture facilities.

Threats

Bald eagle populations in the U.S. had apparently begun to decline more than a century ago, probably due to predator control efforts and habitat alteration. During the 1960s, most of the problems suffered by bald eagle populations, as well as several other species, were traced to the impacts of DDT (dichloro diphenyl trichloroethane), a pesticide that was widely used on agricultural and forest lands beginning in 1947. The chemical entered the eagles' food chain and killed some birds directly. Usually, however, it accumulated in the bodies of prey animals, and then in the eagles themselves where it impaired reproduction. Use of DDT was outlawed in the U. S. in 1972, but it is still manufactured here and used elsewhere. Other persistent toxic chemicals such as PCBs, mercury, and other pesticides and herbicides, continue to pose potential threats to eagles and other wildlife. This species is still susceptible to poisoned baits used for predator control and euthanized carcasses containing pentobarbital, and some eagles are still being injured or killed by gunshot. Nesting habitat is also being lost. A recent concern in Georgia and some other southeastern states is the appearance of a mysterious and often fatal neurological disease called avian vacuolar myelinopathy (AVM) that appears to be linked to toxic algae growing on submerged plants. Apparently, eagles are affected when they consume diseased American coots that have incidentally ingested the algae while feeding on plants.

Georgia Conservation Status

Ossabaw, St. Catherines, Sapelo, Little Tybee, Wassaw, Cumberland, Blackbeard, Little St. Simons, other islands and isolated marsh hammocks; Army Corps of Engineers land at Seminole, Allatoona, Strom Thurmond, West Point, Carters, and Walter F. George lakes; Oconee National Forest, Ft. Stewart, Ft. Benning, Grassy Pond (Air Force), Reed Bingham State Park, Dodge County and Big Lazar Public Fishing Areas; Georgia Power Plant Wansley; Blanton Creek WMA; Bond Swamp NWR; and Silver Lake WMA .

Conservation Management Recommendations

In Georgia, bald eagles were apparently fairly common along the coast up until the middle of the 20th century. However, by the 1950s population declines had been detected. The decline continued until the last known successful nest was noted on St. Catherines Island in 1970. It was not until 1981, on Ossabaw Island, that an eagle pair again produced young in the state. A hacking program from 1979-1995 released young bald eagles on Sapelo and Butler Islands on the coast and at Lake Allatoona north of Atlanta to help reestablish the population. By the time this hacking program was discontinued a total of 89 birds had been released. It is unknown how successful these efforts were due to the difficulty in tracking released birds, but at least one of these birds nested in South Carolina. Others might have nested in Georgia or elsewhere. The nesting population has likely grown and expanded primarily as a result of the ban on DDT as well as other conservation and management efforts. By 1994 the Georgia nesting population surpassed the initial recovery goal of 20 occupied territories. In 1995 the eagle was federally down-listed to threatened, and after continuing to experience widespread population recovery was delisted in August of 2007. By 2010 there were 135 known occupied nesting territories in Georgia. Presently, all known eagle nests are monitored each year to determine occupancy, productivity, and management needs. New nests are found through reports from the public and through surveys of likely habitat. As both the human and eagle populations continue to increase, these two species will more frequently come into contact with each other. Continuing public education is necessary to ensure that attitudes and policy will be conducive to eagle survival. Resolution of management conflicts arising from eagle nests on private land will continue to be a high priority. The objective will be to protect the integrity of the nest site such that the pair will continue to produce young, while at the same time recommending as few management restrictions as is necessary to the landowner.

References

Bent, A. C. 1937. Life histories of North American birds of prey, Part 1. U. S. National Museum Bulletin 167.

Green, N. 1985. The bald eagle. Pages 509-531 *in* R. L. Di Silvestro, ed. Audubon wildlife report 1985. National Audubon Society, New York.

Johnsgaard, P. A. 1990. Hawks, eagles, and falcons of North America. Smithsonian Institution Press, Washington D.C. 403pp.

Odom, R. R. 1981. Current status and reintroduction of the bald eagle in Georgia. *The Oriole* 45:1-14.

Ozier, J. C. 1997. Status and management of the bald eagle in Georgia. Georgia Department of Natural Resources. Unpublished Report. International Bald Eagle Days Conference., Chattanooga, Tenn. 16 Jan. 1997. 8pp.

Stalmaster, M. V. 1987. The bald eagle. Universe Books, New York. 227pp.

Stalmaster, M. V. 1988. Bald eagle. Pages 187-237 *in* R. S. Palmer, ed. Handbook of North American raptors. Vol. 4. Yale University Press, New Haven, Conn.

U.S. Fish and Wildlife Service. 1989. Southeastern states bald eagle recovery plan. U.S. Department of the Interior, Atlanta, Ga. 63pp.

Authors of Account

James C. Ozier and Todd M. Schneider

Date Compiled or Updated

J. Ozier, 1999: original account

J. Ozier, 2010: Breeding Bird Atlas species account

T. Schneider, July 2010: modified and edited text

K. Owers, July 2010: updated status and ranks, added picture

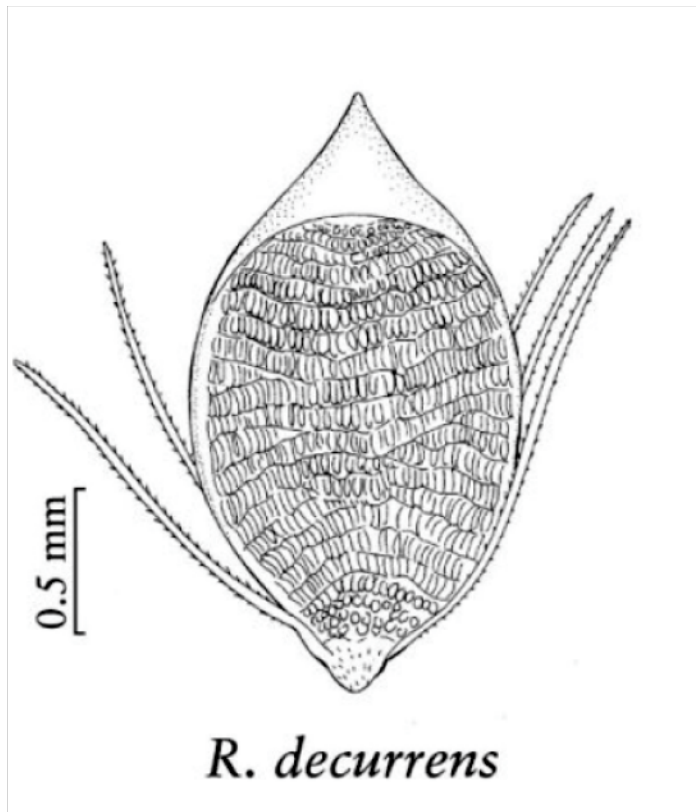
T. Schneider, May 2019 added juvenile photo



Juvenile. Photo by Dan Vickers. Image may be subject to copyright.



Decurrent Beak-sedge (*Rhynchospora decurrens*) specimen by G. Wilhelm, courtesy of the Atlas of Florida Plants. Image may be subject to copyright. (<http://florida.plantatlas.usf.edu>)



Decurrent Beak-sedge (*Rhynchospora decurrens*), drawing of achene courtesy of Flora of North America, (http://www.efloras.org/object_page.aspx?object_id=103336&flora_id=1) Image may be subject to copyright.

Rhynchospora decurrens Chapman

Decurrent Beakrush

Federal Protection: No US federal protection

State Protection: No Georgia state protection

Global Rank: G3G4

State Rank: S2?

SWAP High Priority Species (SGCN): Yes

Element Occurrences (EOs) in Georgia: 11

Habitat Summary for element in Georgia: Swamps

Description

Perennial, clump-forming sedge with a leafy, more or less erect flowering **stem** up to 4 feet (1.2 meters) tall; the angles on the stem are rounded so that it is nearly round in cross-section. **Leaf blades** are shorter than the top of the flowering stem and about 1/10 inch (2-4 mm) wide, flexible, smooth, soft, lax and drooping, flat for most of their length but with 3-angled tapering tips. **Flower clusters** are held at the tops of the stems, consisting of 4-6 smaller, loose clusters of spikelets held at the tips of thread-like, spreading or drooping, branches; narrow, leafy bracts extend beyond the clusters. **Spikelets** are about 3 mm long, oval or spindle-shaped, chestnut-brown, with 3-4 flowers. **Fruits** are seed-like achenes, 2 or 3 per spikelet, 1.5-1.8 mm long including the triangle-shaped **tubercle** (the tiny cap on top of the fruit) and 0.9 mm wide; 6 minutely barbed **bristles** arise from the base of the fruit and do not extend beyond the tubercle (they are easily detached and six may not always be present). The body of the fruit is vivid chestnut-brown, oval in outline, two-sided, covered with a fine horizontal pattern of wrinkles and pits. The name *decurrens* refers to a pale,

narrow, wire-like margin that flows from the base of the tubercle to the base of the fruit body. (10-20x magnification is required to see details of the achene.)

Similar Species

Rhynchospora decurrens closely resembles *R. mixta*, with which it grows in swamp forests, in its overall appearance. They are separated by technical differences in the appearance of the fruit. The fruits of *R. mixta* are pale chestnut in color; their 6 bristles are longer than those of *R. decurrens*, extending beyond the top of the tubercle. The pale, wire-like margin that characterizes the fruit of *R. decurrens* is not present on the fruits of *R. mixta*.

Related Rare Species

14 other species of *Rhynchospora* are rare in Georgia. For more information, see: https://georgiabiodiversity.org/natels/element_lists?group=plant.

Habitat

Swamp forests and river marshes in the Coastal Plain, especially along blackwater rivers.

Life History

Rhynchospora decurrens is a perennial herb that reproduces sexually as well as vegetatively by forming clumps from lateral offshoots and by the spread of rhizomes. All beaksedge flowers are wind-pollinated; their fruits are dispersed by water and gravity, and also by animals, assisted by the tiny, barbed bristles at the base of the fruit which attach to fur and feathers.

Survey Recommendations

Mature fruits are essential for identification of this species, and surveys should be conducted during the late summer and early fall when they are present. A 10-20x hand lens is required to see details of the achene.

Range

Georgia, west to Louisiana and north to North Carolina. It is rare throughout its range.

Threats

Rhynchospora decurrens habitat is threatened by logging, pollution, ditching, draining, and conversion to pine plantations or agriculture. Swamp forests and marshes are invaded by exotic species such as Chinese Privet.

Georgia Conservation Status

Rhynchospora decurrens is ranked S2? by the Georgia Department of Natural Resources, indicating that it is likely imperiled in the state but that there is not enough information to make a definitive ranking. *Rhynchospora decurrens* has been documented in Georgia 11 times in 10 Coastal Plain counties since 1947; only one of these populations, last seen in 1976, occurred on conservation land. Only four populations have been seen since 2000.

Conservation Management Recommendations

Protect swamp forests, river marshes, and other riparian habitats from logging, ditching, draining, and conversion. Prevent pollution into rivers and streams. Monitor sites frequently for exotic plant invasion and eradicate these when found.

References

GADNR. 2019. Element occurrence records for *Rhynchospora decurrens*. Georgia Department of Natural Resources, Wildlife Resources Division. Social Circle, Georgia.

Flora of North America. 2003. Species account for *Rhynchospora decurrens*. Flora of North America North of Mexico, vol. 23. Accessed 24 November 2019. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242101826

Godfrey, R.K., and J.W. Wooten. 1979. Aquatic and wetland plants of southeastern United States: monocotyledons. University of Georgia Press, Athens.

NatureServe. 2019. Species account for *Rhynchospora decurrens*. NatureServe Explorer: an online encyclopedia of life, Version 7.1. NatureServe, Arlington, Virginia. Accessed 24 November 2019. <http://explorer.natureserve.org/servlet/NatureServe?searchName=Rhynchospora%20decurrens>

Weakley, A.S. 2015. Flora of the southern and mid-Atlantic States. University of North Carolina Herbarium, University of North Carolina, Chapel Hill.

Authors of Account

Linda G. Chafin

Date Compiled or Updated

24 November 2019

*profile under revision



Photo by Brad Winn. (Georgia DNR - Wildlife Resources).

Mycteria americana Linnaeus, 1758

Wood Stork

Federal Protection: Listed Threatened

State Protection: Endangered

Global Rank: G4

State Rank: S3

SWAP High Priority Species (SGCN): Yes

Element Occurrences (EOs) in Georgia: 46

Habitat Summary for element in Georgia: Cypress/gum ponds; impounded wetlands with islands or emergent cypress; marshes; river swamps; bays

Description

The wood stork is a very large, long-legged wading bird about 85-113 cm (33-44 in) in height with a wingspan of 150-165 cm (59-65 in), and a large, down-curved bill. The plumage is mostly white, but the wing-tips, trailing edge of the wings, and tail are black with a greenish sheen. Legs are black, but the toes are pink. The neck and head of adults is not feathered, and the skin is grayish black with a scale-like appearance; the bill is also grayish black in color. Juveniles have a yellow bill, and the head and neck are covered with sparse, hair-like feathers. The bill gradually darkens, and the feathers on the head are lost with full adult plumage reached in the bird's fourth year. Male and female plumages are similar.

Similar Species

The adult white ibis (*Eudocimus albus*) can look similar to the wood stork from a distance and in flight but is substantially smaller (63 cm; 25 in long) with pinkish-red to pinkish-orange face, bill, and legs, and only the very tips of the wings are black. Also, white feathers cover the neck and top of

the head. Juvenile white ibis have a dark head, bill, and legs and a white rump. The upper surface of the wings and the upper back are dark brown while the undersides of the wings are white with a dark brown trailing edge, which can look similar to that of the wood stork.

Habitat

Wood storks use a variety of freshwater and estuarine wetlands for breeding, feeding, and roosting. They are colonial nesters, and several nests are often located in the same tree. Colony size in Georgia has ranged from fewer than 12 to more than 500 nests. They are typically located in trees in standing water or on islands 1-20 m (3-66 ft) above the water. Storks will occasionally use the same large colonies for many years, but most colonies are shorter lived, and many are established and abandoned after a single year; few last more than 20 years. The longest-lived colonies in Georgia are deep water ponds with vegetated islands. These sites are typically manmade and managed impoundments that maintain deep water even in relatively dry years. Water levels of natural wetland sites tend to fluctuate dramatically year to year, making their use by storks less predictable. When water levels are low, predators such as raccoons can access nesting trees and wood storks often forego nesting or abandon their nests early in the nesting season.

Diet

Primarily fish; sometimes amphibians (mostly tadpoles), crayfish, crabs, grass shrimp, beetles, grasshoppers, snakes, small alligators, and other small aquatic animals. Rarely birds including rails and grackles and small mammals including mice, rats, and shrews.

Life History

Wood storks feed using a technique known as tacto-location or grope feeding. Usually this involves wading through shallow water with a partially-opened bill or probing into the water. When the bill touches a fish, or other prey, it snaps shut with a rapid reflex motion, one of the fastest known for vertebrates. In addition, they will also feed by holding their bill still and stirring the sediment with their feet and often shuffle their feet and flash their wings to startle prey. Tacto-location is particularly effective in turbid water where it would be impossible to see prey. Preferred prey include fish from about 2 to 25 cm (0.7-10 in) in length. This feeding strategy is very effective during seasonal (or tidal) drawdowns of wetlands when fish are concentrated in shallow pools. In southern Florida, the onset of breeding begins at the start of the dry season, when drying wetlands concentrate prey. The birds depend on successive drying of the wetlands to provide adequate food to raise their young, and rising water levels can cause the adults to abandon nestlings, which subsequently starve. Wood storks use a variety of feeding sites in both freshwater and estuarine wetlands to obtain adequate food. In coastal Georgia, storks feed in small tidal creeks at low tide when fish, especially mummichogs (*Fundulus heteroclitus*), are presumably concentrated. Storks often forage at considerable distances from the nesting colony. The birds take advantage of thermal updrafts to soar and glide to feeding sites. Birds followed to feeding sites from a colony in east-central Georgia usually chose sites that were within 20 km (12 mi) of the colony, but occasionally foraged as far as 29 km (18 mi) from the colony. In Georgia breeding usually begins in March. Clutch size ranges from 2 to 5 eggs (usually 3), and incubation takes about 27-32 days. After hatching, one adult remains with the young, shading the chicks from the sun when necessary. Both adults feed the young by regurgitating food onto the nest platform. Young storks begin learning to fly at about 8 weeks of age; however, the young often remain at the colony and return to the nest platform to be fed by adults until they are around 12 weeks old. Although a few birds have been documented to breed in their third year, most do not breed until their fourth year when adult plumage is attained. The maximum longevity of a bird in the wild is over 20 years, but the wood stork may live to over 30 years of age in captivity. There are currently several birds that are more than 20 years old still nesting every year at Harris Neck NWR.

Survey Recommendations

Conduct aerial surveys of all known nesting sites in early May to determine the number of active nests. Survivorship and productivity can be assessed at selected sites and used as an index of overall population health. Banding chicks at select sites can provide additional data such as site fidelity, dispersal, breeding age, and longevity. Unmanned Aerial Vehicles (UAVs) have been used to monitor stork colonies at some remote sites.

Range

The wood stork's breeding range includes the southeastern U.S., both coasts of Mexico and Central America, Cuba, Hispaniola, and South America from Colombia to Argentina. In the U.S., it breeds in Florida, Georgia, South Carolina, and North Carolina. This species was first recorded nesting in

Georgia in 1965 at Blackbeard Island NWR. Breeding colonies have been documented at least once at 56 different locations in 18 counties primarily along the coast or in southwest Georgia. Following the breeding season, wood storks may disperse northward to North Carolina, Tennessee, and Arkansas. A few wood storks may be seen in the Georgia Piedmont, well north of breeding colonies, during late summer and fall, but the most heavily used habitat during fall is coastal marshes. Beginning in late summer, wood storks from many widely separated breeding colonies gather into communal roosts along the coast. Over 100 birds may roost at favored sites, which are used year after year. The birds rest at the roost during high tide and move out into the saltmarsh to feed during low tide. Birds that nested in Georgia have been tracked south to southern Florida in winter; however, in most years a few birds remain along the coast in McIntosh, Glynn, and Camden counties.

Threats

The breeding population of wood storks in the southeastern U.S. declined from an estimated 15,000-20,000 pairs in the 1930s to a low of 4,500-5,700 pairs from 1977-1980. The lowest annual estimate occurred in 1978 when 2,500 pairs bred. However, this probably reflected the combined influence of a low population and poor nesting conditions; many storks may not have attempted to breed that year. Prior to the mid-1970s, nesting in Georgia was sporadic with only small numbers of nesting birds. Nesting in South Carolina did not start until 1981. As large colonies in southern Florida steadily declined in the early 1980s the number of nesting birds in South Carolina and Georgia steadily increased resulting in a shift of the breeding distribution of this species. Loss of habitat is the primary threat to stork populations. In addition to direct loss of feeding habitat through draining and filling of wetlands, the disruption of the natural cycle of seasonal drying in southern Florida is believed to have caused the loss of major breeding colonies in Everglades National Park. Although wood storks benefit from seasonal drying of foraging habitat, water levels in the colony must remain deep enough to prevent access by predators. When a nesting colony dries up, raccoons are able to invade the area and eat the storks' eggs or young. This dependence on several types of wetlands (deep water for nesting and shallow water for foraging) makes storks particularly vulnerable to wetland loss, and fluctuations in rainfall. Human disturbance and contaminants are other potential threats.

Georgia Conservation Status

While recent years have seen declines from our high count of nests in 2014, the overall trend in the state is still positive. It does appear that numbers to our north (breeding in South Carolina and North Carolina) have increased while Georgia numbers have declined, perhaps indicating an ongoing northward expansion of the breeding range. Productivity data has been collected for many years in Georgia from over 30 different colonies. Productivity measures surpassed the recovery target of 1.5 chicks per pair in 21 out of 29 survey years. Typically, coastal colonies (within 20km of the coast) have slightly higher productivity than inland colonies, perhaps due to more predictable access to food in the intertidal zone. Range-wide wood stork numbers continue to grow, and Georgia clearly represents a significant part of the recovery of the species.

Conservation Management Recommendations

The U.S. Fish and Wildlife Service's Recovery Plan goal for down-listing the wood stork from endangered to threatened was a population of 6,000 pairs (3-year average) and regional productivity greater than 1.5 chicks per nest. They were officially downlisted to threatened in 2014. The goal for delisting is 10,000 pairs (5-year average), with regional productivity greater than 1.5 chicks per nest, and 2,500 successful pairs in south Florida. Recovery tasks include identification and protection of existing foraging and nesting habitat, restoration of historically important habitat in the Everglades, and monitoring of the population through periodic surveys. The Georgia population averaged 1,922 pairs per year from 2011-2018. The largest nesting effort ever recorded in the state occurred in 2014 when a total of 2,950 pairs nested in 22 colonies. Numbers dropped following 2014 with a low of 1594 pairs nesting in Georgia in 2018 but have rebounded with 2564 nests in 2019. This pattern fits an overall all positive trend for nesting pairs in Georgia, but with significant variability year to year. On a local scale, management of artificial feeding lakes and construction of artificial nesting structures where nest trees have been lost can enhance wood stork reproductive success. Both have been used effectively at Harris Neck National Wildlife Refuge on the Georgia coast, which coincidentally is the best site in the state to view this species. Protection of breeding colonies is critical for recovery of the wood stork. Habitat management guidelines developed by the U.S. Fish and Wildlife Service provide information on buffers for nesting colonies and important roost sites. Most stork colonies are located on private land, so working with private landowners is important for their long-term conservation.

References

- Bryan, A. L., Jr. 1994. Wood stork roost sites in the coastal zone of Georgia and South Carolina in 1994. Report to the U.S. Fish and Wildlife Service, Savannah Coastal Refuges, Savannah, GA. 17pp.
- Bryan, A. L., Jr., and M. C. Coulter. 1987. Foraging flight characteristics of wood storks in east-central Georgia, U.S.A. *Colonial Waterbirds* 10:157-161.
- Comer, J. A., M. C. Coulter, and A. L. Bryan, Jr. 1987. Overwintering locations of wood storks captured in east-central Georgia. *Colonial Waterbirds* 10:162-166.
- Coulter, M. C., W. D. McCort, and A. L. Bryan, Jr. 1987. Creation of artificial foraging habitat for wood storks. *Colonial Waterbirds* 10:203-210.
- Hancock, J. A., J. A. Kushlan, and M. P. Kahl. 1992. Storks, ibises, and spoonbills of the world. Academic Press, Harcourt Brace Jovanovich, London. 385pp.
- Harris, M. J. 1995. Status of the wood stork in Georgia, 1965-1993. Pages 34-46 *in* Proceedings of the Wood Stork Symposium. The Georgia Conservancy, Savannah, GA.
- Harris, M. J. 1999. Wood Stork (*Mycteria americana*). Pp. 52-53 *in* T. W. Johnson, J. C. Ozier, J. L. Bohannon, J. B. Jensen, and C. Skelton, eds., Protected Animals of Georgia. Georgia Department of Natural Resources, Wildlife Resources Division, Nongame Wildlife-Natural Heritage Section, Social Circle.
- Kahl, M. P. 1964. Food ecology of the wood stork (*Mycteria americana*) in Florida. *Ecological Monographs* 34:97-117.
- Kushlan, J. A. 1976. Wading bird predation in a seasonally fluctuating pond. *Auk* 93:464-476.
- Murphy, T. M. 1993. Status of the wood stork in South Carolina. Pages 30-33 *in* Proceedings of the Wood Stork Symposium. The Georgia Conservancy, Savannah, GA.
- Ogden, J. C. 1993. Wood stork symposium keynote address: An overview for protection and recovery of the wood stork. Pages 10-18 *in* Proceedings of the Wood Stork Symposium. The Georgia Conservancy, Savannah, GA.
- Ogden, J. C., D. A. McCrimmon, Jr., G. T. Bancroft, and B. W. Patty. 1987. Breeding populations of the wood stork in the southeastern United States. *Condor* 89:752-759.
- Robinette, J. R., J. P. Davis, and J. L. Hall. 1993. U.S. Fish and Wildlife Service wood stork enhancement and restoration projects in coastal Georgia. Pages 57-63 *in* Proceedings of the Wood Stork Symposium. The Georgia Conservancy, Savannah, GA.
- Tsai, R., P. Frederick, and K. D. Meyer. 2011. Finding Wood Stork Habitat and Conserving the Right Features. Final Report for Georgia Department of Natural Resources, Brunswick, GA.
- U.S. Fish and Wildlife Service. 1996. Revised recovery plan for the U.S. breeding population of the wood stork. U.S. Fish and Wildlife Service, Atlanta, Georgia. 76pp.
- Winn, B., and J. C. Ozier. 2010. Wood Stork (*Mycteria americana*). Pp. 114-115 *in* T. M. Schneider, G. Beaton, T. S. Keyes, and N. A. Klaus, eds. The Breeding Bird Atlas of Georgia. University of Georgia Press, Athens.

Authors of Account

Michael J. Harris, Bradford Winn, James C. Ozier, Todd M. Schneider, and Andy Day

Date Compiled or Updated

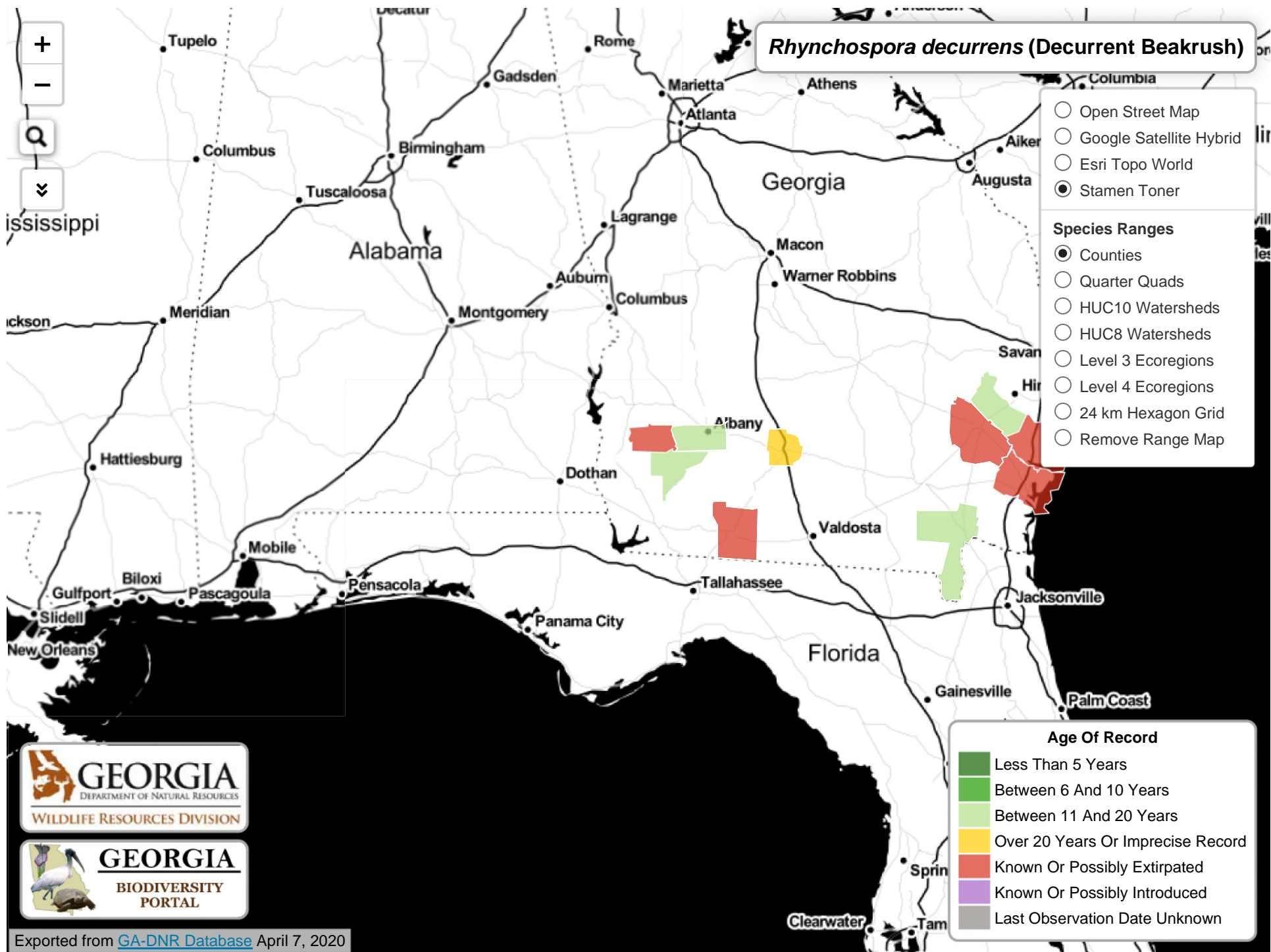
M. Harris, 1999: original account

B. Winn and J. Ozier, 2010: Breeding Bird Atlas species account

T. Schneider, July 2010: modified and edited text

K. Owers, July 2010: updated status and ranks, added picture

A. Day, November 2019: updated status and ranks, modified text





Pteroglossaspis ecristata by Dan Hipes.
Image may be subject to copyright.

Pteroglossaspis ecristata (Fern.) Rolfe

Wild Coco

Federal Protection: No US federal protection

State Protection: Threatened

Global Rank: G2G3

State Rank: S2

SWAP High Priority Species (SGCN): Yes

Element Occurrences (EOs) in Georgia: 16

Habitat Summary for element in Georgia: Grassy saw palmetto barrens; longleaf pine grasslands, sometimes with *Schwalbea americana*

Description

Perennial **herb** up to 5.5 feet (170 cm) tall, with 2 - 4 basal **leaves** 6 - 28 inches (15 - 70 cm) long and up to 1.4 inches (1 - 3.5 cm) wide, erect, pleated, with 3 - 5 conspicuous veins. The **flower stalk** is 5.5 feet (30 - 170 cm) tall, leafless except for a few small bracts, with a cluster of 5 - 30 flowers at the top. **Flowers** are up to 0.8 inch (1 cm) long, twisted inward to the stalk, with a stiff floral bract 2.4 inches (6 cm) long behind each flower. **Sepals and lateral petals** are yellowish-green to pinkish and folded forward over the lip; the **lip** is 3-lobed, with a prominent central lobe that is dark maroon with green margins but lacking a crest. The **fruit** is an erect, rounded capsule up to 0.8 inch (2 cm) long.

Similar Species

In flower, Wild Coco resembles no other species. However, its leaves are similar to those of other orchids such as grass pinks (*Calopogon* spp.) but are stiffer and occur in two's or three's instead of singly. The leaves also resemble those of the seedlings of Saw Palmetto but are softer and lack the woody, saw-toothed leaf stalk of Saw Palmettos.

Related Rare Species

Pteroglossaspis ecristata is the only species in that genus in North America. More than thirty other orchid species are rare in Georgia.

Habitat

Longleaf pine sandhills, flatwoods, oak scrub, and disturbed clearings in these habitats.

Life History

Wild Coco is a perennial herb that reproduces sexually by seed. It blooms only every few years, usually only after a fire. Often many flowers will bloom at once and remain open for about a week; they are probably pollinated by bees. Little else is known about the reproductive biology of this species; closely related species in the genus *Eulophia* are known to be both self- and cross-fertile.

Survey Recommendations

Surveys are best conducted during flowering (July–September) and fruiting (September–November).

Range

Coastal Plain of Georgia, Florida, Alabama, Mississippi, Louisiana, South Carolina, and North Carolina; Cuba.

Threats

Destruction of habitat by conversion to pine plantations, pasture, fields, and residential and commercial development; fire suppression. Invasion by the exotic pest plant Cogon Grass.

Georgia Conservation Status

Pteroglossaspis ecristata is ranked S2 by the Georgia Department of Natural Resources, indicating that it is imperiled in Georgia. It is listed as Threatened by the State of Georgia. Sixteen populations have been documented in Georgia since seen the 1940s, about half on public or conservation lands, but only four have been confirmed in recent years.

Conservation Management Recommendations

Use prescribed fire to create sunny openings in sandhills and flatwoods and reduce competition from woody species. Avoid logging, bedding, and plowing fire lanes in sandhills and flatwoods. Eradicate Cogon Grass.

References

Brown, P.M. and S.N. Folsom. 2004. Wild orchids of the southeastern United States, north of peninsular Florida. University Press of Florida, Gainesville.

Chafin, L.G. 2007. Field guide to the rare plants of Georgia. State Botanical Garden of Georgia and University of Georgia Press, Athens.

Luer, C.A. 1972. The native orchids of Florida. New York Botanical Garden, New York

NatureServe. 2019. *Pteroglossaspis ecristata* comprehensive report. NatureServe Explorer. Arlington, Virginia. <http://explorer.natureserve.org/servlet/NatureServe?searchName=Pteroglossaspis+ecristata>

Romero-González, G.A. 2003. *Pteroglossaspis ecristata* species account. Flora of North America, Vol. 26, Magnoliophyta: Liliidae: Liliales and Orchidales. Oxford University Press, New York. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242101875

Schotz, A.R. 2006. *Pteroglossaspis ecristata* – wild coco, giant orchid Orchid Family (Orchidaceae). Rare Plants of Louisiana Fact Sheet, Louisiana Department of Wildlife and Fisheries. http://dev.wlf.louisiana.gov/sites/default/files/pdf/fact_sheet_plant/32092-Pteroglossaspis%20ecristata/pteroglossaspis_ecristata.pdf OR http://184.106.97.89/sites/default/files/pdf/fact_sheet_plant/32092-Pteroglossaspis%20ecristata/pteroglossaspis_ecristata.pdf

Schotz, A.R. 2003. Threatened and endangered species: giant orchid. Alabama's Treasured Forests, Winter: 28-29. http://www.forestry.alabama.gov/Pages/Informational/Treasured_Forests/Magazine/2003_Winter.pdf

Sorrie, B.A. 1993. *Pteroglossaspis ecristata* element stewardship abstract. The Nature Conservancy, Arlington, Virginia.

Weakley, A.S. 2015. Flora of the southern and mid-Atlantic States. University of North Carolina Herbarium, University of North Carolina, Chapel Hill. <http://www.herbarium.unc.edu/flora.htm>

Authors of Account

Linda G. Chafin

Date Compiled or Updated

L. Chafin, July 2008: original account

K. Owers, Feb. 2010: added pictures

L. Chafin, March 2020: updated original account



Pteroglossaspis ecristata, illustration by Jean C. Putnam Hancock. Image may be subject to copyright.



Pteroglossaspis ecristata by Dan Hipes.
Image may be subject to copyright.



Pteroglossaspis ecristata by Alan Cressler. Image may be subject to copyright.

APPENDIX E

Internet Resources

This page intentionally left blank.

Federal

- Air Force Certification Programs (https://www.acq.osd.mil/eie/afpmb/training_courses.html)
- Aquatic Nuisance Species Task Force (<http://www.anstaskforce.gov>)
- EPA Environmental Dataset Gateway (<https://edg.epa.gov/metadata/catalog/main/home.page>)
- EPA, Education (<http://www.epa.gov/osw/education/train.htm>)
- EPA, Region 4 (Southeast) Water Division (<https://www.epa.gov/aboutepa/organization-epas-region-4-office-atlanta#wd>)
- EPA, Riparian Zone and Stream Restoration (<https://archive.epa.gov/ada/web/html/riparian.html>)
- EPA, Water Quality Standards for Surface Waters (<http://water.epa.gov/scitech/swguidance/standards>)
- EPA, Water Topics (<https://www.epa.gov/environmental-topics/water-topics#our-waters>)
- National Military Fish and Wildlife Association (<https://www.nmfwa.org/>)
- National Interagency Fire Center (<http://www.nifc.gov/>)
- National Invasive Species Council (<https://www.doi.gov/invasivespecies/>)
- USACE, Savanna Georgia Regulatory Division, Wetlands and Waters of the U.S. (<http://www.sas.usace.army.mil/Missions/Regulatory.aspx>)
- USDA, Animal and Plant Health Inspection Service (APHIS) Wildlife Services (<http://www.aphis.usda.gov/>)
- USDA, National Conservation Practice Standards (<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/cp/ncps/>)
- USDA, National Invasive Species Information Center, Georgia State Resources (<https://www.invasivespeciesinfo.gov/us/georgia><https://www.invasivespeciesinfo.gov/us/georgia>)
- USDA NRCS – Georgia (<http://www.nrcs.usda.gov/wps/portal/nrcs/site/ga/home/>)
- USDA NRCS Geospatial Data Gateway (<http://datagateway.nrcs.usda.gov/>)
- USDA NRCS, Migratory Bird Habitat Initiative (<https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/initiatives/?cid=steldevb1027669>)
- U.S. Forest Service (<http://www.fs.fed.us>)
- U.S. Forest Service, Wildland Fire (<http://www.fs.fed.us/fire/safety/index.html>)
- U.S. Forest Service, Fire Effects Information System (<https://www.feis-crs.org/feis/>)
- USFWS, A System for Mapping Riparian Areas in the Western United States (<http://www.fws.gov/wetlands/Documents/A-System-for-Mapping-Riparian-Areas-In-The-Western-United-States-2009.pdf>)
- USFWS, Birds of Conservation Concern (<https://digitalmedia.fws.gov/digital/collection/document/id/1249/rec/1>)
- USFWS, Endangered Species Program (<http://www.fws.gov/endangered/laws-policies/index.html>)
- USFWS, Georgia Field Offices (<http://www.fws.gov/georgia/>)

- USFWS, Law Enforcement (<http://www.fws.gov/southwest/lawenforcement/index.htm>)
- USFWS, Migratory Bird Data Center (<https://www.fws.gov/birds/surveys-and-data/migratory-bird-data-center.php>)
- USFWS, National Conservation Training Center (<http://nctc.fws.gov/>)
- USFWS National GIS Datasets (<http://www.fws.gov/gis/data/national/index.html>)
- USFWS, National Wetlands Inventory (<http://www.fws.gov/wetlands/>)
- USFWS, Southeast Region Migratory Bird Program (<https://www.fws.gov/southeast/birds/migratory-birds/>)

State

- Albany Georgia, Recreation and Parks Department (<https://www.albanyga.gov/about-us/city-departments/recreation-parks-department>)
- Albany GA/Dougherty County, Stormwater Pollution Control (<https://www.albanyga.gov/about-us/city-departments/engineering-department/stormwater-pollution-control>)
- GDNR, Education (<http://www.gadnr.org/education>)
- GDNR, Environmental Protection Division (<http://www.georgiaepd.org/>)
- GDNR, Fishing (<http://www.georgiawildlife.com/fishing/>)
- GDNR, Fishing Regulations(<http://www.georgiawildlife.com/fishing/regulations>)
- GDNR, Georgia Flood M.A.P. Online Digital Flood Insurance Rate Maps (DFIRMs) (<http://map.georgiadfirm.com/>)
- GDNR, Hunter Education (<https://georgiawildlife.com/hunting/huntereducation>)
- GDNR, Hunting Regulations(<http://www.eregulations.com/georgia/hunting/>)
- GDNR, Protected Wildlife Species (<https://georgiawildlife.com/species>)
- GDNR, Watershed Protection Branch, (<https://epd.georgia.gov/about-us/watershed-protection-branch>)
- GDNR, Wildlife Division (<http://www.georgiawildlife.org/>)
- GDNR, Wildlife Resources Division Maps (<https://georgiawildlife.com/locations/wrd>)
- Georgia Association of Floodplain Management (<http://www.gafm.clubexpress.com/>)
- Georgia Cooperative Extension Office (<http://www.caes.uga.edu/extension/>)
- Georgia Cooperative Fish and Wildlife Research Unit (<http://www.coopunits.org/Georgia/>)
- Georgia Department of Agriculture (<http://agr.georgia.gov/>)
- Georgia Department of Health (<http://health.state.ga.us/>)
- Georgia Forestry Commission (<http://www.gfc.state.ga.us/forest-management/>)
- Georgia Forestry Commission, Prescribed Fire (<http://www.gfc.state.ga.us/forest-management/prescribed-fire/>)
- Georgia Invasive Species Task Force (<http://www.gainvasives.org>)
- Georgia Soil and Water Conservation Commission (<http://gaswcc.georgia.gov/>)
- Georgia Soils and Water Commission, Partners in Fish and Wildlife (<http://gaswcc.georgia.gov/partners-fish-and-wildlife>)
- Georgia Natural Resources Foundation (<http://georgianrf.org/>)
- Georgia NPDES Stormwater General Permits (<https://epd.georgia.gov/forms-permits/watershed-protection-branch-forms-permits/storm-water-forms/npdes-industrial-storm>)

- Georgia Stormwater Management Manual (<http://www.atlantaregional.com/environment/georgia-stormwater-manual>)

Navy

- NAVFAC GeoReadiness Center (<http://proceedings.esri.com/library/userconf/eucom-africom10/papers/georeadiness-program.pdf>)
- Navy Public Health Training Center (<http://www.med.navy.mil/sites/nmcphc/nepmu-6/Pages/education-and-training.aspx>)
- OPNAVINST 6250.4 (series): Pest Management Programs. (https://www.navfac.navy.mil/navfac_worldwide/pacific/fecs/southwest/about_us/our_services/Environmental/conservation/applied_biology.html)

Department of Defense (DOD)

- Conserving Biodiversity on Military Lands (http://www.dodbiodiversity.org/ch5/index_6.html)
- DODINST 4150.07: DOD Pest Management Program. (<https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/415007p.pdf?ver=2017-09-15-121506-797>)
- DOD Legacy Program Tracker (<https://www.denix.osd.mil/legacy/home/>)
- DOD Natural Resources Conservation Compliance Program (<http://www.dodnaturalresources.net/Resources.html>)
- DOD, Natural Resource Programs and INRMP Implementation: Partnering Tools (http://www.dodworkshops.org/files/Training/SikesModules/Mod8_PartnerTools_FINAL_july09.pdf)
- DOD Partners in Flight (PIF) (<http://www.dodpif.org/>)
- Natural Resources Funding Manual (September 2009) (http://www.dodnaturalresources.net/files/AEC_EcoFunding_Manual_082010_FINAL_VERSION.pdf)
- DOD INRMP Resources (<http://www.dodnaturalresources.net/INRMP-Resources.html>)
- DOD INRMP Manual (2013) (<https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodm/471503m.pdf>)

Universities

- University of Georgia, College of Agricultural and Environmental Sciences (<https://www.caes.uga.edu/>)
- University of Georgia, College of Agricultural & Environmental Sciences, Dougherty County Cooperative Extension (<http://www.caes.uga.edu/extension/dougherty/>)
- University of Georgia, College of Agricultural & Environmental Science, Forest Stewardship Program (<https://extension.uga.edu/topic-areas/environment-natural-resources/forestry.html>)
- University of Georgia, College of Agriculture and Environmental Sciences, Pond Management (<https://extension.uga.edu/county-offices/jackson/agriculture-and-natural-resources/pond-mangement.html>)
- University of Georgia, Museum of Natural History, Georgia Wildlife Web (<https://naturalhistory.uga.edu/>)

- University of Georgia, Warnell School of Forestry and Natural Resources (<http://www.warnell.uga.edu/>)
- University of Georgia's Carl Vinson Institute (<http://www.cviog.uga.edu/>)

NGOs

- The Association of Fish and Wildlife Agencies (<http://www.fishwildlife.org/>)
- Atlanta Audubon Society (<https://www.atlantaaudubon.org/>)
- Audubon, Georgia (http://www.n-georgia.com/audubon_society.htm)
- Center for Invasive Species and Ecosystem Health (<http://www.bugwood.org>)
- Center for Plant Conservation (<https://saveplants.org/>)
- eBird (<https://ebird.org/home>)
- Georgia Chapter of the American Fisheries Society (<http://gaafs.org/>)
- Georgia Chapter of The Wildlife Society (<http://wildlife.org/georgia/>)
- Georgia Ornithological Society (<https://www.gos.org/>)
- Georgia Prescribed Fire Council, (<http://www.garxfire.com/>)
- Georgia Wildlife Federation (<http://www.gwf.org/>)
- International Hunter Education Association, Hunter Education Requirements (<http://iheausa.org/hunting-and-shooting/requirements/hunter-education-requirements>)
- Invasive and Exotic Species of the Thirteen Southern States (<http://www.invasive.org/seweeds.cfm>)
- Lady Bird Johnson Wildflower Center (<http://www.wildflower.org/organizations/search.php?state=GA>)
- NatureServe (<http://www.natureserve.org/>)
- TNC, Georgia (<https://www.nature.org/en-us/about-us/where-we-work/united-states/georgia/>)
- TNC Migratory Bird Program (<http://my.nature.org/birds/>)
- TNC, Protecting Native Plants and Animals (<http://www.nature.org/ourinitiatives/habitats/forests/howwework/protecting-native-plants-and-animals-taking-on-the-invaders.xml>)
- Sustainable Agriculture Network (<http://www.sare.org/>)
- Society of Wetland Scientists (<http://www.sws.org/>)
- Society for Ecological Restoration (<http://www.ser.org/>)

Other

- Chehaw (<http://chehaw.org/>)

APPENDIX F

INRMP Project Data

This page intentionally left blank.

Appendix F describes the projects to be implemented by MCLB Albany. Projects were identified by the MCLB Albany NRM in consultation with wildlife biologists at NAVFAC MIDLANT, as well as with federal, state, and county wildlife biologists, foresters, and land managers. For each project, Appendix F discusses the purpose, location, description, monitoring need, baselines, and legal requirements, and identifies the relevant INRMP goals, objectives, and management strategies of Section 4 – Natural Resource Management. It is the intent of MCLB Albany to implement the projects as described in Appendix F to the greatest extent possible. The implementation of projects is largely dependent upon availability of funds. Recognizing the uncertainties in funding and the possibility of changes to MCLB Albany military mission and its civilian and military staffing, the implementation of projects will proceed as directly and completely as possible. Table F-1 summarizes the projects.

Funding for implementation of the INRMP will come from MCLB Albany; O&M, MC funds; NAVFAC and Marine Corps natural resources fund sources; or non-DOD funding options. All funding will be sought through the ENCORE system. Every effort will be made to acquire funding to implement DOD mandatory projects in the timeliest manner possible. Stewardship-type projects will be funded through forestry, agricultural outlease, fish and wildlife, Legacy, or other fund sources as funding and personnel resources become available.

Table F-1. INRMP Projects Table.

Project No.	Project Description	INRMP Page Ref.	Scheduled Implementation (FY)	Legal Driver(s)	Funding Priority
1	Natural Resources GIS and Mapping - Update natural resource datasets and layers according to GEOFidelis Geospatial Data Layer Specifications including wetlands, vegetation, special status species, and all applicable layers.	F-9	FY21	7, 9, 15, 17, 28, 30, 32, 33	M
2	Invasive Species Management and Control - Identify locations of invasive and/or exotic plant and animal species. Develop geodatabase and attribute tables, management guidelines, prioritize and implement appropriate control response in accordance with the Integrated Pest Management Plan. Develop protocols for reducing the spread of and preventing the introduction of invasives/exotics.	F-11	FY21	1, 2, 3, 7, 11, 20, 21, 22, 24, 33, 37	S
3	RTE or Special Concern Species and Habitat Protection - Monitor status and population of rare, threatened, endangered, or special concern plant and animal species, and natural communities. Identify critical habitats and evaluate potential for restoration or enhancement of natural communities. Develop restoration plans for longleaf pine and enhancement of areas of native groundcover to benefit habitat for species of concern.	F-13	Start in FY21 through life of INRMP	7, 8, 14, 15, 16, 18, 19, 20, 24, 35, 38, 42	M
4	Fish and Wildlife Habitat Improvement - Conduct management and implement projects to enhance habitat for rare, threatened, endangered, or special concern species, as well as other wildlife and natural communities, including control of invasive plant species, prescribed burning, and management plans for open areas.	F-17	Start in FY21 through life of INRMP	3, 7, 14, 15, 18, 19, 20, 24, 30, 33, 38, 42	S

Project No.	Project Description	INRMP Page Ref.	Scheduled Implementation (FY)	Legal Driver(s)	Funding Priority
5	<p>Forest Management - Conduct forest management practices that promote multiple-use of forest areas including wildlife habitat enhancement, outdoor recreation, forest health, access, and safety. Practices include timber harvesting, insect and disease surveillance, and conducting timber cruise of merchantable stands.</p> <p>Fire Management - Conduct prescribed fire management, including procuring fire management equipment, reducing forest fuel loads, removing debris piles, installing new and improving existing firebreak system, and conducting prescribed burns on a 1–3 year rotation.</p>	F-21	Start in FY21 through life of INRMP	2, 4, 7, 13, 15, 18, 20, 25, 26, 33, 39, 41, 46	S
6	<p>Outdoor Recreation Management - Promote outdoor recreation and manage hunting and fishing programs. Management of fisheries program includes oversight of pond facilities and the Annual Buddy Fishing Tournament, stocking, fertilization, feeding, invasive species management, renovation and/or other appropriate measures. Management of hunting program includes hunter education program and hunter qualification, assessing deer population through camera and other survey methods, setting season quotas and harvest restrictions, oversight of the Conservation Volunteer Program, and compiling and analyzing data to ensure sustainable harvest.</p>	F-25	Start in FY21 through life of INRMP	6, 10, 15, 20, 23, 27, 29, 32, 36, 44	S
7	<p>Natural Resource Outreach and Education - Promote natural resources outreach by educating installation staff, the general public, about natural resources on MCLB Albany. Outreach efforts include overseeing development and operations of the Natural and Cultural Resources Center and Indian Lake Nature Trail and Boardwalk, contributing to news articles and special events, and other forms of educational outreach.</p>	F-27	Start in FY21 through life of INRMP	10, 15, 34	S

Project No.	Project Description	INRMP Page Ref.	Scheduled Implementation (FY)	Legal Driver(s)	Funding Priority
8	Nuisance Animal Management and Control - Address issues related to nuisance domestic animals, feral animals, and wildlife including coordinating with State and federal wildlife agencies, updating Base Animal Control order, utilizing appropriate abatement techniques, maintaining database of nuisance complaints, and other actions.	F-29	Start in FY21 through life of INRMP	22, 37, 40, 43, 45	S
9	INRMP Updates - Ensure INRMP is kept current, reflecting: Installation and Region Management direction, current projects, new natural resources information, current regulatory guidelines and policies, and mission requirements.	F-31	Start in FY21 through life of INRMP	15, 17, 20, 23, 26, 30, 32, 33, 39	M

Funding Priority

M = Mandatory Project; S = Stewardship Project

Legal Drivers

(1)	7 USC 136	Federal Insecticide Fungicide and Rodenticide Act	(27)	EO 11644	Off-Road Vehicles on Public Lands
(2)	7 USC 2801	Federal Noxious Weed Act	(28)	EO 11988	Floodplain Management
(3)	7 USC 2814	Management of Undesirable Plants on Federal Lands	(29)	EO 11989, Section 9	Off-Road Vehicles on Public Lands
(4)	10 USC 2665	Military Construction Authorization Act – Sale of Certain Interests in Lands, Logs	(30)	EO 11990	Wetlands Protection
(5)	10 USC 2667	Non-excess property of Military Departments and Defense Agencies	(31)	EO 12088	Pollution Control
(6)	10 USC 2671	Military Construction Authorization Act – Military Reservations and Facilities- Hunting, Fishing, and Trapping	(32)	EO 12962	Recreational Fisheries
(7)	16 USC 1531 & 1536	Endangered Species Act	(33)	EO 13112	Invasive Species
(8)	16 USC 2901	Fish and Wildlife Conservation Act	(34)	EO 13834	Leadership in Environmental Management
(9)	16 USC 2912	North American Wetlands Conservation Act	(35)	EO 13186	Responsibilities of Federal Agencies to Protect Migratory Birds
(10)	16 USC 670c	Public Access and Outdoor Recreation	(36)	EO 13443	Facilitation of Hunting Heritage and Wildlife Conservation
(11)	16 USC 4701	National Invasive Species Act	(37)	OPNAVINST 6250.4 (series)	Pest Management Programs
(12)	16 USC 590A	Soil and Water Conservation Act	(38)	Public Law 107-314, 2003	National Defense Authorization Act
			(39)	Public Law 93-378	Resources Planning Act

(13)	16 USC 620	Forest Resources Conservation and Shortage Relief Act	(40)	Armed Forces Pest Management Board Technical Guide No. 37	Management of Stray Animals on Military Installations
(14)	16 USC 661-666c	Fish and Wildlife Coordination Act	(41)	DOD National Wildfire Coordination Group Federal Wildland Fire Policy	DOD Wildfire Management
(15)	16 USC 670a-o	Sikes Act Improvement Act	(42)	Georgia Administrative Code, Sections 27-3-130 to 133	Protection of Endangered Wildlife
(16)	16 USC 703-712	Migratory Bird Treaty Act	(43)	Official Code of Georgia, Title 4, Ch. 11	Georgia Animal Protection Provisions
(17)	33 USC 1251	Clean Water Act	(44)	Georgia Administrative Code, Sections 27-2-5.1	Georgia Hunting and Fishing Provisions
(18)	32 CFR 190	Natural Resources Management Program	(45)	Official Code of Georgia 16-12-4	Georgia Offenses Against Public Health and Morals Provisions (Animal Cruelty)
(19)	50 CFR 17	Endangered and Threatened Wildlife and Plants	(46)	The Guidance for Implementation of Federal Wildland Fire Management Policy	Wildfire Management
(20)	MCO 5090.2	Marine Corps Environmental Compliance			
(21)	60 FR 40837	Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds			
(22)	DODI 4150.07	DOD Pest Management Program			
(23)	DODD 4700.4	Natural Resources Management Program			
(24)	DODI 4715.03	Natural Resources Conservation Program			
(25)	DODI 6055.6	DOD Fire and Emergency Services Program			
(26)	DODI 7310.5	Accounting for Production and Sale of Forest Products			

This page intentionally left blank.

Project No. 1: Natural Resources GIS and Mapping

Purpose: Create and update natural resource datasets and layers according to GEOFidelis Geospatial Data Layer Specifications including wetlands, vegetation, special status species, and all applicable layers.

Goals and Objectives: Supports the following INRMP goals and objectives:

Goal 2: Assess the impact of invasive species on MCLB Albany, prioritize treatment, and conduct control measures.

Objective 2.2 Identify invasive species infestation locations.

Goal 3: Rare, Threatened and Endangered Species (RTE) Habitat Management and Surveys.

Objective 3.1 Identify existing locations of rare, threatened or endangered species.

Goal 4: Address issues related to nuisance domestic animals, feral animals, and wildlife aboard MCLB Albany.

Objective 4.1 Correspond with, utilize and cooperate with state and federal wildlife agencies, local animal control or other organizations on nuisance control activities.

Objective 4.2 Employ appropriate abatement and/or removal techniques to address nuisance wildlife, feral animal, and domestic animal complaints.

Objective 4.3 Manage database of MCLB Albany nuisance animal interactions.

Goal 8: Enforce compliance with Federal and State environmental, natural, and cultural resources laws, Marine Corps policies, and other guidelines.

Objective 8.2 Define clear boundaries for hunting, fishing, and other outdoor recreational areas.

Location: Installation-wide.

Baseline: Some existing geospatial data available.

Description:

Geospatial data creation, updates, and mapping are necessary for implementation of, and updates to, the INRMP, and for proper natural resources management and decision making. This powerful management tool provides natural resources managers with a comprehensive database that includes a spatial component in which aerial photographs, survey and monitoring data, and various other natural resource information are all tied to a geographical location. Data delivery of mapping in GIS format allows integration of natural resources information with mission objectives, other base activities, web-based information data and links, and other technology. This project is interlinked with other INRMP projects and is a cost efficient method to bring all natural resources programs and information together to promote proper management as required.

Geospatial data improvements will facilitate the implementation and monitoring of projects and the production of monitoring reports and public relations products, and will improve opportunities to compete for Marine and DOD awards programs and grant applications for special programs and projects.

The advancement and integration of GIS into all aspects of planning at MCLB Albany would reduce the expected work load for INRMP implementation and improve data-sharing and coordination with outside entities and agencies.

Specific management strategies to support this project are identified in INRMP Section 4.3.3 - GIS, Data Integration, Access, and Reporting.

Monitoring:

None.

Legal Driver(s):

Sikes Act Improvement Act of 1997, 16 USC 670 (a) et seq.; Endangered Species Act of 1973 as amended, 16 USC Section 1531 et seq.; Section 404 of the Federal Water Pollution Control Act (CWA), as amended, 33 USC 1251 et seq.; North American Wetland Conservation Act, 16 USC 2912; Recreational Fisheries, EO 12962; Wetlands Protection, EO 11990; Floodplain Management, EO 11988; Invasive Species, EO 13112; and Marine Corps Environmental Compliance and Protection Manual MCO 5090.2.

Project No. 2: Invasive Species Management and Control

Purpose: Manage and control invasive and exotic plant and animal species at MCLB Albany at acceptable levels to minimize their negative impacts and promote native ecosystems.

Goal and Objectives: Supports the following INRMP goal and objectives:

Goal 2: Assess the impact of invasive species on MCLB Albany, prioritize treatment, and conduct control measures.

Objective 2.1 Develop protocols for reducing the spread of invasive species.

Objective 2.2 Identify invasive species infestation locations.

Objective 2.3 Treat invasive species with appropriate chemical or mechanical means of control that are not harmful to sensitive inhabitants of the ecosystem.

Goal 5: Review pest management at the Installation and ensure utilization of integrated pest management (IPM) techniques.

Objective 5.1 Perform functions of the Integrated Pest Management Coordinator.

Objective 5.2 Update Integrated Pest Management Plan.

Location: Installation-wide.

Description: Numerous invasive or nuisance plant species have been documented on the Installation, including several high-priority species such as Lespedeza bicolor, Chinese privet, sacred bamboo, Japanese honeysuckle, and Japanese climbing fern, and lantana. Two non-native invasive wildlife species (feral cat and feral hog) are also known to occur on the Installation. The Installation will survey the extent of invasive and exotic species and develop an invasive and exotic species control plan that will identify and describe invasive and exotic species, and schedule removal. This project involves the following activities to manage and control invasive and exotic species to acceptable levels:

- Identify locations of invasive and/or exotic plant and animal species.
- Develop geodatabase and attribute tables, management guidelines.

- Prioritize and implement appropriate control response (chemical and mechanical treatments, prescribed fire, cultural controls, and biocontrols) in keeping with Integrated Pest Management Plan.
- Within duck habitat, control buttonbush by 90 percent.
- Develop protocols for reducing the spread and preventing the introduction of noxious invasive species on MCLB Albany.

Specific management strategies to support this project are identified in INRMP Section 4.1.3.1 – Invasive Plant and Noxious Weed Management and Section 4.2.5 - Invasive and Nuisance Wildlife Management.

Baseline: Baseline has been established for some species and communities, but datasets will be improved upon and data gaps filled during survey phases of the project.

Monitoring: MCLB Albany will follow up on invasive species management activities as needed based on the species and required action(s) taken, and will inventory treated areas of invasive plant species annually to determine the effectiveness of the implemented removal methods and to identify any adaptive measures needed.

Legal Drivers: Federal Noxious Weed Act of 1974, 7 USC 2801, Sec. 2814 (a); Management of Undesirable Plants on Federal Lands, 7 USC 2814; DOD Pest Management Program, DODINST 4150.07; Endangered Species Act, 16 USC 1531 & 1536; National Invasive Species Act, 16 USC 4701; Invasive Species, EO 13112; Federal Insecticide, Fungicide, and Rodenticide Act, 7 USC 136; Pest Management Programs, OPNAVINST 6250.4 (series); Natural Resources Conservation Program, DODINST 4715.03; President’s Executive Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds, 60 FR 40837; and Marine Corps Environmental Compliance and Protection Manual, MCO 5090.2.

Project No. 3: RTE or Special Concern Species and Habitat Protection

Purpose: To protect and monitor the status and population of rare, threatened and endangered or special concern plant and animal species present on MCLB Albany.

Goals and Objectives: Supports the following INRMP goals and objectives:

Goal 3: Rare, Threatened and Endangered Species (RTE) Habitat Management and Surveys.

Objective 3.1 Identify existing locations of rare, threatened or endangered species.

Objective 3.2 Conserve and manage RTE species and habitats to promote biodiversity.

Goal 6: Implement a sound forest and fire management program.

Objective 6.2 Plan and implement a longleaf pine restoration program.

Location: Installation-wide.

Description: There are no federal or state listed plant species or federally designated critical habitats known to occur on the Installation. However, two rare plants of special conservation concern (poppy mallow; crestless plume orchid) and three natural communities (Clayhill Longleaf Woodland, Limesink Pond/Pond Cypress Pond, South Atlantic Willow Oak Flatwoods Forest), have been confirmed on the Installation.

Nine federally or state protected wildlife species and species of special concern have been identified on the Installation. Federally protected species include wood stork, gopher tortoise, eastern diamondback rattlesnake, and bald eagle. State-protected species include Bachman's sparrow, eastern tiger salamander, northern bobwhite, and loggerhead shrike.

This project will involve coordination with appropriate branches and partners and the following actions identified below to conserve and protect species of special significance on the Installation. Specific activities will be identified and prioritized by the NRM.

- Monitor status and populations of rare, threatened, endangered, or special concern plant and animal species, and natural communities.
- Identify critical habitats and evaluate potential for restoration or enhancement of natural communities.
- Develop restoration plans for longleaf pine and enhancement of areas of native groundcover to benefit habitat for species of concern (gopher tortoise and Bachman's sparrow).

Specific management strategies to support this project are identified in INRMP Section 4.1.5 - Rare, Threatened, and Endangered Plant Species and Natural Communities Management; Section 4.2.7 - Rare, Threatened, and Endangered Wildlife Species Management; Section 4.2.7.1 – Federally Listed and Candidate Species; Section 4.2.7.2 – State Listed Species; and, Section 4.2.7.3 – Other Species of Special Concern.

Baseline:

Biological surveys for RTE species and habitats were conducted on the installation in 1990, 1992, 1995 and 2013. Datasets will be improved upon and data gaps filled during survey and plan development phases of the project and implementation of this INRMP.

Monitoring:

MCLB Albany will monitor as needed based on the management measures/strategies implemented to determine the effectiveness of the action, and to identify any adaptive measures needed.

Legal Driver(s):

Natural Resources Management Program, 32 CFR 190; Endangered Species Act, 16 USC 1531 et seq.; 50 CFR 17, Endangered and Threatened Wildlife and Plants; Sikes Act Improvement Act of 1997, 16 USC 670 (a)-(o); Fish and Wildlife Conservation Act, 16 USC 2901; Fish and Wildlife Coordination Act, 16 USC 661-666c; National Defense Authorization Act (NDAA), Public Law 107-314, 2003; Migratory Bird Treaty Act (MBTA), 16 USC 703-712; Responsibilities of Federal Agencies to Protect Migratory Birds, EO 13186; Natural Resources Conservation Program, DODINST 4715.03; Marine Corps Environmental Compliance and Protection Manual, MCO 5090.2; and Protection of Georgia Endangered Wildlife, Georgia Administrative Code, Sections 27-3-130 to 133.

Project No. 4: Fish and Wildlife Habitat Improvement

Purpose: Conduct management and implement projects to enhance habitat for rare, threatened, endangered, or special concerns species, as well as other wildlife and natural communities on MCLB Albany.

Goal and Objectives: Supports the following INRMP goal and objectives:

Goal 1: Restore, manage, preserve, and/or enhance ecologically significant plant communities, including wetlands.

Objective 1.1 Assess current native groundcover and develop guidelines for maintaining species diversity and abundance.

Objective 1.2 Restore native groundcover.

Objective 1.3 Enhance pollinator habitats by converting non-native landscaped areas to native wildflowers and forbs.

Goal 6: Implement a sound forest and fire management program.

Objective 6.1 Conduct prescribed burns and manage wildfire risk by creating and maintaining firebreaks, reducing fuel loads, and improving wildland-urban interfaces.

Objective 6.2 Plan and implement a longleaf pine restoration program.

Location: Installation-wide.

Description: Numerous opportunities exist to enhance or restore habitats on MCLB Albany for the benefit of the fish and wildlife found on the Installation. In some cases, these efforts would also promote habitats for species of special concern. This project will involve coordination with appropriate branches and partners to enhance fish and wildlife habitat through the activities described below. Specific activities will be identified and prioritized by the NRM.

- Control invasive plant species.
- Conduct prescribed burns.
- Develop management plans for open areas (rights-of-way, golf course, old housing footprint) on installation.

- Develop restoration plans for longleaf pine and for the enhancement of areas of native groundcover to benefit habitat for species of concern (gopher tortoise, Bachman's sparrow).

Specific management strategies to support this project are identified in INRMP Section 4.1 - Land Management; Section 4.2 - Fish and Wildlife Management; and Section 4.3 - Forestry Management.

Baseline:

Some existing inventories and management activities (as referenced in the INRMP) have been conducted to establish baseline conditions of fish and wildlife habitats on the Installation. Activities proposed by the NRM will build upon this information and fill data gaps.

Monitoring:

MCLB Albany will monitor as needed based on the management measures/strategies implemented to determine the effectiveness of the action, and to identify any adaptive measures needed.

Legal Driver(s):

Natural Resources Management Program, 32 CFR 190; Endangered and Threatened Wildlife and Plants, 50 CFR 17; Endangered Species Act, 16 USC 1531 et seq.; Fish and Wildlife Conservation Act, 16 U.S.C 2901 et seq.; Invasive Species, EO 13112; Management of Undesirable Plants on Federal Lands, 7 USC 2814; Sikes Act Improvement Act of 1997, 16 USC 670 (a) et seq; National Defense Authorization Act (NDAA), Public Law 107-314; Fish and Wildlife Coordination Act, 16 USC 661-666c Natural Resources Conservation Program, DODINST 4715.03, Wetlands Protection, EO 11990; and Marine Corps Environmental Compliance, MCO 5090.2.

Project No. 5:

Forest and Fire Management

Purpose:

Conduct forest management practices that promote multiple-use of forest areas including wildlife habitat enhancement, outdoor recreation, forest health, access, and safety. Conduct prescribed fire management and control natural burns on MCLB Albany to promote healthier, more sustainable forest resources, to reduce fuel loads, and to ensure the continuation of fire-dependent plant and wildlife species.

Goals and Objectives:

Supports the following INRMP goal and objectives:

Goal 3: Rare, Threatened and Endangered Species (RTE) Habitat Management and Surveys.

Objective 3.2 Conserve and manage RTE species and habitats to promote biodiversity.

Goal 6: Implement a sound forest and fire management program.

Objective 6.1 Conduct prescribed burns and manage wildfire risk by creating and maintaining firebreaks, reducing fuel loads, and improving wildland-urban interfaces.

Objective 6.2 Plan and implement a longleaf pine restoration program.

Objective 6.3 Manage timber in a manner compatible with multiple-use strategies.

Objective 6.4 Monitor forest health and implement actions to address forest insect, disease or other mortality threats.

Objective 6.5 Submit Quarterly Forestry Reports.

Objective 6.6 Update forestry databases, GIS layers, and inventory.

Location:

Activities will be completed on specific forest compartments as directed by the NRM. Wildfire control will be administered where needed.

Description:

Forest management on MCLB Albany generally involves actions for the commercial production and sale of forest products (including practices such as timber management, timber sales, reforestation, timber stand improvement), and where feasible the benefit of other

components such as wildlife habitat, aesthetics, and recreation. A healthy, well-managed, sustainable forest is a primary objective of forest management at MCLB Albany. This project will involve the activities described below to promote multiple-use of forest areas. Specific activities will be identified and prioritized by the NRM.

- Timber harvesting.
- Insect and disease surveillance.
- Conduct timber cruise of merchantable stands.

Prescribed fires are a management tool used to reduce forest fuels that could generate a high intensity fire and destroy natural resources. When applied properly, fire can also have the additional benefits of improving habitat for many plant and wildlife species (i.e., long leaf pine communities, bobwhite quail, white-tailed deer, turkey, gopher tortoise, indigo snake, and Bachman's sparrow). This project will involve the activities described below to improve forest health and reduce wildfire threats. Specific activities will be identified and prioritized by the NRM.

- Procure fire management equipment.
- Reduce forest fuel loads.
- Remove debris piles.
- Install new and improving existing firebreak system.
- Conduct prescribed burns on a 1–3 year rotation.

Specific management strategies to support this project are identified in INRMP Section 4.3 - Forestry Management, and more specifically in Section 4.3.4 – Management by Forest Cover Type and Section 4.3.7 – Fire Management.

Baseline:

The Installation possesses some baseline forest data and geospatial data for forest compartments and management units based on a 2006 forest inventory. An updated inventory was completed in 2014. Forest inventories obtain estimates of timber volumes, stand conditions, timber types, size or product classes, and other general information needed for planning purposes for commercial timberlands.

Monitoring:

An annual review of forest and fire management activities will be performed to determine necessary program changes.

Legal Driver(s):

Natural Resources Management Program, 32 CFR 190; Endangered Species Act, 16 USC 1531 et seq.; Sikes Act Improvement Act of 1997, 16 USC, 670 (a)-(o); Military Construction Authorization Act – Sale of Certain Interests in lands, logs, 10 USC 2665; Forest

Resources Conservation and Shortage Relief Act, 16 USC 620; Resources Planning Act, Public Law 93-378, 1974; Accounting for Production and Sale of Forest Products, DODINST 7310.5; DOD Fire and Emergency Services Program, DODINST 6055.6; Wildfire Management, Guidance for Implementation of Federal Wildland Fire Management Policy; DOD Wildfire Management, DOD National Wildfire Coordination Group Federal Wildland Fire Policy; and Marine Corps Environmental Compliance and Protection Manual, MCO 5090.2.

This page intentionally left blank.

Project No. 6: Outdoor Recreation Management

Purpose: Promote outdoor recreation and manage hunting and fishing programs for active duty and reserve military personnel, their dependents and accompanied guests; federal civilian employees, their dependents and accompanied guests; and military retirees.

Goal and Objective: Supports the following INRMP goal and objectives:

Goal 7: Support outdoor recreation involving the consumptive or non-consumptive utilization of natural resources.

Objective 7.1 Manage game populations to provide hunting opportunity consistent with ecological and cultural carrying capacity.

Objective 7.2 Manage woods, roads, and trails to provide multiple user benefits.

Objective 7.3 Provide angling opportunity and support game fish populations in Covella Pond, Robinson Pond, Horseshoe Pond, and Indian Lake by maintaining facilities to make this possible.

Objective 7.4 Work with Marine Corps organizations, NGOs, local clubs, societies, and other organizations, to support opportunities for outdoor recreation.

Location: Installation wide where appropriate and designated for each activity.

Description: MCLB Albany offers quality outdoor recreational opportunities to improve the quality of life for Navy personnel and authorized guests where appropriate and feasible. Opportunities include non-consumptive uses such as hiking, biking, bird-watching, etc. as well as consumptive uses such as hunting and fishing. This project will involve the activities described below to promote outdoor recreation at MCLB Albany. Specific activities will be identified and prioritized by the NRM.

- Manage fisheries program to include oversight of pond facilities and the Annual Buddy Fishing Tournament, stocking, fertilization, feeding, invasive species management, renovation and/or other appropriate measures.
- Manage hunting program to include hunter education program and hunter qualification, assessing deer population through camera and other survey methods, setting season quotas and harvest restrictions, oversight of the Conservation Volunteer

Program, and compiling and analyzing data to ensure sustainable harvest.

Specific management strategies to support this project are identified in INRMP Section 4.2 – Outdoor Recreation Management.

- Baseline:** Baseline has been established for some species associated with recreational use such as sport fish and game species (as referenced in the INRMP). Datasets will be improved upon and data gaps filled during survey phases of the project as directed by the NRM.
- Monitoring:** MCLB Albany will monitor as needed based on the management measures/strategies implemented to identify any adaptive measures needed. The Installation will also closely monitor the outdoor recreational opportunities, potential impacts, and the carrying capacity of the resources being utilized.
- Legal Driver(s):** Off-Road Vehicles on Public Lands, EO 11644 and EO 11989, Section 9; Recreational Fisheries, EO 12962; Facilitation of Hunting Heritage and Wildlife Conservation, EO 13443; Georgia Hunting and Fishing Provision, Georgia Administrative Code 27-2-5.1; Military Construction Authorization Act – Military Reservations and Facilities – Hunting, Fishing, and Trapping, 10 USC 2671; Sikes Act Improvement Act of 1997, 16 USC 670a(b)(1)(G); Public Access and Outdoor Recreation 16 USC 670c; Natural Resources Management Program, DOD 4700.4; and Marine Corps Environmental Compliance and Protection Manual, MCO 5090.2.

Project No. 7: Natural Resources Training, Education, and Outreach

Purpose: Promote natural resources outreach by educating installation staff and the general public about natural resources found on MCLB Albany.

Goals and Objective: Supports the following INRMP goals and objectives:

Goal 8: Enforce compliance with Federal and State environmental, natural, and cultural resources laws, Marine Corps policies, and other guidelines.

Objective 8.4 Provide education and training to authorized personnel on MCLB Albany to prevent violation of environmental, natural, and cultural resource laws (Conservation Law Enforcement Program).

Objective 8.5 Provide training and equipment to the Conservation Law Enforcement Officer to enforce applicable Federal and State laws.

Objective 8.6 Provide training to Natural and Cultural Resources Manager in MCLB Albany compliance with applicable Federal and State conservation laws.

Goal 9: Conduct educational outreach activities for natural and cultural resources in partnership with local organizations.

Objective 9.1 Collaborate with wildlife agencies, universities, colleges, and others to achieve regional conservation goals.

Objective 9.2 Contribute to news articles, Welcome Aboard Brief, and other media events.

Objective 9.3 Coordinate Conservation Volunteer Program.

Objective 9.4 Coordinate National Bowhunters Education Foundation course.

Objective 9.5 Oversee opening and daily operations of the Natural and Cultural Resources Center and the Indian Lake Boardwalk.

Location: Installation wide where appropriate and designated for each activity.

Description: This project will involve the activities described below to promote natural resources outreach at MCLB Albany and will include

coordination with local, regional, state, national, or international organizations or public groups as appropriate to promote awareness of the Installations natural resources. Specific activities will be identified and prioritized by the MCCS Department and Installation NRM.

- Oversee development and operations of the Natural and Cultural Resources Center and Indian Lake Nature Trail and Boardwalk.
- Contribute to news articles and special events, and other forms of educational outreach.
- Manage the Conservation Volunteer Program to provide opportunities for residents, employees, or members of the general public to assist or participate in NRP activities or events.

Specific management strategies to support this project are identified in INRMP Section 4.4.3 – Educational Outreach and 4.5 – Integrated Ecosystems Management and Partnering.

Baseline: Cooperative agreements with local or regional fish and wildlife agencies, conservation organizations, and education organizations have been initiated in the past and will continue to be supported.

Monitoring: None.

Legal Driver(s): Sikes Act of 1997, 16 USC 670a(b)(1)(G); Public Access and Outdoor Recreation, 16 USC 670c; Efficient Federal Operations, EO 13834; and Marine Corps Environmental Compliance and Protection Manual, MCO 5090.2.

Project No. 8: Nuisance Animal Management and Control

Purpose: Address issues related to nuisance domestic animals, feral animals, and wildlife at MCLB Albany.

Goal and Objectives: Supports the following INRMP goal and objectives:

Goal 4: Address issues related to nuisance domestic animals, feral animals, and wildlife aboard MCLB Albany.

Objective 4.1 Correspond with, utilize and cooperate with state and federal wildlife agencies, local animal control or other organizations on nuisance control activities.

Objective 4.2 Employ appropriate abatement and/or removal techniques to address nuisance wildlife, feral animal, and domestic animal complaints.

Objective 4.3 Manage database of MCLB Albany nuisance animal interactions.

Goal 5: Review pest management at the Installation and ensure utilization of integrated pest management (IPM) techniques.

Objective 5.1 Perform functions of the Integrated Pest Management Coordinator.

Objective 5.2 Update Integrated Pest Management Plan.

Location: Installation-wide.

Description: Wildlife species (e.g., feral and domestic cats, domestic dogs, Canada geese, insects, rodents, domestic dogs, bats, snakes, fox, and skunks) can become a nuisance and create a threat to human health and/or the military mission. This plan will be implemented to address such issues with nuisance and will involve the following activities:

- Coordinate with State and federal wildlife agencies.
- Update Installation Animal Control order.
- Utilize appropriate abatement techniques.
- Maintain database of nuisance complaints.
- Other actions as dictated by the incident and species.

Specific management strategies to support this project are identified in INRMP Section 4.2.5 - Invasive and Nuisance Wildlife Management.

Baseline: Established database of nuisance wildlife complaints from 2014 to 2019.

Monitoring: MCLB Albany will follow up on nuisance species management activities as needed based on the species and required action(s) taken to determine the effectiveness of the implemented removal methods and to identify any adaptive measures needed.

Legal Drivers: Pest Management Programs, OPNAVINST 6250.4 (series); DOD Pest Management Program, DODINST 4150.07; Georgia offenses Against Public Health and Morals Provisions (Animal Cruelty), Official Code of Georgia 16-12-4; Georgia Animal Protection Provisions, Official Code of Georgia Title 4, Chapter 11; Management of Stray Animals on Military Installations, Armed Forces Pest Management Board Technical Guide No. 37.

Project No. 9:

INRMP Updates

Purpose:

Ensure the MCLB Albany INRMP is kept current, reflecting: Installation and Region Management direction, current projects, new natural resources information, current regulatory guidelines and policies, and mission requirements.

Goal and Objective:

Supports the following INRMP goals and objectives:

Goal 1: Restore, manage, preserve, and/or enhance ecologically significant plant communities, including wetlands.

Objective 1.1 Assess current native groundcover and develop guidelines for maintaining species diversity and abundance..

Goal 2: Assess the impact of invasive species on MCLB Albany, prioritize treatment, and conduct control measures..

Objective 2.1 Develop protocols for reducing the spread of invasive species.

Objective 2.2 Identify invasive species infestation locations.

Goal 3: Rare, Threatened and Endangered Species (RTE) Habitat Management and Surveys.

Objective 3.1 Identify existing locations of rare, threatened or endangered species.

Objective 3.2 Conserve and manage RTE species and habitats to promote biodiversity.

Goal 4: Address issues related to nuisance domestic animals, feral animals, and wildlife aboard MCLB Albany.

Objective 4.1 Correspond with, utilize and cooperate with state and federal wildlife agencies, local animal control or other organizations on nuisance control activities.

Goal 6: Implement a sound forest and fire management program.

Objective 6.2 Plan and implement a longleaf pine restoration program.

Objective 6.3 Manage timber in a manner compatible with multiple-use strategies.

Objective 6.6 Update forestry databases, GIS layers, and inventory.

Goal 7: Support outdoor recreation involving the consumptive or non-consumptive utilization of natural resources.

Objective 7.1 Manage game populations to provide hunting opportunity consistent with ecological and cultural carrying capacity.

Objective 7.2 Manage woods, roads, and trails to provide multiple user benefits.

Goal 8: Enforce compliance with Federal and State environmental, natural, and cultural resources laws, Marine Corps policies, and other guidelines.

Objective 8.2 Define clear boundaries for hunting, fishing, and other outdoor recreational areas.

Goal 9: Conduct educational outreach activities for natural and cultural resources in partnership with local organizations.

Objective 9.1 Collaborate with wildlife agencies, universities, colleges, and others to achieve regional conservation goals.

Goal 10: Provide technical and other support for the completion of the 2021 Integrated Natural Resources Management Plan for MCLB Albany.

Objective 10.1 Prepare Integrated Natural Resources Management Plan for MCLB Albany 2021.

Location: Installation-wide.

Description: In accordance with 32 Code of Federal Regulations (CFR) Part 190, the Sikes Act, and MCO 5090.2, the INRMP will be reviewed on a yearly basis and re-approved every five years. Installations are not required to revise their INRMP within a specified time interval; however, a formal review of the INRMP is required every five years in coordination with USFWS and state partners. The review process will take into account changes in military mission requirements and legal mandates and information obtained from monitoring programs and surveys. Revisions will be reviewed for consistency with the

military mission, federal and state laws, and the ecosystem management goals and objectives of the INRMP.

The revision process will be conducted under the direction of the MCLB Albany CO; revisions will require consultation with and approval by the Installation CO, the Installation NRM, the Regional NRM, and the USFWS.

Baseline: Existing INRMP; current surveys. Future proposed surveys and monitoring will be added as appropriate.

Monitoring: None.

Legal Driver(s): Sikes Act Improvement Act of 1997, 16 USC 670 et seq.; Marine Corps Environmental Compliance and Protection Manual, MCO 5090.2; Natural Resources Management Program, DODD 4700.4; Wetlands Protection, EO 11990; Invasive Species, EO 13112; Recreational Fisheries, EO 12962; Section 404 of the Federal Water Pollution Control Act (Clean Water Act), as amended, 33 USC 1251; Accounting for Production and Sale of Forest Products, DODINST 7310.5; and Resources Planning Act, Public Law 93-378.

APPENDIX G

External Stakeholder Correspondence

This page intentionally left blank.



United States Department of the Interior

Fish and Wildlife Service

355 East Hancock Avenue, Room 320, Box 7

Athens, GA 30601

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) 832-8379

Fax: (912) 832-8744

OCT 29 2020

Marine Corps Logistics Base Albany
814 Radford Boulevard, Suite 20315
Building 5501
Albany, Georgia 31704
Attn: Julie Robbins

RE: FWS File Log No. 2021-I-0210

Dear Ms. Robbins:

The U.S. Fish and Wildlife Service (Service) has reviewed, as per your request via an email dated October 5, 2020, the draft Pre-Final Integrated Natural Resources Management Plan (INRMP) for the Marine Corps Logistics Base (MCLB) Albany. Our comments are provided in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*) and section 7(a)(2) of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 *et seq.*).

Based on the information provided, the requirements of the ESA have been fulfilled relative to this action, and no further consultation is necessary. However, MCLB obligations under section 7 of the ESA must be reconsidered if (1) new information reveals that the proposed project may affect listed species in a manner or to an extent not previously considered, (2) the proposed project is subsequently modified to include activities which were not considered during this consultation; or (3) new species are listed or critical habitat designated that might be affected by the proposed project.

We appreciate the opportunity to comment on the INRMP, and if you have any questions, comments or require additional information regarding this letter, please contact Jim Bates at (706) 544-6422.

Sincerely,

Donald W. Imm

Donald Imm
Field Supervisor

cc: file
GDNR

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

MARINE CORPS LOGISTICS BASE ALBANY

2020

Approving Officials:

Commanding Officer, MCLB Albany

Date

Donald W. Imm

U.S. Fish and Wildlife Service

11/12/2020

Date

Georgia Department of Natural Resources

Date

Natural Resources Manager,
Naval Facilities Engineering Command

Date

Natural Resources Manager, MCLB Albany

Date

Annual Reviews

Name and Title of Reviewer

Date

From: Ingram, Dallas <Dallas.Ingram@dnr.ga.gov>
Sent: Monday, October 19, 2020 6:42 PM
To: Robbins CIV Julie M <julie.m.robbins@usmc.mil>
Subject: [Non-DoD Source] RE: Draft INRMP

Only one comment.

Dallas Ingram
State Quail Coordinator, Game Management

Wildlife Resources Division
(404) 985-0426

Facebook • Twitter • Instagram
Buy a hunting or fishing license today!

A division of the
GEORGIA DEPARTMENT OF NATURAL RESOURCES

Tell Us How We Are Doing
[Customer Satisfaction Survey | Wildlife Resources Division](#)

From: Robbins CIV Julie M [<mailto:julie.m.robbins@usmc.mil>]
Sent: Monday, October 5, 2020 12:35 PM
To: Ingram, Dallas <Dallas.Ingram@dnr.ga.gov>; Jim_Bates@fws.gov
Subject: Draft INRMP

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dallas and Jim,
Here is the draft INRMP for your review.
V/r,
Julie

This page intentionally left blank.