
Integrated Natural Resources Management Plan
Naval Air Station Jacksonville Complex
Jacksonville, Florida



2019 Update

**NAVAL AIR STATION JACKSONVILLE COMPLEX
JACKSONVILLE, FLORIDA
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
(INRMP) - 2019 OPERATIONS AND EFFECT CONCURRENCE**

The Sikes Act and Department of Defense instruction require that annual and 5-year operation and effect reviews of INRMPs occur with federal and state partners. Representatives of the Navy, U.S. Fish & Wildlife Service, Florida Fish and Wildlife Conservation Commission, and National Marine Fisheries Service are invited annually to participate in the yearly Naval Air Station Jacksonville INRMP and Natural Resources Metric review. The last operation and effect review of this INRMP was completed in June 2014. We have revised the installation INRMP with input from the signatory partners as part of the required 5-year review process. By signing below, the partners concur that the management actions prescribed in the INRMP and implemented will contribute to the conservation and rehabilitation of installation natural resources.

_____ Commanding Officer, Naval Air Station Jacksonville	_____ Date
_____ Natural Resources Manager, Naval Air Station Jacksonville	_____ Date
_____ U.S. Navy Region Southeast Environmental Program Manager	_____ Date
_____ Natural Resources Manager, Commander Navy Region SE	_____ Date
_____ U.S. Fish and Wildlife Service	_____ Date
_____ Florida Fish and Wildlife Conservation Commission	_____ Date
_____ National Marine Fisheries Service	_____ Date

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- Appendix C Hunting and Fishing Procedures and Regulations
- Appendix D Interagency Correspondence
- Appendix E NEPA Instruction

List of Acronyms and Abbreviations

°C	Degrees Celsius
°F	Degrees Fahrenheit
AICUZ	Air Installation Compatible Use Zone
AOO	Air Operations Officer
ABB	Applied Biology Branch
APHIS	USDA Animal, Plant Health Inspection Service
APZ	Accident Potential Zone
BASH	Bird/Aircraft Strike Hazard
BHWG	Bird Hazard Working Group
BMPs	best management practices
BOQ	Bachelor Officers' Quarters
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CATEX	Categorical Exclusion
CCCL	Coastal Construction Control Line
CCDP	Conservation Career Development Program
CFR	Code of Federal Regulations
CMP	Clean Marina Program
CNO	Chief of Naval Operations
CO	Commanding Officer
COMNAVREG	Command Naval Region
CWA	Clean Water Act
CWAP	Clean Water Action Plan
CZMA	Coastal Zone Management Act
DDJF	Defense Distribution Depot Jacksonville Florida
DoD	United States Department of Defense
DoD-PARC	Department of Defense Partners in Amphibian and Reptile Conservation
DoN	United States Department of the Navy
DOT	Department of Transportation
E & E	Ecology and Environment, Inc.
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
EPA	United States Environmental Protection Agency
ES&P	Environmental Services and Permitting, Inc.
ESA	Endangered Species Act
ESQD	Explosive Safety Quantity Distance
et seq	"and the following sections" (a legal denotation)
FACSFAC	Fleet Area Control and Surveillance Facility
FCMP	Florida Coastal Management Program
FDACS	Florida Department of Agriculture and Consumer Affairs

FDEP	Florida Department of Environmental Protection
FEMA	Federal Emergency Management Agency
FFS	Florida Forest Service
FWC	Florida Fish and Wildlife Conservation Commission
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FLEPPC	Florida Exotic Pest Plant Council
FMC	Fisheries Management Council
FMIS	Forest Management Information System
FONSI	Finding of No Significant Impact
FNAI	Florida Natural Areas Inventory
FY	Fiscal Year
GIS	Geographic Information Systems
GPS	Global Positioning System
GSRC	Gulf South Research Corporation
INRMP	Integrated Natural Resources Management Plan
IPM	Integrated Pest Management
IR	Installation Restoration
IWI	Index of Watershed Indicators
JLUS	Joint Land Use Study
LSJRB	Lower St. Johns River Basin
MBTA	Migratory Bird Treaty Act
MOU	memorandum of understanding
MMSG	Marine Resources Support Group
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act of 1996
msl	Mean Sea Level
MWR	Morale, Welfare and Recreation
NAAQS	National Ambient Air Quality Standard
NAMTRAGRU	Naval Maintenance Training Group
NAS	Naval Air Station
NAS JAX Complex	Naval Air Station Jacksonville Complex
NAT	Navy Aviation Trades
NATO	North Atlantic Treaty Organization
NATTC	Naval Air Technical Training Center
NAVAVNDEPOT	Naval Aviation Depot
NAVCOMSTELSTA	Naval Telecommunications and Computers Station
NAVFAC	Naval Facilities Engineering Command
NAVFAC, SE	Naval Facilities Engineering Command, Southeast
NEPA	National Environmental Policy Act
NGO	Non-Government Organization
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NO ₂	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	USDA Natural Resources Conservation Service
NRM	Natural Resources Manager
NRP	Natural Resources Plan
NS	Naval Station
NWCG	National Wildfire Coordination Group

NWI	National Wetland Inventory
O ₃	ozone
O&M	operations and maintenance
OLF	Outlying Landing Field
OPAREA	Operating Area
OPNAVINST	Chief of Naval Operations Instruction
OSD	Office of the Secretary of Defense
OTJ	on the job
PIF	Partners in Flight
PM10	Particulate Matter less than 10 microns
PMP	Pest Management Plan
PWD JAX	Naval Public Works Department Jacksonville
PWO	Public Works Officer
ROICC	Resident Officer in Charge of Construction and Contracts
RTE	Rare, Threatened, and Endangered Species
SAFMC	South Atlantic Fishery Management Council
SAIA	Sikes Act Improvement Act
SCA	Student Conservation Association, Inc.
SJRWMD	St. Johns River Water Management District
SO ₂	sulfur dioxide
SUP	Special Use Permit
SWM	Stormwater Manager
SWPPP	Stormwater Pollution Prevention Plan
TNC	The Nature Conservancy
TSI	Timber Stand Improvement
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFS	USDA Forest Service
USFWS	United States Fish and Wildlife Service
WRAP	Wetlands Rapid Assessment Program

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Executive Summary

ES.1 TYPE OF DOCUMENT

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

ES.2 PURPOSE OF DOCUMENT

The purpose of this document is to meet statutory requirements under the Sikes Act Improvement Act (SAIA), Public Law 105-85, Div. B. Title XXIX, Nov. 18, 1997, 111 Stat 2017-2019, 2020-2022. In November 1997, the Sikes Act, 16 U.S.C. § 670a et seq., was amended to require the Secretary of Defense to carry out a program to provide for the conservation and rehabilitation of natural resources on military Installations. To facilitate this program, the amendments require the Secretaries of the military departments to prepare and implement integrated natural resources management plans for each military Installation in the United States unless the absence of significant natural resources on a particular Installation makes preparation of a plan for the Installation inappropriate. The SAIA mandated that these military Installations prepare and implement their INRMPs by 17 November 2001. The United States Department of the Navy (DoN) has prepared this INRMP for the Naval Air Station Jacksonville (NAS JAX) Complex, Jacksonville, Florida.

ES.3 GOALS AND OBJECTIVES OF THE INRMP

The goal of the INRMP is to implement an ecosystem-based conservation program that provides for conservation and rehabilitation of natural resources in a manner consistent with the military mission, integrates and coordinates all natural resources, provides for sustainable multipurpose uses of natural resources, and provides public access for use of natural resources subject to safety and military security considerations. This INRMP will be reviewed annually. Five Complex-wide ecosystem management goals and associated objectives have been identified for the NAS JAX Complex.

Goal 1: Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission.

Objective 1.1: Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality.

Objective 1.2: Reduce and control noxious, invasive, and exotic species.

- Objective 1.3: Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain.
- Objective 1.4: Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized.
- Objective 1.5: Implement environmentally beneficial landscaping, grounds maintenance.
- Goal 2: Protect and enhance forest resources by practicing ecologically-sound forest management leading to sustained yield of quality forest products, watershed protection, and wildlife habitat.
- Objective 2.1: Practice the ecosystem management concept for sustained yield of forest products and forest health.
- Objective 2.2: Manage forests in an ecologically sound way to provide habitat for wildlife.
- Objective 2.3: Manage forest stands for watershed protection.
- Goal 3: Protect, maintain, and restore native vegetative communities for plant and animal life, while improving the quality of life and ensuring the continuation of the military mission.
- Objective 3.1: Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including federally-listed and state-listed species.
- Objective 3.2: Preserve and protect threatened and endangered species and species of special concern to ensure no reduction in population sizes.
- Objective 3.3: Control nuisance wildlife and wildlife diseases that may adversely affect human health and welfare, the health of the ecosystem, and the military mission.
- Goal 4: Provide facilities and develop policies that allow for recreational and educational uses of natural resources, and result in positive effects to these natural resources while improving the quality of life.
- Objective 4.1: Maintain existing and develop additional outdoor recreational trails, interpretive centers, and/or facilities to support present and future natural resources-based outdoor recreation at the NAS JAX Complex.
- Objective 4.2: Implement existing and further develop (where needed) natural resources-based outdoor recreation programs to support present and future outdoor recreation at the NAS JAX Complex.
- Goal 5: Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management.
- Objective 5.1: Provide adequate staffing, equipment, technology, and training for the Natural Resources Program to ensure proper implementation of this INRMP.

- Objective 5.2: Incorporate the concept of ecosystem management into all planning and management processes.
- Objective 5.3: Implement training, education, and stewardship initiatives for ecosystem management.
- Objective 5.4: Establish a planning team to review and update the INRMP in accordance with Chief of Naval Operations Instruction (OPNAVINST) 5090.1D, Chapter 12, part 3.4, paragraph c(4)(e).

ES.4 PROPERTIES INCLUDED IN THE INRMP

The NAS JAX Complex consists of four properties, all of which fall under the auspices of this INRMP. These properties are NAS Jacksonville, OLF Whitehouse, Rodman Bomb Target, and Yellow Water (Figure 1-1). NAS Jacksonville (3,816 acres) is located in Duval County approximately 8 miles south of downtown Jacksonville on the east and west sides of U.S. Highway 17; it is situated on the peninsula between the St. Johns and Ortega rivers (Figure 2-1). OLF Whitehouse (1,931 acres) is also located in Duval County, approximately 10 miles west of downtown Jacksonville at the end of Halsema Road; it consists of both Navy-owned and easement lands (Figure 2-2). Rodman Bomb Target (2,696 acres) is located at the southern edge of central Putnam County, approximately 10 miles south of the city of Palatka (Figure 2-3). Yellow Water (165 acres) is located in Duval County south of Interstate 10 and north of Normandy Boulevard/State Road 228 (Figure 2-4).

The Navy has also been issued a 20-year special use permit by the U.S. Forest Service (USFS) for the continued use of a 5,895-acre impact range in the Ocala National Forest from 2002 to 2022. This range is called the Pinecastle Range; it is covered under a separate INRMP prepared by the USFS for the Ocala National Forest. The USFS is required to regularly monitor endangered and threatened species on the Range in accordance with the record of decision issued for its environmental impact statement. In accordance with a special use permit (SUP) for use of the Pinecastle Range, the Navy assumes these monitoring duties due to USFS manpower reductions. Fleet Area Control and Surveillance Facility (FACSFAC) secures the necessary funding for this monitoring and it is overseen by the natural resources staff at the NAS JAX Complex. The results are submitted to the USFS for implementation into their INRMP.

ES.5 SPECIES MANAGEMENT

The natural resource actions described in this INRMP are for the benefit of the plants, animals, and ecosystems occurring on the complex. Special attention is given to rare, threatened, and endangered (RTE) species, and their habitats, through management actions referenced in Table ES-1. These actions are long-term conservation measures that provide benefits for terrestrial and aquatic habitats on the installation. Management actions such as soil conservation

and storm water management, for example, control sediment and pollutant runoff to protect nearshore water quality for species such as manatees, shorebirds, and fish. Forestry actions such as prescribed burning, thinning, and reforestation help to establish longleaf pine stands and herbaceous low-lying vegetation that provide habitat and resources for gopher tortoises and fox squirrels, as another example.

Table ES-1. Habitat Management Actions at the NAS Jacksonville Complex	
Habitat Management Actions	Section
Wetland Management	5.1.1
Soil Conservation and Erosion Control	5.1.2
Stormwater and Water Quality Control	5.1.3
Floodplain Management	5.1.4
Landscaping and Grounds Maintenance	5.1.5
Invasive, Exotic, and Noxious Species	5.1.6
Urban Forestry	5.1.7
Land Impact Guidelines	5.1.8
Silvicultural Activities (i.e., Thinning, Prescribed Burns)	5.2.1
Forest Protection	5.2.2
Fisheries Management	5.3.1
Migratory Birds	5.3.2
Threatened and Endangered Species	5.3.3
Nuisance Wildlife and BASH	5.3.4

This INRMP includes goals, objectives, strategies, and projects for the benefit and long-term conservation of RTE species found, or potentially found, on the installation. Animal and plant species explicitly accounted for in the Threatened and Endangered Species Protection section of this INRMP (Section 5.3.3) are:

- American Alligator
- American Swallow-tailed Kite (bird)
- Atlantic Sturgeon (fish)
- Bachman’s Sparrow (bird)
- Bald Eagle
- Black Creek Crayfish
- Diverseleaf Crownbeard (plant)
- Eastern Indigo Snake
- Eastern Diamondback Rattlesnake
- Florida Manatee
- Gopher Frog
- Gopher Tortoise
- Great Egret (bird)
- Least Tern (bird)
- Little Blue Heron (bird)
- Loggerhead Shrike (bird)
- Monarch Butterfly
- Shortnose Sturgeon (fish)
- Snowy Egret (bird)
- Southeastern Myotis (bat)
- Pine Lily (plant)
- Southern Hog-nosed Snake
- Spotted Turtle
- White Ibis (bird)
- Wood Stork (bird)
- Yellow-Crowned Night Heron (bird)

ES.6 PROJECTS OF THE INRMP

The projects to be implemented by the NAS JAX Complex are shown in Table A-1 (Appendix A). Projects were identified by the NAS JAX Complex Natural Resources Manager (NRM) and the Navy Region NRM in consultation with foresters, fish and wildlife biologists, and soil conservationists with the Land Management Department of NAVFAC SE, as well as with federal, state, and county wildlife biologists, foresters, and land managers.

It is the intent of the NAS JAX Complex to implement the projects to the greatest extent possible. The implementation of projects is largely dependent upon availability of funds. Funding for implementation of the INRMP will come from the Installation, Commander Navy Installations (CNIC; Major Claimant), or NAVFAC natural resources fund sources. The natural resources programs and projects described here are divided into mandatory and stewardship categories to reflect implementation priorities. Every effort will be made to acquire O & M (N) Environmental, or other funding to implement DoD mandatory projects in the timeliest manner possible. Stewardship projects will be funded through forestry, fish and wildlife, Legacy, or other fund sources as funding and personnel resources become available. Table A-1 (Appendix A) summarizes the projects.

ES.7 MISSION SUSTAINABILITY

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

Table ES-2 provides a cross reference of the discussions presented in this INRMP and the April 2006 Navy Guidance for INRMPs. Sections that are not applicable for the NAS JAX Complex are also identified.

Table ES-2. Cross-Reference of Office of the Secretary of Defense (OSD) Format to Format Used in this INRMP

OSD 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	Chapter 1.0 – Introduction
1.a – Purpose	1.1 – Purpose and Organization
1.b – Scope	1.4 – Scope
1.c – Goals and Objectives Summary	1.5 – Goals and Objectives
1.d – Responsibilities of Stakeholders	1.3 – Responsibilities
1.e – Commitment of Regulatory Agencies	1.7 – Commitment of Regulatory Agencies
1.f – Authority	1.2 – Authority
1.g – Stewardship of Compliance Statement	1.6 – Stewardship and Compliance
1.h – Review and Revision Process	1.8 – Review and Revision Process
1.i – Management Strategies	1.9 – Management Strategies
1.j – Integration with other Plans	Not applicable
Chapter 2 – Current Conditions and Use	Chapter 2.0 – Current Conditions and Use
2.0 – Installation Information	2.1 – Installation Information
2.a.1 – Location Statement (concise)	2.1.1 – General Description
2.a.2 – Regional Land Use	2.1.6 – Regional Land Use
2.a.3 – History and Pre-Military Land Use (abbreviated)	2.1.5 – Abbreviated History and Pre-Military Land Use
2.a.4 – Military Mission (concise)	2.1.2 – Military Mission
2.a.5 – Operations and Activities	2.1.1 – General Description
2.a.6 – Constraints Map	2.1.3 – Constraints Map
2.a.7 – Opportunities Map	2.1.4 – Opportunities Map
2.b – General Physical Environment and Ecosystems	2.2 – General Physical Environment and Ecosystems
2.c – General Biotic Environment	2.3 – Biological Environment
2.c.1 – Threatened and Endangered Species and Species of Concern	2.3.2 – Rare, Threatened and Endangered Species
2.c.2 – Wetlands and Deep Water Habitats	2.2.5 – Hydrology and Water Quality
2.c.3 – Fauna	2.3.1 – Natural Communities
2.c.4 – Flora	2.3.1 – Natural Communities
Chapter 3 – Environmental Management Strategy and Mission Sustainability	Chapter 3.0 – Environmental Management Strategy and Mission Sustainability
3.a – Supporting Sustainability of the Military Mission and the Natural Environment	3.1 – Supporting Sustainability of the Military Mission and the Natural Environment
3.a.1 – Integrate Military Mission and Sustainability Land Use	3.1.1 – Military and Mission and Sustainable Land Use
3.a.2 – Define Impact to the Military Mission	3.1.2 – Defining Impact on the Military Mission

Table ES-2, continued

Table ES-2. Cross-Reference of Office of the Secretary of Defense (OSD) Format to Format Used in this INRMP	
OSD recommended INRMP format	Cross reference to required information in this document
3.a.3 – Describe Relationship to Range Complex Management Plan or other Operational Area Plans	3.1.3 – Relationship to the Jacksonville Range Complex Management Plans
3.b – Natural Resources Consultation Requirements (Section 7, EFH)	3.2 – Natural Resource Consultation Requirements
3.c – NEPA Compliance	3.3 – Planning for National Environmental Policy Act Compliance
3.d – Opportunities for Beneficial Partnerships and Collaborative Resource Planning	3.4 – Beneficial Partnerships and Collaborative Resource Planning
3.e – Public Access and Outreach	3.5 – Public Access and Outreach
3.e.1 – Public Access and Outdoor Recreation	3.5 – Public Access and Outreach
3.e.2 – Public Outreach	3.5 – Public Access and Outreach
3.e.3 – Encroachment Partnering	3.6 – Encroachment Partnering
3.e.4 – State Comprehensive Wildlife Plans (SCWP) Integration	3.7 – Florida’s State Wildlife Action Plan
Chapter 4 – Program Elements	Chapter 5.0 – Program Elements
4.a – Threatened and Endangered Species and Species Benefit, Critical Habitat, Species of Concern Management	5.3.3 –Threatened and Endangered Species
4.b – Wetlands and Deep Water Habitats	5.1.1 – Wetland Management
4.c – Law Enforcement	Not Applicable
4.d – Fish and Wildlife	5.3 – Fish and Wildlife
4.e – Forestry	5.2 – Forest Management
4.f – Vegetation	5.1.5 – Landscaping and Grounds Maintenance
4.g – Migratory Birds	5.3.2 – Migratory Birds
4.h – Invasive Species	5.1.7 – Invasive, Exotic, and Noxious Species
4.i – Pest Management	5.3.4 – Nuisance Wildlife and BASH
4.j – Land Management	5.1 – Land Management
4.k – Agricultural Outleasing	Not Applicable
4.l – GIS Management, Data Integration, Access, and Reporting	5.5.2 – Geographical Information Systems, Data Integration, and Reporting
4.m – Outdoor Recreation	5.4 – Outdoor Recreation
4.n – Bird Aircraft Strike Hazard	5.3.4 – Nuisance Wildlife and BASH
4.o – Wildland Fire	5.2.2 – Forest Protection
4.p – Training of Natural Resource Personnel	5.5.1 – Training of Natural Resource Personnel
4.q – Coastal/Marine	Not Applicable
4.r – Floodplains	5.1.4 – Floodplain Management
4.s – Other Leases	Not Applicable
Chapter 5 – Implementation	Chapter 6.0 – Implementation

Table 2, continued

Table ES-2. Cross-Reference of Office of the Secretary of Defense (OSD) Format to Format Used in this INRMP	
OSD recommended INRMP format	Cross reference to required information in this document
5.a – Summary of Project Prescription Development Process	Appendix A – NAS JAX Complex Projects
5.b – Achieving No Net Loss	3.1 – Supporting Sustainability of the Military Mission and the Natural Environment
5.c – Use of Cooperative Agreements	3.4 – Beneficial Partnerships and Collaborative Resource Planning
5.d – Funding Process	6.4 – Funding
Appendix 1. Acronyms	List of Acronyms
Appendix 2. Detailed Natural Resources Prescriptions	2.3. – Biological Environment
Appendix 3. List of Projects	Appendix A. NAS JAX Complex Projects
Appendix 4. Surveys: Results of Planning Level Surveys	2.3 – Biological Environment
Appendix 5. Research Requirements	Not Applicable
Appendix 6. Migratory Bird Management	5.3.2 – Migratory Birds
Appendix 7. Benefits for Endangered Species	5.3.3 – Threatened and Endangered Species
Appendix 8. Critical Habitat	2.3.2.1 – Critical Habitat

1

Introduction

1.1 PURPOSE AND ORGANIZATION

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

The primary purpose of the INRMP, in addition to meeting the statutory requirement, is to ensure natural resources conservation measures and military operations on the Naval Air Station Jacksonville Complex, Florida (NAS JAX Complex) are integrated and consistent with stewardship and legal requirements. This INRMP was developed to balance the use of resources on NAS JAX Complex utilizing an ecosystem management approach, taking into account mission requirements and other land use activities affecting the installation. This INRMP was prepared in cooperation with the United States Fish and Wildlife Service (USFWS) and Florida Fish and Wildlife Conservation Commission (FWC) to reflect mutual agreement on the fish and wildlife management aspects of the plan.

The United States Department of the Navy (DON) is updating this INRMP for the NAS JAX Complex to comply with the SAIA and with Department of Defense Instruction (DODINST 4715.3). This INRMP also complies with the Office of the Chief of Naval Operations Instruction (OPNAVINST) 5090.1D, Chapter 12, ASN (I&E) Memorandum of 12 August 1998, OUSD Memorandum of 21 September 1998, Chief of Naval Operations (CNO) Itr Ser N45D/8U589016 of 25 September 1998, and CNO letter Ser N456F/8U589129 of 30 November 1998.

The first three sections of this INRMP establish the existing conditions at the NAS JAX Complex. Section 1 provides a general overview of the purpose and intent of the INRMP and processes for review, implementation, and revision of the plan. Section 2 establishes the importance of the

military mission within the DON, discusses the organization of the NAS JAX Complex, provides a brief overview of the natural resources program, and identifies installation partnerships and stakeholders with a particular interest in the protection of installation and regional natural resources. Section 3 discusses the existing physical and biological characteristics of the local and regional environment. Physical characteristics include climate, topography, geology, soils, hydrology, groundwater, and land use. Biological characteristics include wetlands, wildlife, threatened and endangered species, coastal zone issues, and natural vegetative communities.

The remaining sections of the INRMP identify issues pertaining to the long-term management of the Complex ecosystem and land management programs and practices for achieving desired conditions. Section 4 discusses ecosystem management goals, objectives, strategies, initiatives, and projects that comprise a logical sequence of actions for achieving the long-range aim of ecosystem management. Section 5 discusses ecosystem management at the NAS JAX Complex. Appendix A describes the projects that will be implemented by the NAS JAX Complex. The NAS JAX Complex Forest Stand Information is provided as Appendix B. Appendix C contains NAS Jacksonville Instruction 5090.10H: Hunting and Fishing Procedures and Regulations, and Appendix D contains the interagency correspondences related to the preparation of this INRMP.

1.2 AUTHORITY

The NAS JAX Complex INRMP is written to meet the requirements of the SAIA of 1997 (16 U.S.C. § 670a et seq.), and the requirements of the DoD Environmental Conservation Program (DoDINST 4715.3). It also incorporates guidance given in OPNAVINST 5090.1D, the Navy Environmental Protection and Natural Resources Manual, and the NAVFAC Real Estate Procedural Manual (NAVFAC P-73).

1.3 RESPONSIBILITIES

The Commander, Navy Region Southeast (CNRSE) is responsible for ensuring the NAS JAX Complex INRMP complies with DoD, Navy, and CNO policy on the INRMP and associated National Environmental Policy Act (NEPA) document preparation, revision, and implementation; ensuring the NAS JAX Complex INRMP undergoes annual and formal 5-year reviews; ensuring the programming of resources necessary to maintain and implement the NAS JAX Complex INRMP; and participating in the development and revision of the NAS JAX Complex INRMP.

The NAS JAX Complex Commanding Officer (CO) is responsible for the preparation, completion, and implementation of this INRMP and associated NEPA documents for the NAS JAX Complex and systematically applying the conservation practices set forth in this INRMP. The CO's role is to act as the steward of natural resources under his or her jurisdiction and integrate natural

resources management requirements into the daily decision making process; ensure natural resources management and this INRMP comply with all natural resource-related legislation, Executive Orders (EO) and Executive Memorandums, and DoD, Secretary of the Navy (SECNAV), Navy, and CNO directives, instructions and policies; involve appropriate tenant, operational, training, or research and development (R&D) commands in the INRMP review process to ensure no net loss of military mission; designating a Natural Resources Manager (NRM) that is responsible for the management efforts related to the preparation, revision, implementation and funding for this INRMP, as well as coordination with installation trainers, subordinate commands and installations; involve appropriate Navy Judge Advocate General (JAG) or Office of the General Counsel (OGC) Legal Counsel to provide advice and counsel with respect to legal matters related to natural resources management and this INRMP; and, endorse this INRMP via CO signature.

1.4 SCOPE

The NAS JAX Complex is spread across four properties in northeastern Florida – NAS Jacksonville, Outlying Landing Field (OLF) Whitehouse, Rodman Bomb Target, and Yellow Water (Figure 1-1) – all of which fall under the scope of this INRMP. The Complex is associated with the St. Johns River watershed. This INRMP creates the framework for the implementation of a natural resources management program to conserve and rehabilitate natural resources across the entire NAS JAX Complex. Appropriate and effective management of natural resources on Navy lands will be achieved in accordance with the principles and practices of ecosystem management. Ecosystem management initiatives include the following steps, which do not necessarily take place in a particular sequence and often occur in parallel with each other and can be repeated as the process evolves:

- Recognizing and defining the problems or opportunities;
- Delineating boundaries;
- Identifying and involving participants;
- Establishing a common vision;
- Assessing ecological, economical, and social constraints and opportunities;
- Acquiring funding;
- Making decisions and implementing solutions; and
- Monitoring progress, evaluating impacts, and adapting based on new information (The Keystone Center, 1996).

The INRMP does not substitute for a pest management plan, hazardous waste plan, or stormwater retention plan. It has the dual purpose of complying with various natural resources related laws while supporting the military mission of the NAS JAX Complex.

1.5 GOALS AND OBJECTIVES

The development and implementation of the INRMP is a dynamic, multidisciplinary planning process that incorporates as its primary goal supporting and sustaining the military mission while managing, protecting, and enhancing the biological integrity of military lands and waters. The military's use of land and water resources must comply with legal mandates and will, to the extent practicable, be integrated with ecosystem-level goals, plans, and use of lands and waters inside and outside the boundaries of military installations. The INRMP creates an ecosystem-based conservation program that provides for conservation and rehabilitation of natural resources in a manner that is consistent with the military mission, integrates and coordinates all natural resources management activities, provides for sustainable multipurpose uses of natural resources; and provides for military personnel access for use of natural resources subject to safety and military security considerations. The management objectives are to integrate wetland management, soil conservation, water quality control, floodplain management, grounds maintenance, land management, forest management, wildland fire management, vegetative management, fish and wildlife management, migratory bird management, and management for outdoor recreational opportunities, as practicable and consistent with the military mission and established land uses. Specific goals and objectives are discussed in detail in Section 4.

The NAS JAX Complex Mission Statement and Environmental Policy Statement provide the standard by which to measure the effects and effectiveness of INRMP decisions:

Mission Statement

“NAS Jacksonville sustains, enables and supports warfighter readiness.”

Environmental Policy Statement

“The mission of Naval Air Station Jacksonville is to sustain, enable, and support the Fleet, Fighter, and Family. In support of this mission, Naval Air Station Jacksonville will implement programs that ensure environmental compliance with legal regulations, prevent pollution, sustain natural and cultural resources, and promote continual improvement of the station environmental management system through its objectives and targets.”

The primary mission of the NAS JAX Complex is to provide support to naval air training, tenants, and other customers through continuous improvement in quality of life, workforce, environment, and public image. The mission of the Navy's natural resources program is to support the Navy

mission through responsible stewardship of the Complex's natural resources utilizing integrated natural resources management and principles of ecosystem management to ensure ecosystem viability and biodiversity. The primary goal of the INRMP is to restore, develop, and maintain balanced ecosystems supporting the DON mission in an appropriate, sustainable, multiple-use environment. This goal is accomplished through a combination of careful planning and implementation of management prescriptions.

1.6 STEWARDSHIP AND COMPLIANCE

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

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

Funding for implementation of the INRMP will come from the installation, CNIC, and NAVFAC natural resources stewardship. The natural resources programs and projects described in this INRMP are divided into stewardship and mandatory categories to reflect implementation priorities. Stewardship projects will be funded through forestry, fish and wildlife, Legacy, installation funds, and other fund sources as funding and personnel resources become available. Every effort will be made to fund mandatory projects through Navy Operations and Maintenance (O & M [N]) Environmental.

1.7 COMMITMENT OF REGULATORY AGENCIES

The USFWS and FWC are integral parts of the INRMP development, review, and revision process for the NAS JAX Complex, under a cooperative agreement with the DON, as outlined in the Sikes Act. The USFWS and FWC cooperate in the development of the INRMP and participate in the annual reviews and revisions, as well as the formal 5-year review of the NAS JAX Complex INRMP.

Other government agencies outside the DON that have provided technical support to natural resources management at the NAS JAX Complex include The Nature Conservancy (TNC), with which the DON also has a cooperative agreement, the United States Department of Agriculture

(USDA) Natural Resources Conservation Service (NRCS), United States Forest Service (USFS), Florida Department of Agriculture and Consumer Services (FDACS), Florida Forestry Service, Florida Department of Environment Protection (FDEP), and Duval County land management professionals.

Table 1-1. Legal Drivers for Natural Resources Management	
Name/Description	Citation
Addresses off-road vehicle use	Executive Order 12608
Bald Eagle Protection Act of 1940	16 U.S.C. 668
Clean Air Act	42 U.S.C. 7401
Clean Water Act	33 U.S.C. 1251, 33 USC 1341
Coastal Zone Management Act	16 U.S.C. 1456
Endangered Species Act	16 U.S.C. 1531 & 1536
Environmental Conservation Program	DODINST 4715.3
Erosion Protection Act	33 U.S.C. 426
Estuary Protection Act of 1968	16 U.S.C. 1221
Farm Land Protection Policy	7 CFR 658
Farmland Protection Policy Act of 1981	7 U.S.C. 4201
Federal Insecticide, Fungicide, and Rodenticide Act	7 U.S.C. 136
Federal Land Policy and Management Act of 1976	43 U.S.C. 1701
Federal Leadership in Environmental, Energy, and Economic Performance	Executive Order 13514
Federal Noxious Weed Act of 1974	7 U.S.C. 2801
Federal Pest Plant Act	7 U.S.C. 150
Fish and Wildlife Conservation Act	16 U.S.C. 2901
Fish and Wildlife Coordination Act, as amended	16 U.S.C. 661-666c
Floodplain Management	Executive Order 11988
Greening the Government through Environmental Management	Executive Order 13148
Invasive Species	Executive Order 13112
Magnuson-Stevens Fisheries Conservation and Management Act, as amended	Public Law 94-265
Management of Undesirable Plants of Federal lands	7 U.S.C. 2814
Marine Mammal Protection Act of 1972	16 U.S.C. 1361
Migratory Bird Treaty Act	16 U.S.C. 703
Military Construction and Authorization Act – Leases, Non-excess property	10 U.S.C. 2667
Military Reservations and Facilities – Hunting, Fishing, and Trapping	10 U.S.C. 2671
Multiple-Use Sustained Yield Act of 1960	16 U.S.C. 528
National Environmental Policy Act of 1969	42 U.S.C. 4321
Natural Resources Management Program	32 CFR 190
North American Wetland Conservation Act	16 U.S.C. 2912, 4401, 4808

Table 1-1, continued

Table 1-1. Legal Drivers for Natural Resources Management	
Name/Description	Citation
Outdoor Recreation – Federal/State Program Act	16 U.S.C. 460 P-3
Protection and Enhancement of Environmental Quality	Executive Order 11514
Protection of Wetlands	Executive Order 11990
Recreational Fisheries	Executive Order 12962
Rivers and Harbors Act of 1899	33 U.S.C. 401
Sikes Act Improvement Act of 1997	16 U.S.C. 670
Soil and Water Conservation Act of 1977	16 U.S.C. 2001
Soil Conservation Act	16 U.S.C. 590
Timber Sales on Military Lands	10 U.S.C. 2665
Use of Off-Road Vehicles on DoD Lands	Executive Order 11989
Water Resources Planning Act	42 U.S.C. 1962
Watershed Protection and Flood Prevention Act	16 U.S.C. 1001, 33 USC 701

1.8 REVIEW AND REVISION PROCESS

The NAS JAX Complex must complete an evaluation of the effectiveness of this INRMP annually. The evaluation can be readily completed using the web-based Metrics Builder tool provided under the Environmental Management Systems (EMS). The Metrics Builder provides the means to evaluate performance in seven areas:

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

Annual reviews of the NAS JAX Complex INRMP will include annual revisions so the review and revision processes are integrated.

1.9 MANAGEMENT STRATEGIES

The DoD takes an ecosystem approach to natural resources management. Ecosystem management is a goal-driven approach to managing natural resources that support present and future mission requirements, preserves ecosystem integrity, is at a scale compatible with natural processes, is cognizant of nature's time frames, recognizes social and economic viability within

functioning ecosystems, is adaptable to complex and changing requirements, and is realized through effective partnerships among private, local, state, tribal, and Federal interests. Ecosystem management is a process that considers the environment as a complex system functioning as a whole, not as a collection of parts, and recognizes that people and their social and economic needs are a part of the whole. The INRMP and the implementation of its management plans and projects provides for ecosystem management at NAS JAX Complex. The INRMP takes into account specific projects and management techniques that serve to manage the ecosystem and maintain biological diversity at a landscape scale.

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

The NAS JAX Complex manages its natural resources cooperatively with government agencies that provide recommendations for responsible resource stewardship. In cooperative management, representatives of government agencies share information and resources. At the NAS JAX Complex, the USFWS, FWC, and Navy cooperate to meet the military mission while conserving and enhancing the natural resources of the Complex.

Ecosystem-based management and cooperative natural resources management are holistic strategies that benefit individual species in the ecosystem, most notably federally-listed and state-listed threatened and endangered species. The DoD is obligated to comply with the Endangered Species Act of 1973 (ESA), and federally-listed species on the NAS JAX Complex receive full protection under the ESA, enhanced by the Complex's effective cooperative relationship with the regulatory agencies. Ecosystem management protects and enhances habitats for listed species. Management actions such as erosion control and stormwater management, for example, control sedimentation and pollution runoff to adjacent rivers, protecting water quality for the endangered shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrinchus*). Forestry actions such as prescribed burning, thinning, and reforestation help maintain longleaf pine stands and herbaceous vegetation that provide habitat and resources for gopher tortoises (*Gopherus polyphemus*), as another example.

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2

Current Conditions and Use

2.1 INSTALLATION INFORMATION

2.1.1 General Description

The NAS JAX Complex consists of four properties, all of which fall under the auspices of this INRMP. These properties are NAS Jacksonville, OLF Whitehouse, Rodman Bomb Target, and Yellow Water. NAS Jacksonville (3,816 acres) is located in Duval County approximately 8 miles south of downtown Jacksonville on the east and west sides of U.S. Highway 17; it is situated on the peninsula between the St. Johns and Ortega rivers (Figure 2-1). OLF Whitehouse (1,931 acres) is also located in Duval County, approximately 10 miles west of downtown Jacksonville at the end of Halsema Road; it consists of both Navy-owned and easement lands (Figure 2-2). Rodman Bomb Target (2,696 acres) is located at the southern edge of central Putnam County, approximately 10 miles south of the city of Palatka (Figure 2-3). Yellow Water (165 acres) is located in Duval County south of Interstate 10 and north of Normandy Boulevard/State Road 228 (Figure 2-4).

The Navy has also been issued a 20-year special use permit by the USFS for the continued use of a 5,895-acre impact range in the Ocala National Forest from 2002 to 2022. This range is called the Pinecastle Range; it is covered under a separate INRMP prepared by the USFS for the Ocala National Forest. The USFS is required to regularly monitor endangered and threatened species on the Range in accordance with the record of decision issued for its environmental impact statement. In accordance with a SUP for use of the Pinecastle Range, the Navy assumes these monitoring duties due to USFS manpower reductions. FACSFAC secures the necessary funding for this monitoring and it is overseen by the natural resources staff at the NAS JAX Complex. The results are submitted to the USFS for implementation into their INRMP.



Figure 2-1. NAS Jacksonville, Duval County, Florida. NAS Jacksonville owns Tillie K. Fowler State Park.

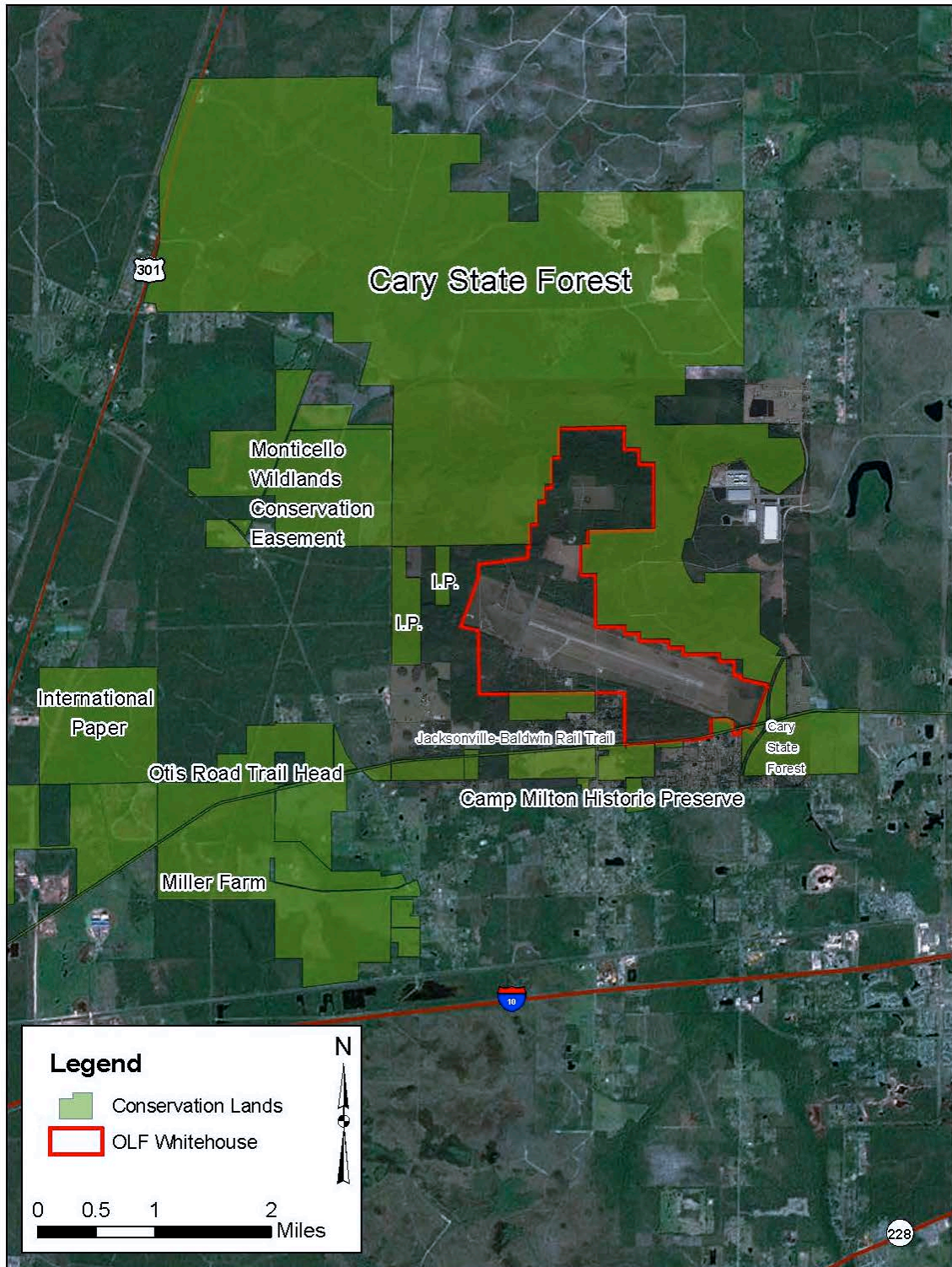


Figure 2-2. OLF Whitehouse, Duval County, Florida.

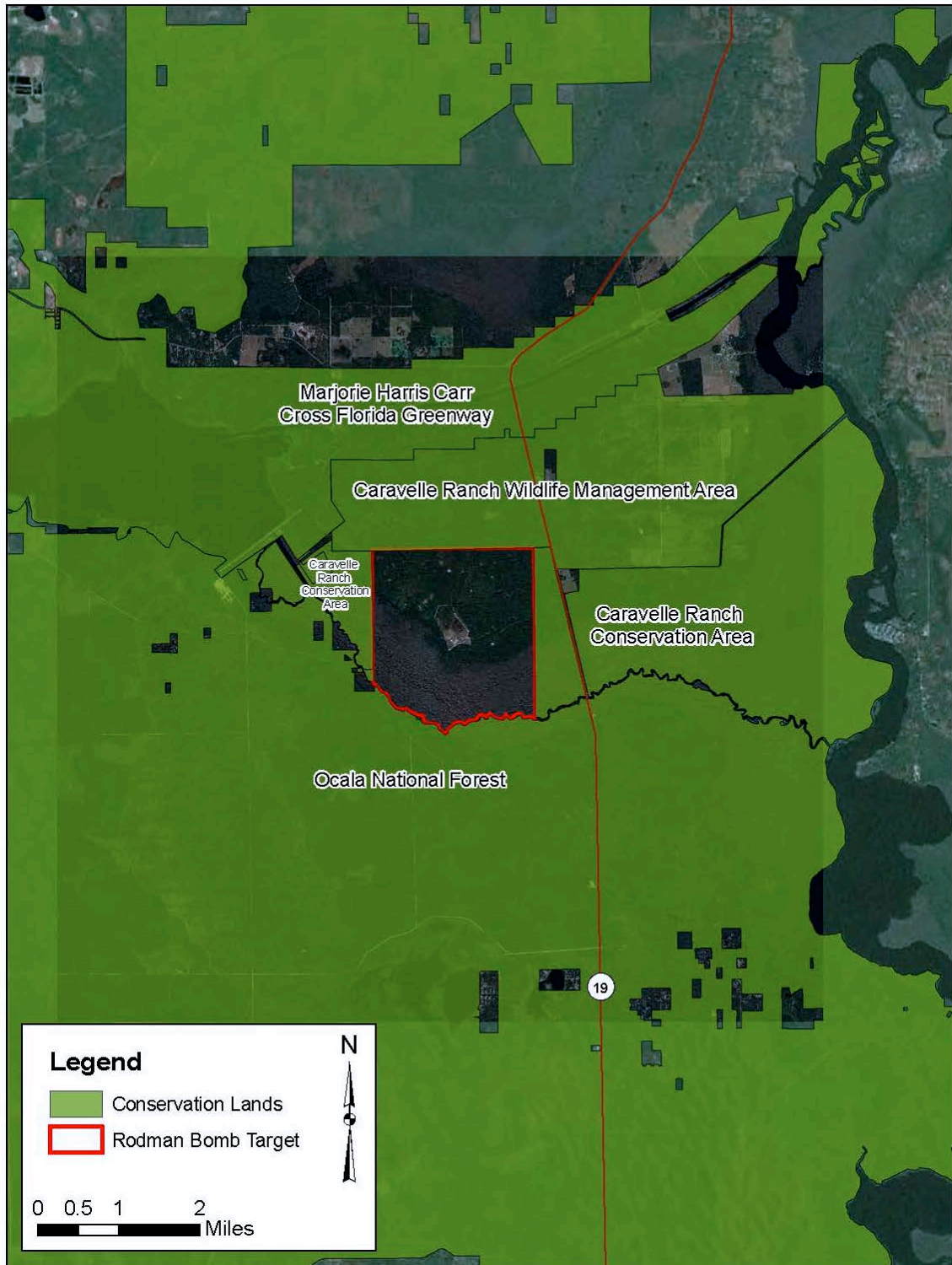


Figure 2-3. Rodman Bomb Target, Putnam County, Florida.

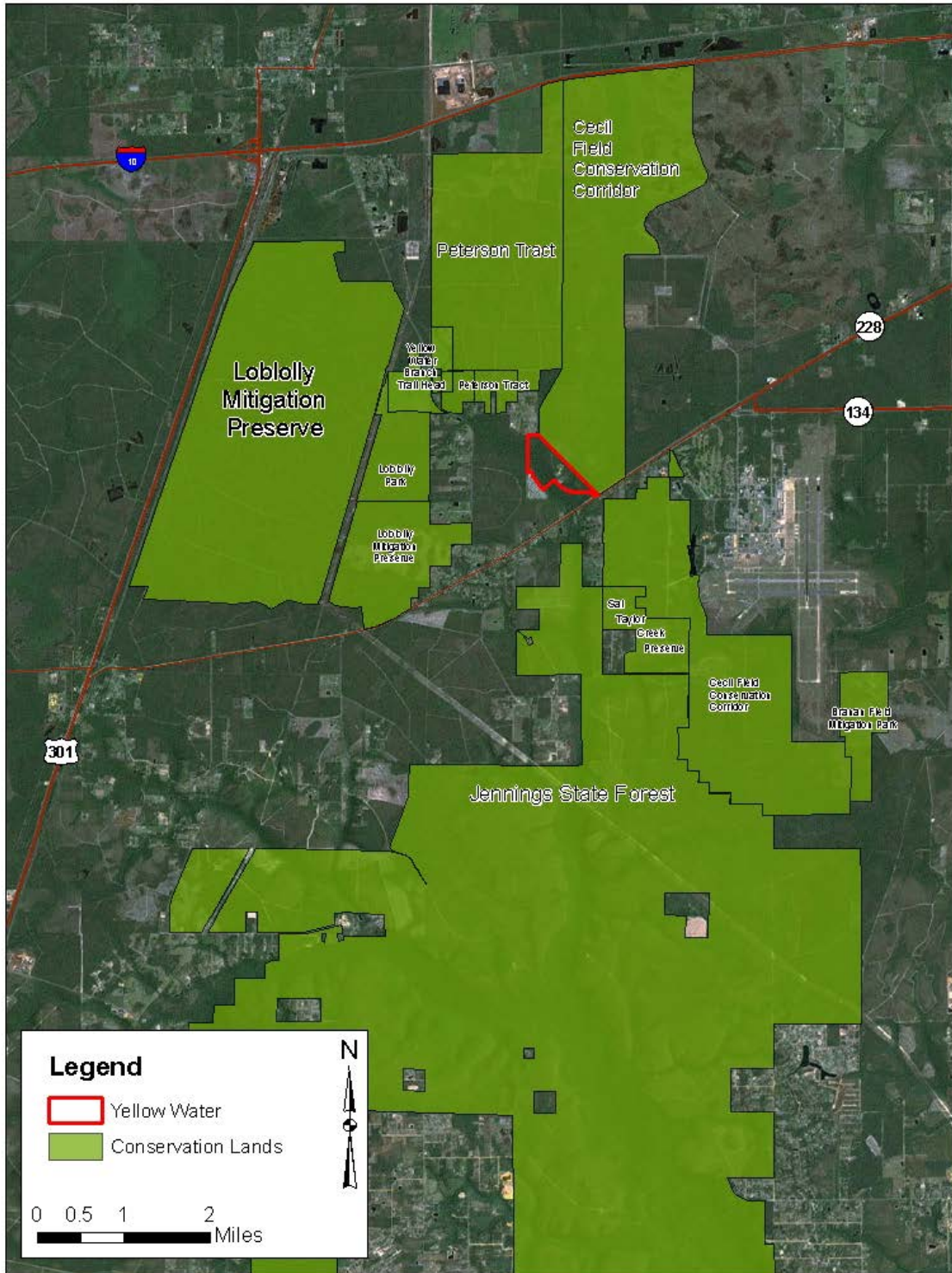


Figure 2-4. Yellow Water, Duval County, Florida.

2.1.2 Military Mission

The NAS JAX Complex Mission Statement and Environmental Policy Statement provide the standard by which to measure the effects and effectiveness of INRMP decisions:

Mission Statement

“NAS Jacksonville sustains, enables and supports warfighter readiness.”

Environmental Policy Statement

“The mission of Naval Air Station Jacksonville is to sustain, enable, and support the Fleet, Fighter, and Family. In support of this mission, Naval Air Station Jacksonville will implement programs that ensure environmental compliance with legal regulations, prevent pollution, sustain natural and cultural resources, and promote continual improvement of the station environmental management system through its objectives and targets.”

The NAS JAX Complex is a multi-mission base hosting more than 100 tenant commands. The Complex is home to long-range anti-submarine reconnaissance and maritime patrol aircraft. In addition to the many operational squadrons flying P-3, P-8, C-12, and C-9 aircraft and SH-60F helicopters, NAS Jacksonville is home to Patrol Squadron Thirty (VP-30), the Navy's largest aviation squadron and the only “Orion” Fleet Replacement Squadron that prepares and trains United States and foreign pilots, air crew, and maintenance personnel for further operational assignments. Vital to national defense, the NAS JAX Complex continues to support the fleet including two airfields for pilot training, a bomb target, maintenance depot, Naval Hospital, Fleet Industrial Supply Center, Navy Family Service Center, and recreational facilities.

The Naval Aviation Depot (NAVAVNDEPOT) is an industrial facility that provides depot-level aircraft maintenance and is the region's largest civilian employer. The mission of the Naval Aviation Depot, Jacksonville, is to provide a full range of high quality maintenance, engineering, logistic, and support services to the Fleet at a competitive price.

The Naval Maintenance Training Group (NAMTRAGRU) provides technical training to officers and enlisted personnel in the operation, maintenance, and repair of aircraft and associated equipment.

Naval Public Works Department Jacksonville (PWD JAX) is responsible for the delivery of Public Works services to DoN and other DoD activities in the Jacksonville, Florida, area. PWD JAX services include facilities maintenance and repair, utilities operations and maintenance, transportation, professional services such as environmental services and engineering design and consultation, and facility services such as grounds maintenance, custodial, and refuse collection.

Naval Air Reserve Jacksonville is comprised of Naval Air Reserve Force squadrons, detachments, and augmentation units assigned to the Naval Air Reserve Jacksonville. Activities are assisted by a staff of active military and civilian specialists who provide training, fiscal, administrative, medical, public affairs, and information systems support to drilling reservists and fleet customers on a daily basis.

The Naval Telecommunications and Computers Station (NAVCOMSTELSTA) is a major hub of the Naval Telecommunications System, which provides direct support to all Navy and Marine Corps commands in the southeastern United States.

The Defense Distribution Depot, Jacksonville, Florida (DDJF) plans, programs, and manages the efficient receipt, storage, inventory, packaging, and distribution of assigned materials.

Commander, Navy Region Southeast (COMNAVREG Southeast) is a one-star admiral who serves as one of three Navy regional coordinators on the East Coast, setting policy and providing the leadership and continuity necessary to sustain the highest-quality combat-ready force. COMNAVREG Southeast leads the combined efforts of 14 commands and activities, which support the operational fleet units in the southeastern United States and the Caribbean.

2.1.3 Constraints Map

The future expansion of properties at the NAS JAX Complex would be limited or impractical, depending upon the property (see Figures 2-1 to 2-4).

NAS Jacksonville is bordered by the St. Johns River to the east, I-295 to the south, the Ortega River to the west, and suburban development to the north. OLF Whitehouse abuts suburban development to the south and east, but largely undeveloped land borders the property to the west and north. The area surrounding Yellow Water is largely undeveloped with only small scattered neighborhoods in the vicinity. Rodman Bomb Target is bordered by conservation lands with Ocala National Park on the south and Caravelle Ranch on the other three sides.

2.1.4 Opportunities Map

The NAS JAX Complex is considered by the Florida Natural Areas Inventory (FNAI) to be Conservation Lands. Other entities whose holdings constitute Conservation Lands near and adjacent to the NAS JAX Complex include the Ocala National Park and Caravelle Ranch, both adjacent to Rodman Bomb Target. The Nature Conservancy is another potential partner to help prevent encroachment at OLF Whitehouse and Yellow Water.

The Yellow Water Natural and Recreation Corridor, adjacent to the Yellow Water, was established through a Memorandum of Understanding (MOU) with the St Johns River Water Management District (SJRWMD), Clay County, Jacksonville Port Authority and the FDEP. The MOU established the corridor to serve as mitigation to offset adverse impacts to natural resources, fish and wildlife, and wetland functions for other areas to be developed at the former NAS Cecil Field. Permitted activities within the corridor include conservation, passive resource based recreation, and forestry management. The corridor is managed uniformly as an integrated wetland and upland system under a cooperative agreement between appropriate local and state agencies. Management may include harvesting of upland forest products under a long-term rotation plan.

2.1.5 Abbreviated History and Pre-Military Land Use

NAS Jacksonville was commissioned in 1940 on the west bank of the St. John's River, 8 miles south of downtown. Prior to that, the area was a riverside wetland area; most industry and housing in the city was situated downtown and local agriculture was on higher ground. Jacksonville had long been an important port city and Florida's major hub of commerce, connecting the Atlantic shipping lanes to railroad lines from New Orleans, South Florida, and the southern Atlantic seaboard.

The city underwent a major developmental transformation after 1901 when a fire engulfed the entire downtown area, burning more than 2,300 buildings to the ground. From the ruins rose a modern skyline of concrete and stone, new houses, paved roads, bridges, and an economic resurgence born from businesses relocating to a city with fresh amenities.

Camp Joseph E. Johnston was commissioned on a portion of the current location of NAS Jacksonville during World War I to train quartermasters. It was decommissioned after the war. The Florida National Guard began using the site in 1928 and it was renamed Camp J. Clifford R. Foster. In 1938, during the early stages of World War II, planning began for NAS Jacksonville with the purpose of providing seaplane support, pilot training facilities, and a Navy Aviation Trades (NAT) school. Duval County officials donated the land at Black Point on the west side of the St. Johns River for base construction. Additional land was obtained by filling the marshes along the St. John's River at the northeast corner of the property.

NAS Jacksonville was commissioned on 15 October 1940, and, by the time the United States entered World War II in December of the following year, construction was underway to more than double the size of the NAT School to provide Marine Corps training. Advanced fighter pilot training became the main focus of NAS Jacksonville in 1942; by the end of World War II, the principle functions of NAS Jacksonville were providing aviation training and aircraft repairs.

The Chief of Naval Aviation Training (CNAVANTRA) and all training facilities were transferred to NAS Corpus Christi, Texas, in 1948, allowing NAS Jacksonville to return to its originally planned role as support for operational fleet squadrons and it is at the forefront of antisubmarine warfare readiness to this day.

NAS Jacksonville increased its land holdings in 1998 to include OLF Whitehouse, Rodman Bomb Target, and Yellow Water. The OLF Whitehouse and Rodman Bomb Target properties support NAS Jacksonville by providing opportunities for participation in flight training exercises.

Today, more than 25,000 civilian and active-duty personnel are employed on the NAS JAX Complex. The Complex is a hub for naval activity in the southern United States. Other United States Navy Bases in the area include Naval Station Mayport, Naval Submarine Base Kings Bay in Camden County, Georgia, Naval Outlying Landing Field Whitehouse (just north of the former NAS Cecil Field) and the Pinecastle Range Complex stretching from just south of Camp Blanding to the southern border of the Ocala National Forest.

The BRAC-directed closure of NAS Brunswick, Maine in mid-2011, caused Patrol Squadron EIGHT (VP-8), Patrol Squadron TEN (VP-10), Patrol Squadron Twenty-Six (VP-26), Special Projects Patrol Squadron ONE (VPU-1) and Fleet Logistics Support Squadron Sixty-Two (VR-62) to be relocated to NAS Jacksonville in 2007.

In addition to the many operational active and reserve squadrons aboard, the NAS JAX Complex is also home to Patrol Squadron Thirty (VP-30), the Navy's largest aviation squadron and the only P-3 Orion Fleet Replacement Squadron that prepares and trains U.S. and NATO/Allied pilots, air crew and maintenance personnel for further operational assignments in the P-3C Orion and EP-3E Aries in the U.S. Navy, and P-3B, P-3C and similar variants in various NATO and Allied navies and air forces. VP-30 will also be the first squadron to operate the U.S. Navy's new P-8 Poseidon aircraft, training flight crews and maintainers as all U.S. Navy patrol squadrons eventually transition to this new platform. NAS Jacksonville is also an Aviation Maintenance training facility for several aviation rates, facilitated by Center for Naval Aviation Technical Training Unit Jacksonville.

Support facilities include a maintenance depot employing more than 150 different trade skills capable of performing maintenance as basic as changing a tire to intricate micro-electronics or total engine disassembly, a Naval Hospital, a Fleet Industrial Supply Center, a Navy Family Service Center, a commissary, Navy Exchange, and recreational facilities for both single sailors and families of the Active, Reserve and Retired military communities.

2.1.6 Regional Land Use

NAS Jacksonville is located in southwestern Duval County, on the perimeter of the City of Jacksonville, an extensively urbanized area. Duval County's population grew by 11 percent from 2000 to 2010, at which time it was 864,263. Population in the county's Southwest Planning District, where NAS JAX is located, increased by 16% (City of Jacksonville 2012). City of Jacksonville operates 337 parks representing more than 80,000 acres. Land in rural areas surrounding the city is predominately used for forest products. Pumpkin Hill Creek State Buffer Preserve, Timucuan Ecological and Historic Preserve, Big Talbot Island State Park, Jennings State Forest, and Cary State Forest are nearby conservation areas.

Regional land uses around the properties of the NAS JAX Complex are governed by several local government policies. Every county in Florida must prepare and adopt a Comprehensive Plan (CP) pursuant to Chapter 163, Part II, Florida Statutes, to establish goals, objectives, and policies for managing land use, transportation facilities, public facilities, environmental resources, recreation and open space, intergovernmental coordination, and capital improvements. The City of Jacksonville 2030 CP contains a chapter that addresses Future Land Use. It has also prepared and adopted a Land Development Code (LDC) to implement the objectives and policies set forth in 2030 CP. Airfield Influence Planning Districts are established around military and public airfields to promote an orderly transition and rational organization of land uses, protect the health, safety and welfare of the public, and maintain military missions. County-specific Joint Land Use Studies (JLUS) are used to guide land use decisions and promote land use compatibility. Open space is preserved as necessary by the Conservation Land Use District to protect water resources, preserve scenic areas, preserve historic sites, provide parklands and wilderness reserves, conserve endemic vegetation, and prevent flood damage and soil erosion. Such areas are protected from development pursuant to site plan review. Non-conforming land uses incompatible or inconsistent with the City's Future Land Use Plan will not be allowed to expand, to be enlarged, or to be rebuilt or reopened if destroyed.

2.2 GENERAL PHYSICAL ENVIRONMENT AND ECOSYSTEMS

2.2.1 Climate

The climate of northeast Florida's is classified as subtropical marine, and is characterized by mild winters and hot, humid, breezy summers. The average high temperature at NAS JAX is 78 degrees Fahrenheit (° F) and the average low temperature is 60° F. The Complex receives an average of 49 inches of rainfall per year (see Table 2-1). January is typically the coldest month of the year, with an average minimum temperature of 45° F. July is typically the hottest month of the year with an average high temperature of 90° F.

Rainfall may be influenced by three types of weather disturbances that result in unpredictable weather patterns: cold fronts, thunderstorms, and hurricanes. Hurricanes are the most destructive of these. Hurricane season extends from June through November, and the frequency of hurricanes in the western Atlantic is greatest during August through October.

Table 2-1. Average Temperatures and Rainfall at the NAS Jacksonville Complex, Florida			
Month	Average Low Temp (° F)	Average High Temp (° F)	Average Rainfall (inches)
January	45	64	3.4
February	47	67	2.6
March	53	73	4.0
April	58	79	2.8
May	65	85	3.2
June	71	89	5.8
July	74	90	6.0
August	74	89	5.9
September	71	86	7.3
October	63	79	3.3
November	55	72	2.4
December	47	65	2.4
Average/Total	60	78	49.0

Source: <http://www.usclimatedata.com>

2.2.1.1 Climate Change

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

2.2.2 Air Quality

The Clean Air Act (CAA) is the primary federal statute governing the control of air pollution. The CAA requires the United States Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for six criteria pollutants considered harmful to public health and

the environment. These pollutants are respirable particulate matter (PM₁₀), carbon monoxide, sulfur dioxide (SO₂), nitrogen dioxide (NO₂), lead, and ozone (O₃), and the levels of these pollutants must not exceed limits set by the NAAQS.

Air pollutant emissions at the NAS JAX Complex are generated from stationary and mobile sources. Stationary sources include surface coating, fuel storage and handling, and firefighting training facilities and miscellaneous small stationary combustion sources. Mobile sources include aircraft, motor vehicles, and ground support equipment. Military aircraft operations are the most significant source of air pollutant emissions at NAS Jacksonville. The NAS JAX Complex is located within the Jacksonville (Florida)-Brunswick (Georgia) air quality control region. The EPA classifies this region as "in attainment" for the six NAAQS criteria pollutants.

Prescribed burning, which is an essential management tool at the NAS JAX Complex, can contribute to higher concentrations of PM₁₀ in the air. Smoke is a mixture of carbon particles and water vapor. If air quality in an area was approaching the NAAQS limit for PM₁₀, prescribed burning could potentially cause the region to exceed the daily limit. The NAS JAX Complex conducts prescribed burns at OLF Whitehouse and Rodman Bomb Target. One or two burns are usually conducted on each property every three-to-five years, and each burn typically covers 500-1,000 acres. The Complex coordinates with the Florida Forest Service (FFS) to avoid potential adverse impacts from prescribed burns on regional air quality. A Smoke Management Plan (SMP) was submitted to the EPA by the FFS that describes prescribed burn activities, sets guidelines, and authorizes prescribed fires in the state. In addition, the Florida Fire Management Information System, a GIS-based system for recording smoke sensitive areas, weather, and prescribed fires (University of Florida Cooperative Extension Service; <http://edis.ifas.ufl.edu/FR058>), has been established and is utilized for prescribed burns on the NAS JAX Complex. The NAS JAX Complex is subject to the prescribed burning laws and requirements of Florida.

2.2.3 Geology, Topography, and Soils

The NAS JAX Complex lies in the Atlantic Coast Flatwoods, a physiographic region characterized by generally flat, low-lying terrain with undulating series of ancient dune ridges. The Complex is in a large geomorphic feature known as the Eastern Valley, which covers the southeastern part of Duval County and is bound on the west by the Trail Ridge and on the east by the Atlantic Beach Ridges (NRCS 1998). The Complex is situated on a gentle rise between the St. Johns River to the east and Ortega River on the west. Elevations range from sea level along the rivers to approximately 27 feet above sea level inland. The highest point occurs in the southern portion of the NAS JAX Complex.

Duval County is underlain by hundreds of feet of quartz sand (containing varying amounts of shell fragments and clay), deposited by marine currents since the beginning of the Pliocene (5 million years ago). Below these sediments lay several limestone formations, one of the oldest of which, the Oldsmar Formation, dates from the Lower Eocene age (37 to 54 million years old). The Oldsmar Formation comprises the lower part of the Floridan aquifer system in Duval County. Two other Eocene formations overlie the Oldsmar: the Avon Park Formation, which contains interbedded dolomite and limestone, and Ocala Limestone, a nearly pure limestone. The Hawthorn Group lies between the Ocala Limestone and the modern sand deposits, and was deposited during the Miocene period (5 to 37 million years ago). All of these formations are considered important water-bearing units in the county (NRCS 1998).

There are 24 soil types on NAS Jacksonville, according to the Soil Survey of the City of Jacksonville, Duval County, Florida (NRCS 1998). The soil types are listed in Table 2-2. Their locations on the NAS JAX Complex properties are depicted in Figures 2-5 to 2-8.

Table 2-2. Soil Types at the NAS Jacksonville Complex Properties.				
Soil Type	Landform	Parent Material	Drainage	Depth to Water Table
NAS Jacksonville				
Albany fine sand	level to gently sloping rises and knolls	sandy and loamy marine sediments	somewhat poorly drained	12-30 inches
Arents	flatwoods	loamy and sandy marine sediments	poorly drained	
Boulogne fine sand	flatwoods	sandy marine sediments	poorly drained	6-18 inches
Hurricane and Ridgewood	rises and knolls	sandy marine sediments	somewhat poorly drained	18-42 inches
Lynn Haven fine sand	flats, seeps on side slopes	sandy marine sediments	very poorly drained	at or near surface
Mascotte-Pelham fine sand	flatwoods	sandy and loamy marine sediments	poorly drained	6-18 inches
Pelham fine sand	flats	sandy and loamy marine sediments	poorly drained	0-12 inches
Sapelo fine sand	flatwoods	sandy marine sediments	poorly drained	6-18 inches
Surrency loamy fine sand	depressional	sandy and loamy marine sediments	very poorly drained	at or above surface
Urban land				
OLF Whitehouse				
Arents	flatwoods	loamy and sandy marine sediments	poorly drained	6-18 inches

Table 2-2. Soil Types at the NAS Jacksonville Complex Properties.

Soil Type	Landform	Parent Material	Drainage	Depth to Water Table
Boulogne fine sand	flatwoods	sandy marine sediments	poorly drained	6-18 inches
Evergreen-Wesconnett complex	depressions	decomposed organic materials underlain by thick sandy sediments	very poorly drained	0-12 inches
Leon fine sand	flatwoods	sandy marine sediments	poorly drained	6-18 inches
Lynn Haven fine sand	flats	sandy marine sediments	very poorly drained	6-18 inches
Mascotte-Pelham fine sand	flatwoods	sandy and loamy marine sediments	poorly drained	6-18 inches
Pelham fine sand	flats	sandy and loamy marine sediments	poorly drained	0-12 inches
Pottsburg fine sand	flatwoods	sandy marine sediments	poorly drained	0-12 inches
Stockade fine sands	depressional	sandy and loamy marine sediments	poorly drained	0-12 inches
Surrency loamy fine sand	depressional	sandy and loamy marine sediments	very poorly drained	at or above surface
Urban land	flatwoods, rises, and knolls	sandy and loamy sediments	variable,	
Rodman Bomb Target				
Bluff sandy clay loam	broad drainage-ways in flatwoods	marine sediment	very poorly drained	0-12 inches
Holopaw fine sand	Flatwoods, drainage-ways, and depressions	sandy and loamy marine sediment	poorly to very poorly drained	0-12 inches
Monteocha sand, depressional	depressional areas in flatwoods	sandy and loamy marine sediment	very poorly drained	24 inches above ground to 0
Palmetto fine sand	flatwoods and along streams and drainage-ways	sandy and loamy marine material	poorly drained	0-12 inches
Ponoma fine sand, depressional	flatwoods	sandy and loamy marine sediment	poorly to very poorly drained	24 inches above ground surface to 12 inches below

Table 2-2. Soil Types at the NAS Jacksonville Complex Properties.				
Soil Type	Landform	Parent Material	Drainage	Depth to Water Table
Riviera fine sand	flatwoods, drainage-ways, and depressional areas	sandy and loamy marine sediment	poorly to very poorly drained	0 - 12"
Shenks muck	floodplains of major rivers and streams	deposits of sapric* organic material underlain by clayey marine sediment	very poorly drained	0-12 inches
Terra Ciera muck	floodplains	nonwoody, hydrophytic plant remains	very poorly drained	0-12 inches
Yellow Water				
Albany fine sand	level to gently sloping rises and knolls	sandy and loamy marine sediments	somewhat poorly drained	12-30 inches
Boulogne fine sand	flatwoods	sandy marine sediments	poorly drained	6-18 inches
Goldhead, wet, and Lynn Haven soils	flats	sandy and loamy sediments	poorly drained	0-6 inches
Leon fine sand	flatwoods	sandy marine sediments	poorly drained	6-18 inches
Mascotte-Pelham complex	flatwoods	sandy and loamy marine sediments	poorly drained	6-18 inches
Pelham fine sand	flats	sandy and loamy marine sediments	poorly drained	0-12 inches
Sapelo fine sand	flatwoods	sandy marine sediments	poorly drained	6-18 inches
Urban land-Mascotte-Sapelo complex	flatwoods	sandy and loamy sediments	poorly drained	6-18 inches
Pelham-Urban land complex	flats	sandy and loamy sediments	poorly drained	0-12 inches
Surrency loamy fine sand	depressional	sandy and loamy marine sediments	very poorly drained	at or above surface

2.2.4 Coastal Resources

The NAS JAX Complex is not located adjacent to coastal environments, but NAS Jacksonville is adjacent to the St Johns River, situated about 30 miles upriver.

All properties of the NAS JAX Complex fall under the jurisdiction of the Florida Coastal Management Program (FCMP), which covers the entire State of Florida. The FCMP is the State

of Florida's federally-approved management program for the implementation of the Coastal Zone Management Act of 1972, 16 U.S.C. 1451 et seq. and was approved by the National Oceanic and Atmospheric Administration (NOAA) in 1981. The FCMP consists of 23 Florida statutes, which are administered by 11 state agencies and four of the five state water management districts. The entire state is included in Florida's Coastal Zone, and it is therefore under the purview of the FCMP. The FCMP is designed to ensure the wise use and protection of the state's aquatic, cultural, historical and biological resources; minimize the state's vulnerability to coastal hazards; ensure compliance with the state's growth management laws; protect the state's transportation system; and protect the state's proprietary interest as the owner of sovereign submerged lands (FDEP 2014).

Coastal zones also are regulated by the FDEP under the Florida Coastal Zone Protection Act (1985), which requires permits for any erosion control devices, excavations, or erection of structures seaward of the coastal construction control line (CCCL). The CCCL occurs only on mainland or barrier island coasts bordering the Gulf of Mexico or the Atlantic Ocean. The actual CCCL is determined separately for each county in Florida. Construction in the Coastal Building Zone is also subject to stricter requirements than structures built farther inland. The Coastal Building Zone extends 1,500 feet landward of the CCCL for mainland coasts and 5,000 feet (or the entire island, whichever is less) for barrier islands. No properties of the NAS JAX Complex are affected by the CCCL or the Coastal Building Zone.

This INRMP was reviewed by the State of Florida for Coastal Zone Consistency/Federal Consistency in compliance with the Federal CZMA.

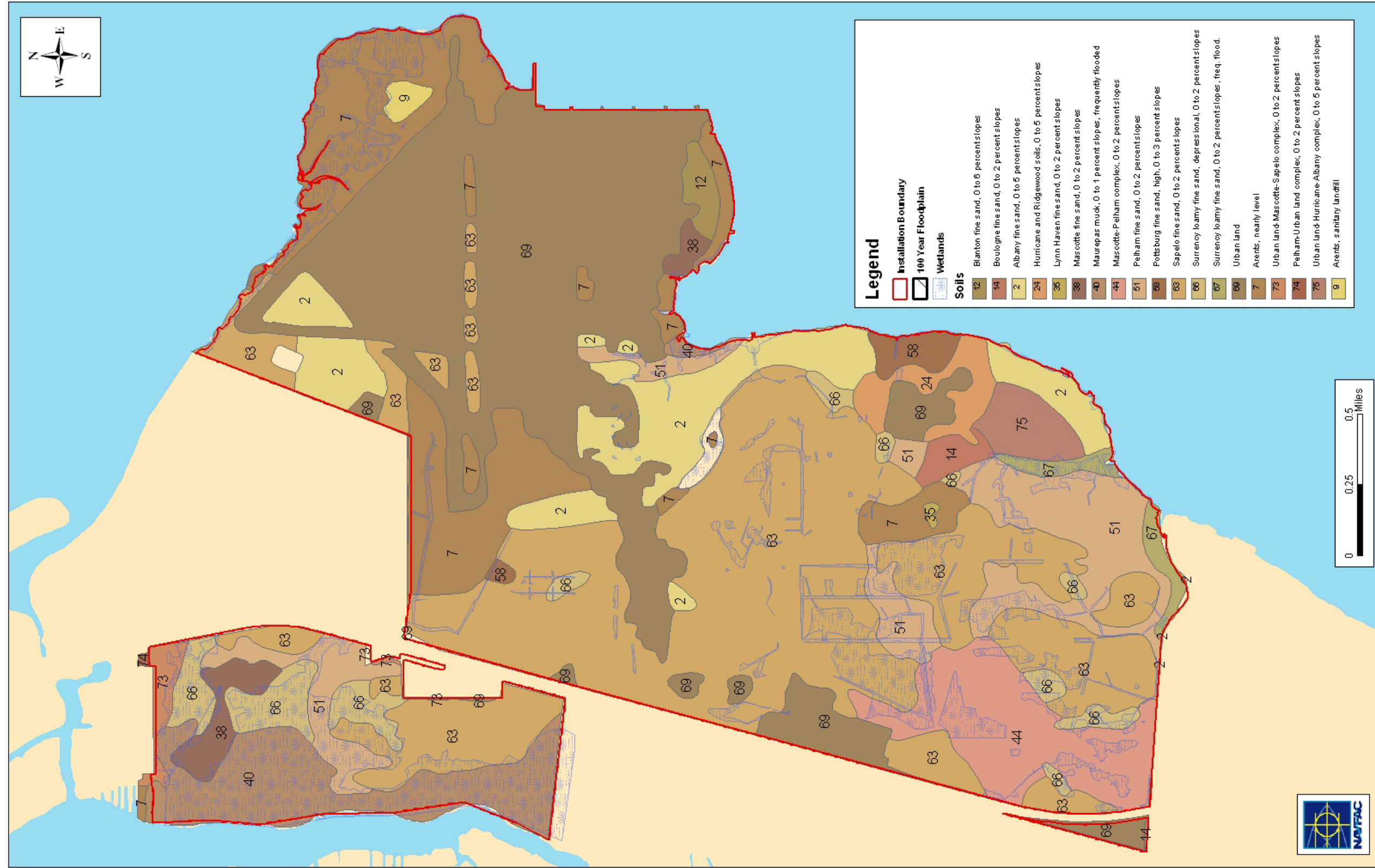


Figure 2-5. Soils, Wetlands, and Floodplains at Naval Air Station Jacksonville.

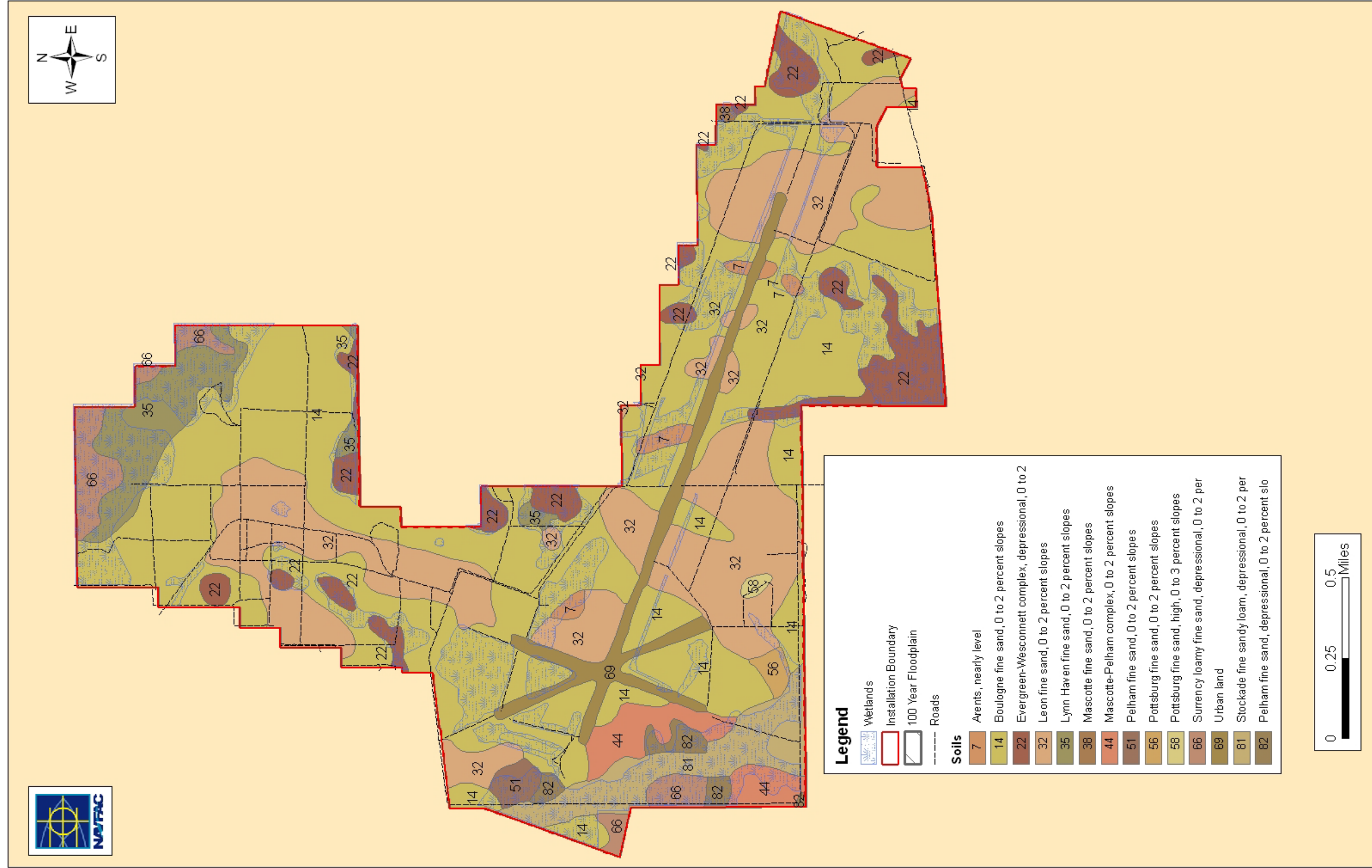


Figure 2-6. Soils, Wetlands, and Floodplains at OLF Whitehouse.

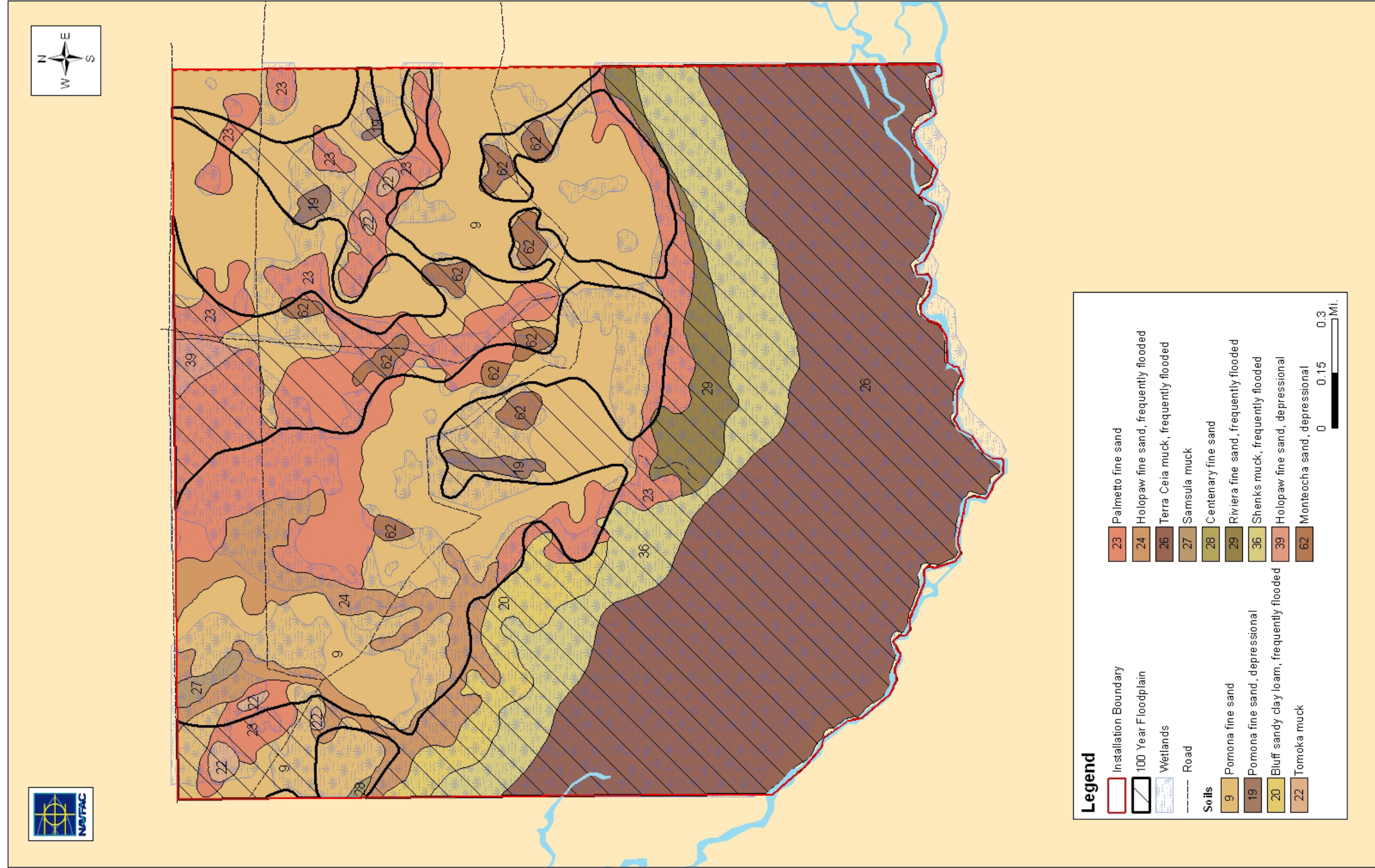


Figure 2-7. Soils, Wetlands, and Floodplains at Rodman Bomb Target.

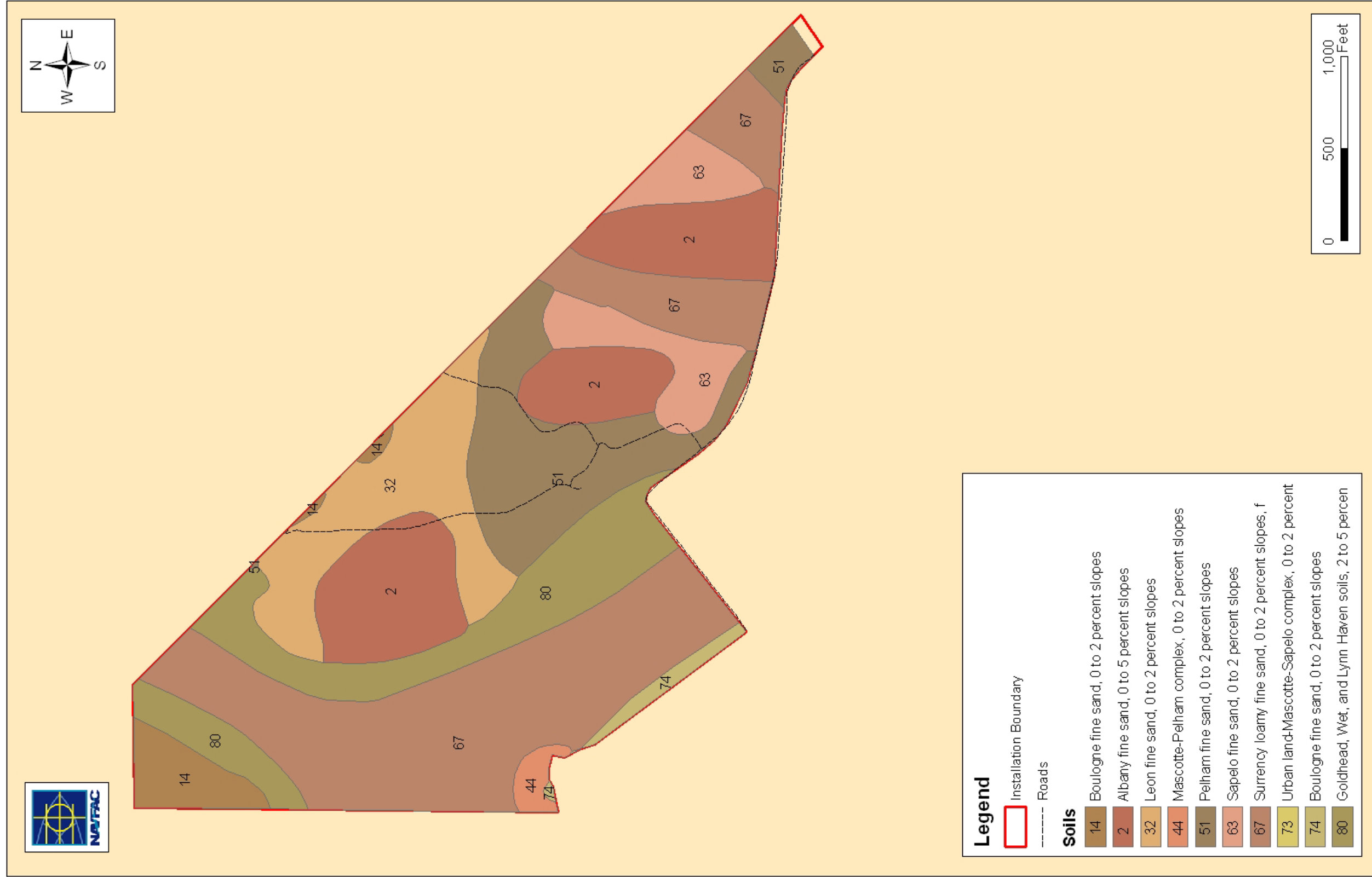


Figure 2-8. Soils, Wetlands, and Floodplains at Yellow Water.

2.2.5 Hydrology and Water Quality

2.2.5.1 Watersheds and Surface Waters

The St. Johns River and its tributaries are the main sources of surface water in the region. Several characteristics of the St. Johns River limit its assimilation capabilities, contributing to high pollution rates. These characteristics include the relatively flat drainage basin, the high number of associated draining water bodies, and the slow flow rate of the river. The St. Johns River, its tributaries, and lakes within the basin are designated as Class III, which is intended for recreational use and the propagation of fish and wildlife.

NAS Jacksonville is located on a peninsula between the St. Johns River and the Ortega River. NAS Jacksonville also has three dredged lakes totaling 26 acres, of which only Casa Linda Lake is managed as a freshwater fishery. Casa Linda Lake is located adjacent to the golf course in the northernmost corner of the property and is approximately 10 acres. Lake Scotlis is approximately 3 acres and is located at the center of the property. Because of its small size, it has previously experienced overfishing, excessive algal growth, and low oxygen levels. Turtle Pond is a very small pond located on the installation golf course. This pond is not utilized as a recreational fishery.

OLF Whitehouse contains three small, mostly channelized tributaries of McGirts Creek, which drains into the St. Johns River via the Ortega River. Although McGirts Creek has a good water quality index rating, it has been affected by dredging activities and wastewater discharges from 17 small wastewater package plants (SJRWMD 1993), and the accidental discharge of waste petroleum products from a former disposal and containment facility located approximately one mile south of the southeastern boundary of the property. This contamination is being remediated.

The southern boundary of Rodman Bomb Target borders approximately 2.6 miles of the Ocklawaha River 2 miles downstream of the Rodman Reservoir Dam. The St. John's River is approximately 4 miles farther downstream to the east. A few small streams drain from the Rodman Bomb Target into the river.

Yellow Water Creek flows from the northwest to the southwest corners of the Yellow Water. Caldwell Branch enters the area from the northeast and runs approximately 0.25 mile before it connects to Yellow Water Creek.

2.2.5.2 Groundwater

The major sources of potable water for Duval County are artesian wells that tap into the Floridan aquifer. The surface of this porous limestone layer lies approximately 260 to 600 feet below the

ground surface and ranges from 500 to 1,000 feet thick. Water levels in the Floridan Aquifer are dependent upon rainfall and water usage conditions. Most of the aquifer is recharged west and southwest of Jacksonville by rainfall. Groundwater quality depends upon the location of the well. Good quality water (soft water) is available in or near recharge areas located in western Duval County; water along the St. Johns River and Atlantic coastline has higher concentrations of chlorine and other constituents. Saltwater intrusion is a threat to groundwater quality in coastal areas experiencing declining water tables.

A test well at the St. Johns River east of the Rodman Bomb Target penetrated the following formations from surface to 700 feet down: Hawthorn Formation, Williston Formation, Inglis Formation, Avon Park Limestone, and Lake City Limestone. In some places in this region, the Hawthorn Formation supplies artesian wells, as it is confined by clays and marls in its upper strata. The lower depths of the Hawthorn comprise the Floridan Aquifer, which is the primary source of water supply. The Hawthorn is overlain by upper Miocene or Pliocene deposits, which also yield water. The Williston Formation is also tapped by wells in Putnam County (Bermes et al. 1963). Recharge to the Floridan Aquifer from the Rodman Bomb Target is generally low (SJRWMD 1995).

2.2.5.3 Floodplains

Floodplains are low, relatively flat areas adjoining inland and coastal waters and include flood-prone areas of offshore islands. The Federal Emergency Management Agency (FEMA) defines these areas as being subject to a 1.0% or greater chance of flooding in any given year.

Approximately 470 acres of floodplain exist on NAS Jacksonville north and west of Blaine Street, along the east side of the Ortega River. Most floodplains on the property are classified in Zone A, land that would be inundated by a flood having a 1% chance of occurring in any given year (commonly known as the 100-year floodplain (FEMA 2012)). The remaining lands are classified as Zone X, land of moderate or minimal hazard subject to flooding from severe storm activity or local drainage problems (FEMA 2006) with smaller areas of Zone X500, which are between the limits of the 100-year and 500-year flood or certain areas subject to 100-year flood with average depths less than 1 foot or where the contributing drainage area is less than 1 square mile, or areas protected by levees from the 100-year flood (Palm Beach County, 2003).

FEMA classifies most of OLF Whitehouse as Zone X. Small areas of FEMA flood zones occur at OLF Whitehouse and are classified as Zone A or Zone AO, land in the 100-year floodplain where shallow water paths (sheet flow) and unpredictable flow paths between 1 and 3 feet occur (FEMA 2006). The floodplain wetlands of the Rodman Bomb Target are classified as Zone A. The

remainder is classified as Zone X. The bottomland hardwood communities along Yellow Water Creek and Caldwell Branch at Yellow Water are rated Zone A.

2.2.5.4 Wetlands

Wetlands are transitional zones between the terrestrial and aquatic environment. These areas are characterized by physical, chemical, and biological features indicative of hydrological conditions. Currently, wetlands are regulated at the federal level by the United States Army Corps of Engineers (USACE) under Section 404 of the CWA of 1977. Wetlands are defined by the USACE as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”

The wetland communities on NAS Jacksonville are floodplain swamp, bottomland forest, estuarine tidal marsh, dome swamp, and depression marsh. These communities are described in Section 2.3.1. The USACE jurisdictional wetlands at NAS Jacksonville (total = 677 acres) are depicted in Figure 2-5. Wetlands on OLF Whitehouse include, but are not limited to dome swamp, depression marsh, and wet prairie. The USACE jurisdictional wetlands at OLF Whitehouse (total = 599 acres) are depicted in Figure 2-6. Wetlands on the Rodman Bomb Target include depression marsh, baygall, dome swamp, bottomland forest, and floodplain swamp. The USACE jurisdictional wetlands at Rodman Bomb Target (total = 1905 acres) are depicted in Figure 2-7. The dominant wetland community at the Yellow Water is bottomland forest along both Yellow Water Creek and Caldwell Branch (see community descriptions below). The USACE jurisdictional wetlands at Yellow Water (total = 70 acres) are depicted in Figure 2-8.

2.2.5.5 Clean Marina Designation

The Mulberry Cove Marina at NAS Jacksonville has been designated as a member of the Clean Marina Program (CMP). Members of the CMP implement a set of BMPs that help protect coastal waterways and pledge to take a proactive approach to environmental stewardship. Membership must be maintained annually to ensure adherence to the BMPs. The BMPs include a variety of measures that ensure good water quality, such as proper use of fertilizers and pesticides, proper storage and disposal of oils, fuels, solvents, and soiled rags, proper use and disposal of cleaning supplies, adequate and well-managed trash receptacles, convenient recycling areas for batteries, refrigerants, and fluorescent bulbs, zero discharge of raw sewage, written plans for hurricane preparedness, and possession of a National Pollution Discharge Elimination System (NPDES) stormwater permit and a Stormwater Pollution Prevention Plan (SWPPP; NAS JAX 2018).

2.2.7 Land Use

Land use classification shows the primary focus of natural resource management. Areas can be classified into one or more of the following management focus objectives:

- **Military operations:** management focuses on wetlands, invasive and exotic species, soil conservation and erosion control, stormwater, grounds maintenance and landscaping, urban forestry, integrated pest management practices, and floodplains protection.
- **Forest management:** management focuses on the improvement of timber stands for timber production and/or wildlife habitat.
- **Fish and wildlife management:** management focuses on actions designed to preserve, enhance, and regulate indigenous wildlife and its associated habitat.
- **Outdoor recreation:** management focuses on the provision of natural resource-based outdoor recreational opportunities, where the emphasis is the understanding and appreciation of the natural environment.

The management focus objectives define the long-term natural resource management for each area. Some areas may have other management objectives, and some may have more than one management focus. Natural Resource land use classification does not intend to limit areas to specific management objectives, but rather show the primary natural resources management that takes place in these areas. Acreages are shown in Table 2-3. Natural resource land use areas are illustrated in Figures 2-9 to 2-12.

Table 2-3. Land Use Areas at the NAS Jacksonville Complex Properties	
Management Focus	Acres
NAS Jacksonville	
Forestry and Wildlife Management	1,198
Land Management	2,501
Outdoor Recreation	170
Total	3,869
OLF Whitehouse	
Forestry & Wildlife Management	1338
Developed and Maintained Grounds	693
Total	2,031
Rodman Bomb Target	
Forestry & Wildlife Management	1,351
Developed and Maintained Grounds	80
Wildlife Management	1,405
Total	2,836
Yellow Water	
Forestry and Wildlife Management	202
Total	202

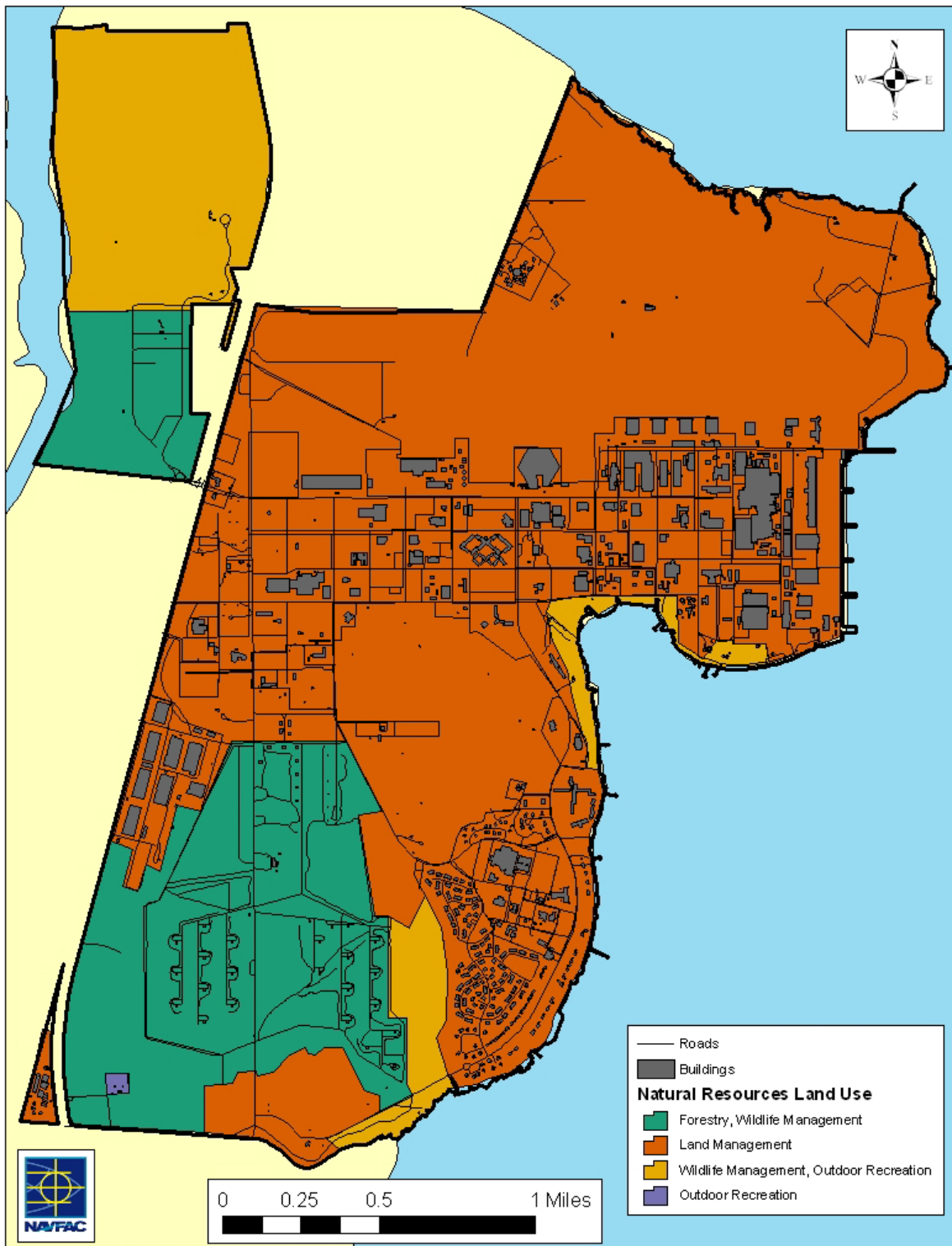


Figure 2-9. Natural Resources Land Use Areas at NAS Jacksonville.

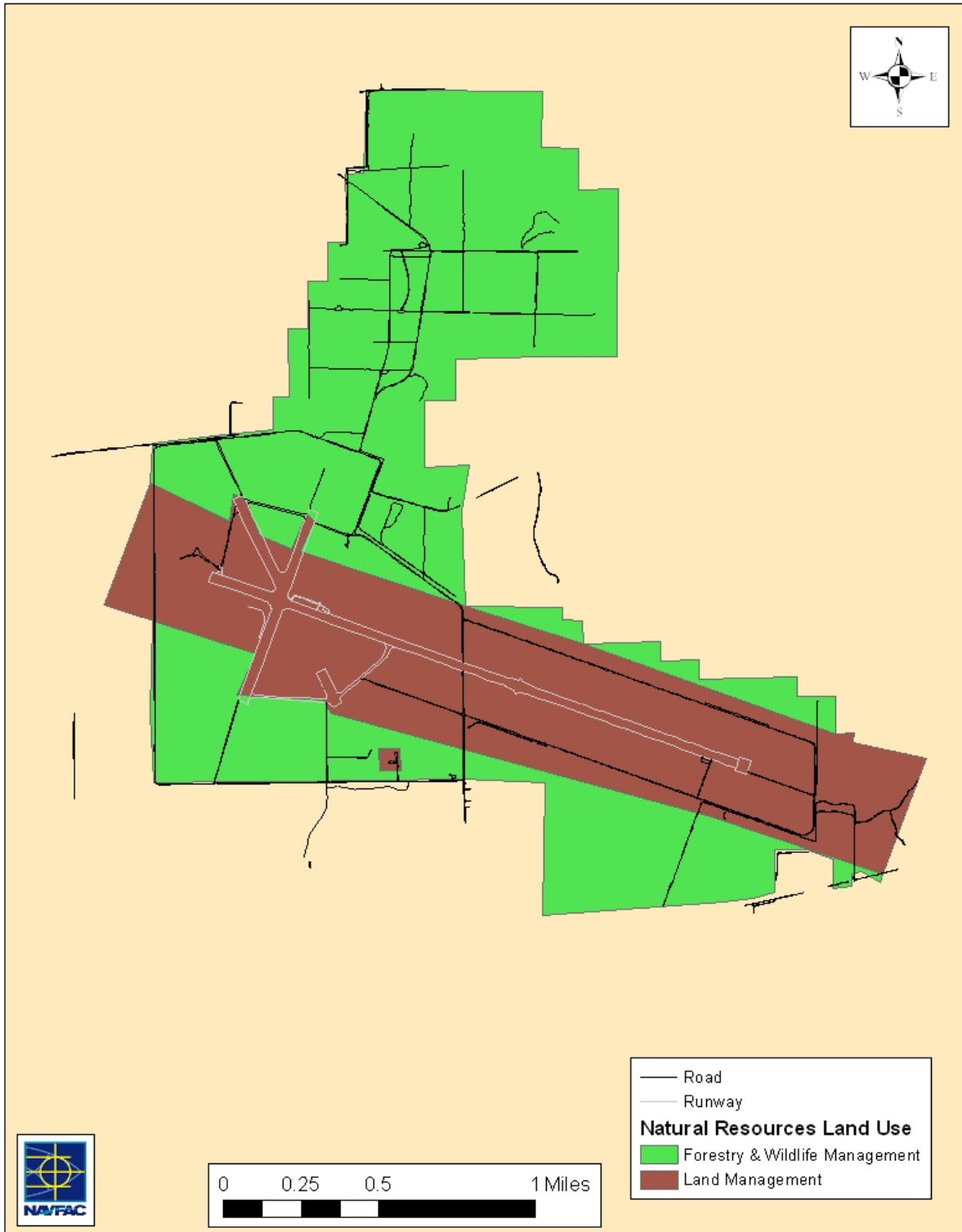


Figure 2-10. Natural Resources Land Use Areas at OLF Whitehouse.

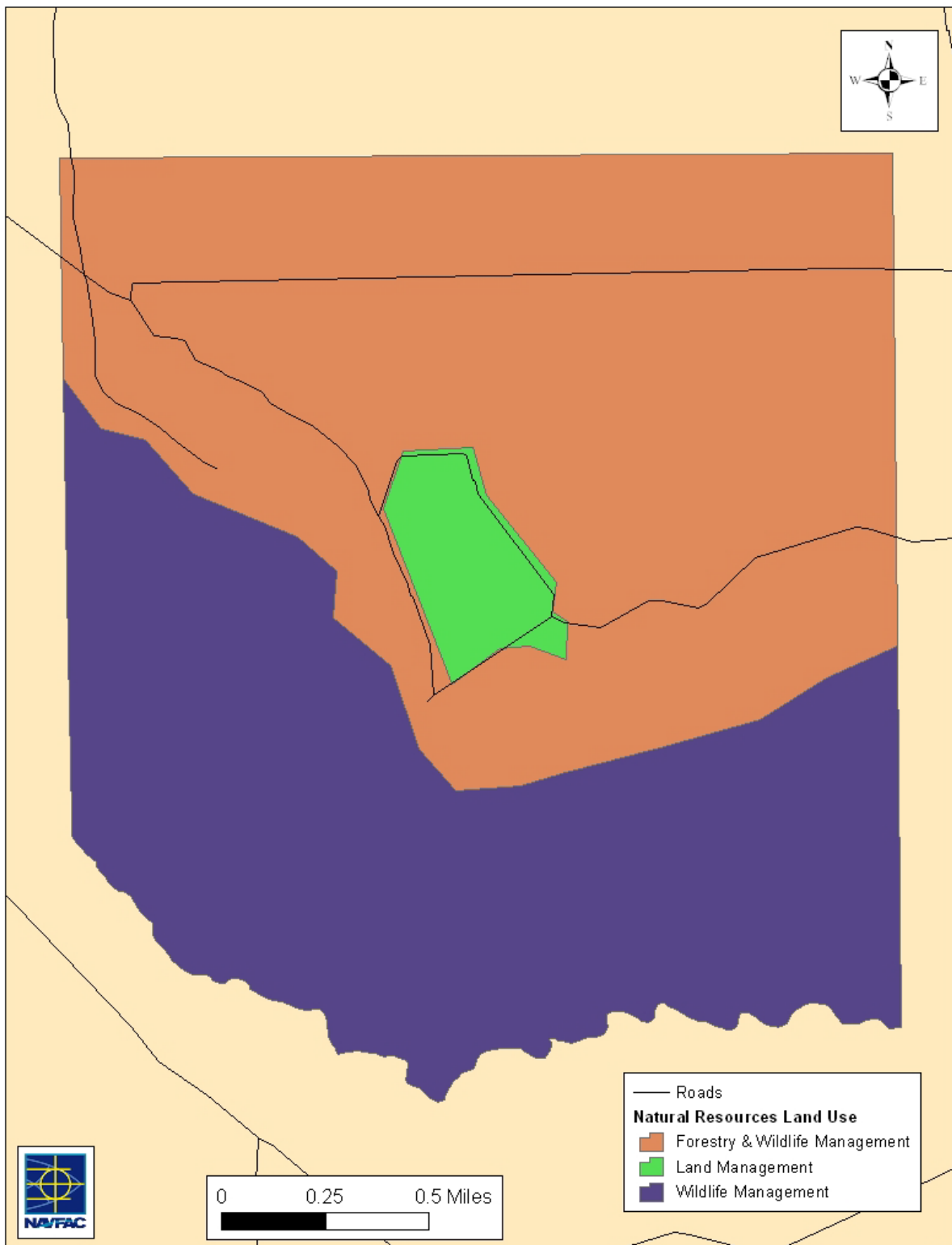


Figure 2-11. Natural Resources Land Use Areas at Rodman Bomb Target.

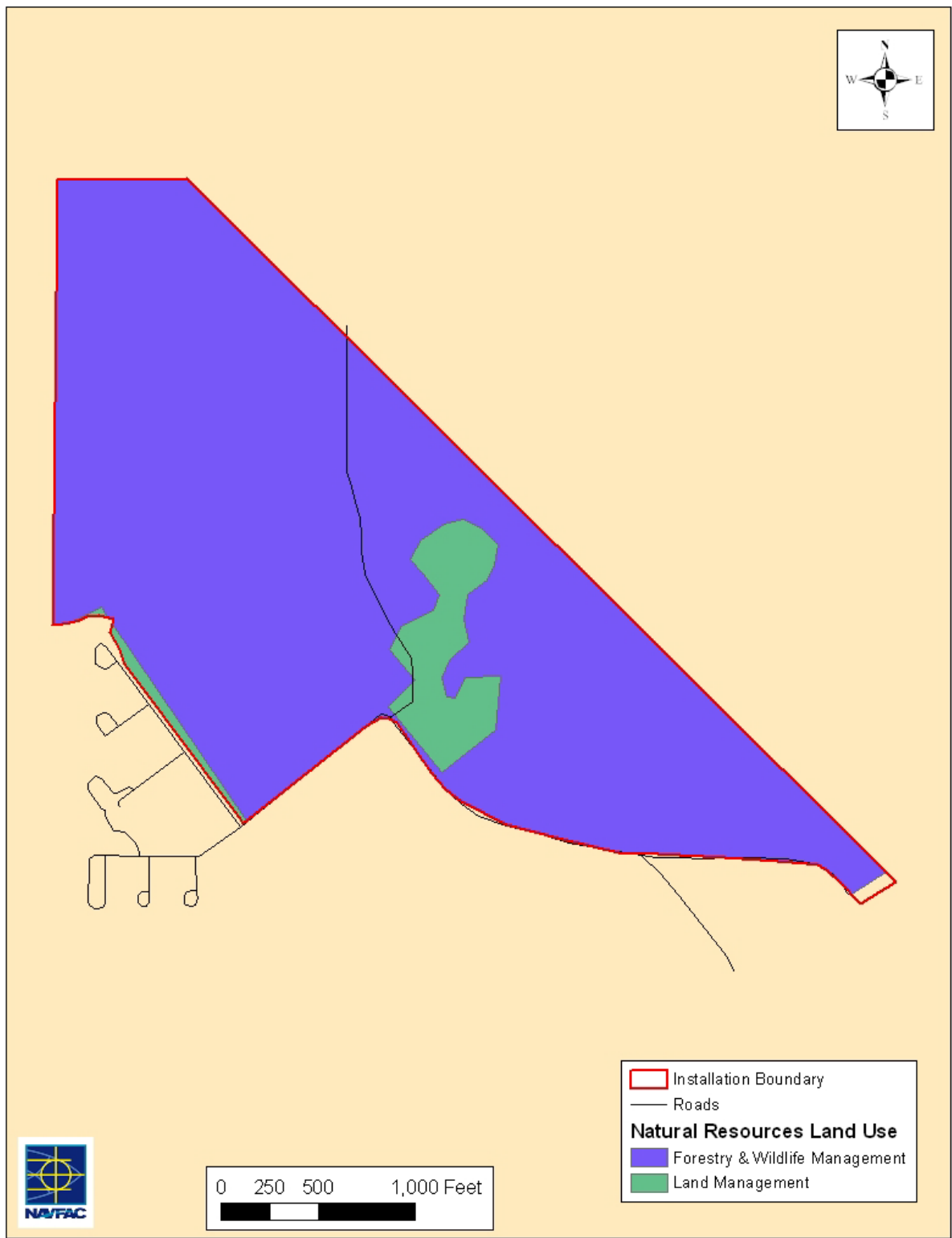


Figure 2-12. Natural Resources Land Use Areas at Yellow Water.

2.3 BIOLOGICAL ENVIRONMENT

The biological environment of the NAS JAX Complex was considerably different prior to colonization and development. Historically, the area was dominated by natural communities that are, today, only scattered throughout the Complex. Ecosystems at the NAS JAX Complex have been affected by development to varying degrees. Areas that have been highly developed by the Navy contain little or no natural vegetation and wildlife associated with previous ecosystems. Prescribed burning and thinning in managed forest stands help regenerate natural communities to maintain and improve ecosystem quality to the extent practicable within the constraints of military mission requirements.

2.3.1 Natural Communities

A natural community is a distinct and reoccurring assemblage of populations of plants, animals, fungi, and microorganisms naturally associated with each other and their physical environment. The natural communities occurring at the NAS JAX Complex properties were surveyed and described by the Florida Natural Areas Inventory (FNAI) in 1997 and the Rodman Bomb Target was re-evaluated in 2017 (LG2ES 2018). A synopsis of those surveys is presented in this subsection.

The annual INRMP review metrics adhere to the ecosystem classification nomenclature prescribed online at natureserve.org. Due to the length of some of the ecosystem names provided by that system, this INRMP maintains fidelity to its original, less-cumbersome, nomenclature throughout the text. Table 2-4 provides a convenient cross-reference table in order to synch the INRMP's terminology with that used by natureserve.org and the annual metrics.

Table 2-4. Natural Community Nomenclature			Present at:			
Nomenclature Used in this INRMP	Nomenclature Used by the Annual Metrics	Natural Community Description	J	W	R	Y
Basin Swamp	Southern Coastal Plain Nonriverine Basin Swamp	This system occupies large, seasonally-inundated basins with peaty substrates. These basins are nonriverine and do not receive overbank flooding. Examples are generally forested; the vegetation is characterized by <i>Taxodium distichum</i> , <i>Nyssa biflora</i> , evergreen "bay" shrubs, and/or mixed hardwoods. Emergent <i>Pinus elliotii</i> may also be present.			X	
Baygall	Southern Coastal Plain Seepage Swamp and Baygall	This wetland system consists of forested wetlands in acidic, seepage-influenced habitats. These are mostly evergreen forests generally found at the base of slopes or other habitats where seepage flow is concentrated. Resulting moisture conditions are saturated or even inundated. The vegetation is characterized by <i>Magnolia virginiana</i> and <i>Nyssa biflora</i> . Due to excessive wetness, these habitats are normally protected from fire except those which occur during extreme drought. These environments are prone to long-duration standing water, and tend to occur on highly acidic, nutrient-poor soils.			X	
Bottomland Forest	Bottomland Hardwood/Black Willow/Bald Cypress	This forest type includes wet forests that are flooded by river overbank flow and are dominated by a combination of <i>Taxodium distichum</i> and <i>Nyssa biflora</i> . Other shrub and herb components vary among stands. This community occurs in sloughs and depressions in seasonally-flooded Coastal Plain riverine settings.	X		X	
Depression Marsh	Coastal Plain Beaksedge Depression	This is a seasonally-flooded upland depressions dominated by sedges of the genus <i>Rhynchospora</i> . Floating aquatic plants may be present. Woody plants such as <i>Hypericum brachyphyllum</i> and seedlings of <i>Pinus elliotii</i> may provide low cover.	X	X	X	
Dome Swamp	Southern Coastal Plain Nonriverine Cypress Dome	This system consists of small forested wetlands, typically dominated by <i>Taxodium ascendens</i> , often with a dome-shaped appearance in which trees in the center are taller than those around the exterior. Examples occupy poorly drained depressions which are most often embedded in a matrix of pine flatwoods or mesic to dry pine woodlands. Pools of stagnant, highly acidic water may stand in the center of these depressions. These sites are underlain by an impervious clay pan which impedes drainage and perches precipitation.	X	X	X	
Estuarine Tidal Marsh	Southern Atlantic Coastal Plain Salt and Brackish Tidal Marsh	This system encompasses brackish-to-saline intertidal marshes. It is dominated by medium to extensive expanses of <i>Spartina alterniflora</i> , flooded twice daily by lunar tides. <i>Juncus roemerianus</i> and other brackish marshes occur on slightly higher marsh, including upstream along tidal creeks, and a variety of small-patch associations occur near the inland edges.	X			

Table 2-4. Natural Community Nomenclature			Present at:			
Nomenclature Used in this INRMP	Nomenclature Used by the Annual Metrics	Natural Community Description	J	W	R	Y
Floodplain Swamp	Floodplain Swamp	This community occupies acidic and clay-free streams and consequently is found within coarse-sandy landscapes. It can occur in small-to-large patches in sloughs of large rivers and filling the entire floodplain of small streams. Soils are often organic. Where it occurs along small to medium streams, it tends to fill the full width of a featureless, muck-filled floodplain. These may have a distinct channel, a network of anastomosing channels, or have no visible channel at all.	X		X	
Mesic Flatwoods	Mesic Flatwoods	This is the most widespread natural community in Florida. Soils are acidic, nutrient-poor fine sands with upper layers darkened by organic matter. Drainage can be impeded by a loosely-cemented organic layer formed beneath the soil surface. The soils are alternately droughty during dry periods and saturated, or even inundated, after heavy rains. Pines dominate.	X		X	
Scrub	Scrubland	This community typically occupies a transition between scrub and mesic flatwoods and may contain species characteristic of either one of these. Beneath an open canopy of <i>Pinus palustris</i> (and possibly <i>Pinus elliottii</i>) is a shrubby understory typically dominated by some combination of <i>Quercus geminata</i> and/or <i>Quercus myrtifolia</i> .	X		X	
Upland Mixed Forest	Live Oak / Mixed Hardwoods	This is a well-developed, closed-canopied forest dominated by deciduous hardwood trees on mesic soils in areas sheltered from fire. It typically has a diverse assemblage of deciduous and evergreen tree species in the canopy and midstory, shade-tolerant shrubs, and a sparse groundcover.	X	X	X	
Wet Flatwoods	Southern Atlantic Coastal Plain Wet Pine Savanna and Flatwoods	This system of pine-dominated savannas and flatwoods has wet, seasonally-saturated soils and historic exposure to frequent low-intensity fire. Understory conditions may be dramatically altered by fire frequency and seasonality. In natural condition, there is a dense ground cover of herbs and low shrubs, although grasses can sometimes dominate.	X			
Wet Prairie	Central Florida Wet Prairie and Herbaceous Seep	This system includes herbaceous seepage wetlands and nearly treeless plains over poorly drained soils. At least some examples have dense cover of grasses and low shrubs, with fairly high species diversity. Pitcher plants may be present.		X		

J=NAS JAX, W=OLF Whitehouse, R=Rodman Bomb Target, Y=Yellow Water Housing

2.3.1.1 NAS Jacksonville Natural Communities

Nine natural community types were identified on NAS Jacksonville during a 1997 survey conducted by FNAI. The extent of these communities is provided in Table 2-5. Additional land cover types include developed areas, pine plantation, roads, and open water. The distribution of these communities is shown in Figure 2-13.

Natural Community	Acres	Natural Community	Acres
Mesic Flatwoods	498	Estuarine Tidal Marsh	24
Scrub	12	Depression Marsh	5
Wet Flatwoods	32	Other Land Cover	
Floodplain Swamp	248	Developed Land	2,501
Bottomland Forest	208	Pine Plantation	157
Upland Mixed Forest	168	Water	13
Dome Swamp	3		

Scrub covers approximately 500 acres on NAS Jacksonville. The canopy of the mesic flatwood community is dominated by slash pine (*Pinus elliotii*) and is also composed of laurel oak (*Quercus laurifolia*), water oak (*Q. nigra*), and southern magnolia (*Magnolia grandiflora*) with a shrub layer of saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), and staggerbush (*Lyonia fruticosa*). Selective logging of pines occurred in some of these areas in the early 1990's. Small areas of wet flatwoods are found within the mesic flatwoods. Wet flatwoods have a groundcover dominated by cinnamon fern (*Osmunda cinnamomea*), royal fern (*O. regalis*), and a variety of hydrophytic grasses and sedges. Scrubby flatwoods occur on the northern island of the Ortega River floodplain. The canopy is dominated by sand live oak (*Quercus geminata*), myrtle oak (*Q. myrtifolia*), and Chapman's oak (*Q. chapmanii*). Only a few slash pine and longleaf pine remain as emergent canopy. Rusty lyonia (*Lyonia ferruginea*) and saw palmetto characterize the shrub layer.

Floodplain swamps occur on three locations on NAS Jacksonville: along the edge of the St. Johns River just west of the marina, along a small creek at the southern end of the facility, and along the Ortega River. The area along the Ortega River is by far the least altered and has a canopy dominated by bald cypress and red maple (*Acer rubrum*). Sweet bay magnolia (*Magnolia virginiana*) and red maple dominate the mid-story while the open understory is composed of button bush (*Cephalanthus occidentalis*), wax myrtle (*Myrica cerifera*), and tall blueberry (*Vaccinium corymbosum*). The sparse herb layer is represented by sawgrass (*Cladium jamai-*

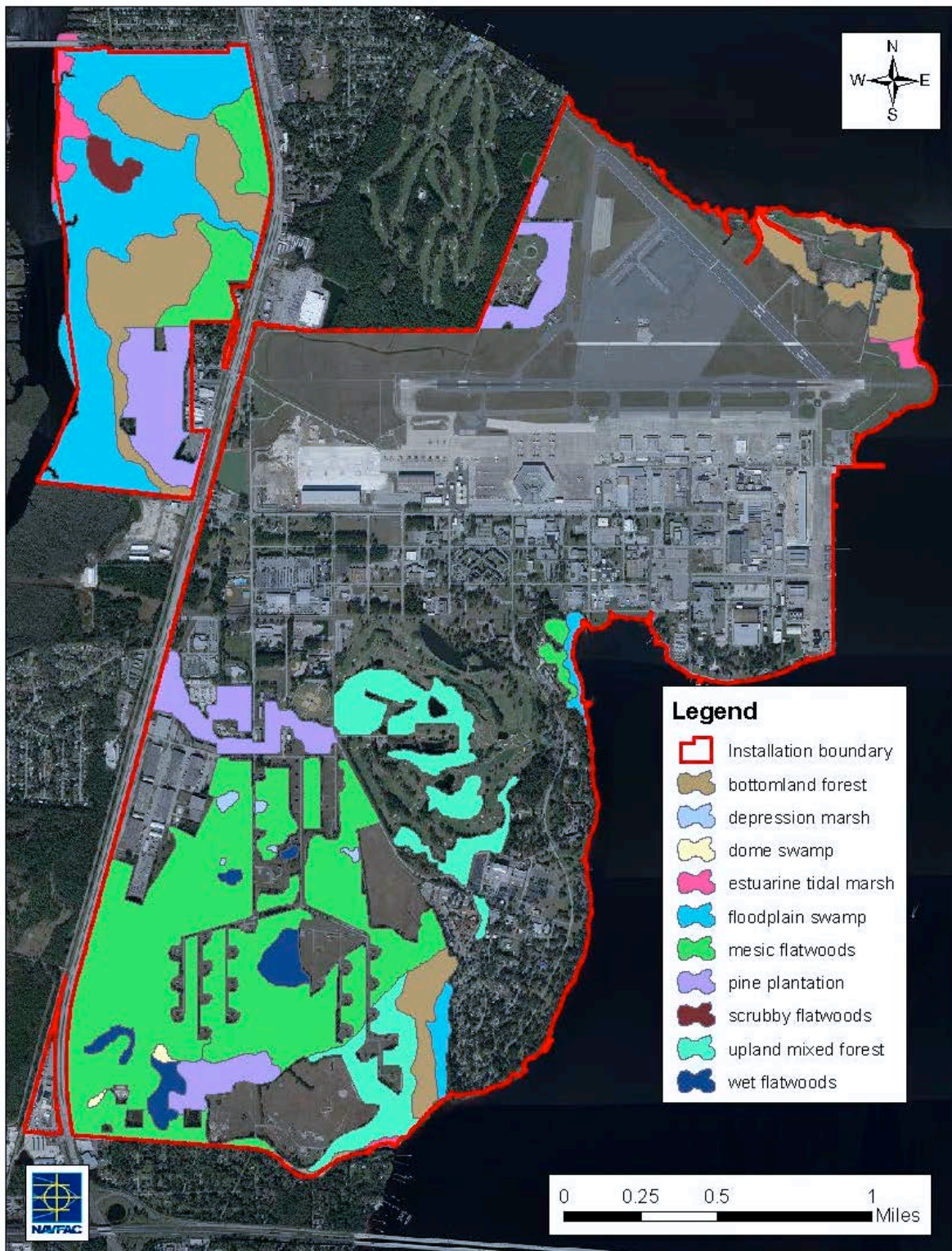


Figure 2-13. Natural Communities at NAS Jacksonville.

cense), arrow arum (*Peltandra virginica*), blue flag (*Iris hexandra*), royal fern, and chain fern (*Woodwardia areolata*).

Bottomland forests occur in the Ortega River floodplain and along the St. Johns River shoreline at NAS Jacksonville. They are low-lying forests of tall, straight trees that create a closed canopy and shelter an open understory of ferns, herbs, and grasses. The water tables are high in these areas, but they are inundated only during extreme floods or exceptionally heavy rains. The dense tree canopies of bottomland forests typically limit air movement and light penetration, creating relatively high humidity and sparse understory, which makes this community resistant to burns. The bottomland forests at NAS Jacksonville are dominated by canopies of bald cypress, sweetbay magnolia, and red maple.

Upland mixed forest is a mixed-species, hardwood-dominated forest that has been fostered by a variety of upland, fire-suppressed situations on NAS Jacksonville. The dominant tree species are live oak (*Quercus virginiana*), laurel oak, loblolly pine (*Pinus taeda*), slash pine, pignut hickory (*Carya glabra*), sweetgum (*Liquidambar styraciflua*), and southern magnolia. Dominant shrub species include sparkleberry (*Vaccinium arboreum*), stagger-bush, horse sugar (*Symplocos tinctoria*), and American witch-hazel (*Hamamelis virginiana*). Herbs are sparse to absent in this densely shaded community. Upland mixed forests typically occur on rolling hills that often have limestone rock near the surface. Soils are sandy-clays or clayey sands with substantial organic and often calcareous components. The topography and clayey soils increase surface water runoff, although this is counterbalanced by the moisture retention properties of clays and by the often thick layer of leaf mulch which helps conserve soil moisture and create decidedly mesic conditions. Because of these conditions, upland mixed forests rarely burn (FNAI/FDNR 1990).

Dome swamp accounts for only 3 acres on NAS Jacksonville and is not depicted in Figure 2-13. It typically occurs in small rounded depressions within upland – usually mesic flatwoods – landscapes. The canopy is generally dominated by pond cypress (*Taxodium ascendens*). Typical mid-story components are wax myrtle, or myrtle-leaved holly (*Ilex myrtifolia*). Herb cover is dependent upon canopy and mid-story density, and may include a dense layer of Virginia chain fern (*Woodwardia virginica*) with patches of hydrophytic forbs and grasses. Frequent fire is an essential ecological component of dome swamp that reduces hardwood encroachment and shrub density; the dome swamp on NAS Jacksonville has suffered from lack of fire and encroachment of pine plantations. Slash pine, hardwood trees, and bays currently are a major component within the dome swamp on the property.

Estuarine tidal marsh at NAS Jacksonville occurs in patches along the St. Johns River and in the northern section of the Ortega River frontage and is dominated by black needle rush (*Juncus*

roemerianus) and saltmarsh cordgrass (*Spartina alterniflora*), with areas of bulrush (*Cyperus* spp.), and marsh elder (*Iva frutescens*).

Depression marshes are interspersed in the mesic flatwoods and pine plantation in the southern half of NAS Jacksonville. These communities have been altered by encroachment by pine plantation and shrubs (i.e., gallberry, fetterbush lyonia [*Lyonia lucida*], red maple) as a result of fire suppression. These factors have resulted in a high percentage of leaf litter and reduced herbaceous cover represented by weedy forbs and grasses including rosy camphorweed (*Pluchea rosea*), blue maidencane (*Amphicarpum muhlenbergianum*), and rosette grass (*Dichanthelium* spp.).

2.3.1.2 OLF Whitehouse Natural Communities

Four natural community types were identified on OLF Whitehouse during the 1997 FNAI survey. The extent of these communities is provided in Table 2-6. Additional land cover types include developed areas, pine plantation, cleared zones, and runway. The distribution of these communities is shown in Figure 2-14.

Table 2-6. Natural Communities and Land Cover at OLF Whitehouse	
Natural Community	Acres
Dome Swamp	72
Depression Marsh	3
Upland Mixed Forest	100
Wet Prairie	11
Converted to Longleaf Pines	345
Pine Plantation	807
Other Land Cover	
Runway and cleared zone	689
Developed	4

The runway and clear zone at OLF Whitehouse covers the center of the south end of the base (Figure 2-14). This area is drained by three small tributary branches of McGirts Creek to the south. All of these tributaries have been channelized to some degree and impacted by the planted pines. The southwest corner has a disturbed area of hydric hammock, dome swamp, and floodplain swamp at the head of the western tributary. The hydric hammock becomes wetter on the east side as it grades into the very narrow floodplain swamp along the channelized creek. The

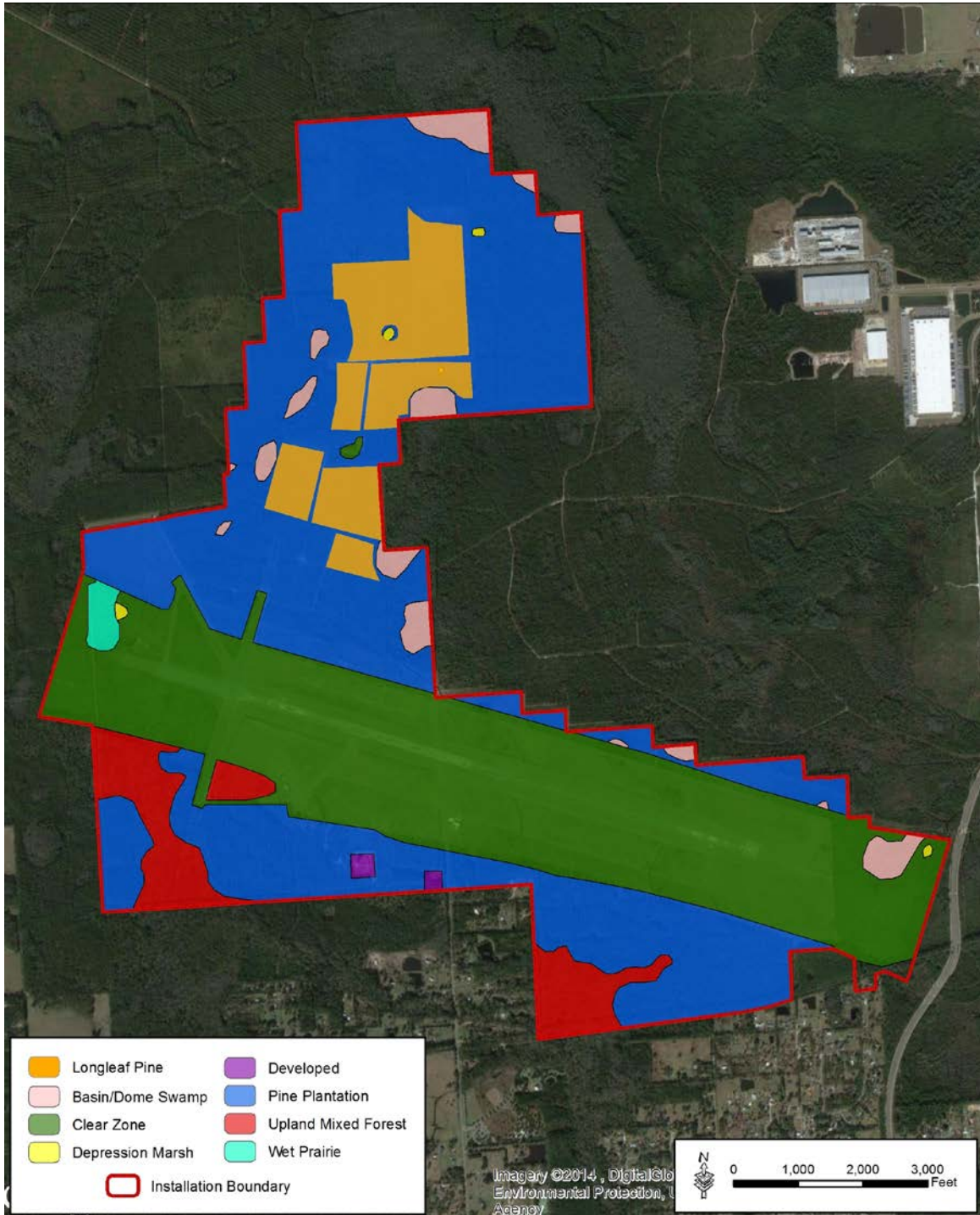


Figure 2-14. Natural Communities at OLF Whitehouse.

floodplain supports large trees including red maple, elm (*Ulmus americana*), and green ash (*Fraxinus pennsylvanica*), as well as the herbs millet beaksedge (*Rhynchospora miliacea*), lizard's tail (*Saururus cernuus*), and royal fern. South of the fire station and control tower is a more xeric area that has been disturbed by logging. A tiny pocket of xeric hammock is represented by sand live oak but the native groundcover is missing. The mowed apron around the runway is noteworthy for its diverse herbaceous ground cover and large gopher tortoise and pine lily (*Lilium catesbaei*) populations. Mature slash pine plantations with a moderate to heavy saw palmetto understory and sparse herbaceous species cover the rest of the south end.

The north end of OLF Whitehouse is pine plantation on an elevated ridge that slopes towards the surrounding basin swamps outside the property boundaries (Figure 2-14). Recently, 345 acres were either clear cut or thinned between 2008 and 2011, and 72 acres were reforested with long-leaf pine (*Pinus palustris*) between 2009 and 2011. Approximately 1,000 acres were prescribed burned in 2009 through a cooperative agreement with the USFS. Future forest management activities include more thinning, prescribed burning, and longleaf pine restoration in planted slash pine stands on dry sandy sites. Three small swamps occur on the eastern edge of the property. A series of three small dome swamps is located in the southwest corner of the north end. These isolated low-quality swamps are dominated by young pond cypress and intruded upon by the planted pines. The remaining natural communities at OLF Whitehouse exist as small disturbed fragments due to extensive areas of planted pine and land clearing for roads.

Depression marshes are interspersed in the pine plantation in the northeastern section of OLF Whitehouse and at the extreme ends of the runway. Upland mixed forest is present in the southwest corner of the property along a ditched section of a tributary of McGirts Creek.

Wet prairie occurs on low, relatively flat, poorly drained terrain, and is typically characterized as a treeless plain with a sparse to dense ground cover of grasses and herbs, which can include wiregrass and other threeawn grasses (*Aristida* spp.), toothache grass (*Ctenium aromaticum*), spikerushes (*Eleocharis* spp.), and beakerushes (*Rhynchospora* spp.). The most important physical factors are hydrology and fire. Wet prairie is seasonally inundated or saturated for 50 to 100 days each year and burns every 2 to 4 years. Wax myrtle and other shrubs quickly invade and will dominate wet prairies with longer fire intervals.

2.3.1.3 Rodman Bomb Target Natural Communities

Nine natural community types were identified on the Rodman Bomb Target during a 2017 survey by LG2ES (2018). The extent of these communities is provided in Table 2-7. Subsets of mesic flatwoods and the clear zone were designated. The distribution of the natural communities is shown in Figure 2-15.

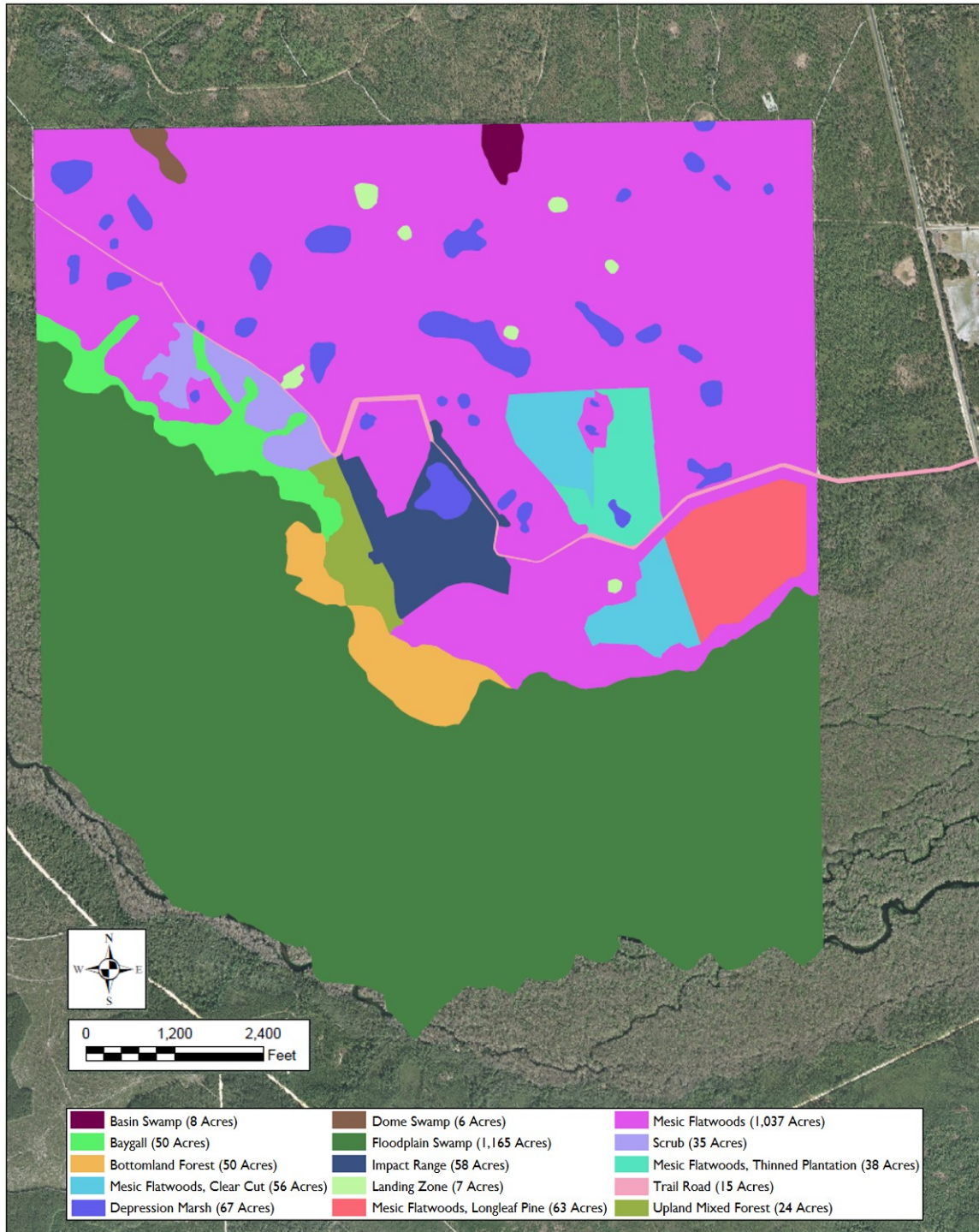


Figure 2-15. Natural Communities at Rodman Bomb Target.

Natural Community	Acres	Natural Community	Acres
Basin Swamp	14	Mesic Flatwoods	1,194
Baygall	50	Clear Cut	56
Bottomland Forest	50	Longleaf Pine	63
Depression Marsh	67	Thinned Plantation	38
Floodplain Swamp	1,165	Clear Zone	80
Scrub	35	Impact Range	58
Upland Mixed Forest	24	Landing Zone	7
		Trail Road	15

Rodman Bomb Target has a main target area of about 80 acres that is maintained as a clear zone by plowing. Several smaller areas have also been cleared for helicopter landing pads. The north part of the property is now mesic slash pine flatwoods with a light to heavy saw palmetto understory (Figure 2-15). This entire area is gridded with shallow ditches that cut south through the scrub to the floodplain.

The main areas remaining in natural condition at Rodman are the floodplain swamp and bottomland forest along the Oklawaha River, the band of baygall, scrub, and mesic flatwoods along the northern boundary side, and numerous small depression marshes and dome swamps scattered throughout the pine plantations (see Figure 2-15).

Mesic flatwoods dominate the northern half of Rodman Bomb Target. This area has been disturbed by site preparation for tree planting, which generally reduces wiregrass cover and increases cover of weedy species such as broomsedge (*Andropogon virginicus*). The former longleaf pine canopy has been replaced with slash pine, which used to be a preferred tree for timber production. Despite these disturbances, the area retains many of the characteristic plant and animal species of mesic flatwoods. The mesic flatwoods west of the clear zone have been disturbed by fire breaks, clearings, and jeep trails. Temporary piles of used bombs and target debris may be found in the area, but range clearance regulations require the collection, demilitarization, and recycling of this material.

Baygall borders the south side of the flatwoods and trees there have suffered damage from hot fires in the past. Baygalls are densely forested or shrubby peat-filled seepage area often at the base of sandy slopes. The canopy may be composed of tall, densely packed, generally straight-

boled evergreen hardwoods dominated by sweet bay, swamp red bay, and loblolly bay. A sparse to very dense (depending on canopy closure) understory of shrubs and ferns commonly occurs. Sphagnum is often interlaced with the convoluted tree roots. Baygalls typically develop at the base of a slope where seepage usually maintains a saturated peat substrate. They may also be located at the edges of floodplains or in other flat areas where high water tables help maintain soil moisture. Baygall soils are generally composed of peat with an acidic pH (3.5 - 4.5).

A number of depression marshes and dome swamps are scattered over the northern half of the property. These depressions average a few acres in size and are surrounded and encroached upon by mature slash Pine Plantation. The depression marshes generally have an open center with maidencane grass (*Panicum hemitomon*) and some have small pools of open water. Blackgum and slash pine typically ring the perimeters. The dome swamps have medium to large pond cypress. Baygall with loblolly bay (*Gordonia lasianthus*) and slash pine form bands around some of the dome swamps.

Scrubby flatwoods occur on a few ridges between the mesic flatwoods and the bottomland forest. There is an open canopy of sand pine (*Pinus clausa*), a tall shrub layer dominated by sand live oak, a short shrub layer dominated by saw palmetto and rusty lyonia, and a sparse herb layer dominated by beakrush (*Rhynchospora megalocarpa*). The scrub has not burned in many years, which has resulted in the dense tall shrub layer and the sparse herb layer.

West of the clear zone, upland mixed forest occurs on a small peninsula jutting into the bottomland forest. The canopy is dominated by live oak, laurel oak, loblolly pine, and sweetgum. The understory is dominated by young laurel oaks. Herbaceous cover is represented by patches of swamp grass (*Chasmanthium* spp.). This community represents a small area that is disturbed by roads and past clearing.

2.3.1.4 Yellow Water Natural Communities

Two natural community types were identified at the Yellow Water during a 2004 FNAI survey. The extent of these communities is provided in Table 2-8. Additional land cover types include housing and recreational areas. The distribution of these communities is shown in Figure 2-16.

Table 2-8. Natural Communities and Land Cover at Yellow Water	
Natural Community	Acres
Recreational Facilities	18
Bottomland Forest	96
Pine Plantation	106

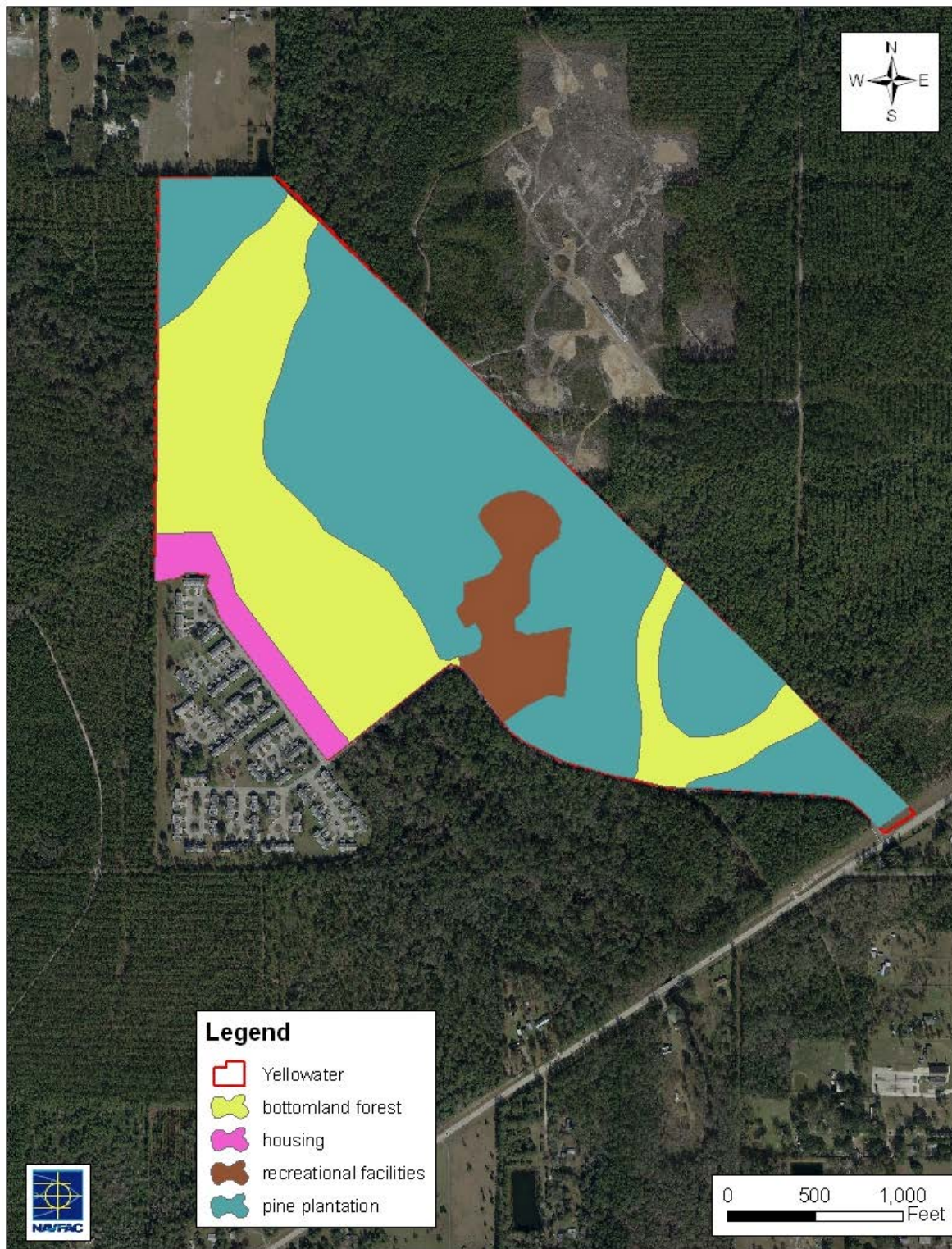


Figure 2-16. Natural Communities at Yellow Water.

The bottomland forest canopy at Yellow Water is dominated by laurel oak, loblolly pine, sweetgum, swamp chestnut oak (*Quercus michauxii*), red maple, and ash (*Fraxinus* sp.). Mid-story and shrub layers are dominated by red maple, sweetgum, and ironwood (*Carpinus caroliniana*). The herb layer is sparse, represented principally by swamp grass (*Chasmanthium sessiliflorum*) and sedges.

Some of the bottomland forest along Yellow Water Creek could be characterized as floodplain swamp. This area is characterized by bald cypress and swamp tupelo (*Nyssa biflora*). Shrub cover is sparse, represented by occasional red maple and Virginia willow (*Itea virginica*). Herb cover is also sparse, represented by sedges and lizard's tail. The transitional zone of the bottomland forest, where it abuts the Pine Plantation, could be classified as upland mixed forest. The canopy here is dominated by laurel oak and loblolly pine. The mid-story is dominated by young laurel oak and herb cover is sparse-to-absent.

2.3.2 Rare, Threatened and Endangered Species

Surveys of rare, threatened, and endangered plants were completed on the NAS JAX Complex in 1990, 1996-97, 2004, and 2009-11 (FNAI 2004; GSRC 2009, 2010, 2011; TNC/FNAI 1997). A survey for rare plants was also conducted at Rodman Bomb Target in 2018 (LG²ES 2018). No federally-listed plants were found on the properties, but five state-listed plants were identified (Table 2-9). The state-endangered star anise (*Illicium parviflorum*) was identified at NAS Jacksonville in 1990, but has not been recorded in subsequent surveys. The same is true for the state-threatened spoon-leaved sundew (*Drosera intermedia*), which was identified at Yellow Water in 1990. The state-endangered pondspice (*Litsea aestivalis*) has been identified at Rodman Bomb Target in every survey since 1996-97. The state-threatened hooded pitcher plant (*Sarracenia minor*) was identified at NAS Jacksonville, OLF Whitehouse, and Rodman Bomb Target in 2009-11, and again at Rodman in 2018. The state-threatened pine lily was identified at the same three properties only during the 1996 to 97 surveys, but there are recent anecdotal observations of pine lilies in OLF Whitehouse clear zone (ES&P 1990; FNAI 2004; GSRC 2009, 2010, 2011; TNC/FNAI 1997) (Table 2-9).

A specific survey for the federally-endangered pondberry (*Lindera melissifolia*) was carried out in 2004 at OLF Whitehouse. No individuals were located, but suitable habitat was identified (FNAI 2004).

Table 2-9. Rare, Threatened, and Endangered Plants at the NAS Jacksonville Complex											
1990 ^a	1996-97 ^b	2004	2009-11 ^c	2018 ^d	Scientific Name Common Name	Community Where Found	Status	NAS Jacksonville	OLF Whitehouse	Rodman Bomb Target	Yellow Water Housing Area
X	X				<i>Aristida rhizomophora</i> Florida Threeawn	Flatwoods, Pine Plantation	N		X		X
X					<i>Drosera intermedia</i> Spoon-leaved Sundew	Drainage Ditch	ST				X
X					<i>Illicium parviflorum</i> Star Anise	Pine Flatwoods	SE	X			
	X				<i>Lilium catesbaei</i> Pine Lily	Mesic Flatwoods, Wet Flatwoods	ST	X	X	X	
		A			<i>Lindera melissifolia</i> Pondberry	Depression Marsh Cypress Dome	FE		A		
	X	X	X	X	<i>Litsea aestivalis</i> Pondspice	Depression Marsh	SE			X	
			X	X	<i>Sarracenia minor</i> Hooded Pitcher Plant	Depression Marsh	ST	X	X	X	
	X				<i>Verbesina heterophylla</i> Diverseleaf Crownbeard	Mesic Flatwoods	N	X			

a = Rodman Bomb Target was not surveyed in 1990

b = Yellow Water was not surveyed in 1996-97

c = Yellow Water was not surveyed in 2009-11, NAS Jacksonville was surveyed in 2010, OLF Whitehouse in 2011, and Rodman Bomb Target in 2009.

d = Only Rodman Bomb Target was surveyed in 2018.

A = The species was targeted during survey efforts, but was not observed and is presumed absent

Status: N = None; FE = Federal Endangered; SE = State Endangered; ST = State Threatened

Surveys of rare, threatened, and endangered animals were completed on the NAS JAX Complex in 1996-97, 2004, and 2009-11 (FNAI 2004; GSRC 2009, 2010, 2011; TNC/FNAI 1997). Five federally-listed and federally-petitioned species were identified, or evidence of their presence (i.e., active burrows and shed skins) was observed. The federally-threatened wood stork (*Mycteria americana*) and Florida manatee (*Trichechus manatus latirostris*) have been confirmed to occasion the properties, wood storks on NAS Jacksonville and Rodman Bomb Target, and manatees in the river adjacent to NAS Jacksonville. The shed skin of a federally-threatened eastern indigo snake (*Drymarchon couperi*) was identified at OLF Whitehouse during the 1996-97 survey (TNC/FNAI 1997). However, subsequent surveys of OLF Whitehouse, including one that used a detector dog (Stevenson and Spear 2015) did not reveal any further evidence of indigo

snake presence. The gopher tortoise, a federal-candidate species, has been observed at all properties during every survey. The gopher frog (*Rana capito*), a federally-petitioned species for listing, was identified associated with gopher tortoise burrows at Rodman Bomb Target in 1996-97 and 2004 (FNAI 2004; TNC/FNAI 1997). The eastern diamondback rattlesnake (*Crotalus adamanteus*) has also been petitioned for federal listing and was observed at Rodman Bomb Target in 1996-97 (TNC/FNAI 1997), but anecdotal reports place it at the other properties as well. Specific surveys were carried out for the frosted flatwoods salamander (*Ambystoma cingulatum*) and its potential habitat at OLF Whitehouse in 2004. Larvae were targeted for this survey, but no specimens were captured and potential habitat was determined to be marginally suitable, at best (FNAI 2004). The bald eagle (*Haliaeetus leucocephalus*) is no longer federally listed, but is still protected under the Bald and Golden Eagle Protection Act. The species has been observed at NAS Jacksonville, OLF Whitehouse, and Rodman Bomb Target (Table 2-10).

Table 2-10. Rare, Threatened, and Endangered Animals at the NAS Jacksonville Complex										
1996-97 ^a	2004	2009-11 ^b	2016-18 ^c	Scientific Name Common Name	Community Where Found	Status	NAS Jacksonville	OLF Whitehouse	Rodman Bomb Target	Yellow Water Housing Area
Fish										
				<i>Acipenser brevirostrum</i> Shortnose Sturgeon	Riverine	FE	Y			
				<i>Acipenser oxyrinchus</i> Atlantic Sturgeon	Riverine	FE	Y			
Amphibians										
	A			<i>Ambystoma cingulatum</i> Frosted Flatwoods Salamander	Depression Marsh	FT		A		
X	X			<i>Rana capito</i> Gopher Frog	Depression Marsh	FP			X	
Reptiles										
				<i>Alligator mississippiensis</i> American Alligator	Depression Marsh, Pine Flatwoods	FT	Y		Y	
X				<i>Crotalus adamanteus</i> Eastern Diamondback Rattlesnake	Pine Plantation, Tortoise Burrow	FP			X	
X				<i>Drymarchon couperi</i> Eastern Indigo Snake	Pine Plantation	FT		Xd		
X	X	X	X	<i>Gopherus polyphemus</i> Gopher tortoise	Flatwoods, Pine Plantation, Ruderal	FC	X	X	X	X

Table 2-10. Rare, Threatened, and Endangered Animals at the NAS Jacksonville Complex										
1996-97 ^a	2004	2009-11 ^b	2016-18 ^c	Scientific Name Common Name	Community Where Found	Status	NAS Jacksonville	OLF Whitehouse	Rodman Bomb Target	Yellow Water Housing Area
Mammals										
	X			<i>Corynorhinus rafinesquii</i> Rafinesque's Big-eared Bat	Forested Wetland	N			X	
	X			<i>Myotis austroriparius</i> Southeastern Myotis (bat)	Forested Wetland Pine Plantation	N	Xe	Xe	Xe	Xe
X		X		<i>Sciurus niger shermani</i> Sherman's Fox Squirrel	Pine Flatwoods	N	X	X		
		X		<i>Trichechus manatus latirostris</i> Florida Manatee	Riverine	FT	X			
X		X	X	<i>Ursus americanus floridanus</i> Florida Black Bear	Pine Flatwoods, Scrub	BMP			X	
Birds										
X		X	X	<i>Aimophila aestivalis</i> Bachman's Sparrow	Depression Marsh, Pine Flatwoods	N		X	X	
X		X	X	<i>Ardea alba</i> Great Egret	Pond, Wetland	N	X	Xf	X	
X		X	X	<i>Egretta caerulea</i> Little Blue Heron	Wetland	ST	X		X	
X		X	X	<i>Egretta thula</i> Snowy Egret	Pond, Wetland	N	X	Xg	X	
		X	X	<i>Egretta tricolor</i> Tricolored Heron	Wetland	ST	X			
X			X	<i>Eudocimus albus</i> White Ibis	Wetland	N	Xg	Xg	X	
X		X	X	<i>Grus canadensis</i> Sandhill Crane	Depression Marsh	N			X	
X		X	X	<i>Haliaeetus leucocephalus</i> Bald Eagle	Mesic Flatwoods, Riverine	BGE	X	Xf	X	
X		X	X	<i>Lanius ludovicianus</i> Loggerhead Shrike	Urban Areas	N	X	X	X	
X		X		<i>Mycteria americana</i> Wood Stork	Depression Marsh, In-Flight	FT	Xf		X	
X		X	X	<i>Nyctanassa violacea</i> Yellow-crowned Night Heron	Wetland	N	X		X	

Table 2-10. Rare, Threatened, and Endangered Animals at the NAS Jacksonville Complex										
1996-97 ^a	2004	2009-11 ^b	2016-18 ^c	Scientific Name Common Name	Community Where Found	Status	NAS Jacksonville	OLF Whitehouse	Rodman Bomb Target	Yellow Water Housing Area
X		X	X	<i>Sterna antillarum</i> Least Tern	Riverine	ST	X			

a = Yellow Water was not surveyed in 1996-97

b = Yellow Water was not surveyed in 2009-11, NAS JAX was surveyed in 2010, OLF Whitehouse in 2011, and Rodman Bomb Target in 2009.

c = A bird survey was conducted at NAS JAX, OLF Whitehouse, and Rodman Bomb Target in 2016-17, and a survey for bears and herpetofauna was conducted at Rodman Bomb Target in 2017-18.

Xd = The species has not been observed on this property since the 1990s.

Xe = Bats were only surveyed in 2004.

Xf = The species was only observed on this property in 2009-11.

Xg = The species was only observed on this property in 2016-17.

A = The species was targeted during survey efforts, but was not observed and is presumed absent

Y = The species is present, but has not been observed during scheduled surveys

Status: N = None; FC = Federal Candidate; FE = Federal Endangered; FP = Federal Petitioned;

FT = Federal Threatened; BGE = Bald and Golden Eagle Protection Act; SE = State Endangered;

ST = State Threatened; BMP = Florida Black Bear Management Plan

Regarding state-listed species, three state-listed threatened bird species have been identified on the Complex. These includes the little blue heron (*Egretta caerulea*), which has been observed at NAS Jacksonville and Rodman Bomb Target, and the tri-colored heron (*Egretta tricolor*) and least tern (*Sterna antillarum*), which have been observed only at NAS Jacksonville. The Florida black bear (*Ursus americanus floridanus*) is not listed, but is managed by FWC under the Florida Black Bear Management Plan. Evidence of black bears was observed at Rodman Bomb Target in 1996-97 (TNC/FNAI 1997) and it was assumed to still be at that property in 2009-11 (GSRC 2009), but photographic evidence was obtained in 2018, including images of a female and two cubs (LG²ES 2018; Table 2-10).



A female black bear and two cubs photographed at Rodman Bomb Target in April 2018.

The Sherman's fox squirrel (*Sciurus niger shermani*), a rare but unlisted mammal, was observed at NAS Jacksonville and OLF Whitehouse in 1996-97 and 2009-11 (GSRC 2010; GSRC 2011; TNC/FNAI 1997). Bats were surveyed at all four properties in 2004 (FNAI 2004). The rare but unlisted southeastern myotis (*Myotis austroriparius*) was identified at all four properties. The Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) was identified only at Rodman Bomb Target (Table 2-10).

2.3.2.1 Critical Habitat

The ESA requires the conservation of critical habitat, which is defined as the areas of land, water, and air space a threatened or endangered species need for survival. Critical habitat also includes such things as food and water, breeding sites, cover or shelter, and sufficient habitat area to provide for normal population growth and behavior. Section 7 of the ESA restricts destructive or adverse modification of critical habitat by any activity funded, authorized, or carried out by any Federal agency. One of the primary threats to many species is the destruction and modification of essential habitat by uncontrolled land and water development.

Critical habitat was designated in the St. Johns River in 1976 for the federally-threatened Florida Manatee (41 FR 41914). This critical habitat includes the nearshore waters of the St. Johns River adjacent to NAS Jacksonville. Natural resources management actions described in this INRMP provide for water quality protection to the water bodies surrounding NAS Jacksonville, which benefits the continued existence and future recovery of the Florida manatee. The NAS JAX Complex's stewardship of water quality is exemplified by the Clean Marina designation bestowed upon Mulberry Cove Marina at NAS Jacksonville (see Section 2.2.5.5).

This INRMP describes natural resources management actions that impart benefits to listed species and their habitats on the NAS JAX Complex and provides assurances that those actions will be implemented and will be effective. The NAS JAX Complex NRM is responsible to ensure this INRMP continues to perform that function for all ESA-listed species on the Complex and those that utilize waters adjacent to the Complex. Navy Region Southeast biologists provide assistance as needed. Effective communication and partnership with the Federal regulatory agencies are also essential to successfully perform this responsibility.

2.3.2.2 Gopher Tortoise

Gopher tortoises are present throughout much of the uplands OLF Whitehouse and especially along the air strip buffer. They are also found on the other three properties. Gopher tortoise surveys were conducted NAS JAX Complex in 1996-97 (all properties except Yellow Water; FNAI 1997), 2004 (all properties except NAS Jacksonville; FNAI 2004), 2009-11 (all properties except

Yellow Water; GSRC 2009; GSRC 2010; GSRC 2011), and in 2017 (only at Rodman Bomb Target; LG²ES). The results from the 1996-97 surveys reported gopher tortoise densities (tortoises per hectare), which were partitioned by natural community type (Table 2-11).

Location	Community Type	Area Sampled (hectares)	Density ¹
NAS Jacksonville	Pine Flatwoods	1.6	0.00
	Scrub	1.0	3.44
OLF Whitehouse	Planted Pine	28.9	0.23
	Scrub	17.2	0.57
	Air Strip Buffer	10.0	8.60
Rodman Bomb Target	Scrub	0.6	4.40
	Planted Pine	1.0	0.50
		10.0	0.00

¹ Densities were estimated using a 0.614 tortoise per burrow correction factor (Auffenberg and Franz 1982)

The results from the 2004, 2009-11, and 2017 surveys reported gopher tortoise burrow counts, which were partitioned into active burrows and abandoned or inactive burrows (Table 2-12).

Survey Year	NAS Jacksonville	OLF Whitehouse	Rodman Bomb Target	Yellow Water
2004	N/A	Active: 33 Not Active: 115	Active: 2 Not Active: 10	Active: 1 Not Active: 2
2009-11 ^a	Active: 20 Not Active: 19	Active: 84 Not Active: *1	Active: 23 Not Active: 22	N/A
2017	N/A	N/A	Active: 73 Not Active: 15	N/A

* The only area at OLF Whitehouse that was surveyed in 2011 was the air strip buffer, which had only one inactive burrow.

2.3.3 Forest Resources

The primary purpose of forest management at the NAS JAX Complex is to provide a sustainable yield of forest products and enhance other natural resource values such as wildlife management, hunting, and outdoor recreation within the scope of the military mission. The forestland

designated for commercial timber production will be managed on an 80-year rotation. Specific forest management activities such as harvesting, reforestation, forest improvement, and forest protection will be scheduled as needed (see Appendix B). Commercial harvests will consist of thinning immature and mature forest stands, and clear-cutting will only be used in special circumstances such as cutting stands damaged by southern pine beetles or conversion of slash pines to longleaf pine stands. Other forest areas not designated for commercial timber production will be left in their present or natural condition and forest management activities will only be conducted in the case of forest destruction from large southern pine beetle outbreaks or hurricanes.

2.3.3.1 NAS Jacksonville Forestland

The Navy protects and enhances forest resources at NAS Jacksonville by practicing ecologically-sound forest management leading to sustained yield of quality forest products, watershed protection, outdoor recreation opportunities and wildlife habitat protection. The forestland at NAS Jacksonville is located primarily in the weapons compound and at Westside Regional Park. The pine forests are comprised of natural slash pines with scattered longleaf and loblolly pines. There are also some small planted slash pine stands in the urbanized areas of the property and around the antenna farm. All of the NAS Jacksonville forest stands have been inventoried as part of an overall forestry resources management effort. A map depicting the forest stands is provided in Figure 2-17. Appendix B provides the comprehensive individual stand inventory data for NAS Jacksonville, as well as the stand locations and compartments.

Timber harvests have occurred only as a result of a need arising from the military mission (such as construction projects or base safety issues). During the 1990s, most of the forest stands in the weapons compound were heavily thinned to aid in the establishment of an uneven aged forest. This has resulted in forests of mature pines with immature pine seedlings and saplings in the understory. Prescribed burning is not performed due to the urbanized areas and major roadways surround this property. A series of firebreaks with connections to roads, cleared areas, and waterways are utilized to provide fire protection. In the event of a wildfire, the NAS Jacksonville Fire Department will provide initial response and the Florida Forest Service will provide support as needed.

2.3.3.2 OLF Whitehouse Forestland

The forestland at OLF Whitehouse consists of mature slash pine plantations with a few stands of natural slash pine with scattered longleaf and loblolly pines. Most of the pine forests range in age from 35-to-60 years or more. The forest understory is consistent, with some areas of pure saw palmetto and other areas containing saw palmetto and gallberry. Some of the forest stands have

been thinned and prescribed burned in the last 20 years. Recently, 345 acres were either clear cut or thinned between 2008 and 2011, and 72 acres were reforested between 2009 and 2011. Approximately 1,000 acres were prescribed burned in 2009 through a cooperative agreement with the USFS. Future forest management activities include more thinning, prescribed burning, and longleaf pine restoration in planted slash pine stands on dry sandy sites. Bottomland hardwood areas will remain in an unmanaged natural state. Prescribed burning will be conducted through a cooperative agreement with the USFS or other government agency. A series of firebreaks with connections to roads, cleared areas, and waterways are utilized to provide fire protection. Fire protection will be performed via periodic firebreak maintenance and prescribed burns. In the event of a wildfire, the Florida Forest Service would provide initial response. The OLF Whitehouse Fire Department is manned during fixed-wing operations and would also respond to wildfire at such times. Forest stands at OLF Whitehouse are illustrated in Figure 2-18.

2.3.3.3 Rodman Bomb Target Forestland

The forestland at Rodman Bomb Target consists of mature slash pine plantations with a few stands of natural slash pines interspersed with scattered longleaf and loblolly pines. There is one large stand of 15-year-old natural slash pines and one stand of 8-year-old planted slash pines. Most of the pine forests range in age from 35-to-65 years or more. A 57-acre stand of longleaf pines was planted in 2015. The pine forest understory contains palmetto and gallberry. Forest stands at Rodman Bomb Target are illustrated in Figure 2-19. Most of the forest stands have been thinned and burned in the last 20 years. Sixty acres were clear cut in 2012 and 27 acres were reforested in 2007. Approximately 1,000 acres were prescribed burned in 2008 through a cooperative agreement with the USFS. Future forest management activities include more thinnings and periodic prescribed burning. Floodplain swamps, bottomland forests, and dome swamps will remain in an unmanaged natural state. Prescribed burning will be conducted through a cooperative agreement with the USFS or other government agency. A series of firebreaks with connections to roads, cleared areas, and waterways are utilized to provide fire protection. Fire protection will be performed via periodic firebreak maintenance and prescribed burns. In the event of a wildfire, the Florida Forest Service would provide fire suppression.

2.3.3.4 Yellow Water Forestland

The forestland at the Yellow Water consists of mature slash pine plantations. There is one stand of young planted slash pines and one mixed pine/hardwood stand of loblolly and pond pine, cypress, gum, maple, oak and ash bordering Yellow Water Creek. The mixed pine and hardwood stand is in the process of natural conversion to a bottomland hardwood stand. Most of the pine and hardwood forests range in age from 35-to-65 years or more. The planted pine understory contains saw palmetto and gallberry. All of the Yellow Water forest stands have been inventoried

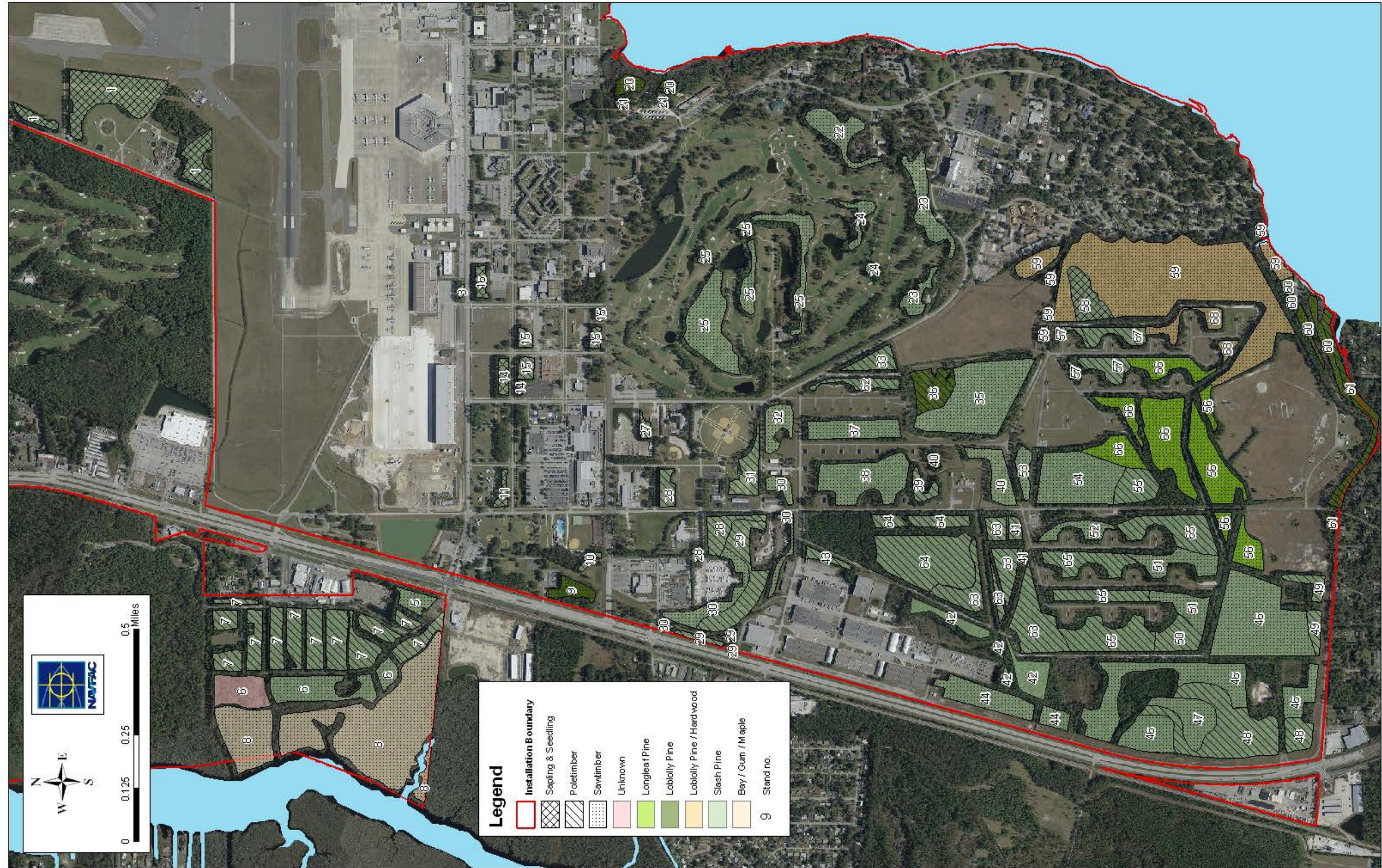


Figure 2-17. Forest Stands at Naval Air Station Jacksonville.

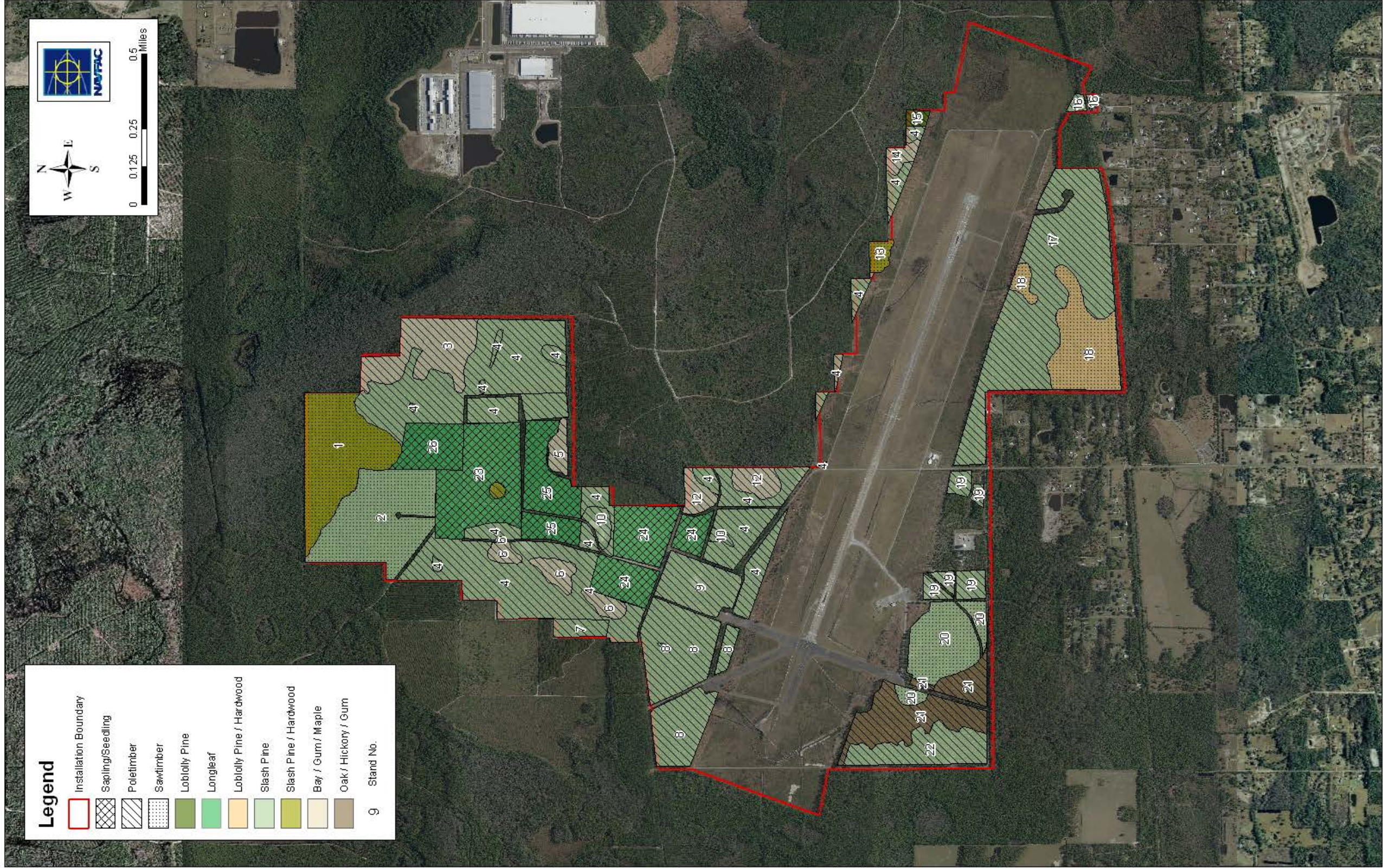


Figure 2-18. Forest Stands at OLF Whitehouse.

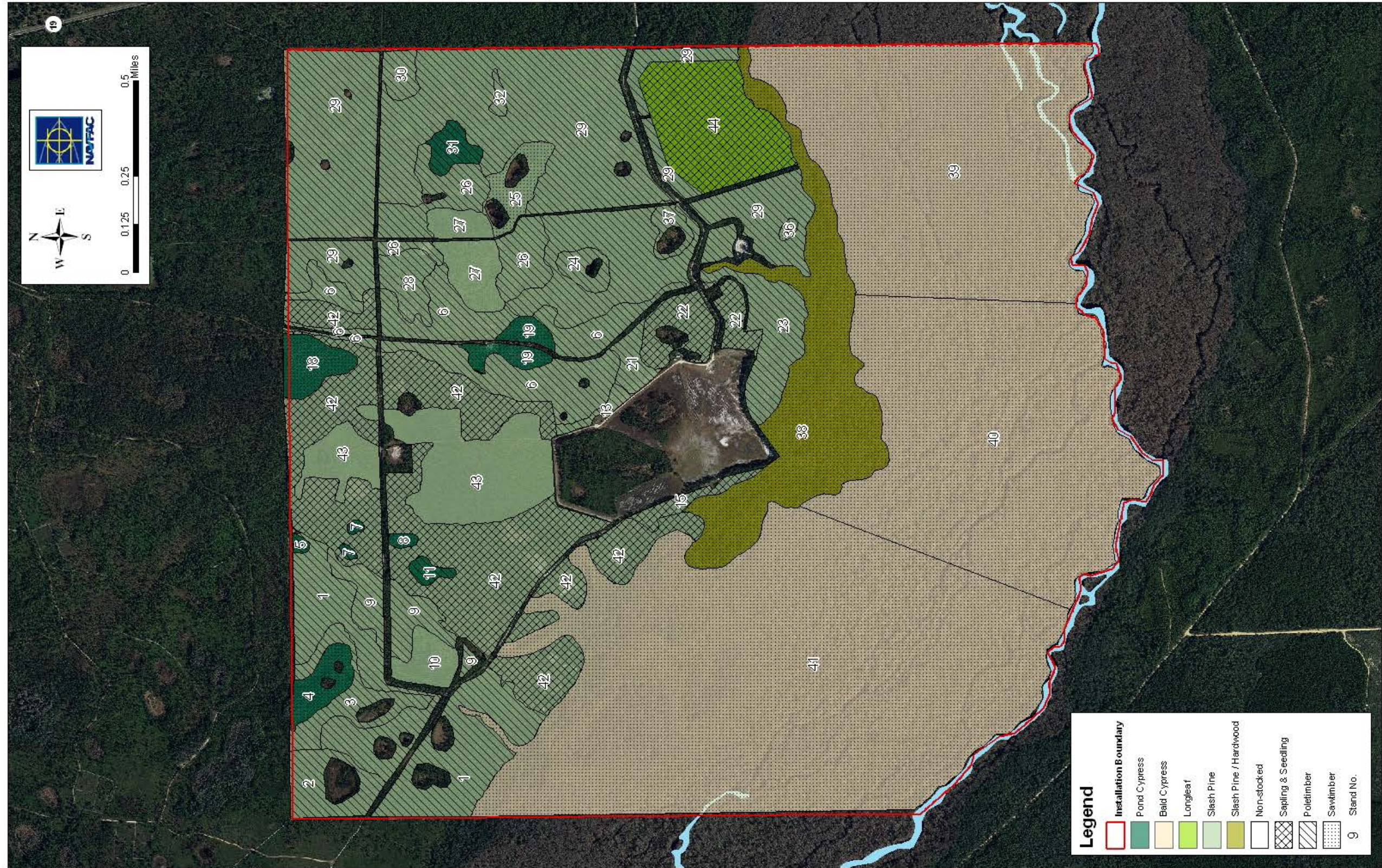


Figure 2-19. Forest Stands at Rodman Bomb Target.

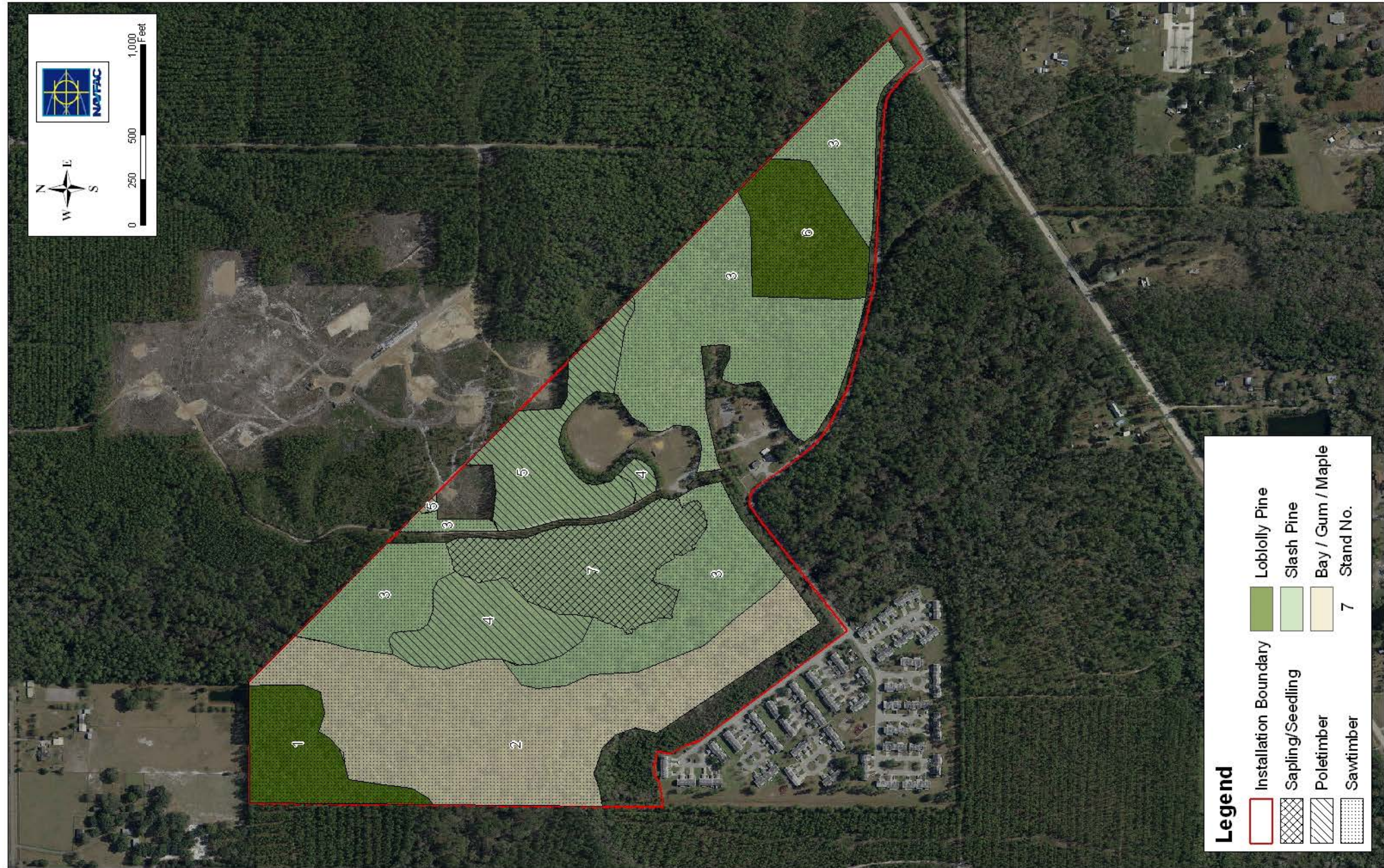


Figure 2-20. Forest Stands at Yellow Water.

as part of an overall forestry resources management effort. Appendix B provides the comprehensive individual stand inventory data, as well as the stand locations and compartments. One of the slash pine stands was damaged by southern pine beetles in the early 2000's and had to be harvested and reforested. Future forest management activities include thinning of the planted slash pine stands. The bottomland hardwood stand will remain in an unmanaged natural state. Forest stands at Yellow Water are illustrated in Figure 2-20.

Prescribed burning is not planned for the Yellow Water since the forestland on this property is bordered by a housing complex, a major state highway, and the Jacksonville Equestrian Center. A series of paved roads and unpaved woods roads, cleared areas, and waterways are utilized to provide fire protection. In the event of a wildfire, the Florida Forest Service would provide fire suppression.

2.4 RECREATIONAL OPPORTUNITIES

Outdoor recreation activities are dependent upon the natural environment. Opportunities for outdoor recreation at the NAS JAX Complex occur primarily at NAS Jacksonville. Recreational facilities at the Complex are maintained primarily by the Morale, Welfare, and Recreation (MWR) Division. MWR promotes and maintains the morale and welfare of military personnel and their dependents, both active and retired, in addition to DoD civilians when possible, through the programming and operation of recreation and club facilities. Some facilities managed by MWR (e.g., the Golf Course) are not considered as outdoor recreation here because they are highly developed.

NAS Jacksonville

NAS Jacksonville has approximately 1,000 acres of land available for recreational activities. These occur primarily along the St. Johns River (e.g., Mulberry Cove, Black Point Watchable Wildlife Area, and Manatee Point Recreation Area), around Casa Linda Lake, and in Tillie K. Fowler Park. Historic locations are also located throughout NAS Jacksonville, including the Chapel, Landplane Hanger Historic District, Senior Officers Quarters Historic Building, and the Warehouse District.

Tillie K. Fowler Park lands were acquired by the U.S. Government in 1976 to control the encroachment of development into the NAS Jacksonville Compatible Use Zone. The DoN entered into a lease with the City of Jacksonville, granting the city use of property exclusively as a public park through 31 July 2026. The park is located west of U.S. Highway 17 on the Ortega River and offers outdoor activities such as hiking, wildlife watching, and education to military personnel and the general public.

Dispersed recreational activities (i.e., fishing, canoeing, sailing, motorized boating, wildlife watching, nature trails, and bicycling) on NAS Jacksonville that are accessible to military personnel, their families and guests, and civilian employees include the following:

- Freshwater fishing at Casa Linda Lake and along the St. Johns River shoreline from Mulberry Cove (fishing is not permitted at the boat house docks, along seaplane ramps, or on the west bank [golf course side] of Casa Linda Lake);
- Interpretive nature trails at Mulberry Cove (Navy Lodge Nature Trail) and Tillie K. Fowler Park;
- Bicycling along a network of sidewalks and roadways;
- Boating from the marina in Mulberry Cove on the St. Johns River that provides various boat and equipment rentals (boating is prohibited on the two lakes);
- Camping at a recreational vehicle and tent campground that is attractive to traveling military retirees because of its proximity to I-10 and I-95;
- Picnicking at one of five picnic areas at Seabat Park, Mariner Park, Fisherman's Cove, Seaking I and II, and Orion Park (numerous non-MWR-administered areas are located near many office and operations buildings, as well as Manatee Point and Patriot's Grove);
- Jogging at marked fitness and jogging courses along the south perimeter road (Patrol Road/Mustin Road);
- Outdoor education and interpretation at Tillie K. Fowler Park (which highlights the hardwood wetlands along the Ortega River and the hardwood forest on the northern side of the park) and interpretive center at Black Point Watchable Wildlife Area (which interprets ecological and historic resources); and
- Skeet shooting.

OLF Whitehouse

Hunting is allowed on the OLF Whitehouse property on a seasonally-published schedule and according to the availability of volunteers to check hunters in and out. Active duty military, reservists, retired military, and current civilian employees of OLF Whitehouse are authorized to hunt in designated areas. NAS Jacksonville Instruction (NASJAXINST) 5090.10 series (Appendix C) explains the hunting regulations, which were developed by Natural Resources personnel in the Environmental Division in accordance with all appropriate state and federal guidelines.

Rodman Bomb Target

Hunting is allowed on the Rodman Bomb Target property on a seasonally-published schedule. Active duty military, reservists, retired military, and current civilian employees of Rodman Bomb Target are authorized to hunt in designated areas. NASJAXINST 5090.10 series (Appendix C) explains the hunting regulations, which were developed by Natural Resources personnel in the Environmental Division in accordance with all appropriate state and federal guidelines.

Yellow Water

All of the recreational facilities at Yellow Water have been removed by MWR in association with the privatization of housing. The natural wildlife corridor still exists for passive outdoor recreational activities.

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Environmental Management Strategy and Mission Sustainability

3.1 SUPPORTING SUSTAINABILITY OF THE MILITARY MISSION AND THE NATURAL ENVIRONMENT

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

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

Nuisance wildlife and outbreak of disease on the Complex could pose a threat to implementation of the military mission through the infection of military personnel and the consequent limitation of access to areas of the installation to control a problem.

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

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

3.1.1 Military Mission and Sustainable Land Use

The primary military mission on the NAS JAX Complex is to maintain and operate facilities and provide services and materials to support operations of aviation activities and units of the operating forces of the DoN and other activities and units, as designated by the CNO. The NAS JAX Complex fully supports the operational and training missions of assigned tenants, enhancing the readiness of the DoN, its sister armed services and other customers, especially with regard to aviation training. Merging the military mission with sustainable land use can be achieved through the maintenance of forestland to prevent encroachment onto the airfields and sustaining native environments such as low-lying scrubs and wet prairies. Maintenance of natural environments also better simulates “real world” conditions for trainees. Sustaining protected species habitat and air and water quality keeps the NAS JAX Complex in compliance with environmental laws, preventing regulatory consequences that can lead to financial penalties and mission delays. Effective partnering with adjacent landholders will help limit urban encroachment, thereby limiting effects of aircraft noise on the surrounding populace. This INRMP creates a framework for sustainable land use that is compatible with the military training requirements while encouraging native and natural species abundance. Through the Commander Navy Region Southeast (CNRSE) and its constituent elements, the NAS JAX Complex integrates its land use to meet the current and future military mission and ensuring the conservation of the natural resources upon which effective training rely.

3.1.2 Defining Impact on the Military Mission

The military mission at the NAS JAX Complex requires safe, natural-state land and environments for the training of naval aviators and other tenants. The NAS JAX Complex will comply with environmental regulations and strive to conserve the natural resources while also conducting effective training. Through the coordination of the various environmental programs (i.e., Forest Management, Fish and Wildlife Management), the NAS JAX Complex ensures the availability of quality training opportunities and the protection of the natural resources on its properties. The NAS JAX Complex NRM and installation mission leadership and operators should coordinate during the planning phase of natural resources projects and training missions to ensure

compatibility between the military mission and natural resources management. Resolutions should be established to ensure environmental regulations (e.g., ESA, Clean Water Act [CWA], etc.) are being satisfied while improving land and water resources and meeting the military mission.

3.1.3 Relationship to the Jacksonville Range Complex Management Plans

The Jacksonville Range Complex represents an essential combination of air, land, and sea space that provides realistic training areas for Navy personnel. The Jacksonville Range Complex includes air, land, and offshore areas of east Florida, Georgia, South Carolina, and North Carolina. An Operating Area (OPAREA) is a designated area of the ocean organized and managed to provide a safe and controlled surface and underwater military training and testing environment. The Jacksonville OPAREA is one of two OPAREAs in the Jacksonville Range (the other is the Charleston OPAREA) and encompasses the oceanic environment offshore of the NAS JAX Complex. An Environmental Impact Statement / Overseas Environmental Impact Statement (EIS/OEIS) was prepared for Navy operations within the Jacksonville Range and its associated OPAREAs in 2008 and was completed in cooperation with the National Marine Fisheries Service (NMFS). Potential impacts to the physical, environmental, and manmade environments from aircraft that take off and land at the NAS JAX Complex as part of training on the Range are evaluated in the Jacksonville Range Complex Final EIS/OEIS. No natural resources management actions described in this INRMP are compromised to accommodate training on the Jacksonville Range or within the Jacksonville OPAREA.

3.2 NATURAL RESOURCE CONSULTATION REQUIREMENTS

All Federal agencies are required to implement protection programs for designated species and to use their authorities to further the purposes of the ESA. Furthermore, if a Federal action of any kind is found to potentially impact any species protected by the ESA, the responsible Federal agency must enter into Section 7 consultation with the USFWS or NMFS. The USFWS is the primary agency responsible for implementing the ESA, except for actions involving marine animals or anadromous fish, such as the Atlantic sturgeon (*Acipenser oxyrinchus*) and shortnose sturgeon (*Acipenser brevirostrum*), for which the NMFS is the acting agency. Species under USFWS jurisdiction, such as the federally-threatened Florida manatee and the federal candidate, gopher tortoise, are also known to occur on the NAS JAX Complex, and manatee critical habitat occurs in the St. Johns River adjacent to NAS Jacksonville. Section 7 consultation could be required for future military projects that have a potential to impact federally-listed species or designated critical habitat.

The CO of the NAS JAX Complex or his agent coordinates with the appropriate regulatory agency on any actions that have the potential to impact rare, threatened, or endangered (RTE) species. Early informal consultation with the acting ESA agency is key to resolving potential problems and addresses issues in a proactive and positive manner, and is the preferred method of consultation. Informal consultation includes all discussions and correspondence with the regulatory agency, and occurs prior to formal consultation to determine whether a proposed Federal action may affect listed species or critical habitat. A flow chart of the informal consultation process is provided in Figure 3-1.

The NAS JAX Complex may determine, through the informal consultation process or simply by the nature of the proposed action, that formal consultation is required for an action. If the NAS JAX Complex determines an activity may have an adverse effect upon a federally-listed species and/or critical habitat, the NAS JAX Complex will enter into formal consultation with USFWS or NMFS to determine whether a proposed action is likely to jeopardize the continued existence of listed species, destroy or adversely modify designated critical habitats, or potentially result in the incidental take of a species. The formal consultation process begins with a NAS JAX Complex written request and submittal of a complete initiation package and concludes with USFWS's or NMFS's issuance of a biological opinion and "incidental take" statement, if applicable. A flow chart detailing the steps of the formal consultation process is presented as Figure 3-2.

Essential marine and anadromous fish habitats (EFHs) are required to be identified and protected by the NMFS, regional fishery management councils (FMC), and other federal agencies under the auspices of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended in 1996. Areas designated as EFH are defined as "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" according to the Magnuson-Stevens Act. EFH is associated with marine fish species, so is unlikely to become an issue at the NAS JAX Complex, which is associated with freshwater aquatic environments.

Marine mammals, including the ubiquitous bottlenose dolphin (*Tursiops truncatus*), are protected under the Marine Mammal Protection Act (MMPA). There are two levels of "take" under the MMPA: Level A take encompasses injury or death of the animal. Level B take includes many form of harassment, which has been interpreted to include sound-in-the-water from activities such as pile driving. NOAA Fisheries has provided criteria for mathematically determining the maximum distance to which sound-in-the-water may travel and constitute a Level B take. Installations may be able to mitigate these takes to zero by implementing a marine mammal observer plan that ensures a shut-down of relevant activities if a marine mammal comes within that distance. Alternatively, the action proponent may pursue an incidental harassment authorization (IHA) for

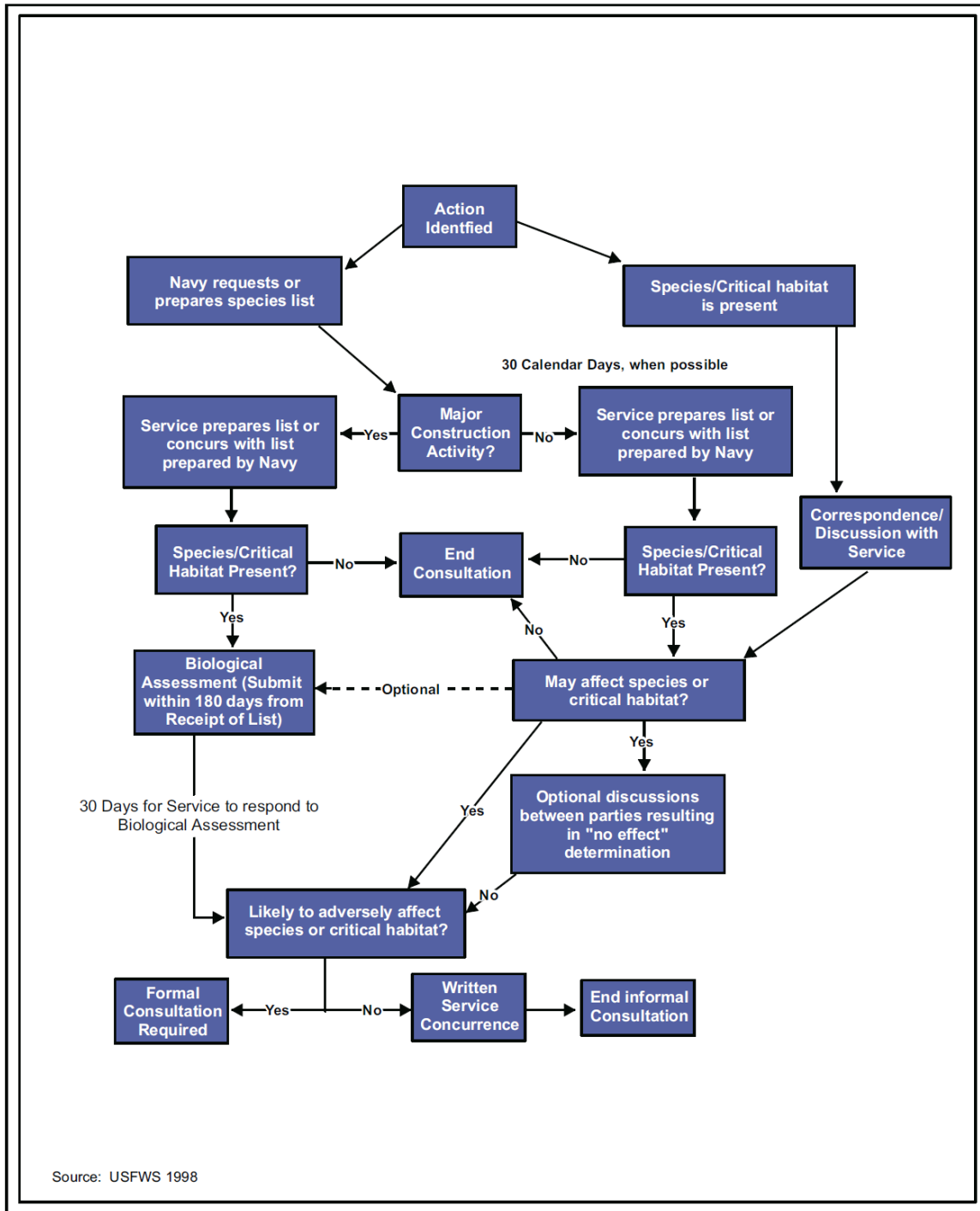


Figure 3-1. Flow Chart for the Informal Consultation Process.

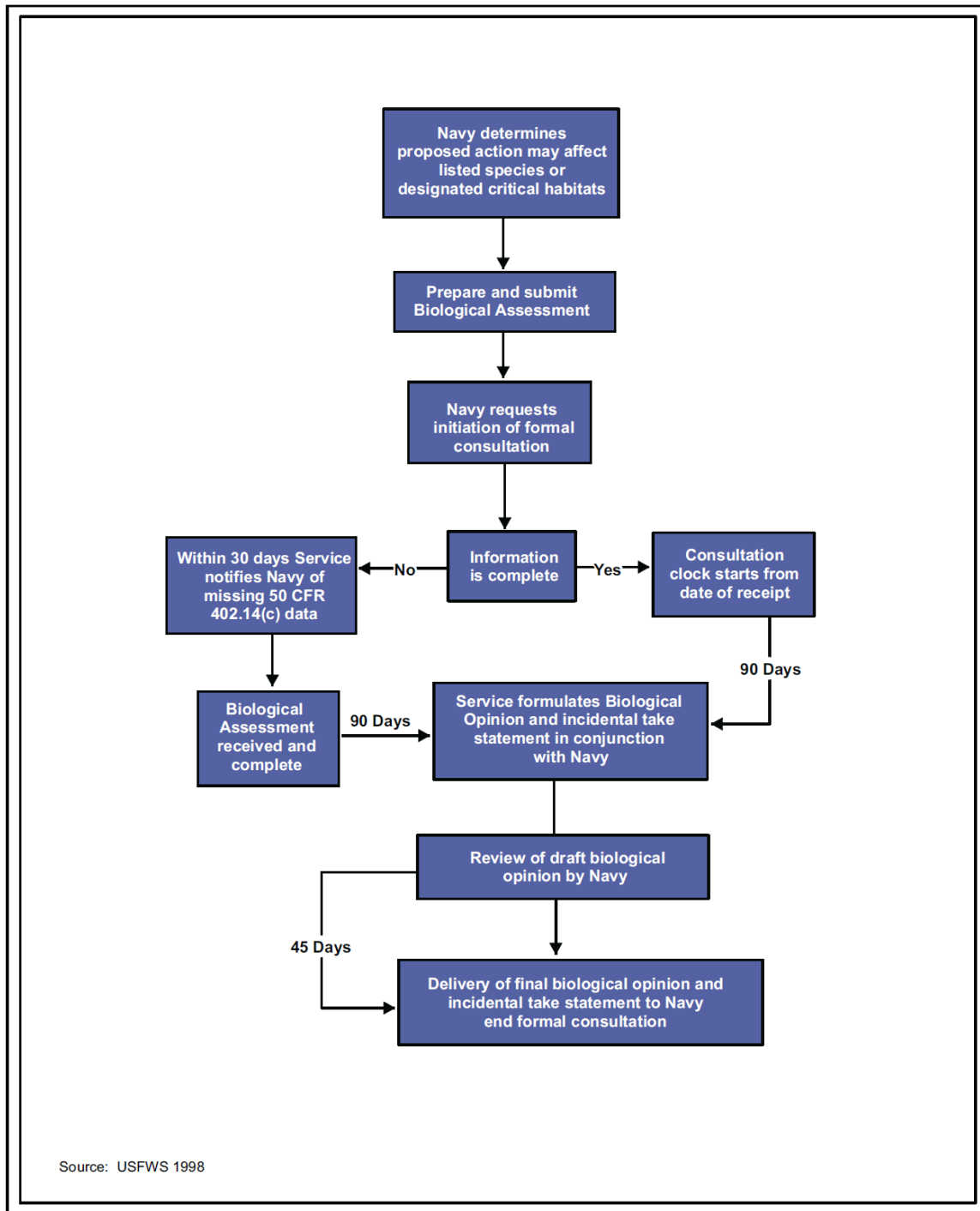


Figure 3-2. Flow Chart for the Formal Consultation Process.

the required number of Level B takes, but an IHA cannot be issued unless an Environmental Assessment (EA) is prepared.

The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, or possessing of migratory birds unless permitted by the USFWS. In December 2017, the Principal Deputy Solicitor released a memorandum stating that the acts prohibited under MBTA are only prohibited if done so intentionally, which is a different legal opinion than previous administrations held. However, the Navy is beholden to Section 315 of the 2003 National Defense Authorization Act (NDAA), which provides an exemption to the Navy for the incidental taking of migratory birds during military readiness activities authorized by the Secretary of Defense or the Secretary of the Navy. Under this statute, the Navy must still assess impacts, through the NEPA process, of proposed or ongoing military readiness activities on migratory bird species likely to occur in the action areas. Military readiness activities are defined under the NDAA as all training and operations of the Armed Forces that relate to combat, and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Military readiness does not include the routine operation of installation operating support functions, such as administrative offices, military exchanges, commissaries, water treatment facilities, storage facilities, motor pools, morale, welfare, and recreation activities, and mess halls; the operation of industrial activities; or the construction or demolition of facilities listed above.

Current MBTA regulations authorize permits for direct take of migratory birds for activities such as scientific research, education, and depredation control. However, the MBTA does not expressly address the issuance of permits for incidental take, so the Navy is compelled to exercise due diligence for activities requiring NEPA analysis and must develop appropriate and reasonable conservation measures to avoid, minimize, and mitigate identified significant adverse effects to migratory birds and their nests resulting from such activities.

3.3 PLANNING FOR NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE

NEPA requires an environmental analysis of major Federal actions, including actions that occur with Federal funding or on Federal lands. The NAS Jacksonville Complex has a NEPA instruction, 5090.12A (Appendix E). NEPA requires the evaluation of the environmental effects of proposed land use, development, and military training activities. Some Navy actions fall under existing categorical exclusion (CATEX) and require no further analysis. For those actions not covered by an existing CATEX, the initial environmental document, the Environmental Assessment (EA) determines the potential for significant project impacts and the feasibility of proposed actions. The NEPA process requires coordination with appropriate Federal and state agencies and the general public. The public review process scopes or identifies significant issues

to develop and evaluate alternatives. The preparation of an EIS occurs only if significant impacts are identified. If the EA finds “no significant impacts”, the Navy would complete the preparation of a formal Finding of No Significant Impact (FONSI) and make it available for public review.

An EA and FONSI were prepared and finalized in 2001 for implementation of this INRMP. The EA evaluated potential environmental impacts that could result from the implementation of various levels of management intensity, with all levels being in compliance with the Sikes Act. The Navy found, based upon the information gathered during preparation of the EA, that the implementation of the INRMP at the NAS JAX Complex would not significantly impact the environment.

3.4 BENEFICIAL PARTNERSHIPS AND COLLABORATIVE RESOURCE PLANNING

The current staffing level of natural resource personnel at the NAS JAX Complex and the need for outside expertise increases the importance of developing cooperative projects with other agencies, universities, contractors, other installations, local residents, conservation organizations, and the Navy command. Cooperating Federal and state agencies, universities, and non-governmental organizations (NGOs) can provide a beneficial exchange of technical information, natural resources services, and field assistance. The NAS JAX Complex has a diversity of natural resources and, due to the need for a variety of expertise and assistance in developing and implementing sound management practices, has developed partnerships and cooperative agreements for technical assistance in managing its natural resources.

Stakeholders are those organizations or individuals who have a vested interest in land management on the NAS JAX Complex. Stakeholders include the FWC, FDEP, FFS, SJRWMD, Florida Division of Recreation and Parks, Duval and Putnam Counties, the City of Jacksonville, and TNC. Additional assistance may be sought from other agencies such as the Natural Resources Conservation Service (NRCS), USFS, Florida Department of Agriculture and Consumer Services (FDACS), Division of Forestry, the USFWS, and NMFS. Partnerships, cooperative agreements, and community programs that affect natural resources management within NAS JAX Complex are discussed below.

DoN also coordinates efforts with volunteer organizations to supplement its personnel resources. DoN primarily benefits from its cooperation with the Student Conservation Association, Inc. (SCA), which provides volunteer workers and natural resources personnel through programs such as the Conservation Career Development Program (CCDP) Fellows, CCDP High School Crews, and National High School Program Crews. This agreement provides SCA volunteers with valuable experience in natural resources management while providing the NAS JAX Complex

with SCA volunteers to supplement Navy staff and work on a variety of natural resources projects.

3.5 PUBLIC ACCESS AND OUTREACH

The MWR promotes and maintains the morale and welfare of military personnel and their dependents, both active and retired, in addition to DoD civilians when possible. This is accomplished through the programming and operation of recreation and club facilities. Opportunities for outdoor recreation at the NAS JAX Complex primarily occur at NAS Jacksonville, with hunting opportunities at OLF Whitehouse and Rodman Bomb Target for guests who are sponsored by active duty military, reservists, retired military, and current civilian DoD employees. The MWR maintains outdoor recreational programs and facilities such as the marinas, picnic pavilions, campgrounds, and beaches. Natural resources staff maintain hiking trails and reviews and provides natural resources recommendations and guidance for all new projects proposed by MWR. They also conduct outreach programs for community groups at the Black Point Interpretive Center on a scheduled basis.

Access to natural resources management areas generally is limited to active duty and reserve military personnel assigned to the Complex, their dependents and accompanied guests, federal and civilian employees, their dependents and accompanied guests, and military retirees. The general public is allowed access to Tillie K. Fowler Park during daily operating hours. Access to recreational opportunities should also be considered in terms of accessibility of facilities and programs for the physically challenged. The Architectural Barriers Act of 1968 (Public Law 90-480) requires facilities to be accessible to the physically challenged. Section 504 of the Rehabilitation Act of 1973, as amended (Public Law 93-112), prohibits discrimination on the basis of handicap in program participation and in all facets of employment. The Americans with Disabilities Act of 1990 (Public Law 101-336) provides standards for addressing discrimination against individuals with disabilities in employment, transportation, telecommunications, public accommodations, and services operated by private entities. Military installations, including the dependents and civilians employed, are not exempt from these laws. Outdoor recreational opportunities available at the NAS JAX Complex have been further discussed in Section 2.4.

3.6 ENCROACHMENT PARTNERING

Encroachment is any issue external to military operations that inhibits, curtails, or has the potential to impede the performance of the military mission. Continued growth in the greater Jacksonville area has added to the encroachment concerns at the NAS JAX Complex and can limit operational capability. Complaints about noise, dust, and smoke from aircraft and vehicles can force the curtailment of certain types of training and available hours. As development

destroys or displaces native species of plants and animals, military posts become their refuge. This, too, can restrict the military mission and so it is in the DoD's interest to help protect habitat, wildlife corridors, biodiversity, ecosystems, and water quality off base, and help educate local governments and communities about the need for ecosystem protection and management.

Duval County has passed Airport/Airfield Environs Overlay ordinances that require all development within the NAS JAX Complex's Accident Potential Zones (APZs) and Noise Zones to be submitted to the NAS JAX Complex for review. The GIS department in Duval County maintains searchable, interactive online mapping programs that include these areas. The NAS JAX Complex hosts an Air Installations Compatible Use Zones (AICUZ) website that includes basic information about military noise and operations at the Complex. The website also posts a Noise Hotline phone number to contact the Complex directly with questions or complaints.

Duval County has also completed a joint land use studies (JLUS) and developed comprehensive plans to set community goals and objectives, create frameworks for actions to implement JLUS recommendations, and lay the legal groundwork for any newly-adopted tools. The JLUS recommends objectives to ensure Naval aviation facilities development is compatible with policies of the comprehensive plans. The following elements are emphasized:

- Protection of the public health, safety, and welfare as the primary objective of land use planning around the airfields
- Mandatory referral to the local Naval installation commander of all development applications filed within the Airfield Influence Planning Districts for the Navy's review and comment
- Use of Airfield Influence Planning Districts around the airfields to promote an orderly transition and rational organization of land uses, protect the health, safety and welfare of the public, and maintain military missions
- General revisions of existing policy text to include reference to Airfield influence Planning Districts (current policies refer more narrowly to the existing AICUZ)
- Implementation of the JLUS as a guide for land use decisions and promotion of land use compatibility
- Coordination with Duval County Utilities Authority, Florida Department of Transportation, and other utilities to review the possible growth-inducing impacts of service extension into the Airfield Influence Planning Districts
- General goals for the future acquisition of land, including the ability to achieve the complementary goals of encroachment reduction, environmental protection and open space (or agricultural) preservation
- Reference to any other new tools used to promote compatibility, such as transfer of development rights As a related measure, the county may also revise the future land use map to identify compatible land use categories (very low density residential, open space and recreation, and some commercial and industrial uses) for parcels within the Airfield Influence Planning Districts.

3.7 FLORIDA'S STATE WILDLIFE ACTION PLANS

The U.S. Congress mandated each state to develop a comprehensive wildlife conservation plan. Each plan was required to include the species and habitats to be conserved, the conservation actions proposed, procedures to review the plan, and coordination with the public and other agencies. Florida completed its most recent State Wildlife Action Plan in 2012 in response to this mandate. The Action Plan provides a list of 1,036 Species of Greatest Conservation Need (SGCN), and report the status and trends of each species. The Action Plan also contains detailed conservation information about 45 habitat categories. Texts of the entire Action Plan can be downloaded at <https://myfwc.com/conservation/special-initiatives/fwli/action-plan/>.

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Natural Resources Goals, Objectives, and Strategies

This section presents the goals, objectives, and strategies for natural resources management at the NAS JAX Complex over the next 10-year period and reviewed annually. Five goals have been identified for the NAS JAX Complex:

- Goal 1 Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission.
- Goal 2 Protect and enhance forest resources by practicing ecologically-sound forest management leading to sustained yield of quality forest products, watershed protection, and wildlife habitat.
- Goal 3 Protect, maintain, and restore native vegetative communities for plant and animal life, while improving the quality of life and ensuring the continuation of the military mission.
- Goal 4 Provide facilities and develop policies that allow for recreational and educational uses of natural resources and result in positive effects to these natural resources while improving quality of life.
- Goal 5 Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management.

Goal 1 primarily pertains to land management issues (see Section 5.1), Goal 2 to forest management issues (see Section 5.2), Goal 3 to natural community and wildlife issues (see Section 5.3), Goal 4 to Outdoor Recreation issues (see Section 5.4), and Goal 5 to the general implementation of adaptive ecosystem management. Through these goals, the NAS JAX Complex will create and maintain a balance between the Complex's natural resources and military operations. To ensure success in achieving these goals at the NAS JAX Complex, a framework or "road map" of objectives, strategies, projects, and management initiatives is provided in this section. The goals, objectives, strategies, projects, and initiatives are referenced throughout the INRMP where appropriate and relevant.

Definitions

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

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

Objectives: Objectives are defensible targets or specific components of a goal, the achievement of which represent measurable progress toward that goal. Objectives help focus management activities and provide a yardstick against which to evaluate and communicate results. One or more objectives may be identified for successfully achieving a particular goal.

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

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

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

Goal 1: Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission.

Issue: As development and training activities have a significant potential to affect land area at the NAS JAX Complex, land management decisions and practices will become increasingly important aspects of ecosystem management. The use and management of lands for military mission needs, and the decision-making process regarding such land use, directly affects the sustainability of the ecosystem. Specific components of land management include wetlands (Section 5.1.1); soil conservation and erosion control (Section 5.1.2); stormwater and water quality control (Section 5.1.3); floodplain management (Section 5.1.4); landscaping and grounds maintenance (Section 5.1.5); invasive, exotic, and nuisance species (Section 5.1.6); and urban forestry (Section 5.1.7). To protect and maintain natural resources while ensuring the continuation of the military mission, the NAS JAX Complex will implement practices to meet the following objectives:

Objective 1.1: Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality;

Objective 1.2: Reduce and control noxious, invasive, and exotic species;

Objective 1.3: Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;

Objective 1.4: Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;

Objective 1.5: Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices.

Objective 1.1: Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality.

Wetland and water quality may be improved through the proper management of soil erosion and pesticide and fertilizer use at the NAS JAX Complex. The following strategies were developed to accomplish Objective 1.1. Projects and initiatives pertaining to each strategy are also listed.

Strategy 1.1.1: The NAS JAX Complex will continue to evaluate soil conservation and pollutant loading, and to implement BMPs to minimize runoff of pesticides, herbicides, and fertilizer.

Projects: Project No. 1 – Invasive Species Control; see Appendix A.

Initiatives:

- (1) Continue to assist with implementation of the stormwater pollution prevention plan (SWPPP; NAS JAX 2018) as necessary and if requested. The Stormwater Pollution Prevention (P2) Team is responsible for implementation and revision of the SWPPP.
- (2) Consistent with the SWPPP, the Complex will implement structural design and construction BMPs, such as constructing material storage area covers or material storage sheds, installing filters in catch basins, constructing wetlands for water filtration, and installing oil/water separators. The use of structural BMPs will be employed Complex-wide as needed.

- (3) Create a GIS layer showing watershed boundaries, water bodies and watercourses, stormwater piping schematics, and other sources of pollution.
- (4) The Environmental Division will review discharges into wetlands and water bodies to address the protection of water quality and ensure that:
 - runoff is subjected to BMPs prior to discharging into wetlands and water bodies. BMPs shall prevent or reduce the amount of pollution in water to a level compatible with Florida Surface Water Quality Standards;
 - discharge onto the Complex from external sources does not adversely impact water quality on the Complex (consult FDEP and appropriate counties in the event that incoming water does not meet Florida Surface Water Quality Standards);
 - no activities on the Complex result in violation of state water quality standards associated with the siltation of wetlands, or reduction in the natural retention or filtering capability of wetlands;
 - adequate soil erosion measures are implemented. Cross Reference: Strategy 1.1.2; and
 - no site activities allow water to become a health hazard or contribute to the breeding of mosquitoes.
- (5) Manage runoff from new development to achieve no net increase in discharge volume from the Complex, unless there are no means to do so that will meet the military mission.
- (6) Provide runoff retention by developing and enhancing retention ponds. Retention ponds often function as wetlands and can provide ideal growing conditions for emergent wetland vegetation that may be useful in pollutant removal.
- (7) Use natural or created buffers around new retention ponds to provide wildlife habitat, filter sediments and sediment-bound pollutants, and facilitate infiltration prior to discharge into water bodies.
- (8) Where feasible, the Complex will use permeable alternatives to impervious surfaces; for example, using wood decks instead of concrete patios, grass swales instead of concrete.

Strategy 1.1.2: The NAS JAX Complex will continue to develop a soil erosion control plan (or a working list), and will reduce the rate of soil erosion through the implementation of long-term measures and projects.

Project: Project No. 9 – Forestry Program Support; see Appendix A.

- Initiatives:**
- (1) Determine areas where soil type presents a threat of erosion. Cross Reference: Strategy 5.2.3 (GIS maps).
 - (2) Continue the use of BMPs to prevent soil erosion, and implement the six soil conservation principles described in Section 5.1.2.
 - It will be the responsibility of a Natural Resources Program representative to work with facility and environmental personnel to ensure implementation of soil erosion control measures.

- (3) Train and educate all contract and department personnel on actions that may directly or indirectly contribute to soil erosion problems and measures that can be employed to avoid or lessen soil erosion.
 - Consult with soil conservation experts from NAVFAC SE, as well as with the USDA NRCS to develop a training program. Cross Reference: Section 5.1.2 - Additional Sources of Information.

Strategy 1.1.3: The NAS JAX Complex will continue to inventory its use of pesticides and fertilizers to assess alternatives to their use and a reduction in pesticide and fertilizer use. The intent is to protect water quality by reducing the quantity of chemical pesticides and fertilizers used. Continue to use Integrated Pest Management (IPM) techniques in pest management programs and emphasize the use of pesticides with low toxicity and low application rates; and

Projects: Project No. 1 – Invasive Species Control; see Appendix A.
Project No. 9 – Forestry Program Support; see Appendix A.

- Initiatives:**
- (1) Inventory current pesticide and fertilizer use and consult NAVFAC SE's Applied Biology Department (ABD) and the FDACS Pesticide Division for means of reduction.
 - (2) Continue to use Integrated Pest Management (IPM) techniques. Consider non-pesticide removal methods, or removal using pesticides with low toxicity and low application rates. Cross References: Objective 1.2, and Sections 5.1.5 and 5.1.6 - Additional Sources of Information.
 - (3) Ensure that contractors, grounds maintenance, natural resources, and other appropriate personnel receive education on the use of pesticides and fertilizers, and verify that they understand the procedures they are permitted to perform (and/or require certification).
 - (4) Consult with foresters, fish and wildlife biologists, and soil conservationists from NAVFAC SE, as well as with federal, state, and county wildlife biologists, foresters, and land managers.

Strategy 1.1.4: The NAS JAX Complex will inventory wetlands and assess their function and quality on a routine basis (approximately every 5 to 10 years), establish protective buffers for wetlands where feasible, and promote land use and land management practices that will not adversely affect wetland resources.

Projects: None. Delineations are funded when and where needed for compliance with the Clean Water Act.

- Initiatives:**
- (1) Utilize baseline and individual project wetland delineations at all Complex properties to evaluate no net loss of wetlands. Cross Reference: Section 5.1.1 – Additional Sources of Information.
 - (2) Continue to implement management practices (e.g., prescribed burning) to enhance wetland habitat, where appropriate (see Section 5.2).
 - (3) Where feasible, establish and maintain 50-foot vegetative buffers around all wetlands.
 - Inventory wetlands to identify areas with insufficient or inadequate buffering. List areas having insufficient or inadequate buffering, as identified by the survey, as projects in subsequent INRMP updates.

- Encourage the use of volunteers to improve buffers of native vegetation.
 - Use native species and xeriscaping principles when creating buffers. Cross Reference: Section 5.1.5 - Additional Sources of Information (for xeriscaping).
- (4) Create a GIS layer for wetland quality
 - (5) Avoid impacts to wetlands, unless essential to the military mission.
 - (6) Plan for mitigation if wetlands need to be adversely impacted.

Strategy 1.1.5: Continue using BMPs for forest management activities to ensure watershed protection.

Projects: Project No. 9 – Forest Program Support; see Appendix A.
Project No. 10 – Forest Inventory; see Appendix A.
Project No. 11 – Forest Fire Protection; see Appendix A.
Project No. 12 – Forest Product Sales; see Appendix A.

Initiatives: (1) Consult with foresters and soil conservationists from NAVFAC SE, as well as with federal, state and county foresters, soil scientists, and land managers.
(2) Cross References: Strategies 1.1.2 and 2.2.1.

Objective 1.2: Reduce and control noxious, invasive, and exotic species.

This objective will ensure that noxious, invasive, and exotic species do not interfere with military and recreational activities or the quality and functions of wildlife habitats, forests, wetlands, or other resources. The following strategies have been developed to address noxious, invasive, and exotic species. Projects and initiatives pertaining to each strategy are also listed.

Strategy 1.2.1: The NAS JAX Complex continues its active implementation strategy for the removal of noxious, invasive, and exotic plant species. The station began control work for invasive and exotic species in 2006.

Project: Project No. 1 – Invasive Species Control; see Appendix A.

Initiatives: (1) Develop a noxious, invasive, and exotic species management strategy that involves a survey of the NAS JAX Complex to determine the extent of exotic and invasive species, species priority for control efforts, and removal methods, including time of year for removal; and pesticide application rates.

- Consult NAVFAC SE's ABD and the FDACS Pesticide Division to determine recommended removal methods. Consider non-pesticide removal methods and removal using pesticides with lower toxicity and applied at reduced rates. Cross Reference: Strategy 1.1.3 and Section 5.1.6 - Additional Sources of Information for noxious, invasive, and exotic species control.
- Consult with foresters and fish and wildlife biologists from NAVFAC SE, as well as with federal, state, and county wildlife biologists, foresters, and land managers, for identification of noxious, invasive, and exotic species, and for appropriate measures to protect fish and wildlife. Cross

Reference: Section 5.1.6 - Additional Sources of Information for noxious, invasive, and exotic species control.

- (2) Identify individuals or groups that could contribute to the removal effort.
 - NAS JAX Complex natural resources staff members.
 - Contractor and installation personnel.
 - Volunteer groups during non-chemical control portions of the work.
 - Special Interest Groups (i.e., TNC).
- (3) Ensure adequate training of removal teams. Cross Reference: Strategy 5.1.2.
- (4) Maintain a program for the eradication and control of noxious, invasive, and exotic plant species and prohibit the planting of such species. Develop a monitoring and removal program for problem areas. The NRM will review and monitor landscape materials used for new as well as renovation landscaping projects. Cross Reference: Section 5.1.6 – Laws, EOs, Regulations, Directives, and Memoranda Relevant to Invasive Species.

Objective 1.3: Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain.

Floodplains provide many important functions, such as the temporary storage of floodwaters, moderation of peak flows, maintenance of water quality, and provision of habitat for wildlife. The following strategies have been developed to address development of, and impacts to, the 100-year floodplain.

Strategy 1.3.1: The NAS JAX Complex will continue to review and monitor proposed activities to avoid impacts to the attenuation capacity of the 100-year floodplain. If it is determined that development is necessary within the 100-year floodplain to support the military mission, development shall first be located in the previously disturbed areas of the floodplain.

Projects: Project No. 3 – Wildlife Conservation Management; see Appendix A.

- Initiatives:**
- (1) It will be the responsibility of a Natural Resources Program representative to work with Public Works and environmental personnel to ensure implementation of the floodplain management strategy.
 - (2) Map undisturbed and disturbed areas of the 100-year floodplain for use in the decision-making process. Cross Reference: Strategy 5.2.3.
 - (3) Where there is no practical alternative to development within the 100-year floodplain, construction methods should be such that damage will be minimized in the event of flooding. The Complex will use the county's floodplain ordinances and building codes as guidance for development in the floodplain.
 - (4) Retain the natural attenuation and filtering capacity of wetlands within the 100-year floodplain.
 - Ensure no net loss of wetlands. Cross Reference: Strategy 1.1.4.
 - Ensure adequate buffers around wetland areas to maintain wetland attenuation capacity. Cross Reference: Strategy 1.1.4.

Objective 1.4: Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized.

This objective may be accomplished through appropriate and careful site selection and development to avoid or minimize impacts associated with the placement of human-made linear and nonlinear features and structures. The arbitrary location of such features may undermine ecological processes by separating and isolating plant and wildlife populations, which can render the fragmented parcels unsuitable for wildlife. An arbitrary method of locating features also increases costs associated with daily land management practices and infrastructure improvements. The following strategy has been developed to accomplish Objective 1.4.

Strategy 1.4.1: The NAS JAX Complex will ensure implementation of policies that minimize adverse impacts to ecosystem resources from land disturbance activities (e.g., construction, clearing, and training).

Projects: Project No. 1 – Invasive Species Control; see Appendix A.
Project No. 4 – Endangered and Threatened Species Habitat Protection; see Appendix A.

Initiatives: (1) It will be the primary responsibility of the NRM to work with Public Works and Environmental personnel to ensure the use of site selection and site plan development criteria to minimize impacts to environmental and ecological resources.
(2) Natural resources maps will be used as a tool for minimizing impacts.
Cross References: Strategy 5.2.3.

Objective 1.5: Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices.

By using native species and xeriscaping concepts, the Navy will reduce the need for irrigation, pesticides, and fertilizers. In addition, urban forests provide numerous quality of life benefits to both humans and wildlife (see Section 5.1.7). The following strategies were developed to accomplish Objective 1.5.

Strategy 1.5.1: The NAS JAX Complex will continue to implement general landscape management practices consistent with the concepts presented in this INRMP.

Projects: Project No. 1 – Invasive Species Control; see Appendix A.

Initiatives: (1) Educate grounds maintenance planning personnel on the principles of landscaping discussed in this INRMP (see Section 5.1.5). The NRM will review grounds maintenance plans, as needed.
(2) Evaluate the use of combined organic and mineral fertilizers. Slow release fertilizers will be preferred over other mineral fertilizers.

Strategy 1.5.2: The NAS JAX Complex will continue to apply xeriscaping principles using native species for new landscaping, and will phase in these principles for existing landscapes.

Projects: Project No. 1 – Invasive Species Control; see Appendix A.

- Initiatives:**
- (1) Educate grounds maintenance personnel on the principles of xeriscaping. Cross References: Strategy 5.3.1 and Section 5.1.5.
 - (2) Use volunteer groups and/or interested Complex personnel to assist in plantings.
 - (3) Integrate the concept of xeriscaping into grounds maintenance plans (contracted maintenance and golf course maintenance). Cross Reference: Section 5.1.5.
 - (4) Develop a xeriscaping program; enlist the services of foresters, fish and wildlife biologists, and soil conservationists at NAVFAC SE, as well as federal, state, and county wildlife biologists, foresters, and land managers. Cross Reference: Section 5.1.5 - Additional Sources of Information (for xeriscaping).
 - (5) Remove noxious, invasive, and exotic plant species from existing landscape plantings as the opportunity avails itself. Cross Reference: Strategy 1.2.1.

Strategy 1.5.3: The NAS JAX Complex will continue to follow its working Urban Forestry Plan and implement projects to enhance wildlife habitat and aesthetics in developed areas.

Projects: None.

- Initiatives:**
- (1) Consider producing a multi-year Urban Forestry Plan for use and distribution.
 - (2) Use volunteers for planting. Cross Reference: Strategy 5.3.2.
 - (3) Train and educate grounds maintenance personnel on the principles of urban forestry management.
 - (4) Ensure that public works personnel coordinate installation planning, construction, and maintenance with the natural resources program to ensure a positive effect on urban forests. Construction and facility managers shall coordinate with the natural resources program concerning replacement of trees removed for any reason, except due to natural causes.
 - (5) Ensure that the Urban Forestry Management Program conforms to technical and professional recommendations, as provided by NAVFAC SE and cooperating agencies.

Goal 2: Protect and enhance forest resources by practicing ecologically-sound forest management leading to sustained yield of quality forest products, watershed protection, and wildlife habitat.

Issue: Ecologically sound stewardship of forestland involves managing it 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. To protect and enhance forest resources, the Complex will implement programs to address the following objectives:

Objective 2.1: Practice the ecosystem management concept for sustained yield of forest products and forest health;

Objective 2.2: Manage forests in an ecologically sound way to provide habitat for wildlife; and

Objective 2.3: Manage forest stands for watershed protection.

Objective 2.1: Practice the ecosystem management concept for sustained yield of forest products and forest health.

Sustained yield is the management of forest resources for continuous production, with the aim of achieving an approximate balance between net growth and harvest. Healthy forests may be maintained through silvicultural activities (see Section 5.2.1). Silvicultural activities that will be undertaken at the NAS JAX Complex include harvesting, herbicide applications, and prescribed burns. The following strategies were developed to accomplish Objective 2.1.

Strategy 2.1.1: Continue managing forest stands through harvesting, herbicide applications, and prescribed burns.

Projects: Project No. 9 – Forest Program Support; see Appendix A.
Project No. 10 – Forest Inventory; see Appendix A.
Project No. 11 – Forest Fire Protection; see Appendix A.
Project No. 12 – Forest Product Sales; see Appendix A.

Initiatives:

- (1) Sell timber and other forest products, to be removed, to private logging contractors using competitive timber sales contracts.
- (2) Complete Society of American Foresters certification for all staff foresters.
- (3) Identify certified prescribed burn training programs. Ensure that the program and its duration are compatible with the timeframe of the implementation strategy. Attendance is contingent upon availability of travel and training funds.
 - Training will be conducted through Florida’s Interagency Prescribed Fire Course administered through Hillsborough Community College (813-757-2207). This course is offered at various locations throughout the state, but requires the participant to complete three supervised prescribed burns to become a Certified Burn Manager.
- (4) Identify training programs for Federal Wildland Firefighting and complete S-130 and S-190 federal wildland fire training courses, at a minimum.
- (5) Consult with foresters from NAVFAC SE, as well as state and federal foresters.

Strategy 2.1.2: The NAS JAX Complex will continue to support the training and certification of one individual in prescribed burn management, in addition to the Regional Forester.

Projects: None.

Initiatives: Cross References: Strategy 2.1.1.

Strategy 2.1.3: Perpetuate the prevailing pine forest while giving equal emphasis to hardwoods in those areas best suited to such species.

Projects: Project No. 9 – Forest Program Support; see Appendix A.
Project No. 10 – Forest Inventory; see Appendix A.
Project No. 11 – Forest Fire Protection; see Appendix A.
Project No. 12 – Forest Product Sales; see Appendix A.

Initiatives: (1) Update FMIS regularly.
(2) Monitor for insect/disease outbreaks.
(3) Monitor noxious, invasive, and exotic weed encroachment.

Objective 2.2: Manage forests in an ecologically sound manner to provide habitat for wildlife.

Strategy 2.2.1: Continually evaluate forest management practices and their effects on ecosystems and wildlife habitat, and continue programs to protect rare, threatened, and endangered plant and animal species.

Projects: Project No. 2 – Protected Species Surveys; see Appendix A.
Project No. 3 – Wildlife Conservation Management; see Appendix A.
Project No. 4 – Endangered and Threatened Species Habitat Protection; see Appendix A.
Project No. 5 – Gopher Tortoise Management; see Appendix A.
Project No. 6 – Gopher Tortoise Radio Tracking Survey; see Appendix A.
Project No. 7 – Survey and Monitoring of Migratory Bird Species; see Appendix A.
Project No. 9 – Forest Program Support; see Appendix A.
Project No. 10 – Forest Inventory; see Appendix A.
Project No. 11 – Forest Fire Protection; see Appendix A.
Project No. 12 – Forest Product Sales; see Appendix A.

Initiatives: (1) Review management recommendations outlined in the rare plant, rare vertebrate, and natural community surveys conducted in 1996-97, 2004, and 2009-11 (see Section 2.3).
(2) Seek additional management guidance and management recommendations from foresters, fish and wildlife biologists, and soil conservationists from NAVFAC SE, as well as federal, state, and county wildlife biologists, foresters, and land managers.

Objective 2.3: Manage forest stands for watershed protection.

Strategy 2.3.1: Cross Reference: Strategy 1.1.5.

Projects: Project No. 9 – Forest Program Support; see Appendix A.
Project No. 11 – Forest Fire Protection; see Appendix A.

Project No. 12 – Forest Product Sales; see Appendix A.

Initiatives: Cross Reference: Strategy 1.1.4.

Goal 3: Protect, maintain, and restore native vegetative communities for plant and animal life, while improving the quality of life and ensuring the continuation of the military mission.

Issue: The biological environment of the NAS JAX Complex and surrounding area was considerably different prior to colonization and development. Historically, the area was dominated by natural communities that today are found scattered throughout the Complex. Areas representing the following communities remain in relatively small patches within the Complex: floodplain swamp, baygall, depression marsh, mesic flatwoods, wet flatwoods, and bottomland forest (see Section 2.3.1). These natural communities provide good quality habitat for plants and animals and will be protected and enhanced.

Occasionally, nuisance wildlife species (i.e., rodents and feral cats) become overpopulated or congregate in areas creating a threat to human health and the military mission. In such cases, these wildlife species must be controlled to prevent problems. To protect, maintain, and restore native communities for plant and animal life, while preventing nuisance wildlife from negatively impacting quality of life and the military mission, the NAS JAX Complex will implement programs to address the following objectives:

Objective 3.1: Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including federally-listed and state-listed species.

Objective 3.2: Preserve and protect threatened and endangered species and species of special concern to ensure no reduction in population sizes.

Objective 3.3: Control nuisance wildlife and wildlife diseases that may adversely affect human health and welfare, the health of the ecosystem, and the military mission.

Objective 3.1: Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species.

Strategy 3.1.1: The NAS JAX Complex will continue existing efforts, and further, establish a program/plan using prescribed burns and/or thinning to improve habitat quality, reduce the potential for wildfires, control diseases and insect pests, and ensure the continuation of fire-dependent plant communities.

Projects: Project No. 2 – Protected Species Surveys; see Appendix A.
Project No. 3 – Wildlife Conservation Management; see Appendix A.
Project No. 4 – Endangered and Threatened Species Habitat Protection; see Appendix A.
Project No. 5 – Gopher Tortoise Management; see Appendix A.
Project No. 9 – Forest Program Support; see Appendix A.
Project No. 11 – Forest Fire Protection; see Appendix A.

- Initiatives:**
- (1) In consultation with foresters and wildlife biologists from NAVFAC SE, as well as federal, state, and county wildlife biologists and foresters, prepare harvesting and prescribed burn prescriptions using existing data from the FMIS.
 - Develop and implement a prescribed burn regime that will adequately address safety and smoke concerns. Burns will be conducted by trained personnel. The prescribed burn schedule may be adjusted to accommodate fuel-reduction burns and site safety constraints.
 - (2) Certify additional personnel in prescribed burning and wildfire fighting. Cross Reference: Strategy 2.1.1.
 - (3) Review management recommendations outlined in the rare plant, rare vertebrate, and natural community surveys conducted in 1996-97, 2004, and 2009-11 (see Section 2.3).
 - (4) Seek additional management suggestions from foresters, fish and wildlife biologists, and soil conservationists from NAVFAC SE, as well as federal, state, and county wildlife biologists, foresters, and land managers to generate maximum benefits.

Strategy 3.1.2: Continue monitoring program for natural communities (as well as rare, threatened and endangered species), and implement programs to enhance natural communities and wildlife habitat.

- Projects:**
- Project No. 2 – Protected Species Surveys; see Appendix A.
- Project No. 3 – Wildlife Conservation Management; see Appendix A.
- Project No. 4 – Endangered and Threatened Species Habitat Protection; see Appendix A.
- Project No. 5 – Gopher Tortoise Management; see Appendix A.

- Initiatives:** Cross References:
- Objective 1.1 – wetland buffers, stormwater runoff, soil erosion, and pesticide and fertilizer use.
 - Objective 1.3 – 100-year floodplain.
 - Objective 1.4 – land management and land use decisions.
 - Objective 1.5 – environmentally beneficial landscaping practices.

Objective 3.2: **Preserve and protect threatened and endangered species and species of special concern to ensure no reduction in population sizes.**

Strategy 3.2.1: Continue program to conduct and update surveys of rare, threatened, and endangered species, and to monitor other rare species as needed.

- Projects:**
- Project No. 2 – Protected Species Surveys; see Appendix A.
- Project No. 3 – Gopher Tortoise Management; see Appendix A.
- Project No. 7 – Survey and Monitoring of Migratory Bird Species; see Appendix A.

- Initiatives:** (1) Contract a consultant to conduct the surveys; or

- (2) Develop a team of experts from within NAVFAC to conduct the surveys.
- (3) Pursue services provided via cooperative agreements between the NAS JAX Complex and the USFWS, the FWC, and TNC.

Strategy 3.2.2: The NAS JAX Complex will continue to implement programs and activities for the protection and enhancement of threatened and endangered plant and animal species and their habitats.

Projects:

Project No. 2 – Protected Species Surveys; see Appendix A.

Project No. 3 – Wildlife Conservation Management; see Appendix A.

Project No. 4 – Endangered and Threatened Species Habitat Protection; see Appendix A.

Project No. 5 – Gopher Tortoise Management; see Appendix A.

Project No. 7 – Survey and Monitoring of Migratory Bird Species; see Appendix A.

Project No. 11 – Forest Fire Protection; see Appendix A.

Initiatives:

- (1) Cross References:
 - Strategy 1.5.3 – Urban forestry.
 - Strategy 2.2.1 – Forest management practices.
 - Strategy 3.2.1 – Rare, threatened, and endangered species surveys.
 - Strategy 3.3.1 – Wildlife damage and disease control.
- (2) The NAS JAX Complex will use FWC guidelines for the protection of listed species from proposed development or land clearing impacts. The NAS JAX Complex will consult with FWC, USFWS, and NAVFAC SE wildlife biologists to implement this initiative.
- (3) Use volunteer assistance for implementation and construction of habitat enhancement projects.
- (4) The NAS JAX Complex will institute wildlife education and stewardship programs. Cross References:
 - Strategy 5.3.1 – NAS JAX Complex personnel education and participation.
 - Strategy 5.3.1 – Training for contract and Complex-employed maintenance personnel.
 - Strategy 5.3.2 – Citizen education and participation.

Objective 3.3: **Control nuisance wildlife and wildlife diseases that may adversely affect human health or welfare, the health of the ecosystem, and the military mission.**

Strategy 3.3.1: The NAS JAX Complex will continue to monitor the health and size of animal populations, and control populations as needed.

Projects: Project No. 1 – Invasive Species Control; see Appendix A.

- Initiatives:**
- (1) Establish an awareness program to educate the public on indicators of wildlife population problems and diseases. Use pamphlets, flyers, and command units to disseminate information. Cross Reference: Strategy 5.3.2.
 - (2) Continue to use IPM techniques in the PMP and emphasize the use of pesticides with low toxicity and low application rates.
 - (3) Repair or re-fence perimeter fences, and develop management strategies for clear zones to keep deer and other animals from interfering with flight operations.

Strategy 3.3.2: The NAS JAX Complex will implement grounds maintenance practices consistent with the BASH Plan. The BASH Plan will be continuously updated and monitored to meet the needs of the Complex.

Projects: None.

- Initiatives:**
- (1) Educate grounds maintenance personnel on practices that will minimize BASH-related incidents.
 - (2) Ensure that the grounds maintenance personnel receive a copy of the BASH Plan and are aware of the locations in which to manage in accordance with the plan.
 - (3) Cross References: Strategies 3.3.1 and 5.2.3.

Goal 4: Provide facilities and develop policies that allow for recreational and educational uses of natural resources, and result in positive effects to these natural resources while improving the quality of life.

Issue: The SAIA requires that military installations evaluate the potential for providing outdoor recreational resources to the general public. In general, access to the NAS JAX Complex for outdoor recreation is limited to active duty and reserve military personnel assigned to work at the installation, their dependents and accompanied guests; federal civilian employees, their dependents and accompanied guests; and military retirees. However, at the NAS JAX Complex, the general public is allowed access to Tillie K. Fowler Park, located across U.S. Highway 17 from the main Installation. The CO authorizes access for educational and outdoor natural resource recreational activities consistent with the military mission and security levels. The following objectives were developed to address Goal 4.

Objective 4.1: Maintain existing and develop additional outdoor recreational trails, interpretive centers, and/or facilities to support present and future natural resources-based outdoor recreation at the NAS JAX Complex.

Objective 4.2: Implement existing and further develop (where needed) natural resources-based outdoor recreation programs to support present and future outdoor recreation at the NAS JAX Complex.

Objective 4.1: Maintain existing and develop additional outdoor recreational trails, interpretive centers, and/or facilities to support present and future natural resources-based outdoor recreation at the NAS JAX Complex.

Strategy 4.1.1: The NRM will continue updating the baseline information pertaining to present usage of natural resources-based outdoor recreation activities.

- Projects:** None.
- Initiatives:**
- (1) Monitor existing use of outdoor recreational facilities and trails by placing sign-in sheets at convenient locations.
 - (2) Survey base personnel to determine types and locations of desired natural resources-based outdoor recreational activities.
- Strategy 4.1.2:** Continue to develop recreational trails and/or interpretive centers in areas exhibiting unique cultural, natural, historical, or archeological resources.
- Projects:** Project No. 19 – Wildlife Education and Installation, see Appendix A
- Initiatives:**
- (1) Use GIS data coverages for preliminary site assessments. Cross Reference: Strategy 5.2.3.
 - (2) Use volunteers and interested Complex personnel for construction of facilities. Cross Reference: Strategy 5.3.2.
 - (3) Identify potential natural resources conflicts that could arise from increased outdoor recreational facilities.
 - (4) Investigate facility use agreements with other providers of educational, cultural, and recreational opportunities in the area.
 - (5) 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.
 - (6) Identify the types of outdoor recreational and educational opportunities compatible with the NAS JAX Complex’s mission.
- Strategy 4.1.3:** Expand, improve, and provide additional facilities (in addition to trails and interpretive centers, addressed in Strategy 4.1.2) for outdoor recreational opportunities.
- Projects:** None.
- Initiatives:**
- (1) Cross References: Section 5.4 – Long-term Management, and Strategy 4.1.2.
 - (2) Develop rules and regulations for outdoor recreational activities, and incorporate them into NAS JAX Complex instructions.
- Objective 4.2:** **Implement existing and further develop (where needed) natural resources-based outdoor recreation programs to support present and future outdoor recreation at the NAS JAX Complex.**
- Strategy 4.2.1:** The NAS JAX Complex will further develop outdoor recreational opportunities at the Complex.
- Projects:** None.
- Initiatives:**
- (1) Annually assess recreational opportunities, such as hunting, fishing, boating, hiking, and biking to explore additions of new opportunities and expansion of existing opportunities.

Goal 5: Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management.

Issue: Existing programs and plans for maintaining and managing natural resources within the NAS JAX Complex consider the inter-relationships among resources on the Complex and in the region, but typically focus on the management of individual resources in accordance with federal and state laws.

Ecosystem management cannot be accomplished solely through the implementation of programs and plans focused on individual resources. A coordinated effort among all programs and personnel, from tenant commands to decision-making authorities, is necessary to protect the interdependent components of communities that define an ecosystem. The coordinated effort will address the consequences of actions on related resources, and will resolve conflicts between competing programs and plans for use of the Complex's natural resources.

Ecosystem management is a holistic, adaptive management concept that transcends human-made boundaries, both internal and external to the NAS JAX Complex. Management for a sustainable ecosystem requires awareness, education and training, and responsible participation of all individuals potentially affecting the ecosystem, as well as adjustments in management principles and practices to respond to new knowledge and dynamic conditions. To participate in adaptive ecosystem management, the NAS JAX Complex will implement programs to meet the following objectives:

Objective 5.1: Provide adequate staffing, equipment, technology, and training for the Natural Resources Program to ensure proper implementation of this INRMP.

Objective 5.2: Incorporate the concept of ecosystem management into all planning and management processes.

Objective 5.3: Implement training, education, and stewardship initiatives for ecosystem management.

Objective 5.4: Establish a planning team to review and update the INRMP in accordance with OPNAVINST 5090.1D, Chapter 12, paragraph 3.4c(4).

Objective 5.1: Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP.

Inadequate natural resources staffing and resources could lead to non-compliance with environmental laws and instructions, such as the Sikes Act, which could lead to violation of federal laws such as the CWA or the ESA.

Strategy 5.1.1: Staffing needs shall be continuously reviewed for adequacy and filled to meet those needs.

Projects: None.

Initiatives: Annually review staffing to determine adequacy. Submit staffing recommendations up the chain of command.

Strategy 5.1.2: Continually verify that natural resources personnel obtain proper training/certifications for the following:

- Fire Management;
- Threatened and Endangered Species Management;
- Wetlands Management;
- Ecosystem Management (including noxious, invasive, and exotic species control);
- Technology (GIS/GPS);
- Natural Resources Legal Requirements;
- Professional Forest Management Training;
- Department of Transportation (DOT) Requirements;
- HW Training;
- Safety Training;
- Pest Management (including BASH Training); and
- Real Estate Management.

Projects: None.

Initiatives: (1) Identify training programs.
(2) Cross Reference: Strategy 2.1.1 (2).

Strategy 5.1.3: The NRM will continue to purchase equipment (i.e., an all-terrain vehicle (ATV)/utility vehicle) needed for access areas too difficult to reach on the Complex, as well as other needed supplies.

Projects: None.

Initiatives: Annually assess equipment to determine adequacy. Submit recommendations up the chain of command.

Strategy 5.1.4: The NRM will continue to obtain tools and capabilities (e.g., GPS/GIS mapping and digital photography) that will assist in managing natural resources and meeting the goals of the INRMP.

Projects: None.

Initiatives: Annually review tools and capabilities to determine adequacy. Submit recommendations up the chain of command.

Objective 5.2: **Incorporate the concept of ecosystem management into all planning and management processes.**

Strategy 5.2.1: The NAS JAX Complex will continue to utilize the review board within the Public Works Department to review all projects that potentially affect natural resources, including soil and water quality. The NRM of the Natural Resources Program will continue to be a part of the review board. In the interim, the NRM will be provided an opportunity to review all ground disturbing projects for natural resources concerns at an early stage of development.

- Projects:** Project No. 13 – INRMP Update; see Appendix A.
- Initiatives:** Brief the CO on the importance of the formation of a review board to ensure that natural resources are considered when making planning decisions. Cross Reference: Military mission discussions throughout Section 5.
- Strategy 5.2.2:** Continue to integrate the management concepts of the INRMP into all appropriate working programs and department plans (e.g., PMP, Urban Forestry Plan, Grounds and Surfaced Area Maintenance Plan, and SWPPP [NAS JAX 2018]).
- Projects:** None.
- Initiatives:** Develop a working team whose responsibility it is to integrate the concepts of the INRMP into all appropriate plans (e.g., PMP, Urban Forestry Plan, Grounds and Surfaced Area Maintenance Plan, and SWPPP). The team will consist of a representative from each department or division who is tasked with the responsibility of implementing programs, plans, or policies related to ecosystem management. The NRM will be on the team, and the team should meet monthly until all programs are integrated.
- Strategy 5.2.3:** The NAS JAX Complex will continue the use of Computer-Aided Drafting and a GIS for construction, environmental, engineering, and natural resources mapping. The NAS JAX Complex will continue to build and acquire appropriate Complex and region-wide data coverage. The GIS allows environmental and natural resources professionals to produce custom maps for preliminary environmental site assessments and to facilitate analysis of natural resources and environmental issues.
- Projects:** None.
- Initiatives:**
- (1) Cross Reference: Strategy 5.1.4.
 - (2) Compile GIS data coverages and maintain and update data coverages, as needed. GIS data coverages should include:
 - Wetlands, waterbodies, water courses, and appropriate buffers;
 - Forest stands;
 - Natural communities;
 - Undisturbed and undeveloped 100-year floodplain;
 - Military constraint areas;
 - Maps of soil units and areas where soil type presents a threat of erosion;
 - Maps showing current soil erosion areas;
 - Ground maintenance plan of operation for improved and semi-improved grounds;
 - Populations and habitats of endangered and threatened species and species of special concern;
 - HW sites;
 - Land use;

- Infrastructure and utilities;
- NAS JAX Complex boundaries and buildings;
- Trails and roads;
- Cultural, natural, historical, or archeological resources where allowed;
- Pest management areas (e.g., specific areas where coyote and deer concentrate);
- Stormwater outfalls and monitoring stations; and
- Outdoor recreation facilities.

Strategy 5.2.4: The NAS JAX Complex will continue to ensure that all cooperative agreements, memoranda, or other agreements between the Complex and federal and state agencies that oversee and regulate natural resources protection, are current, and those agreements have been established with all necessary agencies.

Projects: None.

Initiatives: It will be the responsibility of the NRM to ensure that the NAS JAX Complex has up-to-date agreements. The NRM will consult with foresters and fish and wildlife biologists from NAVFAC SE, as well as with federal, state, and county wildlife biologists, foresters, and land managers for assistance. The NRM will also consult with Complex commands and departments, such as MWR.

Objective 5.3: Implement training, education, and stewardship initiatives for ecosystem management.

Strategy 5.3.1: The NAS JAX Complex will continue an ecosystem management awareness and training/education program available to all interested NAS JAX Complex personnel. In addition, the Complex will continue the technical education and training program for all contract and installation personnel involved in activities that may directly or indirectly affect ecosystem management success. Individuals required to attend will be those involved in activities associated with (but not limited to): stormwater management, landscaping, forest management, HW response, operations, MWR, Public Works, volunteers, and trainers.

Projects: Project No. 8 – Natural Resources Training; see Appendix A.

Initiatives:

- (1) For program development, enlist the services of foresters, fish and wildlife biologists, and soil conservationists from NAVFAC SE, as well as federal, state, and county wildlife biologists, foresters, and land managers.
- (2) Encourage participation by providing information about NAS JAX Complex natural resources and communicating each individual's important contributions to ensuring a viable ecosystem. Use pamphlets, flyers, command units, and the Internet to disseminate information. Initiate an annual environmental awareness achievement award for project suggestions and participation.
- (3) Offer hands-on training and individual participation in activities to better demonstrate the concept, application, and importance of ecosystem management. Cross References: Activities such as wetland enhancement

(Section 5.1.1), prescribed burning (Section 5.2.1), landscaping (Section 5.1.5), urban forestry (Section 5.1.7), and threatened and endangered species management (Section 5.3.3).

- (4) Annually brief the CO on the importance of training and education to ensure cooperation among participating departments. Communicate to the CO the importance of all contract and Complex personnel receiving education in relevant environmental laws, regulations, directives, and mandates that have the potential to affect the military mission. Require, at a minimum, that one representative from each of the tenant commands participate in the training.
- (5) Encourage participants in the technical education and training program to conduct training and education classes for the tenant commands and departments they represent.
- (6) Provide information about natural resources at the NAS JAX Complex to visiting commands (e.g., training groups) prior to the command initiating actions.
- (7) The NRM will receive training needed to stay current on changes to natural resources and environmental legislation and Navy policy.

Strategy 5.3.2: The NAS JAX Complex will continue to implement programs and initiatives that foster citizen participation in ecosystem education and stewardship.

Projects: None.

- Initiatives:**
- (1) Encourage the use of volunteer groups on the Complex. Offer hands-on training or activity participation to better demonstrate the concept, application, and importance of ecosystem management. Cross References: Strategy 5.3.1 and activities, such as wetland enhancement (Section 5.1.1), landscaping (Section 5.1.5), prescribed burning (Section 5.2.1), urban forestry (Section 5.1.7), and threatened and endangered species management (Section 5.3.3).
 - (2) Actively pursue suggestions from Complex personnel for environmental enhancement projects.
 - (3) Continue participation in Earth Day activities, field trips, and other environmental stewardship opportunities.
 - (4) Continue participation in regional ecosystem management initiatives.
 - (5) Continue to develop a Watchable Wildlife Program.

Objective 5.4: **Establish a planning team to review and update the INRMP in accordance with OPNAVINST 5090.1D, Chapter 12, paragraph 3.4c(4).**

The INRMP is intended as a dynamic, evolving planning document; updates are required to ensure compliance with regulations and to initiate requests for project funding. The following strategy has been developed to accomplish this objective.

Strategy 5.4.1: The NAS JAX Complex will develop a team of experts with sufficient technical knowledge, to evaluate the effectiveness of INRMP implementation and to recommend improvements.

Projects: Project No. 13 – INRMP Update; see Appendix A.

Initiatives: With assistance from NAVFAC SE and federal, state, and county agencies, review Complex staffing to determine whether there is adequate staffing and expertise to update the INRMP. If needed staffing does not exist, list private contracting as a compliance project for implementation of Project No. 16.

Cross Reference: Sections 1.6 and 6.1 for updating compliance.

5

Program Elements

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

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

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

The "Wildlife Habitat Management and Threatened and Endangered Species, and Natural Communities" section of this INRMP (Section 5.3.2) includes additional goals, objectives, strategies, and projects for the benefit and long-term conservation of RTE species found, or potentially found, on the Complex. Animal and plant species explicitly accounted for in this INRMP are:

- American Alligator
- American Swallow-tailed Kite (bird)
- Atlantic Sturgeon (fish)
- Bachman’s Sparrow (bird)
- Bald Eagle
- Black Creek Crayfish
- Diverseleaf Crownbeard (plant)
- Eastern Indigo Snake
- Eastern Diamondback Rattlesnake
- Florida Manatee
- Gopher Frog
- Gopher Tortoise
- Great Egret (bird)
- Least Tern (bird)
- Little Blue Heron (bird)
- Loggerhead Shrike (bird)
- Monarch Butterfly
- Shortnose Sturgeon (fish)
- Snowy Egret (bird)
- Southeastern Myotis (bat)
- Pine Lily (plant)
- Southern Hog-nosed Snake
- Spotted Turtle
- White Ibis (bird)
- Wood Stork (bird)
- Yellow-Crowned Night Heron (bird)

Table 5-1. Habitat Management Actions at the NAS Jacksonville Complex	
Habitat Management Actions	Section
Wetland Management	5.1.1
Soil Conservation and Erosion Control	5.1.2
Stormwater and Water Quality Control	5.1.3
Floodplain Management	5.1.4
Landscaping and Grounds Maintenance	5.1.5
Invasive, Exotic, and Noxious Species	5.1.6
Urban Forestry	5.1.7
Land Impact Guidelines	5.1.8
Silvicultural Activities (i.e. Thinning, Prescribed Burns)	5.2.1
Forest Protection	5.2.2
Fisheries Management	5.3.1
Migratory Birds	5.3.2
Threatened and Endangered Species	5.3.3
Nuisance Wildlife and BASH	5.3.4

5.1 LAND MANAGEMENT

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

and enhance the natural environment, while continuing to provide for the needs associated with the military mission of the NAS JAX Complex.

5.1.1 Wetland Management

Wetlands are lands on which water covers the soil or is present either at or near the surface of the soil or within the root zone all year or for varying periods of time during the year, including during the growing season. The USACE (33 CFR 328.3(b), 1991) and the EPA (40 CFR 230.3(t), 1991) jointly define wetlands as "...those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (USACE 1982). The USACE and FDEP define wetlands based upon the presence of hydrophytic vegetation, hydric soil characteristics, and hydrologic indicators, which must all occur and meet the defined characteristics in order for a location to be classified as a wetland. The NAS JAX Complex has 3,251 acres of wetland areas (Table 5-2).

Property	Wetlands (acres)
NAS Jacksonville	677
NOLF Whitehouse	599
Rodman Bomb Target	1,905
Yellow Water	70

Issues

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

Goals and Objectives

- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;
- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;

- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;
- Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality;
- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Manage forests in an ecologically sound manner to provide habitat for wildlife;
- Manage forest stands for watershed protection;
- Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP; and
- Incorporate the concept of ecosystem management into all planning and management processes.

Projects

- Endangered and Threatened Species Habitat Protection (Project 4 in Appendix A);
- Forestry Program Support (Project 9 in Appendix A); and
- Forest Fire Protection (Project 11 in Appendix A).

Management Strategies

- Inventory wetlands and assess their function and quality on a routine basis;
- Promote 50-foot buffers for all wetlands, and ensure land use and land management practices that will not adversely affect wetland resources;
- Continue to develop a soil erosion control plan and reduce the rate of soil erosion through the implementation of long-term measures and projects;
- Continue to inventory the use of pesticides and fertilizers to assess alternatives to their use and a reduction in pesticide and fertilizer use;
- Continue adhering to BMPs in the SWPPP (NAS JAX 2018) and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (FDEP 2008) to ensure wetlands protection;
- Continue using the Silviculture BMPs (FDACS 2003) for forest management activities to ensure watershed protection;
- Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices;
- Continually verify that natural resources personnel obtain proper training and certifications; and

- Continue the use of Computer-Aided Drafting and a GIS for construction, environmental, engineering, and natural resources mapping.

Long-Term Management

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

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

In addition to creating and maintaining buffers to protect wetlands and subsequently water quality, the NAS JAX Complex will manage stormwater (see Section 5.1.3) and the use of pesticides and herbicides (see Sections 5.1.5 and 5.2.1) to further protect water quality.

Integration with Other Natural Resources Management Activities

- Soil Conservation and Erosion, Section 5.1.2 – prevent sedimentation into wetlands;
- Stormwater and Water Quality, Section 5.1.3 – control stormwater runoff into wetlands;
- Floodplains, Section 5.1.4 – maintain wetlands to reduce flood impacts;
- Landscaping and Grounds Maintenance, Section 5.1.5 – maintain wetland buffer;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – potential pesticide contamination of wetlands;
- Urban Forestry, Section 5.1.7 – consider wetland buffers and water quality during urban forestry;
- Land Impact Guidelines, Section 5.1.8 – maintain 50-foot buffers during development;
- Silviculture, Section 5.2.1 –protect wetlands by preventing erosion and sedimentation during silviculture;
- Forest Protection, Section 5.2.2 – maintain regular burn cycles to ensure natural wetland conditions;

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

Ecosystem Management

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

Military Mission

NAS JAX Complex activities detrimental to wetland functions can affect the military mission by placing Complex at odds with Florida DEP. Proper wetland management improves water quality for MWR and outdoor recreational activities, which helps maintain the morale of personnel assigned to the Complex. Proper wetland management also helps mitigate the effects of flooding, which could pose a threat to the continuation and location of training activities.

Laws, Executive Orders, Regulations, Directives, and Memoranda Relevant to Wetlands

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

- federal permit or license that may result in a discharge to wetlands or other waters under state jurisdiction to ensure that the actions would be consistent with the state's water quality requirements.
- Executive Order 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
 - OPNAVINST 5090.1D, 12-3.8(b), discusses natural resources management relating to wetland management.
 - Coastal Zone Management Act, 16 U.S.C. 1451, Establishes goals and a mechanism for states to control use and development of their coastal zone. Authorizes states to administer approved coastal non-point source pollution programs.

Additional Sources of Information

USACE, Jacksonville Division
<http://www.saj.usace.army.mil/>

USFWS, National Wetlands Inventory, Regional Wetlands Coordinator, Region 4
<http://www.fws.gov/wetlands/Organization/rwc4.html>

EPA, Water: Wetlands
<http://water.epa.gov/type/wetlands/index.cfm>

FDEP, Wetland Evaluation and Delineation Program
<http://www.dep.state.fl.us/water/wetlands/delineation/>

FDEP, Water Programs
<http://www.dep.state.fl.us/water/>

St Johns River Water Management District (SJRWMD)
<http://www.floridaswater.com>

University of Florida, Howard T. Odum Center for Wetlands
<http://www.cfw.ufl.edu/>

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

5.1.2 Soil Conservation and Erosion Control

Soil conservation involves the identification (e.g., type, location, and amount) and appropriate use of soils in accordance within the limits of its physical characteristics while protecting it from uncontrolled stormwater runoff to prevent and control soil erosion. This information will be used to plan the use and management of soils for construction, forestry practices, recreation facilities, and wildlife habitat. More fragile soil types require modifications to the timing, intensity and frequency of forestry and wildlife management practices. Knowing where soil types are located on a particular tract, and understanding the capabilities and limitations of the soils are prerequisites to selecting the most appropriate wildlife habitat or forestry improvement practices.

Erosion is the detachment and movement of soil, usually by water, which results in sedimentation and physical damage. Water quality is diminished by increased sedimentation, which is a form of

water pollution. Sedimentation is particularly detrimental to benthic organisms and many fish species; it can eliminate habitat by covering food sources and spawning sites, smother bottom-dwelling organisms, and increase turbidity to the point that photosynthesis is hindered or prevented. Reductions in photosynthesis decrease dissolved oxygen levels to the detriment of fish and benthic invertebrates. Soil erosion also undermines roadways, shoreline facilities, and other military structures, and increases maintenance costs associated with stormwater facilities.

Issues

Soil erosion can undermine roadways, shoreline facilities, and other military structures, and often results in water quality problems (e.g., increased turbidity). It also increases maintenance costs associated with stormwater facilities. Properties of the NAS JAX Complex have above average potential for severe erosion because of their soil types. Actions contributing to the susceptibility of the soil to erosion include:

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

Areas at the NAS JAX Complex that are either susceptible to erosion or have an erosion problem include road shoulders, stream banks, and areas adjacent to runways that receive airfield surface runoff. Proper grounds maintenance, which emphasizes vigorous growth of vegetation, is the best and most economical means of erosion control.

Goals and Objectives

- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;
- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;

- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;
- Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality;
- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Manage forests in an ecologically sound manner to provide habitat for wildlife;
- Manage forest stands for watershed protection;
- Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP; and
- Incorporate the concept of ecosystem management into all planning and management processes.

Projects

- Invasive Species Control (Project 1 in Appendix A);
- Forestry Program Support (Project 9 in Appendix A); and
- Forest Fire Protection (Project 11 in Appendix A).

Management Strategies

- Continue to develop a soil erosion control plan and reduce the rate of soil erosion through the implementation of long-term measures and projects;
- Continue adhering to BMPs in the SWPPP (NAS JAX 2018) and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (FDEP 2008) to ensure watershed protection;
- Inventory wetlands and assess their function and quality on a routine basis;
- Promote 50-foot buffers for all wetlands, and ensure land use and land management practices that will not adversely affect wetland resources;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices;
- Ensure implementation of policies that minimize adverse impacts to ecosystem resources from land disturbance activities (e.g., construction, clearing, and training);
- Apply xeriscaping principles using native species for new landscaping, and will phase in these principles for existing landscapes;

- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Continue using the Silviculture BMPs (FDACS 2003) for forest management activities to ensure watershed protection;
- Manage forests in an ecologically sound manner to provide habitat for wildlife;
- Manage forest stands for watershed protection; and
- Continually verify that natural resources personnel obtain proper training and certifications.

Long-Term Management

Long-term management for soil conservation and erosion control will include identifying and understanding the suitability and sustainability of a soil unit for a proposed action. The USDA NRCS soil surveys may be used to identify the potential applicability and limitations of each soil unit for land use activities. Land uses may include forestry, building construction, recreation, wildlife habitat, and agriculture. The USDA soil surveys for Duval and Putnam Counties provide information on potential erosion hazards; groundwater contamination; productivity of cultivated crops, trees, and grass; and the protection of water quality, wetlands, and wildlife habitat.

To minimize soil erosion, the NAS JAX Complex will implement the following:

- Continue the use of BMPs to control soil erosion (FDACS 2003; FDEP 2008; NAS JAX 2018). In addition, the NAS JAX Complex will implement the following six principles for soil conservation and erosion management:
 1. Minimize areas of disturbance,
 2. Stabilize and protect disturbed areas from raindrop and runoff energies as soon as practical,
 3. Minimize runoff velocities,
 4. Protect disturbed areas from adjacent area runoff,
 5. Retain sediment within construction sites, and
 6. Reduce exposure time (Smoot and Smith, 1999);
- Implement BMPs during forest management activities such as road building, harvesting, reforestation, and timber stand improvement (FDACS 2003);
- Evaluate areas on the Installation for erosion control problems;
- Reduce mowing and increase grass height and coverage, where practicable;
- Control potential erosion control problems by:
 1. Using vegetative and structural protective covers (e.g., permanent seeding, groundcover),
 2. Using sediment barriers (e.g., silt fence, brush),
 3. Creating sediment detention ponds and basins (e.g., sediment traps and basins),

4. Implementing stream and pond bank protection (e.g., natural vegetation),
5. Constructing pervious surface walkways in areas of high pedestrian traffic,
6. Constructing water conveyances (e.g., slope drains, check dam inlet and outlet protection),
7. Implementing temporary construction and road stabilization (e.g., placement of stone and geotextile fabrics [Smoot and Smith 1999]),
8. Repairing bare and slightly eroded areas quickly, and
9. Maintain healthy ground cover in improved and semi-improved areas with low fertility by applying natural or chemical fertilizers and/or soil additives.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 –prevent sedimentation into wetlands;
- Stormwater and Water Quality, Section 5.1.3 –control stormwater to reduce erosion and sedimentation;
- Floodplains, Section 5.1.4 – identify soil types to reduce flood damage;
- Landscaping and Grounds Maintenance, Section 5.1.5 – ensure mowing plans and landscaping do not compromise soil conservation;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – ensure removal of undesired plants does not enhance erosion;
- Urban Forestry, Section 5.1.7 – consider soil conservation during urban forestry planning;
- Land Impact Guidelines, Section 5.1.8 – include erosion control in project planning;
- Silviculture, Section 5.2.1 – control erosion and sedimentation during silviculture;
- Forest Protection, Section 5.2.2 – burns promote the health of herbaceous ground cover to prevent erosion;
- Fisheries Management, Section 5.3.1 – control erosion into fishing areas;
- Migratory Birds, Section 5.3.2 – control erosion into wading areas;
- Threatened and Endangered Species, Section 5.3.3 – control erosion to maintain habitat and water quality for protected species;
- Nuisance Wildlife and BASH, Section 5.3.4 – controlling nuisance species that root (e.g., feral pigs) enhances erosion control;
- Outdoor Recreation, Section 5.4 – educate resource users to minimize erosion;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on BMPs; and
- GIS, Section 5.5.2 – utilize GIS tools to improve soil mapping and management.

Ecosystem Management

Soil conservation is an essential component of the ecosystem management concept. Soils are particularly susceptible to erosion from uncontrolled stormwater runoff and may discharge into water bodies from point and nonpoint sources. Sediments in stormwater runoff have the capacity to obstruct drainage infrastructure and to reduce the volume capacity of wetlands, potentially

resulting in damaging flood conditions. Turbidity pollution, derived from soil erosion, may also affect surface water quality in adjacent freshwater, estuarine, and marine environments.

Military Mission

Erosion can undermine roads and runways, potentially affecting the military mission. It can also increase sediment loading in stormwater runoff, which increases turbidity and reduces water quality in surrounding waters, violating environmental laws and placing the Complex at odds with Florida FDEP.

Laws, Executive Orders, Regulations, Directives, and Memoranda Relevant to Soil Conservation

- Soil Conservation Act, 16 U.S.C. 590(a) et seq., provides for soil conservation practices on federal lands.
- Federal Water Pollution Control Act, as amended by the CWA of 1977, 33 U.S.C. 1251, regulates the dredging and filling of wetlands and establishes procedures for identifying and regulating nonpoint sources of polluted discharge, including turbidity, into waterways.
- CWA, Section 402: National Pollutant Discharge Elimination System (NPDES) Program, 2002, 33 USC 1251, controls direct discharges into navigable waters. NPDES permits, issued by either the EPA or an authorized state or tribe, contain industry-specific technology-based limits and establish pollutant monitoring and reporting requirements.
- CWA, Section 401, requires an applicant for a federal license or permit to provide a certification that any discharges from the facility will comply with the CWA, including water quality standard requirements.
- CWA, Section 404, establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands.
- Rivers and Harbors Act, requires authorization from the USACE for the construction of any structure in or over any navigable water of the United States and the excavation, dredging, and deposition of material in these waters or any obstruction or alteration in a navigable water.
- EOs 11989 and 12608, close areas to off-road vehicles where soil, wildlife, or other natural resources may be adversely affected.
- EO 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems. Vegetative buffers and landscaping to control soil erosion must comply with this executive order.
- OPNAVINST 5090.1D, 12-3.8(d), discusses natural resources management relating to soil conservation management.
- Florida Statutes, Chapter 582.05, provides for control and prevention of soil erosion and damage from floodwater and sediments, and for the conservation of soil and water resources.

Additional Sources of Information

USDA Natural Resources Conservation Service in Florida
<http://www.fl.nrcs.usda.gov/>

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

FDEP Stormwater, Erosion, and Sediment Control
<http://www.dep.state.fl.us/water/nonpoint/erosion.htm>

USDA Soil Survey Geographic (SSURGO) Database
<http://soils.usda.gov/survey/geography/ssurgo/>

The National Soil Erosion Research Laboratory
http://www.ars.usda.gov/main/site_main.htm?modecode=36-02-15-00

5.1.3 Stormwater and Water Quality Control

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

Issues

Stormwater management and related permitting at the NAS JAX Complex falls under the purview of the Stormwater Manager (SWM) who cooperates with the NRM to address stormwater issues arising with regard to natural resources. Stormwater discharges have been increasingly identified as a significant source of water pollution in numerous nationwide studies on water quality. As development increases at the NAS JAX Complex, the control of stormwater drainage is an increasingly important aspect of water quality control. More impermeable surface area (less land available for absorption and filtration) translates to faster runoff rates and increased pollution loads. More development means more land clearing and landscaping activities that require appropriate stormwater management practices. It is especially important to have proper stormwater management when developed areas are in close proximity to surface waterbodies.

Goals and Objectives

- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;

- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;
- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;
- Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality;
- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Reduce and control noxious, invasive, and exotic species;
- Ensure that land management and land use decisions comply with all applicable laws, EO, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices;
- Manage forests in an ecologically sound manner to provide habitat for wildlife;
- Manage forest stands for watershed protection;
- Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP; and
- Incorporate the concept of ecosystem management into all planning and management processes.

Projects

- Invasive Species Control (Project 1 in Appendix A);
- Forestry Program Support (Project 9 in Appendix A).

Management Strategies

- Continue to develop a soil erosion control plan and reduce the rate of soil erosion through the implementation of long-term measures and projects;
- Continue adhering to BMPs in the SWPPP (NAS JAX 2018) and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (FDEP 2008) to ensure watershed protection;
- Inventory wetlands and assess their function and quality on a routine basis;
- Promote 50-foot buffers for all wetlands, and ensure land use and land management practices that will not adversely affect wetland resources;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices;

- Ensure implementation of policies that minimize adverse impacts to ecosystem resources from land disturbance activities (e.g., construction, clearing, and training);
- Apply xeriscaping principles using native species for new landscaping, and will phase in these principles for existing landscapes;
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Continue using Silviculture BMPs (FDACS 2003) for forest management activities to ensure watershed protection;
- Manage forests in an ecologically sound manner to provide habitat for wildlife;
- Manage forest stands for watershed protection; and
- Continually verify that natural resources personnel obtain proper training and certifications.

Long-Term Management

Stormwater on the NAS JAX Complex is managed by the SWM according to the Jacksonville Complex SWPPP. The SWPPP establishes engineering and management strategy to improve the quality of the storm water runoff from the Complex's industrial areas. The SWPPP was prepared according to OPNAVINST 5090.1D and in order to comply with the EPA National Pollutant Discharge Elimination System (NPDES) program under the Federal Water Pollution Control Act, as amended by the CWA of 1977. The EPA has issued an NPDES multi-sector Permit (# FLR05A829) to NAS JAX, which covers all the properties.

The SWPPP divides NAS Jacksonville into 72 drainage basins, of which, 25 contain industrial activities. For each industrial activity, the SWPPP performs three major functions: storm water monitoring; BMP implementation; and site compliance evaluations. The SWPPP does not address stormwater management in non-industrial drainage basins on NAS JAX. The SWPPP focuses on three objectives:

1. Identify sources of pollution potentially affecting the quality of stormwater discharges associated with industrial activity from the facility;
2. Describe and ensure implementation of practices to minimize and control pollutants in stormwater discharges associated with industrial activity from the facility; and
3. Ensure compliance with the terms and conditions of the NPDES permit.

The CO is responsible for the implementation of the SWPPP and delegates authority to the SWM. A Stormwater Pollution Prevention Team (SWPPT) was formed to determine the adequacy of the SWPPP, ensure implementation of BMPs, perform required record keeping, and carry out the annual update and certification of the SWPPP. The SWPPP will be revised and updated at least annually. The SWM is also responsible for reviewing projects and ensuring the action proponent

applies for a permit for discharging stormwater from construction sites greater than 1.0 acre on the facility.

The SWPPP consists of a series of steps and activities to identify potential sources of stormwater pollution or contamination and implement BMPs. Analytical and visual monitoring for pollutants will occur in areas specified in the SWPPP. Visual examinations include observations of color, odor, turbidity, floating solids, foam, oil sheet, settled solids, suspended solids, and other obvious indicators of stormwater pollution.

In addition to operating under its SWPPP, the NAS JAX Complex will implement additional programs to reduce pollutant loading and stormwater runoff into wetlands and waterbodies. Wetland quality and wildlife habitat will benefit from the reduction of stormwater and pollutant loading. The NAS JAX Complex will operate under the following management guidelines for stormwater runoff and water quality control:

1. The NAS JAX Complex will prevent pollutant loading in stormwater by operating under the SWPPP (NAS JAX 2018) and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (FDEP 2008), and following pollution management plans: Preparedness, Prevention and Contingency Plan (40 CFR 264 and 265); SPCC Plan (40 CFR 112); NPDES Toxic Organic Management Plan (40 CFR 413.433, and 469); and Occupational Safety and Health Administration (OSHA) Emergency Action Plan (29 CFR 1910);
2. The NAS JAX Complex will implement the Silviculture BMPs (FDACS 2003) during silvicultural activities (e.g., thinning, reforestation, and prescribed burning) to prevent soil erosion and other adverse impacts to the soil;
3. The NAS JAX Complex will manage stormwater runoff from new development to achieve no net increase in stormwater discharge volume from the Installation, unless there are no means to do so that will meet the military mission;
4. The NAS JAX Complex will provide stormwater retention by developing and enhancing stormwater ponds. Stormwater ponds often function as wetlands and can provide ideal growing conditions for emergent wetland vegetation, which may be useful in pollutant removal;
5. The NAS JAX Complex will consider, where feasible, retrofitting stormwater infrastructure to provide natural infiltration of stormwater (e.g., grass swales, shallow retention ponds adjacent to intakes), or to increase detention time prior to discharge;
6. The NAS JAX Complex will use natural or created buffers around new stormwater ponds to provide wildlife habitat; reduce impacts associated with runoff; filter sediments and sediment-bound pollutants; and facilitate infiltration prior to discharge into waterbodies. Reducing sediment loading will increase the longevity of the retention ponds and further reduce maintenance costs;
7. The NAS JAX Complex will use permeable alternatives to impervious surfaces; for example, wood decks instead of concrete patios, grass swales instead of concrete; and
8. To protect water quality, the NAS JAX Complex will inventory its use of pesticides and fertilizers and will assess alternatives to reduce the use of mineral fertilizers and/or

pesticides. The NAS JAX Complex intends to use pesticides with lower toxicity levels and to apply them at reduced rates.

- The use of organic matter to provide nutrient material will be considered. Organic matter consists of the wastes and remains of plants and animals. Organic matter is the nutrient of choice because it improves soil composition and structure by making soil more resistant to erosion by stormwater runoff. Other benefits from increasing the organic matter content of soil include better soil aeration and temperature control, increased water holding and nutrient retaining capacities, and a steady supply of nutrients to plants.
- Mineral fertilizers are materials, either natural or manufactured, containing nutrients essential for the normal growth and development of the plants. Mineral fertilizers include both fast and slow-release fertilizers, and will be used as a supplement to organic matter for the growth and development of landscaping.
- Where feasible, slow-release fertilizers will be the mineral fertilizer of choice, and will be used, after consultation with the NRM, in combination with organic matter when it is impractical to only use organic matter. Slow-release mineral fertilizers are released at a slow rate throughout the season, thereby reducing the amount of waste by leaching and reducing the potential for surface water contamination. Other benefits of using slow-release fertilizers are the reduced application frequency and the minimization of fertilizer burn.
- Fertilizers or pesticides will not be applied before or during rain events due to the strong likelihood of runoff. Fertilizers and pesticides will be applied during maximum plant uptake periods to minimize leaching.
- The NAS JAX Complex will contact the ABD at NAVFAC SE and the FDACS Pesticide Division for information regarding fertilizer and pesticide applications.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – control runoff and sedimentation into wetlands;
- Soil Conservation and Erosion, Section 5.1.2 – stormwater control will reduce erosion;
- Floodplains, Section 5.1.4 – proper stormwater drainage helps reduce flood damage;
- Landscaping and Grounds Maintenance, Section 5.1.5 – landscape to reduce runoff velocity and maximize absorption;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – ensure removal of undesired plants does not accentuate the effects of runoff;
- Urban Forestry, Section 5.1.7 – consider runoff during urban forestry planning;
- Land Impact Guidelines, Section 5.1.8 – consider runoff when planning land use projects;
- Silviculture, Section 5.2.1 – control stormwater and water quality during silvicultural activities;
- Forest Protection, Section 5.2.2 – burns promote the health of herbaceous ground cover to prevent erosion from stormwater;
- Fisheries Management, Section 5.3.1 – control water quality in fishing areas;
- Migratory Birds, Section 5.3.2 – control water quality in wading areas;
- Threatened and Endangered Species, Section 5.3.3 – maintain water quality for protected species;

- Nuisance Wildlife and BASH, Section 5.3.4 – control pesticide to reduce runoff in stormwater;
- Outdoor Recreation, Section 5.4 – educate resource not to accentuate the effects of runoff;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on stormwater and water quality BMPs; and
- GIS, Section 5.5.2 – utilize GIS tools to improve management of stormwater runoff.

Ecosystem Management

Like soil conservation, the effective management of stormwater, and associated pollutant loading, is essential to realize the ecosystem management concept. Implementation of BMPs (FDACS 2003; FDEP 2008; NAS JAX 2018) in developed, semi-developed, and unimproved areas will help protect water quality and habitat for aquatic life. These BMPs address the reduction of sedimentation, nutrient overloading, bacterial and parasitic pests, and harmful chemicals in stormwater. Construction of any new stormwater ponds in accordance with the stormwater and water quality management concept will increase wildlife habitat and reduce the potential for additional discharge from new development into nearby creeks.

Military Mission

Improper stormwater management could lead to increased flooding on the NAS JAX Complex properties, altering the timing and location of training. It can also lead to increased erosion, pollution, and sedimentation into water bodies, which increases turbidity and reduces water quality, violating environmental laws and placing the Complex at odds with Florida FDEP and potentially violating federal permits.

Laws, Executive Orders, Regulations, Directives, and Memoranda Relevant to Stormwater and Water Quality

- Federal Water Pollution Control Act, as amended by the CWA of 1977, 33 U.S.C. 1251, regulates the dredging and filling of wetlands and establishes procedures for identifying and regulating nonpoint sources of polluted discharge, including turbidity, into waterways.
- Coastal Zone Management Act of 1972, 16 U.S.C. 1451 et seq., establishes authority (Section 6217) for states to administer coastal nonpoint pollution programs when approved by NOAA and EPA. The NAS JAX Complex will coordinate with the State of Florida for nonpoint source compliance with the Florida Coastal Nonpoint Source Pollution Control Program.
- EO 11990, 24 May 1977, as amended, directs the preservation and enhancement of wetlands.
- Oil Pollution Act of 1990 (OPA 90), 33 U.S.C. 2701, requires planning for, rescue of, minimization of injury to, and assessment of damages or injury to fish and wildlife resources from the discharge of oil.

- Comprehensive, Environmental Response, Compensation and Liability Act, 42 U.S.C. 9601 et seq., authorizes Natural Resources Trustees to recover damages for injury to, destruction of or loss of natural resources resulting from the release of a hazardous substance.
- CWA, Section 402 NPDES Program, 2002, 33 USC 1251, controls direct discharges into navigable waters. NPDES permits, issued by either the EPA or an authorized state or tribe, contain industry-specific, technology-based and water-quality-based limits and establish pollutant monitoring and reporting requirements.
- CWA, Section 401, requires an applicant for a federal license or permit to provide a certification that any discharges from the facility will comply with the CWA, including water quality standard requirements.
- CWA, Section 404, establishes a program to regulate the discharge of dredge and fill material into waters of the United States, including wetlands.
- OPNAVINST 5090.1D, 12-3.8(f), discusses natural resources management relating to nonpoint source pollution.
- OPNAVINST 5090.1D, Chapter 23, establishes requirements, guidelines and standards for the assessment of damages arising from the release of oil or hazardous substances.
- Florida Statutes, Chapter 373, Management and Storage of Surface Waters, regulates the management and storage of surface water and is implemented by NFWFMD under Environmental Resources Permitting.
- Florida Statutes, Chapter 376, Pollutant Discharge Prevention and Removal, prohibits the discharge of pollutants into coastal waters, estuaries, tidal flats, or beaches.
- Florida Statutes, Chapter 380, The Florida Environmental Land and Water Management Act of 1972, is intended: (1) to ensure a water management system that reverses the deterioration of water quality and that provides optimum utilization of limited water resources; (2) to facilitate orderly, well planned development; and (3) to protect public health, welfare, safety, and quality of life for Florida residents.
- Florida Statutes, Chapter 403, Florida Air and Water Pollution Control Act, conserves, protects, maintains, and improves the quality of the public water supply. Waste must not be discharged into any waters without prior approval from the state.
- Florida Statutes, Chapter 582, Soil and Water Conservation, provides control and prevention of soil erosion, prevention of damage from floodwater and sediments, and conservation of soil and water resources.
- Florida Coastal Management Program, requires federal action in the coastal zone to be consistent with 23 Florida Statutes, which are administered by 11 state agencies and four of the five state water management districts. The coastal zone includes the area encompassed by the state's 67 counties and its territorial waters. Therefore, federal actions which occur throughout the state are reviewed by the state for consistency with the FCMP. Consistency with the statutes constitutes consistency with the FCMP (FDEP 2014).

Additional Sources of Information

St. Johns River Water Management District
<http://www.floridaswater.com>

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

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

FDEP Water Programs
<http://www.dep.state.fl.us/water/>

FDEP Stormwater, Erosion, and Sediment Control
<http://www.dep.state.fl.us/water/nonpoint/erosion.htm>

FDEP Nonpoint Source Management Program
<http://www.dep.state.fl.us/water/nonpoint/index.htm>

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

USGS Florida Water Science Center
<http://fl.water.usgs.gov/>

Environmental Law Institute
www.eli.org

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

5.1.4 Floodplain Management

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

Issues

Portions of all four NAS JAX Complex properties occur in the 100-year floodplain. Substantial development (i.e., grading, filling, dredging, extraction, storage, soil mixing, and the construction or improvement of structures) has occurred within the 100-year floodplain on NAS Jacksonville, but the floodplains on OLF Whitehouse, Rodman Bomb Target, and Yellow Water are undeveloped. The NAS JAX Complex must minimize development and activities that occur in the floodplain in order to avoid adverse impacts.

Goals and Objectives

- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;
- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;
- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;

- Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality;
- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Manage forests in an ecologically sound manner to provide habitat for wildlife;
- Manage forest stands for watershed protection;
- Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP; and
- Incorporate the concept of ecosystem management into all planning and management processes.

Projects

- Protected Species Surveys (Project 2 in Appendix A); and
- Endangered and Threatened Species Habitat Protection (Project 4 in Appendix A).

Management Strategies

- Inventory wetlands and assess their function and quality on a routine basis;
- Continue adhering to BMPs in the SWPPP (NAS JAX 2018) and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (FDEP 2008) to ensure floodplain protection;
- Promote 50-foot buffers for all wetlands, and ensure land use and land management practices that will not adversely affect wetland resources;
- Continue to develop a soil erosion control plan and reduce the rate of soil erosion through the implementation of long-term measures and projects;
- Continue to inventory the use of pesticides and fertilizers to assess alternatives to their use and a reduction in pesticide and fertilizer use;
- Continue using the Silviculture BMPs (FDACS 2003) for forest management activities to ensure watershed protection;
- Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices;
- Continually verify that natural resources personnel obtain proper training and certifications; and
- Continue the use of Computer-Aided Drafting and a GIS for construction, environmental, engineering, and natural resources mapping.

Long-Term Management

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

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – manage to maintain viability of floodplains;
- Soil Conservation and Erosion, Section 5.1.2 – identify soil types in floodplain;
- Stormwater and Water Quality, Section 5.1.4 – proper stormwater drainage helps reduce flood damage;
- Landscaping and Grounds Maintenance, Section 5.1.5 – use appropriate landscape practices in floodplains;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – ensure removal of undesired plants is consistent with maintaining floodplain function;
- Urban Forestry, Section 5.1.7 – ensure urban forestry is consistent with maintaining floodplain function;
- Land Impact Guidelines, Section 5.1.8 – consider floodplains when planning land use projects;
- Silviculture, Section 5.2.1 – perform silvicultural activities in a manner that maintains floodplain viability;
- Forest Protection, Section 5.2.2 – burns promote the health of herbaceous ground cover to prevent erosion during flooding;
- Fisheries Management, Section 5.3.1 – proper management of floodplains improves water quality in fishing areas;
- Migratory Birds, Section 5.3.2 – undeveloped floodplains provide bird habitat away from infrastructure;
- Threatened and Endangered Species, Section 5.3.3 – controlling development in floodplains enhances habitat and water quality for protected species;

- Nuisance Wildlife and BASH, Section 5.3.4 – consider floodplain function when modifying habitat on the airfield;
- Outdoor Recreation, Section 5.4 – controlling development in floodplains enhances outdoor recreational opportunities;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on floodplain laws; and
- GIS, Section 5.5.2 – utilize GIS tools to improve management of floodplains.

Ecosystem Management

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

Military Mission

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

Laws, Executive Orders, Regulations, Directives, and Memoranda Relevant to Floodplains

- EO 11988, Floodplain Management, 24 May 1977, requires federal service agencies to avoid construction or management practices that will adversely affect floodplains, unless it is found that there is no practical alternative and the proposed action has been designed to minimize harm to or within the floodplain.
- OPNAVINST 5090.1D, 12-3.8(c), discusses natural resources management relating to floodplain management.
- Florida Coastal Management Program, requires federal action in the coastal zone to be consistent with 23 Florida Statutes, which are administered by 11 state agencies and four of the five state water management districts. The coastal zone includes the area encompassed by the state's 67 counties and its territorial waters. Therefore, federal actions which occur throughout the state are reviewed by the state for consistency with the FCMP. Consistency with the statutes constitutes consistency with the FCMP (FDEP 2014).

Additional Sources of Information

St. Johns River Water Management District
<http://www.floridaswater.com>

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

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

Florida Floodplain Management Program
<http://www.floridadisaster.org/Mitigation/SFMP/Index.htm>

Florida Floodplain Managers Association
<https://ffma.pbsjteamaccess.com/default.aspx>

5.1.5 Landscaping and Grounds Maintenance

Landscaping and grounds maintenance is defined here as landscaping design and construction practices intended to benefit the environment and to generate long-term cost savings. Such practices include using native species, which will reduce the need for irrigation and fertilization, stabilize soil, and improve wildlife habitat. The majority of grounds maintenance and landscaping at the NAS JAX Complex is provided outside the natural resources program. Grounds maintenance is provided by the RBOS II contract through the Public Works Department. Grounds maintenance, which includes such services as grass cutting, edging, pruning, mulching, fertilization, irrigation, and sodding, is outside the management scope for this INRMP. The ground maintenance under the natural resources program includes such practices as mowing impoundment dikes, forest service roads, and trails. The natural resources program will implement the following objectives and Long Term management practices.

The Rodman Bomb Target is an unimproved area with the exception of the road network and a trailer adjacent to the cleared bomb target zone. Yellow Water is an unimproved with no structures. No grounds maintenance or landscaping is planned for either property.

Issues

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

Goals and Objectives

- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;
- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;

- Provide facilities and develop policies that allow for recreational and educational uses of natural resources, and result in positive effects to these natural resources while improving the quality of life;
- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;
- Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality;
- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices;
- Control nuisance wildlife and wildlife diseases that may adversely affect human health or welfare, the health of the ecosystem, and the military mission;
- Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP; and
- Incorporate the concept of ecosystem management into all planning and management processes.

Projects

- Invasive Species Control (Project 1 in Appendix A);
- Endangered and Threatened Species Habitat Protection (Project 4 in Appendix A);
- Gopher Tortoise Management (Project 5 in Appendix A); and
- Natural Resources Training (Project 8 in Appendix A).

Management Strategies

- Continue to implement general landscape management practices consistent with the concepts presented in this INRMP;
- Continue to apply xeriscaping principles using native species for new landscaping, and will phase in these principles for existing landscapes;
- Continue to follow its working Urban Forestry Plan and implement projects to enhance wildlife habitat and aesthetics in developed areas;
- Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices;
- Promote 50-foot buffers for all wetlands, and ensure land use and land management practices that will not adversely affect wetland resources;

- Continue adhering to BMPs in the SWPPP (NAS JAX 2018) and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (FDEP 2008) to ensure watershed protection;
- Continue to develop a soil erosion control plan and reduce the rate of soil erosion through the implementation of long-term measures and projects;
- Continue to inventory the use of pesticides and fertilizers to assess alternatives to their use and a reduction in pesticide and fertilizer use;
- Implement grounds maintenance practices consistent with the BASH Plan;
- Continue to implement programs and activities for the protection and enhancement of threatened and endangered plant and animal species and their habitats; and
- Continually verify that natural resources personnel obtain proper training and certifications.

Long-Term Management

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

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

The NAS JAX Complex will landscape by xeriscaping around all newly-constructed buildings and other facilities to create relatively low maintenance and low cost landscapes and reduce the need for intensive labor (i.e., hand trimming and bed maintenance). Xeriscaping will also be phased into existing landscaped areas. Xeriscaping offers a viable alternative to the typically high-volume water requirements of other landscaping approaches by conserving water through creative landscaping. Xeriscaping uses native plants, which are adapted to local climatic conditions and variations, generally resistant to drought, disease, and pests, and require less water than non-native species. The potential benefits of xeriscaping include reduced water use (typically from 30 to 80 percent), reduced heating and cooling costs from placement of appropriate tree species, decreased stormwater and irrigation runoff, fewer pesticide and fertilizer applications, less yard waste, increased habitat for plants and animals, and lower labor and maintenance effort and thus costs. Xeriscaping incorporates seven principles (Xeriscape Colorado, Inc., 1999):

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

The NAS JAX Complex will evaluate current landscaping practices to determine how effective the principles of xeriscaping would be in improving existing conditions. The NAS JAX Complex will determine: (1) if implementation of xeriscaping principles will provide sufficient benefits to justify any additional cost, (2) if the implementation of certain principles may achieve the desired results, or (3) if continuation of existing conditions will achieve desired results. The NAS JAX Complex will monitor the success of integrating the principles of xeriscaping with existing landscaped areas and adjust management practices as warranted.

Grounds maintenance at the NAS JAX Complex will be accomplished using the following guidelines:

- Avoid excessive mowing. Grass mowing should be scheduled on the basis of height, rather than by arbitrarily specified time intervals, if practicable;
- Maintain good ground cover through proper fertilization to prevent erosion. If erosion occurs, it will be addressed and corrected as soon as possible;
- Maintain healthy lawns to prevent insect infestations and disease;
- Minimize hand trimming; and
- Implement grounds maintenance activities in the vicinity of airfields to reduce BASH-related incidents. Grounds maintenance in the vicinity of airfield operations require significantly different management than in other developed areas.

Grounds maintenance personnel will contact the NRM for technical advice prior to tree and shrub pruning, fertilization, grass replacement, species selection, new landscape projects, and new irrigation projects. Pesticide and fertilizer applications during landscaping and grounds maintenance will be consistent with the long-term management concepts pertaining to pesticides and fertilizers in Sections 5.1.7 and 5.3.3.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – maintain a 50-foot buffer around wetlands;
- Soil Conservation and Erosion, Section 5.1.2 – landscape to reduce erosion;
- Stormwater and Water Quality, Section 5.1.3 – use proper amounts of herbicide and fertilizers to avoid excessive runoff in stormwater;
- Floodplains, Section 5.1.4 – ensure landscaping in floodplains does not alter floodplain function;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – replace removed exotic species with native vegetation;
- Urban Forestry, Section 5.1.7 – utilize urban forestry principles during landscaping and grounds maintenance, and vice-versa;
- Land Impact Guidelines, Section 5.1.8 – utilize xeriscaping and native plants;
- Forest Protection, Section 5.2.2 – maintain grounds to reduce fuel loads;
- Fisheries Management, Section 5.3.1 – use proper amounts of herbicide and fertilizers to avoid runoff into fishing areas;
- Migratory Birds, Section 5.3.2 - use proper amounts of herbicide and fertilizers to avoid runoff into wading areas;
- Threatened and Endangered Species, Section 5.3.3 – landscape and maintain grounds to maintain and enhance habitat for protected wildlife;
- Nuisance Wildlife and BASH, Section 5.3.4 – control nuisance animals to prevent landscape damage;
- Outdoor Recreation, Section 5.4 – maintain aesthetically-pleasing grounds for recreation;
- Natural Resources Training, Section 5.5.1 – ensure personnel are aware of landscaping and grounds issues and practices; and
- GIS, Section 5.5.2 – utilize GIS tools to improve landscaping plans.

Ecosystem Management

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

Military Mission

Inappropriate landscaping and grounds maintenance practices (e.g., excessive use or application of inappropriate pesticides) may potentially affect water quality and federally and state-designated endangered or threatened species, resulting in regulatory actions by agencies such as the

USFWS, FDEP, or USACE, which could threaten the military mission of the NAS JAX Complex. In addition, appropriate landscaping and maintenance practices improve quality of life.

Laws, Executive Orders, Regulations, Directives, and Memoranda Relevant to Landscaping and Grounds Maintenance

- EO 13148, 21 April 2000, Section 207, requires implementing landscaping practices that are intended to benefit the environment and generate long-term cost savings.
- EO 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
- The President's April 16, 1994, Memorandum on Environmentally Beneficial Landscaping, requires implementing landscaping practices that are intended to benefit the environment and generate long-term cost savings.
- Federal Insecticide, Fungicide and Rodenticide Act, 7 U.S.C. 136, governs the use and application of pesticides in natural resources management programs.
- Federal Water Pollution Control Act as amended by the CWA of 1977, 33 U.S.C. 1251, prohibits the discharge of dredged or filled materials into waters of the United States, including wetlands, without first obtaining a permit from USACE (Section 404 of the CWA).
- OPNAVINST 5090.1D, 12-3.8(e), discusses natural resources management relating to environmentally and economically beneficial landscaping.
- DODINST 7310.5, administers the reimbursement of costs related to managing forest resources for timber production. Under this regulation, only expenses related to the maintenance of timber for commercial sales are reimbursed.

Additional Sources of Information

Florida-Friendly Landscape Guidance Models
<http://www.dep.state.fl.us/water/nonpoint/docs/nonpoint/ffl-mo-ccr-1-09.pdf>

Escambia County IFAS Extension Office, Horticulture
<http://escambia.ifas.ufl.edu/lng/>

Florida Association of Native Nurseries
<http://www.afnn.org/>

Florida Natural Areas Inventory
<http://www.fnai.org>

Florida Native Plant Society
<http://www.fnps.org>

American Water Works Association, WaterWiser
<http://www.awwa.org/waterwiser/>

5.1.6 Invasive, Exotic, and Noxious Species

Species can be categorized as native, exotic, exotic and invasive, or native and invasive. A native species is a species already occurring at the time of European contact in 1500 (Florida Exotic Pest Council 1999). An exotic species is a non-indigenous (non-native) species that was either

purposefully or accidentally introduced into an area outside its natural range. Invasive species are alien species whose introduction does, or is likely to, cause harm to the economy, environment, or human health. Invasive species in natural areas include aggressive plants that produce a significant change in terms of species composition, ecosystem structure, or ecosystem function (Cronk and Fuller 1995).

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

The higher temperatures and changes in precipitation patterns associated with climate change are anticipated to cause shifts in species composition and geographic range. Among the species shifts anticipated are movement of wildlife to more favorable habitat, shifts in vector-borne diseases, and expansion of invasive grasses and shrubs. Invasive plants contribute fuel load for wildfires, which in turn increases the likelihood, range, and intensity of wildfire. Ongoing management of exotic and invasive species is therefore vital to offset the potential vulnerability of properties and native communities on the NAS JAX Complex.

The following species occur on the NAS JAX Complex and are considered exotic and invasive:

- Chinese tallow or popcorn tree (*Sapium sebiferum*) tends to take over large areas, mainly areas with wet soils, but can thrive in upland areas as well. It can survive in both freshwater and saline soils and has the capacity to dominate wetland areas. This species is located along portions of the St. Johns River shoreline and in some disturbed forested wetlands at the southern end of NAS Jacksonville (FLEPPC Category I).
- Camphor tree (*Cinnamomum camphora*) generally occurs in drier disturbed areas. This species is located primarily in housing backyards on NAS Jacksonville (FLEPPC Category I).
- Torpedo grass (*Panicum repens*) is located primarily in dense stands in shallow areas along ponds and lakes and edges of marshes and ditches. This species is located along the shoreline of Lake Scottlis (FLEPPC Category I).
- Common reed (*Phragmites communis*) is located in all wet habitats and adjoining banks. This plant has become naturalized and is not considered exotic; however, it is considered invasive. This plant has also been identified along the St. Johns River shoreline.

- Wild taro (*Colocasia esculenta*) is an aggressive weed found along streams, marshy shores, canals, ponds, and ditches. Its dense growth displaces native shorelines. This species is located along the St. Johns River shoreline, and ditched (FLEPPC Category I).
- Coral ardisia (*Ardisia crenata*) is a small upright shrub that can grow 6ft in height. The leaves are thick, glossy, dark green in color with scalloped margins and red berries. This species is located along nature trails in the southern portion of the installation. (FLEPPC Category I)

The following animal pest species are also known at the NAS JAX Complex:

- Mole crickets (*Scapteriscus borellii*) damage turf and pasture grasses mainly by tunneling (because it is largely carnivorous and feeds on soil-inhabiting insects).
- Fire ants (*Solenopsis* spp.) include many opportunistic ant species, both exotic and native. Fire ants are present throughout NAS JAX Complex.
- Household and nuisance pests - cockroaches, ants, fleas, spiders, silverfish, etc.;
- Structural pests - termites, powder post beetles, wood borers, and wood destroying fungi, etc.;
- Stored products pests - grain, meal, and flour moths; rice and granary weevils; and saw-toothed grain and confused flour beetles, etc.;
- Health-related pests – mosquitoes and filth flies;
- Pests of ornamental plants and turf – soil and root infesting insects, leaf-chewing insects, plant-sucking insects, wood-boring insects, etc.; and
- Vertebrate pests – vertebrates such as rodents, feral cats, opossums, armadillos, coyotes, starlings, and pigeons may be considered pests under certain circumstances (e.g., when they occur in high numbers or in certain locations in urban or developed areas). Vertebrate pests are also discussed as nuisance wildlife in Section 5.3.3.

Issues

Invasive species have the potential to interfere with military and recreational activities, wildlife habitats, forests, wetlands, and other natural areas. Invasive species often interfere with ecosystem functions. Some of them can form expansive monocultures when left uncontrolled and, in extreme case, will lead to complete loss of native plant communities and reduction in regional biodiversity.

Goals and Objectives

- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;
- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;
- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;

- Control nuisance wildlife and wildlife diseases that may adversely affect human health or welfare, the health of the ecosystem, and the military mission;
- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality;
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices;
- Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP; and
- Incorporate the concept of ecosystem management into all planning and management processes.

Projects

- Invasive Plant Control (Project 1 in Appendix A); and
- Endangered and Threatened Species Habitat Protection (Project 4 in Appendix A).

Management Strategies

- Continue existing efforts, and further, establish a program/plan using prescribed burns and/or thinning to improve habitat quality, reduce the potential for wildfires, control diseases and insect pests, and ensure the continuation of fire-dependent plant communities;
- Continue monitoring program for natural communities (as well as rare, threatened and endangered species), and implement programs to enhance natural communities/wildlife habitat;
- Continue to implement programs and activities for the protection and enhancement of threatened and endangered plant and animal species and their habitats;
- Continue to implement general landscape management practices consistent with the concepts presented in this INRMP;
- Continue to apply xeriscaping principles using native species for new landscaping, and will phase in these principles for existing landscapes;
- Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices;
- Continue to inventory the use of pesticides and fertilizers to assess alternatives to their use and a reduction in pesticide and fertilizer use; and
- Continually verify that natural resources personnel obtain proper training and certifications.

Long-Term Management

Invasive and exotic species will be managed through the removal of the species and restrictions on the introduction of the species to the NAS JAX Complex in accordance with EO 13112. The Complex will survey the extent of invasive and exotic species on all properties and schedule removal. This plan will be implemented to control invasive and exotic species to acceptable levels. The NRM will screen all lists of landscaping plants proposed for the NAS JAX Complex to ensure invasive and exotic species are not used.

Prior to the use of pesticides at the NAS JAX Complex, the Installation's pest manager will contact the ABD of NAVFAC SE and the FDACS Pesticide Division for information regarding approved pesticides, including the location of use, amount, and concentrations, as well as treatment methods. The FDEP Bureau of Invasive Plant Management issues licenses that may be required for special use pesticides. The NAS JAX Complex will also consider the applicability of burning and hand clearing in combination with pesticides, as well as non-pesticide removal methods alone.

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

Pesticides will be applied by skilled, DoD-certified workers and according to label instructions to ensure their application does not contaminate surface waters or affect flora and fauna. Careful prescription of the type and amount of chemical to be applied and the use of buffer areas around surface waters will also help prevent misdirected application or deposition. The NAS JAX Complex will use pesticides with lower toxicity and apply them at rates below those specified on the label, when it is believed that such modifications can adequately address the problem. The NAS JAX Complex will also consider the applicability of non-pesticide removal methods, which could be implemented through the use of volunteer groups.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – prevent contamination of wetlands by pesticides;
- Soil Conservation and Erosion, Section 5.1.2 – control nuisance animals that contribute to erosion;
- Stormwater and Water Quality, Section 5.1.3 – prevent contamination of water quality by pesticides;
- Floodplains, Section 5.1.4 – ensure exotic species do not compromise attenuation properties of floodplains;
- Landscaping and Grounds Maintenance, Section 5.1.5 – landscape with native plants to reduce the opportunity for exotics to become established;
- Urban Forestry, Section 5.1.7 – ensure only native trees are planted;
- Land Impact Guidelines, Section 5.1.8 – prevent the introduction of invasive and exotic plant species and pests;
- Silviculture, Section 5.2.1 – ensure activities promote native vegetation in the forest understory;
- Forest Protection, Section 5.2.2 – burn to accentuate the environmental conditions of native plants and wildlife;
- Fisheries Management, Section 5.3.1 – manage exotic aquatic plants and prevent stocking of non-native fishes;
- Migratory Birds, Section 5.3.2 – conserve native vegetation used by migratory birds;
- Threatened and Endangered Species, Section 5.3.3 – control exotic plants and wildlife that would otherwise compete with protect species for resources;
- Nuisance Wildlife and BASH, Section 5.3.4 – reduce nuisance species concurrent with control of invasives and exotics;
- Outdoor Recreation, Section 5.4 – eliminate exotic vegetation to enhance outdoor recreation;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on exotic and invasive control procedures and laws; and
- GIS, Section 5.5.2 – utilize GIS tools to improve management of exotic and invasive species.

Ecosystem Management

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

Military Mission

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

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

- Federal Noxious Weed Act of 1974, 7 U.S.C. 2801 et. seq., provides for the control and eradication of noxious weeds and their regulation in interstate and foreign commerce.
- EO 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
- Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. 136, requires that all pesticides, whether for commercial or private use, be applied in accordance with product labeling and that containers are properly disposed of. EPA is responsible under FIFRA for the registration of all pesticide active ingredients used in the United States.
- OPNAVINST 6250.4B, 27 August 1998, DoD Pest Management Programs, provides the DON with policies for implementing pest management programs directed against pests that conflict with or adversely affect the mission of the DoD; affect the health and well-being of the DON personnel and their dependents; attach or damage real property, supplies, or equipment; adversely affect the environment; or are otherwise undesirable.
- Federal Plant Pest Act, 7 U.S.C. 150a et seq., regulates the importation and interstate movement of plant pests and authorizes the Secretary of Agriculture to take emergency measures to destroy infected plants or materials.
- OPNAVINST 5090.1D, 12-3.10 discusses natural resources management relating to the control of invasive species.
- Florida Statutes, Chapter 487, the Florida Pesticide Law, regulates the distribution and use of pesticides.
- Florida Statutes, Chapter 482, Structural Pest Control Act, requires using pesticides for their intended purpose in accordance with the registered labels or as directed by the EPA.
- Florida Statutes, Chapter 369.20, Florida Aquatic Weed Control Act, regulates noxious aquatic weeds on public lands.
- Florida Statutes, Chapter 369.252, Invasive Exotic Plant Control, requires a program be established to eradicate or maintain control of the species detrimental to the state's natural environment.

Additional Sources of Information

USDA Invasive and Noxious Weeds
<http://plants.usda.gov/java/noxiousDriver>

Federal Noxious Weed Act
<http://www.fws.gov/laws/lawsdigest/fednox.html>

FIFRA Act
<http://www.epa.gov/agriculture/lfra.html>

USDA State-Specific Threats

<http://www.invasivespeciesinfo.gov/unitedstates/fl.shtml#thr>

Center for Plant Conservation

<http://www.centerforplantconservation.org/>

The Nature Conservancy, Protecting Native Plants and Animals

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

Florida Exotic Pest Plant Council

www.fleppc.org

FDEP Bureau of Invasive Plant Management

http://www.dep.state.fl.us/mainpage/programs/invasive_plants.htm

University of Florida, Center for Aquatic and Invasive Plants

<http://aquat1.ifas.ufl.edu/welcome.html>

USFWS Invasive Species

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

5.1.7 Urban Forestry

Urban forestry is the management of forests and related natural resources within human communities. Urban forests include trees, groups of trees, or stands of trees occurring within improved or semi-improved lands, exclusive of commercial forest stands. Successful urban forestry programs manage these resources to enhance both natural and human-built features.

Issues

Trees and vegetation in urban areas, when properly managed, contribute to ecological health and quality of life at the NAS JAX Complex. Certain areas at the NAS JAX Complex, such as industrial and residential areas, would benefit from urban forestry practices that contribute to:

- Reduced noise levels, stormwater runoff, and soil erosion;
- Increased habitat for wildlife;
- Air quality improvements, dust control, purer air and dust control, reduced pollution, and controlled wind speeds;
- Moderated temperatures in paved areas and around buildings;
- Aesthetic improvements, including color, views, and seasonal changes; and
- Defined space, buffers, and barriers.

Urban landscaping has been shown to contribute to individuals' physical and mental health and quality of life. Urban landscaping also improves the public image of the Installation and directly relates to positive public opinion in the community.

Goals and Objectives

- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;
- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;
- Provide facilities and develop policies that allow for recreational and educational uses of natural resources, and result in positive effects to these natural resources while improving the quality of life.
- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;
- Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices;
- Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality;
- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Control nuisance wildlife and wildlife diseases that may adversely affect human health or welfare, the health of the ecosystem, and the military mission;
- Plan for adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP; and
- Incorporate the concept of ecosystem management into all planning and management processes.

Projects

- Invasive Species Control (Project 1 in Appendix A);
- Endangered and Threatened Species Habitat Protection (Project 4 in Appendix A); and
- Forest Program Support (Project 9 in Appendix A).

Management Strategies

- Continue to follow its working Urban Forestry Plan and implement projects to enhance wildlife habitat and aesthetics in developed areas;
- Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices;
- Continue to implement general landscape management practices consistent with the concepts presented in this INRMP;

- Continue to apply xeriscaping principles using native species for new landscaping, and will phase in these principles for existing landscapes;
- Promote 50-foot buffers for all wetlands, and ensure land use and land management practices that will not adversely affect wetland resources;
- Continue adhering to BMPs in the SWPPP (NAS JAX 2018) and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (FDEP 2008) to ensure watershed protection;
- Continue to develop a soil erosion control plan and reduce the rate of soil erosion through the implementation of long-term measures and projects;
- Continue to inventory the use of pesticides and fertilizers to assess alternatives to their use and a reduction in pesticide and fertilizer use;
- Implement grounds maintenance practices consistent with the BASH Plan;
- Continue to implement programs and activities for the protection and enhancement of threatened and endangered plant and animal species and their habitats; and
- Continually verify that natural resources personnel obtain proper training and certifications.

Long-Term Management

The following Tree Mitigation Plan was developed in support of the NAS JAX urban forestry program.

Tree Mitigation Plan

Background. The current forested lands on the main station of NAS JAX are composed of upland mixed forest (70 acres), floodplain swamp (200 acres), dome swamp (35 acres), mesic flatwoods (185 acres), scrub (15 acres), mixed pine/hardwood forest (92 acres), and pine plantation (642 acres). Tree mitigation guidelines are intended to facilitate compensation for the loss of healthy, established trees on the main station. The forests provide habitat for numerous species of animals, including threatened and endangered species. Many large oak, pine and palm trees are also an important part of the landscape in developed areas of the NAS JAX. Trees provide noise reduction, wind protection, important shade/cooling benefits, and immeasurable aesthetic value. Forest cover also lowers maintenance costs for mowing, helps to control runoff, and reduces stream silt. This is especially important due to the proximity of the Main Station to the St. Johns River, and the Navy's role as steward of these lands for future generations. These guidelines will be an effective tool for sustaining vital forested lands on the Station.

Exemptions from Tree Mitigation Guidelines include the following:

- Vegetation clearing necessary in conjunction with ongoing maintenance of flight line clear zones, rights-of-way, and permitted stormwater features;

- Trees identified by the FDEP, Bureau of Invasive Plant Management as invasive and not native to North or Central America, including Chinese tallow, chinaberry (*Melia azedarach*), camphor, and golden raintree (*Koelreuteria bipinnata*);
- Trees which are determined by the NRM to be dead, deteriorated as a result of insect infestation or disease, or damaged by storms or other acts of nature;
- Trees requiring immediate removal due to imminent danger to public safety.

Action. Removal of healthy, established trees on NAS JAX shall be mitigated in accordance with the following guidelines. Locations for replacement tree planting shall be coordinated with the NRM. These guidelines shall be incorporated into plans and specifications for construction projects that require the removal of trees.

A. Trees that are characteristic of mixed upland forest, mesic flatwoods, and scrub include oaks (*Quercus*, spp.), sweetgum, and southern magnolia. Because these trees provide food, cover and shelter for so many wildlife species, all upland hardwoods shall be replaced using the following guidelines:

- Plant three trees for every one removed of over 4 inches in diameter.
- Each replacement tree shall measure one-third of the total diameter at breast height (DBH) inches of the trees removed, or the quantity of smaller replacement trees may be increased by up to four times to compensate for the loss of mature tree canopy (i.e., mitigation for removal an 16 inches in DBH tree with full canopy would be the planting of four 4-inch DBH trees). This decision shall be made by the NRM.
- Trees will typically be replaced with the same species as those removed; however, some species may be difficult to obtain from nurseries. In the event that efforts to procure same type as the lost trees prove unsuccessful, live oaks may be substituted because of their tolerance to the local climate and soils. Live oaks are sturdy, long-lived and native to this area.

B. Trees of the floodplain swamp not only provide food, shelter and breeding opportunities for wildlife, their root systems provide bank stability which protects against erosion. Trees such as baldcypress, laurel oak, red maple, and Carolina ash (*Fraxinus caroliniana*) are tolerant of the extreme conditions caused by fluctuating water levels. Dome swamp habitat is characterized by pond cypress and swamp tupelo. Because of the rarity and value of these swamps, trees shall only be removed when absolutely necessary due to disease or safety concerns. In view of the limited surface area of these fragmented swamps, replacement guidelines are as follows:

- Plant two trees for every one tree removed of over 4 inches in diameter.
- Specifications for replacement trees are the identical to those in Part A.

- Trees shall be replaced only with the same species as those removed to maintain the character of the floodplain forest.

C. Stands of pines planted for timber harvest are comprised of loblolly pine and slash pine. Longleaf pine is also prevalent, and was the dominant native pine species prior to plantation. Pine trees that are removed for reasons other than contracted timber harvest shall be replaced at a ratio of 1:1 (5-gallon trees), or 3:1 (seedlings). Replacement trees shall be planted at a reforestation site to be designated according to the following guidelines:

- Plant one tree (or three seedlings) for every one tree removed of over 3" diameter.
- Each replacement tree is to be 6 - 8 feet in height, with a spread of 4 feet.
- Replacement trees shall be characteristic of native pine forest. Replant with the following species: longleaf pine and/or pond pine (*Pinus serotina*).

D. The 1:1 ratio shall also be used in cases where ornamental landscape trees (palms, crepe myrtle, etc.) require removal.

Monitoring and Maintenance. Newly-planted trees need to receive the proper care in order to survive. Roots must not be allowed to dry out, and this is a major concern at NAS JAX since the soils are sandy and well-drained. The following safeguards must be implemented, and incorporated into any actions that involve the removal of trees (such as construction contracts where the contractor provides replacement trees):

- Remove grass, weeds and ground cover (turf) within a 20-inch radius of the planting hole; this vegetation competes with the tree for water and nutrients;
- Mix peat moss with sandy soils at the time of planting to improve water retention capacity;
- Soak tree 2 to 4 hours twice a week for the first 2 to 3 months. If rainfall does not occur on a regular basis, it may be necessary to continue to soak the tree weekly for the first year;
- Staking trees with large crowns planted on windy sites or where people or animals may push them over; make sure that ties do not damage the bark; stakes should be removed after 1 year;
- Mulch newly planted trees with 2 to 3 inches of shredded or chunk pine bark, pine straw, or composts. Watering and staking of new trees can be included as part of the grounds maintenance contract.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – maintain a 50-foot buffer around wetlands;

- Soil Conservation and Erosion, Section 5.1.2 – urban forestry can help reduce erosion;
- Stormwater and Water Quality, Section 5.1.3 – use proper amounts of herbicide and fertilizers to avoid excessive runoff in stormwater;
- Floodplains, Section 5.1.4 – ensure urban forestry does not compromise the function of floodplains;
- Landscaping and Grounds Maintenance, Section 5.1.5 – ensure urban forestry projects are consistent with landscaping and grounds maintenance tasks;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – replace removed exotic trees with native trees;
- Land Impact Guidance, Section 5.1.8 – ensure land use projects are consistent with urban forestry objectives;
- Forest Protection, Section 5.2.2 – maintain urban forests to reduce fuel loads;
- Fisheries Management, Section 5.3.1 – use proper amounts of herbicide and fertilizers to avoid runoff into fishing areas;
- Migratory Birds, Section 5.3.2 - use proper amounts of herbicide and fertilizers to avoid runoff into wading areas;
- Threatened and Endangered Species, Section 5.3.3 – maintain and enhance habitat for protected wildlife;
- Nuisance Wildlife and BASH, Section 5.3.4 – be aware of creating potential habitat for BASH birds and wildlife;
- Outdoor Recreation, Section 5.4 – maintain aesthetically-pleasing grounds for recreation;
- Natural Resources Training, Section 5.5.1 – ensure personnel are aware of urban forestry issues and practices; and
- GIS, Section 5.5.2 – utilize GIS tools to improve urban forestry plans.

Ecosystem Management

Urban forestry supports the ecosystem management concept by providing wildlife habitat through the development of new greenways and managing urban areas for the enhancement of wildlife. Urban forests help reduce stormwater runoff and soil erosion, and will be used as a component of xeriscaping. Urban trees can also play an important role in temperature modification in developed areas.

Military Mission

Urban forestry practices can be implemented to help protect and enhance water quality and wildlife; thereby reducing the potential for adverse impacts to these resources that could threaten the military mission. It can also play an important part in improving quality of life for those supporting the military mission.

Laws, Executive Orders, Regulations, Directives, and Memoranda Relevant to Urban Forest Management

- Federal Noxious Weed Act of 1974, 7 U.S.C. 2801, establishes control and eradication of noxious weeds and regulates them in interstate and foreign commerce.
- EO 13112, Invasive Species, as previously described.
- OPNAVINST 5090.1D, 12-3.8(j), discusses laws that govern natural resources management relating to the protection and management of forest resources.

Additional Sources of Information

FDACS Forest Service

http://www.floridaforestservice.com/field_operations/county_foresters/

IFAS, Southern Escambia County, Florida's Urban Forests

<http://edis.ifas.ufl.edu/fr293>

Alliance for Community Trees

<http://actrees.org/site/index.php>

Arbor Day Foundation

<http://www.arborday.org/programs/treeCityUSA/index.cfm>

Native Florida, Your Florida Backyard

<http://www.nsis.org/>

International Society of Arboriculture

<http://www.isa-arbor.com/home.aspx>

National Association of State Foresters

<http://www.stateforesters.org/>

Society of American Foresters

<http://www.safnet.org/>

Society of Municipal Arborists

<http://www.urban-forestry.com/mc/page.do?sitePagelD=1374>

USDA Forest Service

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

Treelink

<http://www.treelink.org/>

5.1.8 Land Impact Guidelines

Land impact is any activity that could adversely affect the function of ecosystems. Such activities include construction of buildings and infrastructure. Guidelines are needed that will not only support the military mission of the NAS JAX Complex but also minimize adverse impacts to natural resources. Proper site selection and site planning will add significant value to the quality of life and will ensure that development activities do not violate federal and state laws.

Issues

Conflicts occasionally arise between development on the NAS JAX Complex properties and natural resources conservation. Natural resources management should maintain continual communication with landscape, infrastructure, and facility engineers to ensure development incorporates principles of natural resources conservation, such as preventing fragmentation, avoiding wetlands and wetland buffers, not landscaping with exotic plant species, and protecting water quality.

Goals and Objectives

- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;
- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;
- Provide facilities and develop policies that allow for recreational and educational uses of natural resources, and result in positive effects to these natural resources while improving the quality of life.
- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;
- Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices;
- Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality;
- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP; and
- Incorporate the concept of ecosystem management into all planning and management processes.

Projects

- Invasive Species Control (Project 1 in Appendix A); and
- Endangered and Threatened Species Habitat Protection (Project 4 in Appendix A)

Management Strategies

- Implement environmentally beneficial landscaping, grounds maintenance, and urban forestry practices;
- Continue to implement general landscape management practices consistent with the concepts presented in this INRMP;
- Continue to apply xeriscaping principles using native species for new landscaping, and will phase in these principles for existing landscapes;
- Promote 50-foot buffers for all wetlands, and ensure land use and land management practices that will not adversely affect wetland resources;
- Continue adhering to BMPs in the SWPPP (NAS JAX 2018) and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (FDEP 2008) to ensure watershed protection;
- Continue to develop a soil erosion control plan and reduce the rate of soil erosion through the implementation of long-term measures and projects;
- Continue to inventory the use of pesticides and fertilizers to assess alternatives to their use and a reduction in pesticide and fertilizer use;
- Implement grounds maintenance practices consistent with the BASH Plan;
- Continue to implement programs and activities for the protection and enhancement of threatened and endangered plant and animal species and their habitats; and
- Continually verify that natural resources personnel obtain proper training and certifications.

Long-Term Management

Buildable areas at the NAS JAX Complex will generally be considered to be those areas not limited or affected by the development constraints described below, unless the area is needed to support the military mission:

- Existing Infrastructure constraints would physically limit future development, such as available space, utilities, and parking/traffic circulation.
- Historic constraints would limit where development could occur due to the presence of protected historic structures and areas.
- Archaeological constraints would restrict development sighting due to the presence of artifacts and other archaeological relics.
- Natural constraints would restrict development sighting due to natural features such as floodplains, wetlands, flora and fauna, forest stands, and natural communities.
- Mission/Installation constraints would restrict development sighting due to a particular military purpose or location, including Explosive Safety Quantity Disturbance (ESQD) arcs, noise contours, clear zones, and BASH.

The NAS JAX Complex will employ the following guidelines to minimize impacts to natural resources:

- New building and training activities will be located to prevent habitat fragmentation. Fragmentation undermines ecological processes by (1) interfering with environmental processes, such as hydrology; (2) isolating plant and wildlife populations; and (3) creating an edge effect. Buildings and training activities will be located on the edges of forested areas rather than in the middle of forested areas.
- Transportation infrastructure will be located to prevent habitat. Adding a road or other transportation corridor through a natural area can severely diminish that area's value as habitat.
- A naturally vegetated buffer will be maintained between new facilities and training areas and roadway frontage to provide wildlife habitat and aesthetic value.
- To protect water, wildlife, and vegetative habitat quality, new facilities or training activities will not be located within any 50-foot vegetative buffer that surrounds an existing wetland, or within the undeveloped 50-foot area adjacent to water bodies.
- Wildlife habitat enhancements (e.g., nest boxes) will be required as mitigation for new activities that adversely affect wildlife habitat.
- Only the area necessary for the building footprint, parking, and security and safety of the site will be cleared for new development. This will help preserve the natural ground cover, reduce future grounds maintenance costs, and minimize soil erosion.
- Xeriscaping will be used for all landscaping.
- Pervious surfaces will be evaluated for use in place of impervious surfaces (for example, the use of porous paving stones instead of pavement in parking lots).
- Stormwater generated by new activities will be retained within the boundaries of the installation, where practicable.
- Stormwater retention facilities will be designed as artificial wetlands (subject to availability of funding and land).
- Soil erosion and stormwater control measures will be implemented in accordance with established BMPs (FDACS 2003; FDEP 2008; NAS JAX 2018) during all site-disturbing activities to avoid degrading water quality.
- NAX JAX natural resource personnel will not engage in an activity that might result in a negative impact to regulated species without conducting a thorough environmental assessment through Section 7 consultation with the USFWS.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – maintain a 50-foot buffer around wetlands;
- Soil Conservation and Erosion, Section 5.1.2 – control erosion during developmental activities;
- Stormwater and Water Quality, Section 5.1.3 – use proper amounts of herbicide and fertilizers to avoid excessive runoff in stormwater;
- Floodplains, Section 5.1.4 – maintain functional purpose of floodplains;
- Landscaping and Grounds Maintenance, Section 5.1.5 – ensure landscaping and grounds maintenance tasks are consistent with natural resources conservation;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – avoid use of exotic vegetation during developmental activities;

- Urban Forestry, Section 5.1.7 – ensure urban forestry projects are consistent with conservation objectives;
- Forest Protection, Section 5.2.2 – prevent fragmentation to maintain ecological function of forests;
- Fisheries Management, Section 5.3.1 – use proper amounts of herbicide and fertilizers to avoid runoff into fishing areas;
- Migratory Birds, Section 5.3.2 – avoid alterations and unnecessary fragmentation of migratory bird habitat;
- Threatened and Endangered Species, Section 5.3.3 – consider impacts of proposed developmental activities on listed species;
- Nuisance Wildlife and BASH, Section 5.3.4 – be aware of constricting habitat that would otherwise reduce the risk of BASH;
- Outdoor Recreation, Section 5.4 – maintain aesthetically-pleasing grounds for recreation;
- Natural Resources Training, Section 5.5.1 – ensure personnel are aware of land impact guidelines and how to integrate natural resources conservation; and
- GIS, Section 5.5.2 – utilize GIS tools to improve development decisions on the Complex.

Ecosystem Management

Land impact guidelines support the ecosystem management concept by accounting for all aspects of the ecosystem (i.e., wetlands, vegetation, species habitat, etc.) in the planning stage of landscaping, infrastructure, and other construction activities on the NAS JAX Complex. Successful implementation of these guidelines will preserve ecosystem function while accomplishing activities necessary to carry out the military mission.

Military Mission

Proper implementation of the land impact guidelines will reduce the potential for adverse impacts to regulated natural resources, the violation of which would threaten the military mission.

Laws, Executive Orders, Regulations, Directives, and Memoranda Relevant to Land Impact Guidelines

- Sikes Act, 16 U.S.C. 670 (a)-(o), authorizes conservation programs on military reservations.
- Federal Noxious Weed Act of 1974, 7 U.S.C. 2801, establishes control and eradication of noxious weeds and regulates them in interstate and foreign commerce.
- EO 11990, 24 May 1977, as amended, requires government agencies, in carrying out agency actions and programs affecting land use, to provide leadership and take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.
- EO 13148, 21 April 2000, Section 207, requires implementing landscaping practices that are intended to benefit the environment and generate long-term cost savings.

- EO 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
- EO 11988, Floodplain Management, 24 May 1977, requires federal service agencies to avoid construction or management practices that will adversely affect floodplains, unless it is found that there is no practical alternative and the proposed action has been designed to minimize harm to or within the floodplain.
- The President's April 16, 1994, Memorandum on Environmentally Beneficial Landscaping, requires implementing landscaping practices that are intended to benefit the environment and generate long-term cost savings.
- Florida Coastal Management Program, requires federal action in the coastal zone to be consistent with 23 Florida Statutes, which are administered by 11 state agencies and four of the five state water management districts. The coastal zone includes the area encompassed by the state's 67 counties and its territorial waters. Therefore, federal actions which occur throughout the state are reviewed by the state for consistency with the FCMP. Consistency with the statutes constitutes consistency with the FCMP (FDEP 2014).
- Coastal Zone Management Act, 16 U.S.C. 1451, Establishes goals and a mechanism for states to control use and development of their coastal zone. Authorizes states to administer approved coastal non-point source pollution programs.
- Federal Water Pollution Control Act as amended by the CWA of 1977, 33 U.S.C. 1251, prohibits the discharge of dredged or filled materials into waters of the United States, including wetlands, without first obtaining a permit from USACE (Section 404 of the CWA).
- CWA: Section 401 Water Quality Certification, 1986, 33 U.S.C. 1341, requires that states certify compliance of federal permits or licenses with state water quality requirements and other applicable state laws. Under Section 401, states have authority to review any federal permit or license that may result in a discharge to wetlands or other waters under state jurisdiction to ensure that the actions would be consistent with the state's water quality requirements.
- OPNAVINST 5090.1D, 12-3.8(b), discusses natural resources management relating to wetland management.
- OPNAVINST 5090.1D, 12-3.8(c), discusses natural resources management relating to floodplain management.
- OPNAVINST 5090.1D, 12-3.8(e), discusses natural resources management relating to environmentally and economically beneficial landscaping.
- OPNAVINST 5090.1D, 12-3.8(j), discusses laws that govern natural resources management relating to the protection and management of forest resources.

Additional Sources of Information

U.S. Department of Energy Green Building Principles: Environmental Impact
<http://www.sustainable.doe.gov/buildings/gbintro.shtml>

Low Impact Development Center
<http://www.lowimpactdevelopment.org/>

5.2 FOREST MANAGEMENT

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

Forest Management may be divided into two major components: silviculture and forest protection. Silvicultural practices include timber harvesting, pine straw harvesting, prescribed burning, establishment of firebreaks, herbicide application, forest fertilization, site preparation, and regeneration. Forest protection includes protection from wildfire, diseases, and insects. Managers at the NAS JAX Complex recognizes that the frequent and intense heat extremes and altered precipitation patterns projected to occur with climate change may increase the frequency and intensity of wildfires. Ongoing and continued forest management and protection measures are therefore vital to offset the potential vulnerability of properties on the Complex.

There are approximately 4,212 acres of commercial forestland at the NAS JAX Complex. This includes commercial forest stands at NAS Jacksonville (563 acres, see Figure 2-17), OLF Whitehouse (1,029 acres, see Figure 2-18), Rodman Bomb Target (2,426 acres, see Figure 2-19), and Yellow Water (194 acres, see Figure 2-20).

Slash, loblolly, and longleaf pine are the favored species, and will be perpetuated on sites suited for the particular species. Hardwoods contribute greatly to the food and habitat needs of wildlife in the area. Some of the most prevalent hardwood species include hickory, oak, dogwood, sweetgum, holly, maple, and blackgum. Hardwoods will be given equal importance to pine in areas where hardwood species can be managed. Mast trees, den trees, and cavity trees will be left, when possible, to provide habitat for wildlife. Oaks in the pine plantations will be removed in most cases, however, since they are an alternate host of fusiform rust. Live oak trees will receive special consideration due to their longevity and aesthetic value.

5.2.1 Silvicultural Activities

Silviculture is the science and practice of controlling the establishment, growth, composition, health, and quality of forests with respect to human objectives. Silvicultural activities include timber harvesting, prescribed burning (including the establishment of firebreaks), herbicide

application, forest fertilization, site preparation, and regeneration. Timber harvesting methods include the following: thinning; improvement cutting; salvage cutting; clear cutting; seed tree cutting; and shelterwood cutting. Silvicultural practices are described below.

- **Thinnings** are cuttings in planted immature stands to increase the rate of growth of timber products and maintain stand composition. A thinning can be a removal of every other row of trees, or the removal of selected trees that are ready for the market and low-value trees that are competing with future crop trees. In either case, a thinning will redistribute the growth potential of the site to the best trees so that they continue to grow at an acceptable growth rate. This action also increases sunlight penetration to the forest floor, which stimulates understory growth and creates food and cover for wildlife.
- **Improvement cuttings** are made in stands older than the sapling stage, usually to improve the composition. This type cut is most often applied to wild stands being placed under management and involves removal of undesirable trees that are of sufficient size to provide merchantable products, as well as trees that are diseased, mechanically injured, unthrifty (likely to die before the next cut), insect infested, and of poor form (forked or crooked). Improvement cuttings and thinnings in a stand are usually concurrent operations.
- **Salvage cuttings** remove dead and injured trees in order to utilize them before they become unable to be harvested. Trees are salvaged promptly following storm events, severe fires, or attacks of insects and diseases. Salvage cuts are sometimes required to clear construction sites.
- **Clear cuttings** will be used at the discretion of the NRM in consultation with NAVFAC SE foresters and fish and wildlife biologists, as well as other federal and state agencies. Clear cutting will be used when there is an identified need to change species (e.g., slash pine to longleaf pine), remove an over mature or diseased stand, or for another reason deemed essential (i.e., following natural disasters). No clear cutting is planned for this 10-year period. Occasionally, clear cutting is required to meet mission safety criteria, such as height restrictions around runways.
- **Shelterwood cuttings** will be used at the discretion of the NRM in consultation with NAVFAC SE foresters and fish and wildlife biologists, as well as other federal and state agencies. Shelterwood cutting will be used to regenerate forest stands through a series of perhaps two to three cuts. This system is frequently used to regenerate heavy seeded species. Cuttings may be separated by as much as 20 years.
- **Seed tree cuttings** will be used at the discretion of the NRM in consultation with NAVFAC SE foresters and fish and wildlife biologists, as well as other federal and state agencies. Seed tree cutting involves the removal of all trees except trees of the desired species in sufficient numbers to reseed the cut-over area.
- **Prescribed burning** is the purposeful application of fire in a controlled, knowledgeable manner to remove and reduce forest fuels on a specific land area under selected weather conditions. A prescribed burn generally involves backing a low-intensity, surface fire through forest stands. Prescribed burning improves habitat by removing dense, scrubby understory vegetation, and allowing early successional flora to grow. Burning removes forest floor litter, promotes wildlife forage, promotes germination of plant seeds scarified by the heat, releases minerals and nutrients tied up in vegetation to the soil, and creates an edge effect along the boundaries between burned and unburned areas. In addition, prescribed burning reduces fuel levels and the chance of wildfires, which could destroy or seriously damage forest stands and potentially cause a threat to the military mission. Prescribed burning cannot be used in hardwood stands under management. Sand pines are also very sensitive to fire.

- **Firebreaks** are a necessary part of a fire management program. Existing features such as roads and streams may be used as firebreaks, but oftentimes such features are not present. Where existing features do not occur, man-made firebreaks must be established. Plowed firebreaks will be disked and leveled to prevent soil erosion and interruption of boundaries and hydrology. Permanent firebreaks may later be used for forest access.
- **Herbicide application** is used as a timber stand improvement (TSI) practice to control understory vegetation in areas where prescribed burning cannot be accomplished.
- **Forest fertilization** is used as a TSI practice to improve timber growth rates on relatively poor quality sites. Combined with herbicide applications, prescribed burning, and thinning, fertilization will promote the more rapid development of the forest stand so that other ecosystem values can be realized.
- **Site preparation** includes activities designed to improve conditions for seeding or planting that result in increased germination or seedling survival and tree growth. Examples include land-clearing activities, such as drum chopping, shearing, raking, piling into windrows, burning, and pesticide applications. Additional methods of site preparation include complete vegetation removal through chipping and other debris removal methods, followed by disking or scarification.
- **Regeneration** is the renewal of a forest by either natural or artificial means. Regeneration is generally preceded by a clear cut, a seed tree cut, or a shelterwood cut. Regeneration methods include natural seeding, planting, and direct seeding. The need for regeneration is not anticipated during this 10-year period.

Issues

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

Goals and Objectives

- Protect and enhance forest resources by practicing ecologically sound forest management leading to sustained yield of quality forest products, watershed protection, and wildlife habitat;
- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;
- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;
- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;
- Practice the ecosystem management concept for sustained yield of forest products and forest health;

- Manage forests in an ecologically sound manner to provide habitat for wildlife;
- Manage forest stands for watershed protection;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Preserve and protect threatened and endangered species and species of special concern to ensure no reduction in population sizes;
- Control nuisance wildlife and wildlife diseases that may adversely affect human health and welfare, the health of the ecosystem, and the military mission; and
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized.

Projects

- Invasive Species Control (Project 1 in Appendix A);
- Endangered and Threatened Species Habitat Protection (Project 4 in Appendix A);
- Gopher Tortoise Management (Project 5 in Appendix A);
- Forest Program Support (Project 9 in Appendix A);
- Forest Inventory (Project 10 in Appendix A);
- Forest Fire Protection (Project 11 in Appendix A); and
- Forest Product Sales (Project 12 in Appendix A).

Management Strategies

- Continue managing forest stands through harvesting, herbicide applications, and prescribed burns;
- Support the training and certification of one individual in prescribed burn management, in addition to the NAS JAX Forester;
- Perpetuate the prevailing pine forest while giving equal emphasis to hardwoods in those areas best suited to such species;
- Continually evaluate forest management practices and their effects on ecosystems and wildlife habitat, and continue programs to protect rare, threatened, and endangered plant and animal species;
- Continue using the Silviculture BMPs (FDACS 2003) for forest management activities to ensure watershed protection;
- Promote 50-foot buffers for all wetlands, and ensure land use and land management practices that will not adversely affect wetland resources;
- Continue adhering to BMPs in the SWPPP (NAS JAX 2018) and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (FDEP 2008) to ensure watershed protection;

- Continue to develop a soil erosion control plan and reduce the rate of soil erosion through the implementation of long-term measures and projects;
- Continue to inventory the use of pesticides and fertilizers to assess alternatives to their use and a reduction in pesticide and fertilizer use;
- Implement grounds maintenance practices consistent with the BASH Plan;
- Continue to implement programs and activities for the protection and enhancement of threatened and endangered plant and animal species and their habitats; and
- Continually verify that natural resources personnel obtain proper training and certifications.

Long-Term Management

The forest management program for the NAS JAX Complex is administered and carried out by the NAS JAX NRM and Forester with assistance from the NAVFAC SE Regional NRM and Forester. The program provides for sustained-yield of quality timber products, and protection and development of other natural resources in a multiple-use, integrated concept.

The primary management goal for the forestland at the NAS JAX Complex is outdoor recreation and wildlife management with sustainable timber production as a minor objective. Timber harvests have occurred only as a result of a need arising from the military mission (such as construction projects or base safety issues). Due to the fact that highly urbanized areas and major roadways surround this installation, prescribed burning is not performed. A series of firebreaks with connections to roads, cleared areas, and waterways are utilized to provide fire protection. In the event of a wildfire, the NAS Jacksonville Fire Department will provide initial response and the Florida Forest Service will provide back up support as needed.

The actual forestry operations are implemented by the NRM and Forester, NAS JAX forces, NAVFAC SE, and contractual services. Basic operation, such as marking and cruising timber, prescribed burning, inspection of timber contracts, and general forest management, are the responsibility of the NAS JAX NRM and Forester. NAVFAC SE provides technical support and assists in contract specification preparation, and advertises, awards, and maintains records on forestry contracts.

Forest stands at the NAS JAX Complex are managed with an ecosystem approach for sustained yield and health. Cutting and prescribed burn cycles will be conducted consistent with the long-term management concepts for wildlife (Section 5.3). Silvicultural activities that may be utilized are discussed below.

Thinning

Scheduled thinnings reduce the stand density as measured by “basal area” in square feet per acre. The desired reduction in density will be determined by the NRM, and will reflect the needs of the forest stand and the associated ecosystem represented by the stand and surrounding area. Thinnings will be designed to promote future natural regeneration of the forest stand by leaving quality seed trees spaced appropriately. A target basal area for pine regeneration at rotation age will be from 20 to 60 square feet of basal area per acre. In pine communities, the cutting cycle will begin when the stand reaches merchantable size (approximately 13 to 15 years) and will continue every 7 to 10 years until the rotation age of 80 years. The cutting cycle will be scheduled at the discretion of the NRM. Stands older than 80 years will be evaluated by the NRM, as well as by NAVFAC SE wildlife biologists, for their value as wildlife habitat. Cutting will decrease stand density between 60 and 80%. Harvesting activities in forested wetlands will occur as determined by the NRM. The NAS JAX Complex will practice snag retention, the practice of leaving dead trees standing in managed forests to enhance wildlife habitat. Dead trees are often colonized and used by various wildlife species. The NAS JAX Complex will not remove a snag unless it jeopardizes property or is a safety risk.

Prescribed Burning

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

Firebreaks must be established as part of the prescribed burning program to prevent fire from escaping from the burn area. Existing barriers such as roads and wetlands will be used as firebreaks where feasible, but firebreaks must be established and maintained where existing barriers are not present. Prescribed burning is dependent upon weather conditions and mission-related activities. Equipment necessary to conduct fire management includes crawler tractor, transport truck, ATVs, Gyro-trac, and other fire ignition and suppression equipment.

The following conditions must be understood and described in each prescription for prescribed burns to be an effective management technique: (1) biological requirements of target species (i.e., gopher tortoise, eastern indigo snake), (2) vegetative condition of the stand to be burned, and (3) expected results for understory and species composition.

Herbicide Application

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

Forest Fertilization

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

Unplanned Activities

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

Silvicultural actions for unplanned activities include the full range of available and acceptable practices as described above, as well as forest harvesting methods, such as clearcutting. Unplanned activities such as clearcutting, debris removal, chipping, drum chopping, shearing, raking, piling into windrows, burning, pesticide applications, and conversion to a different forest age class may be necessary if the unplanned activity is dictated by natural events. The specific project, if mission related, shall include complete environmental documentation separate from the actions designated by this INRMP as unplanned activities. The

environmental authorization established by this INRMP will cease for an existing forest stand if it is converted to another use for mission purposes.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – maintain a 50-foot buffer around wetlands;
- Soil Conservation and Erosion, Section 5.1.2 – consider and control erosion during silvicultural activities using the Silviculture BMPs (FDACS 2003);
- Stormwater and Water Quality, Section 5.1.3 – use proper amounts of herbicide and fertilizers to avoid excessive runoff in stormwater;
- Floodplains, Section 5.1.4 – ensure silvicultural activities do not compromise the function of floodplains, in accordance with the Silviculture BMPs (FDACS 2003);
- Landscaping and Grounds Maintenance, Section 5.1.5 – ensure silvicultural projects are consistent with landscaping and grounds maintenance tasks;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – reduce and control exotic vegetation in forest stands;
- Urban Forestry, Section 5.1.7 – apply principles to urban forestry when possible;
- Land Impact Guidelines, Section 5.1.8 – ensure silvicultural projects are consistent with land use projects;
- Forest Protection, Section 5.2.2 – maintain forest stands to reduce fuel loads;
- Fisheries Management, Section 5.3.1 – use proper amounts of herbicide and fertilizers to avoid runoff into fishing areas;
- Migratory Birds, Section 5.3.2 - use proper amounts of herbicide and fertilizers to avoid runoff into wading areas;
- Threatened and Endangered Species, Section 5.3.3 – maintain and enhance forest habitat for protected wildlife;
- Nuisance Wildlife and BASH, Section 5.3.4 – be aware of creating potential habitat for BASH birds and wildlife;
- Outdoor Recreation, Section 5.4 – maintain aesthetically-pleasing forests for recreation;
- Natural Resources Training, Section 5.5.1 – ensure personnel are aware of forestry issues and practices; and
- GIS, Section 5.5.2 – utilize GIS tools to improve forest management and silvicultural plans.

Ecosystem Management

Silvicultural activities are essential to maintain healthy forests (especially fire-dependent ecosystems) that provide quality wildlife habitat and sustainable yields of forest products. Harvesting activities are means by which to redistribute the site's growth potential to the best trees so that they maintain an acceptable rate of growth. Harvesting also stimulates understory growth, which creates food and cover for some wildlife. Prescribed burning is a natural part of

many ecosystems at the NAS JAX Complex, and, when used in combination with harvesting, can maintain healthy and vigorous forest stands on the Installation, as well as provide habitat for RTE species.

Military Mission

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

Laws, Executive Orders, Regulations, Directives, and Memoranda Relevant to Silvicultural Activities

- Resources Planning Act (RPA), passed by Congress in 1974, requires a complete national assessment or inventory of all forest, rangeland resources, and public needs every ten years, along with a plan to meet those needs.
- Soil Conservation Act, 16 USC 590a et. seq., provides for soil conservation practices on federal lands.
- Federal Noxious Weed Act of 1974, 7 U.S.C. 2801, establishes control and eradication of noxious weeds and regulates them in interstate and foreign commerce.
- EOs 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems. Vegetative buffers and landscaping to control soil erosion must comply with this executive order.
- EO 11989 and 12608, close areas to off-road vehicles where soil, wildlife, and other natural resources may be adversely affected.
- Federal Water Pollution Control Act, as amended by the CWA of 1977, 33 USC 1251, regulates the dredging and filling of wetlands and establishes procedures to identify and regulate nonpoint sources of pollutant discharge, including turbidity, into wetlands.
- CWA, Section 402 NPDES Program, 2002, 33 USC 1251, controls direct discharges into navigable waters. NPDES permits, issued by either the EPA or an authorized state or tribe, contain industry-specific, technology-based and water-quality-based limits and establish pollutant monitoring and reporting requirements.
- CWA Section 401, requires an applicant for a federal license or permit to provide a certification that any discharges from the facility will comply with the CWA, including water quality standard requirements.
- CWA Section 404, establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands.
- Endangered Species Act, protects threatened and endangered species and their habitats until they are out of danger of extinction.
- DoD 7000.14-R, Volume 11A, Chapter 16 administers the reimbursement of costs of managing forest resources for timber production. Under this regulation, only expenses related to the maintenance of timber for commercial sale are reimbursed.
- OPNAVINST 5090.1D, 12-3.8(j), discusses laws that govern natural resources management relating to the protection and management of forest resources.

- [Sikes Act, 16 U.S.C. 670a-o](#), authorizes conservation programs on military reservations.
- [DoD Directive 4715.1E](#), establishes the Defense Environmental Security Council; the Environment, Safety, and Occupational Health Policy Board and the Defense Environmental Security Council Committee structure; and the Armed Forces Pest Management Board.

Additional Sources of Information

Eglin Air Force Base Forest Restoration

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

FDACS Florida Forest Service

<http://www.floridaforestservice.com/index.html>

FDACS Prescribed Fire Training

http://www.floridaforestservice.com/wildfire/rx_training.html

FDACS County Forester Directory

http://www.floridaforestservice.com/field_operations/county_foresters/

Tall Timbers Research Station

<http://www.talltimbers.org/>

TNC Fire Management Manual

<http://www.tncfiremanual.org/>

A Guide for Prescribed Fire in Southern Forests

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

American Forests

<http://www.americanforests.org/>

National Association of State Foresters

<http://www.stateforesters.org/>

Society of American Foresters

<http://www.safnet.org/>

USDA Forest Service

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

Treelink

<http://www.treelink.org/>

5.2.2 Forest Protection

The NAS JAX Complex protects its forest stands against wildfires, insects, and diseases, and endeavors to maintain desirable environmental and aesthetic forest qualities. A desirable aesthetic quality may be a dense stand of healthy trees near a roadside.

- **Wildfires** are uncontained fires in forested or open areas. Wildfires may result from human activities or weather events. The potential for severe wildfires may be decreased by implementing prescribed burning programs, which decrease fuel loads in forest stands (see Section 5.2.1).
- **Diseases**, such as fusiform rust (*Cronartium fusiforme*), are present on the NAS JAX Complex. Galls are the first signs of the disease, and grow on branches and tree trunks,

eventually encircling the trunk or branch and killing it. Thinnings will emphasize salvage and removal of diseased trees. It is likely that highly infected plantations may have to be cleared and replanted because, after salvage cutting, too few trees per acre will remain for future growth and development.

- **Insects**, such as the southern pine, ips, and black turpentine beetles, attack and kill pine trees. The attack intensity depends on the field conditions, tree vigor, and weather. Needles on trees will turn brown within several days after a fatal attack. The threat of insect infestations may be lowered by the use of pesticides and maintaining thinned healthy forests (see Section 5.2.1). Damage to trees by machinery, especially in pine stands, should be minimized because the wounds will attract insects.

Issues

Wildfires, insects, and diseases have the potential to cause severe damage in forest stands on the NAS JAX Complex. Silvicultural activities and proper training to control wildfires, insects, and diseases at the NAS JAX Complex are essential to carrying out the goals and objectives of this INRMP. Proper forest protection activities will increase the growth rate of the preferred trees, reduce the potential for wildfires, control diseases and insect pests, and ensure the continuation of healthy forest communities.

Goals and Objectives

- Protect and enhance forest resources by practicing ecologically sound forest management leading to sustained yield of quality forest products, watershed protection, and wildlife habitat;
- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;
- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;
- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;
- Practice the ecosystem management concept for sustained yield of forest products and forest health;
- Manage forests in an ecologically sound manner to provide habitat for wildlife;
- Manage forest stands for watershed protection;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Preserve and protect threatened and endangered species and species of special concern to ensure no reduction in population sizes;
- Control nuisance wildlife and wildlife diseases that may adversely affect human health and welfare, the health of the ecosystem, and the military mission; and

- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized.

Projects

- Invasive Species Control (Project 1 in Appendix A);
- Endangered and Threatened Species Habitat Protection (Project 4 in Appendix A);
- Gopher Tortoise Management (Project 5 in Appendix A);
- Forest Program Support (Project 9 in Appendix A);
- Forest Inventory (Project 10 in Appendix A);
- Forest Fire Protection (Project 11 in Appendix A); and
- Forest Product Sales (Project 12 in Appendix A).

Management Strategies

- Continue managing forest stands through harvesting, herbicide applications, and prescribed burns;
- Support the training and certification of one individual in prescribed burn management, in addition to the NAS JAX Forester;
- Perpetuate the prevailing pine forest while giving equal emphasis to hardwoods in those areas best suited to such species;
- Continually evaluate forest management practices and their effects on ecosystems and wildlife habitat, and continue programs to protect rare, threatened, and endangered plant and animal species;
- Continue using the Silviculture BMPs (FDACS 2003) for forest management activities to ensure watershed protection;
- Promote 50-foot buffers for all wetlands, and ensure land use and land management practices that will not adversely affect wetland resources;
- Continue adhering to BMPs in the SWPPP (NAS JAX 2018) and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (FDEP 2008) to ensure watershed protection;
- Continue to develop a soil erosion control plan and reduce the rate of soil erosion through the implementation of long-term measures and projects;
- Continue to inventory the use of pesticides and fertilizers to assess alternatives to their use and a reduction in pesticide and fertilizer use;
- Implement grounds maintenance practices consistent with the BASH Plan;
- Continue to implement programs and activities for the protection and enhancement of threatened and endangered plant and animal species and their habitats; and
- Continually verify that natural resources personnel obtain proper training and certifications.

Long-Term Management

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

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – use proper amounts of pesticides to avoid wetland contamination;
- Soil Conservation and Erosion, Section 5.1.2 – consider and control erosion during forest protection activities using the Silviculture BMPs (FDACS 2003);
- Stormwater and Water Quality, Section 5.1.3 – use proper amounts of pesticides to avoid excessive runoff in stormwater;
- Floodplains, Section 5.1.4 – ensure forest protection activities do not compromise the function of floodplains y adhering to the Silviculture BMPs (FDACS 2003);
- Landscaping and Grounds Maintenance, Section 5.1.5 – ensure forest protection activities are consistent with landscaping and grounds maintenance tasks;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – reduce and control destructive pests in forest stands;
- Urban Forestry, Section 5.1.7 – protection measures will likely benefit urban forestry;
- Land Impact Guidance, Section 5.1.8 – ensure land impacts do not hinder forest protection
- Silvicultural Activities, Section 5.2.1 – maintain forest stands to reduce fuel loads;
- Fisheries Management, Section 5.3.1 – use proper amounts of pesticides to avoid runoff into fishing areas;
- Migratory Birds, Section 5.3.2 – use proper amounts of pesticides to avoid runoff into wading areas;
- Threatened and Endangered Species, Section 5.3.3 – protect forest health and habitat for protected wildlife;
- Nuisance Wildlife and BASH, Section 5.3.4 – be aware of creating potential habitat for BASH birds and wildlife;
- Outdoor Recreation, Section 5.4 – maintain aesthetically-pleasing forests for recreation;
- Natural Resources Training, Section 5.5.1 – ensure personnel are aware of forestry issues and practices; and
- GIS, Section 5.5.2 – utilize GIS tools to improve forest protection.

Ecosystem Management

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

Military Mission

Forest protection helps prevent wildfires which could threaten the NAS JAX Complex military mission activities, facilities, and housing.

Laws, Executive Orders, Regulations, Directives, and Memoranda Relevant to Forest Protection

- Federal Noxious Weed Act of 1974, 7 U.S.C. 2801, establishes control and eradication of noxious weeds and regulates them in interstate and foreign commerce.
- EO 13112, Invasive Species, as previously described.
- Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. 136, requires that all pesticides, whether for commercial or private use, be applied in accordance with product labeling and that containers are properly disposed of. EPA is responsible under FIFRA for the registration of all pesticide active ingredients used in the United States.
- Federal Plant Pest Act, 7 U.S.C. 150a et seq., regulates the importation and interstate movement of plant pests and authorizes the Secretary of Agriculture to take emergency measures to destroy infected plants or materials.
- Florida Statutes, Chapter 487, the Florida Pesticide Law, regulates the distribution and use of pesticides.
- OPNAVINST 6250.4B, 27 August 1998, DoD Pest Management Program, provides the DON with policies for implementing pest management programs directed against pests that conflict with or adversely affect the mission of the DoD; affect the health and well-being of the DON personnel and their dependents; attack or damage real property, supplies, or equipment; adversely affect the environment; or are otherwise undesirable.
- DoD 7000.14R, Volume 11A, Chapter 16 administers the reimbursement of costs of managing forest resources for timber production. Under this regulation, only expenses related to the maintenance of timber for commercial sale are reimbursed.
- OPNAVINST 5090.1D, 12-3.8(j), discusses laws that govern natural resources management relating to the protection and management of forest resources.

Additional Sources of Information

FDACS Florida Forest Service
<http://www.floridaforestservice.com/index.html>

FDACS Prescribed Fire Training

http://www.floridaforestservice.com/wildfire/rx_training.html

FDACS County Forester Directory

http://www.floridaforestservice.com/field_operations/county_foresters/

Tall Timbers Research Station

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TNC Fire Management Manual

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A Guide for Prescribed Fire in Southern Forests

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

American Forests

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National Association of State Foresters

<http://www.stateforesters.org/>

Society of American Foresters

<http://www.safnet.org/>

USDA Forest Service

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

5.3 FISH AND WILDLIFE

Fish and wildlife management actions are designed to preserve, enhance, and manage indigenous wildlife and their habitats. These actions include the conservation of protected species and nongame species, management and harvest of game species, BASH reduction, and animal damage and disease control. Primary management issues for fish and wildlife at the NAS JAX Complex are: (1) fisheries management; (2) migratory bird management; (3) threatened and endangered species and natural community management; and (4) nuisance wildlife and BASH.

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

- Current demands on wildlife resources and long-term needs for wildlife programs include:
- Species protection and habitat development program;

- Surveys and protection program for threatened and endangered species and natural communities;
- Survey and protection program for neotropical migratory birds;
- Program to address wildlife damage and diseases;
- Nuisance wildlife monitoring and control program; and
- BASH Plan revision and implementation.

The Navy is a member of several conservation partnerships, including Partner in Flight (PIF), which focuses on bird conservation (www.partnersinflight.org) and DOD Partners in Amphibian and Reptile Conservation (DoD-PARC), which focuses on herpetofauna conservation (www.dodnaturalresources.net/DoD-PARC.html). Additionally, the Marine Resources Support Group (MRSRG) is a network of Navy environmental professionals who work together to meet the environmental planning and compliance requirements for Navy at-sea training and testing (www.navfac.navy.mil/products_and_services/ev/products_and_services/marine_resources.html). All of these partnerships offer excellent networking opportunities to help manage fish and wildlife on NAS Jacksonville.

5.3.1 Fisheries Management

Fisheries management involves monitoring and manipulating habitat and/or populations of fish species. Although fishing is possible at various ponds across the NAS JAX Complex and in the St. Johns River, adjacent to NAS Jacksonville, and in the Oklawaha River, adjacent to Rodman Bomb Target, no active fisheries management is conducted at any of the NAS JAX Complex properties. All fishing is subject to the State of Florida freshwater fishing regulations.

Issues

Natural resources management must properly manage shoreline erosion, stormwater runoff, and floodplain development to ensure fishery habitat is not negatively affected by pollution and eutrophication.

Goals and Objectives

- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;
- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;
- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;

- Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality;
- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Control nuisance wildlife and wildlife diseases that may adversely affect human health or welfare, the health of the ecosystem, and the military mission;
- Ensure that land management and land use decisions comply with all applicable laws, EOs, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Manage forest stands for watershed protection;
- Maintain existing and develop additional outdoor recreational trails, interpretive centers, and/or facilities to support present and future natural resources-based outdoor recreation at the NAS JAX Complex;
- Implement existing and further develop (where needed) natural resources-based outdoor recreation programs to support present and future outdoor recreation at the NAS JAX Complex;
- Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP; and
- Incorporate the concept of ecosystem management into all planning and management processes.

Projects

- Wildlife Conservation Management (Project 3 in Appendix A).

Management Strategies

- Further develop recreational fishing opportunities at the Complex;
- Inventory wetlands and assess their function and quality on a routine basis;
- Promote 50-foot buffers for all wetlands, and ensure land use and land management practices that will not adversely affect wetland resources;
- Continue adhering to BMPs in the SWPPP (NAS JAX 2018) and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (FDEP 2008) to ensure watershed and aquatic habitat protection;
- Continue to implement programs and activities for the protection and enhancement of threatened and endangered plant and animal species and their habitats;
- Continue to develop a soil erosion control plan and reduce the rate of soil erosion through the implementation of long-term measures and projects;
- Continue to inventory the use of pesticides and fertilizers to assess alternatives to their use and a reduction in pesticide and fertilizer use;
- Continue using the Silviculture BMPs (FDACS 2003) for forest management activities to ensure watershed protection;

- Continue to monitor the health and size of animal populations, and control populations as needed;
- Continue updating the baseline information pertaining to present usage of natural resources-based outdoor recreation activities;
- Expand, improve, and provide additional facilities for outdoor recreational opportunities; and
- Continually verify that natural resources personnel obtain proper training and certifications.

Long-Term Management

Natural resource managers will continue to evaluate the stormwater management program and activities contributing to stormwater runoff and pollutant loading in stormwater runoff, and to implement BMPs (FDACS 2003) to minimize stormwater pollution. They will also continue to inventory the use of pesticides and fertilizers to assess alternatives and reduce pesticide and fertilizer use. The intent is to protect water quality by reducing the quantity of chemical pesticides and fertilizers used.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – wetland health relates to fishery health;
- Soil Conservation and Erosion, Section 5.1.2 – control sedimentation into fishing areas;
- Stormwater and Water Quality, Section 5.1.3 – water quality relates to fishery health;
- Floodplains, Section 5.1.4 – floodplain maintenance relates to fishery health;
- Landscaping and Grounds Maintenance, Section 5.1.5 – maintain wetland buffers and properly apply herbicides and fertilizers;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – control invasive aquatic weeds in fishing areas;
- Urban Forestry, Section 5.1.7 – properly apply herbicides and fertilizers during urban forestry;
- Land Impact Guidelines, Section 5.1.8 – consider impacts to recreational fisheries;
- Silviculture, Section 5.2.1 – consider effects of thinning and soil erosion on water quality;
- Forest Protection, Section 5.2.2 – maintain regular burn cycles to ensure natural wetland conditions;
- Migratory Birds, Section 5.3.2 – wading birds and osprey prey upon fish.
- Threatened and Endangered Species, Section 5.3.3 – ensure protection of sturgeon and other listed aquatic animals at fishing areas;
- Nuisance Wildlife and BASH, Section 5.3.4 – ensure fishing areas do not increase the BASH risk, and advise fishers of biting insects and venomous animals;
- Outdoor Recreation, Section 5.4 – properly educate recreational participants in stewardship of the resource and aquatic environment;

- Natural Resources Training, Section 5.5.1 – ensure personnel are current on Florida fishing rules and regulations; and
- GIS, Section 5.5.2 – utilize GIS tools to improve fisheries management.

Ecosystem Management

Successful fisheries are indicative of successful ecosystem management, since fish benefit from a healthy aquatic ecosystem resulting from low pollution loads and reduced artificial eutrophication.

Military Mission

High eutrophication can result in an overpopulation of small prey fish, which attracts birds to feed at ponds near air fields and an increase in bird populations utilizing stormwater retention ponds. Birds have a potential to negatively impact the military mission through BASH-related incidents. Fishing also helps sustain the morale and wellness of base tenants.

Laws, Executive Orders, Regulations, Directives, and Memoranda Relevant to Fisheries Management

- EO 12962 directs federal agencies to cooperate in conservation of aquatic resources and enhancement of opportunities for recreational fishing.
- Endangered Species Act, 16 U.S.C. 35, 32 CFR 190, provides for the identification and protection of threatened and endangered species of fish, wildlife, and plants and their critical habitats. Requires federal agencies to ensure that no agency action is likely to jeopardize the continued existence of a threatened or endangered species.
- Sikes Act, as amended 16 U.S.C. 670a-o, requires each military department to manage fish and wildlife resources in accordance with a tripartite cooperative plan agreed to by the USFWS and state wildlife agency.
- Fish and Wildlife Conservation Act, 16 U.S.C. 2901, encourages all federal departments and agencies to utilize their statutory and administrative authority, to the maximum extent practicable and consistent with each agency's statutory responsibilities, to conserve and promote conservation of nongame fish and wildlife and their habitats.
- EO 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
- OPNAVINST 5090.1D, 12-3.5, discusses laws that govern natural resources management relating to the protection and management of fish and wildlife resources.
- Florida Statutes, Chapter 370.12, Florida Endangered and Threatened Species Act, is to conserve, protect, and manage the threatened and endangered species and their habitats.

Additional Sources of Information

FWC, Division of Freshwater Fisheries Management
<http://myfwc.com/about/overview/programs/ffm/>

FWC, Division of Habitat and Species Conservation
<http://myfwc.com/about/overview/programs/hsc/>

UF, IFAS, Center for Aquatic and Invasive Plants
<http://plants.ifas.ufl.edu/>

USFWS, North Florida Ecological Services Office
<http://www.fws.gov/northflorida/welcome.htm>

NOAA Fisheries Service, Southeast Regional Office
<http://sero.nmfs.noaa.gov/>

5.3.2 Migratory Birds

The MBTA of 1918 (16 USC 703-711) protects migratory birds and their parts (e.g., eggs, nests and feathers). Game birds are not protected by this Act, but their takes are governed by State hunting regulations. Migratory birds face serious challenges, including habitat loss, collisions with man-made structures, and environmental contaminants, resulting in species decline. Protecting migratory birds requires a coordinated effort involving multiple jurisdictions and interests because many species migrate across national boundaries, watersheds, and ecosystems. Under the MBTA, the Navy is compelled to exercise due diligence for activities requiring NEPA analysis and must develop appropriate and reasonable conservation measures to avoid, minimize, and mitigate adverse effects to migratory birds and their nests resulting from such activities.

The most recent survey of migratory birds on the NAS JAX Complex took place in 2016-17. It identified a total of 105 species present across NAS Jacksonville (n=86 species), OLF Whitehouse (n=64 species), and Rodman Bomb Target (n=47 species; Table 5-3). State- and federally-listed species were observed, including the state-threatened least tern, little blue heron, and tricolored heron. American kestrels were also observed, but it was unclear whether the observed specimens were the state-threatened Southeastern American kestrel. The wood stork (federally-listed threatened), has been observed foraging at NAS Jacksonville, but was not observed at any survey point during the course of the 2016-17 survey (Table 5-3).

Table 5-3. Migratory Bird Species Observed on the NAS Jacksonville Complex, by Season.					
Common Name	Scientific Name	Autumn 2016	Winter 2017	Spring 2017	Summer 2017
American crow	<i>Corvus brachyrhynchos</i>	J W R	J W R	J W R	J W R
American goldfinch	<i>Spinus tristis</i>	J	W R	R	R
American kestrel	<i>Falco sparverius</i>	J W	J	R	
American pipit	<i>Anthus rubescens</i>				J
American redstart	<i>Setophaga ruticilla</i>	J		J	
American robin	<i>Turdus migratorius</i>	J W	J W R	W	J W
Anhinga	<i>Anhinga anhinga</i>				J
Bachman's sparrow	<i>Peucaea aestivalis</i>			W	W

Table 5-3. Migratory Bird Species Observed on the NAS Jacksonville Complex, by Season.

Common Name	Scientific Name	Autumn 2016	Winter 2017	Spring 2017	Summer 2017
Bald eagle	<i>Haliaeetus leucocephalus</i>	J	J	J	
Barn swallow	<i>Hirundo rustica</i>	J		J W	J
Barred owl	<i>Strix varia</i>		R	R	
Belted kingfisher	<i>Ceryle alcyon</i>		J		
Black tern	<i>Chlidonias niger</i>			J	
Black vulture	<i>Coragyps atratus</i>	J W R	J W	J R	
Black-and-white warbler	<i>Mniotilta varia</i>	W	W		
Black-crowned night heron	<i>Nycticorax nycticorax</i>	J			J
Blackpoll warbler	<i>Setophaga striata</i>			J	
Blue jay	<i>Cyanocitta cristata</i>	J W R	J W R	J W R	J W R
Blue-gray gnatcatcher	<i>Poliotilta caerulea</i>		J W	J R	J W R
Blue-headed vireo	<i>Vireo solitaries</i>		W		
Boat-tailed grackle	<i>Quiscalus major</i>		J	J	
Bobolink	<i>Dolichonyx oryzivorus</i>			J	
Brown thrasher	<i>Toxostoma rufum</i>	J W	J W	J W	J W R
Brown-headed nuthatch	<i>Sitta pusilla</i>	J W R	J W R	J W R	J W R
Canada goose	<i>Branta canadensis</i>	W		W	
Carolina chickadee	<i>Poecile carolinensis</i>	J W R	J W R	J W	J W R
Carolina wren	<i>Thryothorus ludovicianus</i>	J W	J W R	J W R	J W R
Cattle egret	<i>Bubulcus ibis</i>	J		J	
Cedar waxwing	<i>Bombycilla cedrorum</i>			J W	
Chimney swift	<i>Chaetura pelagica</i>	W			
Chipping sparrow	<i>Spizella passerine</i>		W		
Common ground-dove	<i>Columbina passerina</i>		R	J	J
Common yellowthroat	<i>Geothlypis trichas</i>	J	W R	J W R	R
Double-crested cormorant	<i>Phalacrocorax auritus</i>	J	J	J	J
Downy woodpecker	<i>Picoides pubescens</i>	J W R	J W R	J W R	J W R
Eastern bluebird	<i>Sialia sialis</i>	J W	J W	J W	J
Eastern meadowlark	<i>Sturnella magna</i>	W	W	W	W
Eastern phoebe	<i>Sayornis phoebe</i>	W R	J R	J R	
Eastern towhee	<i>Pipilo erythrophthalmus</i>	J W R	J W R	J W R	J W R
Eastern wood-pewee	<i>Contopus virens</i>			R	
European starling	<i>Sturnus vulgaris</i>	J		J	
Gray catbird	<i>Dumetella carolinensis</i>	J W R	J W R	J W R	
Gray kingbird	<i>Tyrannus dominicensis</i>			J	
Great blue heron	<i>Ardea herodias</i>	J		J	J
Great crested flycatcher	<i>Myiarchus crinitus</i>			J W	W
Great egret	<i>Ardea alba</i>	J	J		J
Hermit thrush	<i>Catharus guttatus</i>		W		
Herring gull	<i>Larus smithsonianus</i>		J		
House finch	<i>Haemorhous mexicanus</i>		J		
House wren	<i>Troglodytes aedon</i>	J W R	J W R	J W R	J W R

Table 5-3. Migratory Bird Species Observed on the NAS Jacksonville Complex, by Season.

Common Name	Scientific Name	Autumn 2016	Winter 2017	Spring 2017	Summer 2017
Indigo bunting	<i>Passerina cyanea</i>			W	
Killdeer	<i>Charadrius vociferus</i>	J	J W	J W	
Laughing gull	<i>Leucophaeus atricilla</i>	J	J	J W	J
Least tern	<i>Sternula antillarum</i>			J	
Limpkin	<i>Aramus guarauna</i>	J			
Little blue heron	<i>Egretta caerulea</i>	J	J		J
Loggerhead shrike	<i>Lanius ludovicianus</i>	J	J		
Marsh wren	<i>Cistothorus palustris</i>	J		J	
Mourning dove	<i>Zenaida macroura</i>	J W	J W R	J W R	J W R
Northern bobwhite	<i>Colinus virginianus</i>			W	J W
Northern cardinal	<i>Cardinalis cardinalis</i>	J W R	J W R	J W R	J W R
Northern flicker	<i>Colaptes auratus</i>	W R	J		
Northern harrier	<i>Circus cyaneus</i>	W	J W		
Northern mockingbird	<i>Mimus polyglottos</i>	J W	J W	J W	J W
Northern parula	<i>Setophaga americana</i>		J	J W R	J
Orange-crowned warbler	<i>Vermivora celata</i>		W		
Osprey	<i>Pandion haliaetus</i>	J	J	J	J
Palm warbler	<i>Setophaga palmarum</i>	J W R	J W R		
Pied-billed grebe	<i>Podilymbus podiceps</i>	J	J		
Pileated woodpecker	<i>Hylatomus pileatus</i>	J W R	J W R	J W R	J W R
Pine warbler	<i>Setophaga pinus</i>	J W R	J W R	J W R	J W R
Prairie warbler	<i>Setophaga discolor</i>	R		J	
Purple gallinule	<i>Porphyrio martinicus</i>				J
Purple martin	<i>Progne subis</i>			J	
Red-bellied woodpecker	<i>Melanerpes carolinus</i>	J W R	J W R	J W R	J W R
Red-eyed vireo	<i>Vireo olivaceus</i>			W R	W R
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>			J W R	J R
Red-shouldered hawk	<i>Buteo lineatus</i>	J W R	J W R	J W	J W R
Red-tailed hawk	<i>Buteo jamaicensis</i>	R		J	J
Red-winged blackbird	<i>Agelaius phoeniceus</i>	W R	J R	J W	
Ring-billed gull	<i>Larus delawarensis</i>	J	J R		
Royal tern	<i>Thalasseus maximus</i>	J	J		J
Ruby-crowned kinglet	<i>Regulus calendula</i>		J W R	J W R	W R
Ruby-throated hummingbird	<i>Archilochus colubris</i>				J
Sandhill crane	<i>Grus canadensis</i>		R	R	
Savannah sparrow	<i>Passerculus sandwichensis</i>	J			
Scarlet tanager	<i>Piranga olivacea</i>			J	
Sedge wren	<i>Cistothorus stellaris</i>	W			
Snowy egret	<i>Egretta thula</i>	J	J		J
Song sparrow	<i>Melospiza melodia</i>	J	J W		
Summer tanager	<i>Piranga rubra</i>			J R	W R
Swamp sparrow	<i>Melospiza georgiana</i>	J			

Table 5-3. Migratory Bird Species Observed on the NAS Jacksonville Complex, by Season.					
Common Name	Scientific Name	Autumn 2016	Winter 2017	Spring 2017	Summer 2017
Tree swallow	<i>Tachycineta bicolor</i>	W	W		
Tricolored heron	<i>Egretta tricolor</i>		R		W
Tufted titmouse	<i>Baeolophus bicolor</i>	J W R	J W R	J W R	J W R
Turkey vulture	<i>Cathartes aura</i>	W R	J W	J W	
White ibis	<i>Eudocimus albus</i>	R	R		J W
White-eyed vireo	<i>Vireo griseus</i>	J W	J W R	J W R	J W R
Wild turkey	<i>Meleagris gallopavo</i>	J		J W	
Wilson's snipe	<i>Gallinago delicata</i>		W		
Wood duck	<i>Aix sponsa</i>			R	R
Yellow-throated warbler	<i>Setophaga dominica</i>	J			
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	W	J W R		
Yellow-billed cuckoo	<i>Coccyzus americanus</i>				W R
Yellow-crowned night heron	<i>Nyctanassa violacea</i>				J
Yellow-rumped warbler	<i>Setophaga coronata</i>	J	J W R	J W R	W R

J=observed at NAS Jacksonville, W=observed at OLF Whitehouse, R=observed at Rodman Bomb Target
 Source: LG²ES 2018

Issues

Migratory birds at the NAS JAX Complex are protected under the MBTA against take for normal and routine operations such as installation support functions. Take includes pesticide application, nest or egg removal, and occasionally, tree removal. The temporal and spatial presence of migratory bird species must therefore be considered when carrying out all management activities described in this INRMP. Habitat modification as a result of timber sales would not constitute a take; neither would nest removal outside nesting season.

Goals and Objectives

- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;
- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;
- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;
- Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality;

- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Preserve and protect threatened and endangered species and species of special concern to ensure no reduction in population sizes;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Control nuisance wildlife and wildlife diseases that may adversely affect human health or welfare, the health of the ecosystem, and the military mission;
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP; and
- Incorporate the concept of ecosystem management into all planning and management processes.

Projects

- Wildlife Conservation Management (Project 3 in Appendix A);
- Survey and Monitoring of Migratory Bird Species (Project 7 in Appendix A);
- Forest Program Support (Project 9 in Appendix A); and
- Wildlife Education and Installation Indoctrination Center (Project 14 in Appendix A).

Management Strategies

- Complete surveys for neotropical migratory birds approximately every five years by using the recommendations provided in the DOD Coordinated Bird Monitoring Plan to guide survey design and data management;
- Notify the NRM of installation support actions that may affect migratory bird species so that impacts to birds may be avoided and minimized in accordance with the MBTA;
- Continue monitoring program for natural communities (as well as rare, threatened and endangered species), and implement programs to enhance natural communities/wildlife habitat;
- Further establish a program/plan using prescribed burns and thinning to improve habitat quality, reduce the potential for wildfires, control diseases and insect pests, and ensure the continuation of fire-dependent plant communities;
- Continue program to conduct (i.e., update) surveys of rare, threatened, and endangered species every 5 years (next survey scheduled for 2009), and to monitor other rare species as needed;
- Continue to implement programs and activities for the protection and enhancement of threatened and endangered plant and animal species and their habitats;
- Continue to monitor the health and size of animal populations, and control populations as needed;
- Implement grounds maintenance practices consistent with the BASH Plan. The BASH Plan will be continuously updated and monitored to meet the needs of the Complex;

- Inventory wetlands and assess their function and quality on a routine basis;
- Promote 50-foot buffers for all wetlands, and ensure land use and land management practices that will not adversely affect wetland resources;
- Continue adhering to BMPs in the SWPPP (NAS JAX 2018) and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (FDEP 2008) to ensure watershed and aquatic habitat protection;
- Continue using the Silviculture BMPs (FDACS 2003) for forest management activities to ensure watershed protection; and
- Continually verify that natural resources personnel obtain proper training and certifications.

Long-Term Management

Avoiding and minimizing impacts to migratory birds begins with an up-to-date working knowledge of species presence, seasonality, nesting habits, and habitat condition on the installation. The NRM will therefore ensure that migratory bird surveys are regularly completed on the Complex. These surveys shall follow the guidance and recommendations in the DOD Coordinated Bird Monitoring Plan for survey design and data management. Additional guidance and information is available on the DOD Partners in Flight Monitoring Working Group website (www.dodpif.org). The NRM and Regional Natural Resources support staff will use collected data to avoid, minimize, and mitigate impacts to migratory birds resulting from activities on the NAS JAX Complex. Because most migratory birds cross installation and state boundaries, data sharing is a vital component to their management. Data collected at the NAS JAX Complex will be shared with federal and state agencies through participation in programs such as the Breeding Bird Research and Monitoring Database (BBIRD), eBird, and Monitoring Avian Productivity and Survivorship (MAPS). Public outreach opportunities, such as Christmas Bird Counts and wildlife viewing opportunities will continue to be promoted on the Complex.

The Commanding Officer maintains a depredation permit so a BASH control agent at the NAS JAX Complex may legally take migratory birds that pose a BASH threat. The agent needs to cooperate with the NRM to ensure that the goals, objectives, and strategies for migratory bird management are achieved in concert with the goals, objectives, and strategies of BASH control.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – wetlands provide forage habitat for various bird species;
- Soil Conservation and Erosion, Section 5.1.2 – control sedimentation into bird foraging areas;
- Stormwater and Water Quality, Section 5.1.3 – control water quality in bird foraging areas;

- Floodplains, Section 5.1.4 – limited development in floodplains provides habitat for migratory birds away from Complex infrastructure;
- Landscaping and Grounds Maintenance, Section 5.1.5 – ensure nests are not removed in season during grounds maintenance activities;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – exotic species can provide unwanted nesting areas and materials for birds near infrastructure;
- Urban Forestry, Section 5.1.7 – consider potential for bird nesting near infrastructure and training areas when planning urban forests;
- Land Impact Guidelines, Section 5.1.8 – consider impacts of land use on migratory birds and their habitats ;
- Silviculture, Section 5.2.1 – consider nesting season when planning thinning and prescribed burn activities;
- Forest Protection, Section 5.2.2 – maintain forests to prevent disease and monitor dead trees that provide nesting habitat for BASH species;
- Fisheries Management, Section 5.3.1 – wading birds and osprey prey upon fish;
- Threatened and Endangered Species, Section 5.3.3 – migratory bird management aids the status and survival of rare bird species;
- Nuisance Wildlife and BASH, Section 5.3.4 – the NRM, Bash control agent, and USFWS should communicate before nests are removed for BASH purposes;
- Outdoor Recreation, Section 5.4 – enlist avid bird watchers in bird inventories ;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on MBTA and related laws; and
- GIS, Section 5.5.2 – utilize GIS tools to improve migratory bird management.

Ecosystem Management

Migratory bird management is one component of ecosystem management on the NAS JAX Complex. Benefits of other management activities described in this INRMP, such as marine coastal management, wetland management, and nuisance animal control all benefit migratory bird management, and vice-versa. Many birds that migrate through the Complex spread seeds, eat rodents, and perform other functions that benefit the health of the entire ecosystem.

Military Mission

Appropriate landscaping and management of migratory birds will help alleviate potential hindrances to the military mission of the MBTA. The integration of the various management actions described in this INRMP and an understanding of how they all relate to migratory bird management will enable the NAS JAX Complex to accomplish all its training objectives within the framework of the MBTA.

Laws, Executive Orders, Regulations, Directives, and Memoranda Relevant to Migratory Birds

- MBTA, as amended 16 U.S.C. 703-712, prohibits the taking or harming of a migratory bird, its eggs, nests, or young without the appropriate permit.
- Bald and Golden Eagle Protection Act, 16 U.S.C. 668-668c, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs.
- EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, describes specific actions to advance migratory bird conservation, avoid or minimize the take of migratory birds, and ensure DoD operations, other than military readiness activities, are consistent with the MBTA.
- 2003 National Defense Authorization Act, exempts the Armed Forces from the incidental taking of migratory birds during military readiness activities.
- ESA, 16 U.S.C. 35, 32 CFR 190, provides for the identification and protection of threatened and endangered species of fish, wildlife, and plants and their critical habitats. It requires federal agencies to ensure that no agency action is likely to jeopardize the continued existence of a threatened or endangered species.
- Sikes Act, as amended 16 U.S.C. 670a-o, requires each military department to manage fish and wildlife resources in accordance with a tripartite cooperative plan agreed to by the USFWS and state wildlife agency.
- Fish and Wildlife Conservation Act, 16 U.S.C. 2901, encourages all federal departments and agencies to utilize their statutory and administrative authority, to the maximum extent practicable and consistent with each agency's statutory responsibilities, to conserve and promote conservation of nongame fish and wildlife and their habitats.
- 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.
- OPNAVINST 5090.1D, 12-3.5(b)(2), discusses natural resources management relating bald and golden eagles.
- OPNAVINST 5090.1D, 12-3.5(b)(1), discusses natural resources management relating to migratory birds.

Additional Sources of Information

Smithsonian National Zoological Park, Migratory Bird Center
<http://nationalzoo.si.edu/ConservationAndScience/MigratoryBirds/>

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

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

Migratory Bird Treaty Act
<http://www.fws.gov/permits/mbpermits/regulations/mbta.html>

The Nature Conservancy, Migratory Bird Program
<http://www.nature.org/initiatives/programs/birds/>

5.3.3 Threatened and Endangered Species

The ecological integrity of wetland and upland communities will be maintained for the protection of native plant and animal species, including numerous federally and state-listed species. Threatened and endangered species, and species of special concern, will be preserved and protected to ensure there is no reduction in species numbers or population sizes. Wildlife habitat management is the approach used by the NAS JAX Complex; management activities at the NAS JAX Complex have been described in this INRMP for wetlands, floodplains, coastal areas, urban areas, and forests, and these activities are intended to enhance habitat for fish, birds, and wildlife on and adjacent to the Complex, including threatened and endangered species.

Species are listed as endangered or threatened if, based upon scientific and commercial data, there is a current or threatened habitat loss, disease, over-exploitation, or other factors affecting its existence. Table 5-3 lists rare species as well as state- and federally-listed species occurring or potentially occurring on the NAS JAX Complex. The table also identifies the management actions (described in this chapter) that benefit each species and its habitat and also identifies the projects (described in Appendix A) that benefit each species and its habitat.

Surveys of rare, threatened, and endangered plants were completed on the NAS JAX Complex in 1990, 1996-97, 2004, and 2009-11 (FNAI 2004; GSRC 2009, 2010, 2011; TNC/FNAI 1997). A survey for rare plants was also conducted at Rodman Bomb Target in 2018 (LG²ES 2018). No federally-listed plants were found on the properties, but five state-listed plants were identified (Table 2-8). The state-endangered star anise (*Illicium parviflorum*) was identified at NAS Jacksonville in 1990, but has not been recorded in subsequent surveys. The same is true for the state-threatened spoon-leaved sundew (*Drosera intermedia*), which was identified at Yellow Water in 1990. The state-endangered pondspice (*Litsea aestivalis*) has been identified at Rodman Bomb Target in every survey since 1996-97. The state-threatened hooded pitcher plant (*Sarracenia minor*) was identified at NAS Jacksonville, OLF Whitehouse, and Rodman Bomb Target in 2009-11, and again at Rodman in 2018. The state-threatened pine lily was identified at the same three properties only during the 1996 to 97 surveys, but there are recent anecdotal observations of pine lilies in OLF Whitehouse clear zone (ES&P 1990; FNAI 2004; Gulf South Research Corporation [GSRC] 2009, 2010, 2011; TNC/FNAI 1997; LG²ES 2018).

A specific survey for the federally-endangered pondberry was carried out in 2004 at OLF Whitehouse. No individuals were located, but suitable habitat was identified (FNAI 2004).

Surveys of rare, threatened, and endangered animals were completed on the NAS JAX Complex in 1996-97, 2004, and 2009-11 (FNAI 2004; GSRC 2009, 2010, 2011; TNC/FNAI 1997). Five federally-listed and federally-petitioned species were identified, or evidence of their presence (i.e.,

active burrows and shed skins) was observed. The federally-threatened wood stork and Florida manatee have been confirmed to occasion the properties, wood storks on NAS Jacksonville and Rodman Bomb Target, and manatees in the river adjacent to NAS Jacksonville. The shed skin of a federally-threatened eastern indigo snake was identified at OLF Whitehouse during the 1996-97 survey (TNC/FNAI 1997). However, subsequent surveys of OLF Whitehouse, including one that used a detector dog (Stevenson and Spear 2015) did not reveal any further evidence of indigo snake presence. The gopher tortoise, a federal-candidate species, has been observed at all properties during every survey. The gopher frog, a federally-petitioned species for listing, was identified associated with gopher tortoise burrows at Rodman Bomb Target in 1996-97 and 2004 (FNAI 2004; TNC/FNAI 1997). The eastern diamondback rattlesnake has also been petitioned for federal listing and was observed at Rodman Bomb Target in 1996-97 (TNC/FNAI 1997), but anecdotal reports place it at the other properties as well. Specific surveys were carried out for the frosted flatwoods salamander and its potential habitat at OLF Whitehouse in 2004. Larvae were targeted for this survey, but no specimens were captured and potential habitat was determined to be marginally suitable, at best (FNAI 2004). The bald eagle is no longer federally listed, but is still protected under the Bald and Golden Eagle Protection Act. The species has been observed at NAS Jacksonville, OLF Whitehouse, and Rodman Bomb Target.

Regarding state-listed species, three state-listed threatened bird species have been identified on the Complex. These includes the little blue heron, which has been observed at NAS Jacksonville and Rodman Bomb Target, and the tri-colored heron and least tern, which have been observed only at NAS Jacksonville. The Florida black bear is not listed, but is managed by FWC under the Florida Black Bear Management Plan. Evidence of black bears was observed at Rodman Bomb Target in 1996-97 (TNC/FNAI 1997) and it was assumed to still be at that property in 2009-11 (GSRC 2009), but photographic evidence was obtained in 2018, including images of a female and two cubs (LG²ES 2018).

Issues

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

Table 5-4. Rare, Threatened, and Endangered Species Occurring or Potentially Occurring on the NAS Jacksonville Complex.

Species (in alphabetical order by common name)	Status	Category	Cross-reference to text	Management Activities that Benefit the Species and its Habitat													INRMP Projects that Benefit the Species and its Habitat															
				Wetlands Management	Soil Conservation and Erosion Control	Stormwater and Water Quality Control	Floodplain Management	Landscaping and Grounds Maintenance	Invasive, Exotic, and Noxious Species	Urban Forestry	Land Impact Guidelines	Silvicultural Activities	Forest Protection	Fisheries Management	Migratory Birds	Threatened and Endangered Species	Nuisance Wildlife and BASH	Invasive Species Control	Protected Species Surveys	Wildlife Conservation Management	Threatened Species Habitat Protection	Gopher Tortoise Management	Gopher Tortoise Radio Tracking Survey	Survey and Monitoring of Migratory Birds	Natural Resources Training	Forestry Support Program	Forest Inventory	Forest Fire Protection	Forest Product Sales	Least Tern Nest Site	INRMP Update	Wildlife Education and Indoctrination Center
American Alligator (<i>Alligator mississippiensis</i>)	FTA	Aquatic reptile	p. 5-82 Table 2-10	M	M	M	M	M	M		M			M		M		P	P	P	P									P	P	
Atlantic Sturgeon (<i>Acipenser oxyrinchus</i>)	FE	Anadromous fish	pp. 1-9, 3-3, 5-83 Table 2-10	M	M	M	M	M							M						P									P	P	
Bachman's Sparrow (<i>Aimophila aestivalis</i>)	N	Uplands bird	p. 5-97 Tables 2-10, 5-3	M	M	M	M	M	M	M	M	M	M		M	M	M	P	P	P	P				P	P	P	P	P	P	P	
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	BGE	Bird of prey	pp. 2-44, 5-76, 5-83 Tables 2-10, 5-3	M	M	M	M	M	M	M	M	M	M	M	M	M		P	P	P	P			P	P	P	P	P	P		P	P
Black Creek Crayfish (<i>Procambarus pictus</i>)	FP	Crayfish	p. 5-84	M	M	M	M	M	M		M				M			P	P	P	P									P	P	
Diverseleaf Crownbeard (<i>Verbesina heterophylla</i>)	N	Uplands plant	p. 5-97 Table 2-9	M	M	M	M	M	M		M	M	M			M		P	P		P								P	P	P	P
Eastern Diamondback (<i>Crotalus adamanteus</i>)	FP	Uplands reptile	pp. 2-44, 5-76, 5-85, 5-102 Table 2-10	M	M	M	M	M	M		M	M	M			M	M	P	P	P	P	P	P							P	P	
Eastern Indigo Snake (<i>Drymarchon couperi</i>)	FT	Uplands reptile	pp. 2-43, 5-54, 5-76, 5-85, 5-102, Table 2-10	M	M	M	M	M	M		M	M	M			M	M	P	P	P	P	P	P							P	P	
Florida Black Bear (<i>Ursus americanus</i>)	BMP	Uplands mammal	pp. 2-46, 5-76, 5-91 Table 2-10	M	M	M	M	M	M		M	M	M			M		P	P	P	P									P	P	
Florida Manatee (<i>Trichechus manatus latirostris</i>)	FT	Marine mammal	pp. 2-43, 2-47, 3-3, 5-1, 5-76, 5-79, 5-86, Table 2-10	M	M	M	M	M			M				M				P	P	P									P	P	
Florida Threeawn (<i>Aristida rhizomophora</i>)	N	Uplands plant	p. 5-98 Table 2-9	M	M	M	M	M	M	M	M	M	M			M		P	P		P								P	P	P	P
Frosted Flatwoods Salamander (<i>Ambystoma cingulatum</i>)	FT	Wetlands amphibian	pp. 2-44, 5-76 Table 2-10	M	M	M	M	M	M		M	M	M			M	M	P	P	P	P								P	P	P	P
Gopher Frog (<i>Lithobates capito</i>)	FP	Uplands amphibian	pp. 2-44, 5-76, 5-87 Table 2-10	M	M	M	M	M	M		M	M	M			M	M	P	P	P	P	P	P							P	P	
Gopher Tortoise (<i>Gopherus polyphemus</i>)	FC/ST	Uplands reptile	pp. 1-9, 2-37, 2-44, 2-47, 2-48, 3-1, 3-3, 5-1, 5-54, 5-76, 5-81, 5-87, 5-102 Tables 2-10, 2-11, and 2-12	M	M	M	M	M	M		M	M	M			M	M	P	P	P	P	P	P								P	P
Great Egret (<i>Ardea alba</i>)	N	Wetlands bird	p. 5-98 Tables 2-10, 5-3	M	M	M	M	M	M	M	M	M	M	M	M			P	P	P	P			P	P	P	P	P		P	P	
Hooded Pitcher Plant (<i>Sarracenia minor</i>)	ST	Wetlands plant	pp. 2-42, 5-75, 5-95 Table 2-9	M	M	M	M	M	M	M	M	M			M	M		P	P		P								P	P	P	P
Least Tern (<i>Sterna antillarum</i>)	ST	Coastal bird	pp. 2-46, 5-67, 5-76, 5-91, 5-92 Tables 2-10, 5-3	M	M	M	M	M	M	M	M			M	M	M	M	P	P	P	P			P	P					P	P	P
Little Blue Heron (<i>Egretta caerulea</i>)	ST	Wetlands bird	pp. 2-46, 5-67, 5-76, 5-93 Tables 2-10, 5-3	M	M	M	M	M	M	M	M	M	M	M	M			P	P	P	P			P	P	P	P	P		P	P	

Table 5-4. Rare, Threatened, and Endangered Species Occurring or Potentially Occurring on the NAS Jacksonville Complex.

Species (in alphabetical order by common name)	Status	Category	Cross-reference to text	Management Activities that Benefit the Species and its Habitat														INRMP Projects that Benefit the Species and its Habitat																
				Wetlands Management	Soil Conservation and Erosion Control	Stormwater and Water Quality Control	Floodplain Management	Landscaping and Grounds Maintenance	Invasive, Exotic, and Noxious Species	Urban Forestry	Land Impact Guidelines	Silvicultural Activities	Forest Protection	Fisheries Management	Migratory Birds	Threatened and Endangered Species	Nuisance Wildlife and BASH	Invasive Species Control	Protected Species Surveys	Wildlife Conservation Management	Threatened Species Habitat Protection	Gopher Tortoise Management	Gopher Tortoise Radio Tracking Survey	Survey and Monitoring of Migratory Birds	Natural Resources Training	Forestry Support Program	Forest Inventory	Forest Fire Protection	Forest Product Sales	Least Tern Nest Site	INRMP Update	Wildlife Education and Indoctrination Center		
Loggerhead Shrike (<i>Lanius ludovicianus</i>)	N	Uplands bird	p. 5-99 Tables 2-10, 5-3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	P	P	P	P			P	P	P	P	P	P		P	P		
Monarch Butterfly (<i>Danaus plexippus</i>)	FP	Migratory butterfly	p. 5-88	M	M	M	M	M	M		M				M			P	P	P	P					P				P	P			
Pine Lily (<i>Lilium catesbaei</i>)	ST	Wetlands plant	pp. 2-37, 2-42, 5-75, 5-96 Table 2-9	M	M	M	M	M	M	M	M	M	M			M	M	P	P		P					P	P	P	P	P		P	P	
Pondberry (<i>Lindera melissifolia</i>)	FE	Wetlands plant	pp. 2-42, 5-75 Table 2-9	M	M	M	M	M	M		M	M	M			M		P	P		P					P	P	P	P	P		P	P	
Pondspice (<i>Litsea aestivalis</i>)	SE	Wetlands plant	pp. 2-42, 5-75, 5-95 Table 2-9	M	M	M	M	M	M	M	M	M	M			M	M	P	P		P					P	P	P	P	P		P	P	
Rafinesque's Big-eared Bat (<i>Corynorhinus rafinesquii</i>)	N	Uplands mammal	pp. 2-47, 5-100 Table 2-10	M	M	M	M	M	M		M	M	M			M	M	P	P	P	P					P	P	P	P	P		P	P	
Sandhill Crane (<i>Grus canadensis</i>)	N	Wetlands bird	p. 5-99 Tables 2-10, 5-3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	P	P	P	P			P	P	P	P	P	P		P	P		
Shortnose Sturgeon (<i>Acipenser brevirostrum</i>)	FT	Anadromous Fish	pp. 1-9, 3-3, 5-89 Table 2-10	M	M	M	M	M							M			P			P										P	P		
Snowy Egret (<i>Egretta thula</i>)	N	Wetlands bird	p. 5-93 Tables 2-10, 5-3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	P	P	P	P			P	P	P	P	P	P		P	P		
Southeastern Myotis (<i>Myotis austroriparius</i>)	N	Uplands mammal	pp. 2-47, 5-100 Table 2-10	M	M	M	M	M	M		M	M	M			M	M	P	P	P	P					P	P	P	P	P		P	P	
Southern Hog-nosed Snake (<i>Heterodon simus</i>)	FP	Uplands snake	p. 5-89	M	M	M	M	M	M		M	M	M			M	M	P	P	P	P	P					P	P	P	P	P		P	P
Spoon-leaved Sundew (<i>Drosera intermedia</i>)	ST	Wetlands plant	pp. 2-42, 5-75, 5-96 Table 2-9	M	M	M	M	M	M	M	M	M	M			M	M	P	P		P					P	P	P	P	P		P	P	
Spotted Turtle (<i>Clemmys guttata</i>)	FP	Wetlands turtle	p. 5-90	M	M	M	M	M	M		M				M			P	P	P	P					P				P		P	P	
Star Anise (<i>Illicium parviflorum</i>)	SE	Wetlands plant	pp. 2-42, 5-75, 5-96 Table 2-9	M	M	M	M	M	M	M	M	M	M			M	M	P	P		P					P	P	P	P	P		P	P	
Tricolored Heron (<i>Egretta tricolor</i>)	ST	Wetlands bird	pp. 5-67, 5-94 Tables 2-10, 5-3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	P	P	P	P			P	P	P	P	P	P		P	P		
White Ibis (<i>Eudocimus albus</i>)	N	Wetlands bird	p. 5-94 Tables 2-10, 5-3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	P	P	P	P			P	P	P	P	P	P		P	P		
Wood Stork (<i>Mycteria americana</i>)	FT	Wetlands bird	pp. 2-33, 2-43, 5-77, 5-90 Table 2-10	M	M	M	M	M	M	M	M	M	M	M	M	M	M	P	P	P	P			P	P	P	P	P	P		P	P		
Yellow-crowned Night Heron (<i>Nyctanassa violacea</i>)	N	Wetlands bird	p. 5-101 Tables 2-10, 5-3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	P	P	P	P			P	P	P	P	P	P		P	P		

M = The denoted management activity benefits the denoted species and its habitat. P = The denoted project benefits the denoted species and its habitat.

Status Key: BGE = Bald and Golden Eagle Protection Act; BMP = Florida Black Bear Management Plan; FC = Federal Candidate; FE = Federally Endangered; FP = Federally Petitioned; FT = Federally Threatened; FTA = Federally Threatened by Similarity of Appearance; SE = State Endangered; ST = State Threatened; N= Not Listed, but Rare

Natural communities at the NAS JAX Complex provide habitat for many protected species and require special protection and management. Nearshore areas of the St. Johns River are designated as critical habitat for Florida manatees.

Climate change is anticipated to result in ecosystem changes and, consequently, many species are expected to become increasingly vulnerable to extinction. This scenario is of particular concern for threatened, endangered, rare, and species at-risk species. The response of species to climate change is uncertain and is subject to complex interactions and processes. Reptiles, amphibians, and fish, which are cold-blooded, will be more vulnerable than mammals and birds. More frequent and intense heat extremes and changes in precipitation patterns could alter wet prairies and wetlands, threatening vulnerable vegetation, such as pitcher plants, and facilitating their replacement by invasive grasses.

Goals and Objectives

- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;
- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;
- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;
- Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality;
- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Preserve and protect threatened and endangered species and species of special concern to ensure no reduction in population sizes;
- Maintain the attenuation capacity of the remaining undisturbed acreage within the 100-year floodplain;
- Control nuisance wildlife and wildlife diseases that may adversely affect human health or welfare, the health of the ecosystem, and the military mission;
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP; and
- Incorporate the concept of ecosystem management into all planning and management processes.

Projects

- Invasive Species Control (Project 1 in Appendix A);
- Protected Species Surveys (Project 2 in Appendix A);
- Wildlife Conservation Management (Project 3 in Appendix A);
- Endangered and Threatened Species Habitat Protection (Project 4 in Appendix A);
- Gopher Tortoise Management (Project 5 in Appendix A);
- Gopher Tortoise Radio Tracking Survey (Project 6 in Appendix A);
- Survey and Monitoring of Migratory Bird Species (Project 7 in Appendix A);
- Natural Resources Training (Project 8 in Appendix A);
- Forest Program Support (Project 9 in Appendix A);
- Forest Inventory (Project 10 in Appendix A);
- Forest Fire Protection (Project 11 in Appendix A);
- INRMP Updates (Project 12 in Appendix A); and
- Wildlife Education and Installation Indoctrination Center (Project 14 in Appendix A).

Management Strategies

- Continue monitoring program for natural communities (as well as rare, threatened and endangered species), and implement programs to enhance natural communities and wildlife habitat;
- Further establish a program/plan using prescribed burns and thinning to improve habitat quality, reduce the potential for wildfires, control diseases and insect pests, and ensure the continuation of fire-dependent plant communities;
- Continue program to conduct (i.e., update) surveys of rare, threatened, and endangered species every 5 years, and to monitor other rare species as needed;
- Continue to implement programs and activities for the protection and enhancement of threatened and endangered plant and animal species and their habitats;
- Continue to monitor the health and size of animal populations, and control populations as needed;
- Implement grounds maintenance practices consistent with the BASH Plan. The BASH Plan will be continuously updated and monitored to meet the needs of the Complex;
- Inventory wetlands and assess their function and quality on a routine basis;
- Promote 50-foot buffers for all wetlands, and ensure land use and land management practices that will not adversely affect wetland resources;
- Continue adhering to BMPs in the SWPPP (NAS JAX 2018) and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (FDEP 2008) to ensure watershed and aquatic habitat protection;
- Continue using the Silviculture BMPs (FDACS 2003) for forest management activities to ensure watershed protection; and

- Continually verify that natural resources personnel obtain proper training and certifications.

Long-Term Management

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

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

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

- 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, such as logging decks) with wildlife food plants to prevent erosion and provide forage.
- Avoid impacts to wetlands.

The following species sub-sections describe management recommendations and benefits of this INRMP for threatened and endangered species known to occur at the NAS JAX Complex. Changes in management practices may result from: (1) the listing or removal of a species under the ESA or (2) a change in species presence at the NAS JAX Complex. The NAS JAX Complex will continue to conduct species survey updates to identify changes in populations and habitat on the properties. Species information provided in the surveys will be used to modify management practices. Modification to management practices will be administered by the NRM in consultation with NAVFAC SE foresters and fish and wildlife biologists, as well as other federal, state, and county agencies.

5.3.3.1 Federally-Listed Species

American Alligator (*Alligator mississippiensis*)

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

The American alligator is known to occur in the Ortega and St. Johns Rivers, adjacent to NAS Jacksonville, and the Oklawaha River, adjacent to Rodman Bomb Target, although one has never been documented during wildlife surveys on the properties. Alligators may also temporarily inhabit freshwater ponds across the Complex. They inhabit low-lying areas near water. Females build nests on undeveloped shorelines and lay clutches of 20 to 60 eggs between May and July. They are protective of their nesting areas during this season and such areas should be avoided. Alligators should not be fed, as this causes them to associate humans with food, thereby increasing the likelihood of dangerous encounters. Staff and visitors will be educated about the dangers of interacting with alligators. This INRMP protects habitat and water quality for alligators through active management of factors such as wetlands (Section 5.1.1; *i.e.*, control pesticide runoff, maintain chemical-free vegetative buffers), erosion control (Section 5.1.2; *i.e.*, prevent sedimentation), stormwater control (Section 5.1.3; *i.e.*, manage non-point and point

source pollution), and floodplain management (Section 5.1.4; *i.e.*, maintain attenuation and filtering capacity of wetlands within the floodplain). Projects described in this INRMP that benefit and conserve alligator habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, and Endangered and Threatened Species Habitat Protection (see Appendix A for descriptions).

Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)

Status: Endangered (Federal)

Adult Atlantic sturgeon primarily reside in marine waters, but migrate up rivers in late spring to spawn. A second spawning run may occur in autumn. Spawning occurs between the salt front and fall line. Larvae move down river after hatching and juveniles settle out in brackish estuarine waters where they may reside for months or years. Subadults move into nearshore coastal waters and adults may make migrations of more than 1,000 miles before returning to their natal rivers to spawn. Atlantic sturgeon may utilize the St. Johns River adjacent to NAS Jacksonville as juveniles. This INRMP protects water quality for Atlantic sturgeon by managing factors such as wetlands (Section 5.1.1; *i.e.*, control pesticide runoff, maintain chemical-free vegetative buffers), erosion control (Section 5.1.2; *i.e.*, prevent sedimentation), stormwater control (Section 5.1.3; *i.e.*, manage non-point and point source pollution), and floodplain management (Section 5.1.4; *i.e.*, maintain attenuation and filtering capacity of wetlands within the floodplain). Mulberry Cove Marina at NAS JAX is a member of the Clean Marina Program, indicating that water quality standards have been achieved and continue to be met at the facility (see Section 2.2.5.5). Projects described in this INRMP that benefit and conserve Atlantic sturgeon habitat include Wildlife Conservation Management and Endangered and Threatened Species Habitat Protection (see Appendix A for descriptions).

Bald Eagle (*Haliaeetus leucocephalus*)

Status: Protected under the Bald and Golden Eagle Protection Act

The bald eagle has been observed at NAS JAX, OLF Whitehouse, and Rodman Bomb Target. It is assumed to also occur over the Yellow Water on occasion. Nesting bald eagles have been observed on NAS JAX in a forested area along the Ortega River. Habitat is primarily riparian associated with coasts, rivers and lakes. Nesting adults usually require living tall trees and occasionally nest in dead trees. Management for the bald eagle on the NAS JAX Complex will focus on the maintenance of riparian habitats and bottomland hardwood forests, which provide suitable feeding habitat. DoN will comply with the USFWS Habitat Management Guidelines for the Bald Eagle in the

Southeastern Region if any nests are located on or adjacent to the NAS JAX Complex properties. These guidelines will provide general guidance for compliance with the federal and state laws protecting bald eagles and are designed to minimize detrimental human-related impacts on bald eagles, particularly during nesting season. This INRMP protects habitat for bald eagles through active management of factors such as wetlands (Section 5.1.1; *i.e.*, control pesticide runoff and preserve habitat for aquatic prey), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), forest protection (Section 5.2.2; *i.e.*, protect forest ecosystems by preventing wildfires and proactively treating plights and insect infestations), and migratory birds (Section 5.3.2; *i.e.*, maintain knowledge of seasonality and locations). Projects described in this INRMP that benefit and conserve bald eagle habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Survey and Monitoring of Migratory Bird Species, Forestry Support Program, and Forest Fire Inventory (see Appendix A for descriptions).

Black Creek Crayfish (*Procambarus pictus*)

Status: Petitioned (Federal) and Threatened (State)

The Black Creek crayfish is a mid-sized crayfish that can reach a length of three inches and is only found in Duval, St. Johns, Clay, and Putnam counties in Florida. This species has a black back with yellow and white marks, and a dark red abdomen with black bands. They also have ten bumps on their claws where other crayfish species have hair-like features. Black Creek crayfish inhabit tannic stained streams where they take refuge under tree roots and in vegetation. They eat dead animals, plants, and decomposed organic matter. State of Florida biologists have identified Black Creek crayfish less than a mile north of Yellow Water Housing. This INRMP protects water quality for Black Creek crayfish by managing factors such as wetlands (Section 5.1.1; *i.e.*, control pesticide runoff, maintain chemical-free vegetative buffers), erosion control (Section 5.1.2; *i.e.*, prevent sedimentation), stormwater control (Section 5.1.3; *i.e.*, manage non-point and point source pollution), and floodplain management (Section 5.1.4; *i.e.*, maintain attenuation and filtering capacity of wetlands within the floodplain). Projects described in this INRMP that benefit and conserve Black Creek crayfish habitat include Invasive Species Control, Wildlife Conservation Management, and Endangered and Threatened Species Habitat Protection (see Appendix A for descriptions).

Eastern Diamondback Rattlesnake (*Crotalus adamanteus*)

Status: Petitioned for Listing (Federal)

Eastern diamondback rattlesnakes have been confirmed present on Rodman Bomb Target and are likely present on the three other properties. They generally live in dry pine flatwoods, sandy woodlands, and scrub habitats, and often inhabit gopher tortoise burrows. Natural resources managers at the NAS JAX Complex actively manage habitat for the benefit of gopher tortoises and these actions concurrently protect habitat for eastern diamondbacks. Although the eastern diamondback is not endangered, indiscriminate killing and widespread loss of habitat have decreased its numbers throughout its range, which stretches from North Carolina to eastern Louisiana. This INRMP protects habitat for eastern diamondbacks through active management of factors such as landscaping and grounds maintenance (Section 5.1.5; *i.e.*, maintain natural environments and minimize habitat fragmentation), invasive species control (Section 5.1.6; *i.e.*, control succession of native ecosystems by non-native trees and plants), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and forest protection (Section 5.2.2; *i.e.*, protect forest ecosystems by preventing wildfires and proactively treating plights and insect infestations). Projects described in this INRMP that benefit and conserve eastern diamondback habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Gopher Tortoise Management, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Eastern Indigo Snake (*Drymarchon couperi*)

Status: Threatened (Federal)

An eastern indigo snake was documented on OLF Whitehouse in 1996 by the observation of a shed skin. This was the last record of eastern indigo snake for Duval County. According to the FNAI database, there are no other records for the county after 1983. The closest record within the last 5 years is for Camp Blanding Training Site in Clay County (25 miles away) where substantial suitable habitat remains. The area within and surrounding OLF Whitehouse is marginal habitat for indigo snakes as a result of intensive plantation forestry, fire suppression and suburban development. Because there is insufficient land area on OLF Whitehouse to support a long term population of indigo snakes and the surrounding habitat is marginal to unsuitable, it is unlikely that this species persists on the facility or in the area. Management activities directed at gopher tortoises on site will benefit indigo snakes if they are still present. This INRMP protects habitat for eastern indigo snakes through active management of factors such as landscaping and grounds maintenance (Section 5.1.5; *i.e.*, maintain natural environments

and minimize habitat fragmentation), invasive species control (Section 5.1.6; i.e., control succession of native ecosystems by non-native trees and plants), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and forest protection (Section 5.2.2; i.e., protect forest ecosystems by preventing wildfires and proactively treating plights and insect infestations). Projects described in this INRMP that benefit and conserve eastern indigo snake habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Gopher Tortoise Management, Gopher Tortoise Radio Tracking Survey, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Florida Manatee (*Trichechus manatus latirostris*)

Status: Threatened (Federal)

The Florida manatee occurs in the St. Johns River south to Green Cove Springs. Much of the St. Johns River has been federally designated as critical habitat for the species. Its endangered status is primarily due to harm and harassment from adverse interactions with watercraft and water control structure operations, and adverse impacts to its habitat. Manatees concentrate in areas of warmer water (springs and warmwater discharge areas) during times of cooler weather, between October and April.

Manatee management includes protection of water quality and conservation of suitable aquatic habitat in the St. Johns River. Mulberry Cove Marina at NAS Jacksonville is a member of the Clean Marina Program, indicating that water quality standards have been achieved and continue to be met at this facility (see Section 2.2.5.5). Manatee kiosks have been erected at Mulberry Cove Marina, Manatee Point, and behind the bachelor officers quarters (BOQ) to educate the public about manatees and to inform them of the slow speed zone along the entire shoreline of NAS Jacksonville. NAS Jacksonville personnel will coordinate with the City of Jacksonville to construct a manatee information kiosk in Tillie K. Fowler Park along the boardwalk to the Ortega River. The USFWS will be consulted prior to any construction activities along river shorelines to ensure compliance with the ESA.

This INRMP protects water quality for Florida manatees by managing factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff, maintain chemical-free vegetative buffers), erosion control (Section 5.1.2; i.e., prevent sedimentation), stormwater control (Section 5.1.3; i.e., manage non-point and point source pollution), and floodplain management (Section 5.1.4; i.e., maintain attenuation and filtering capacity of wetlands

within the floodplain). Projects described in this INRMP that benefit and conserve manatee habitat include Wildlife Conservation Management and Endangered and Threatened Species Habitat Protection (see Appendix A for descriptions).

Gopher Frog (*Lithobates capito*)

Status: Petitioned for Listing (Federal)

Gopher frogs prefer upland sandy uplands in pine-forest areas, and historically were ubiquitous in longleaf pine habitat. They are dependent upon gopher tortoises since they reside in the tortoise burrows. Forest management strategies such as thinning and prescribed burning help open canopy and promote the growth of forage plants, and fire should be allowed to move into wetlands when possible, especially into ephemeral ponds. Gopher frogs are vulnerable to predation by nuisance animals such as dogs, feral cats, and raccoons. Management activities directed at gopher tortoises on site will benefit gopher frogs as well. This INRMP protects habitat for gopher tortoises through active management of factors such as landscaping and grounds maintenance (Section 5.1.5; i.e., maintain natural environments and minimize habitat fragmentation), invasive species control (Section 5.1.6; i.e., control succession of native ecosystems by non-native trees and plants), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and forest protection (Section 5.2.2; i.e., protect forest ecosystems by preventing wildfires and proactively treating plights and insect infestations). Projects described in this INRMP that benefit and conserve gopher frog habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Gopher Tortoise Management, Gopher Tortoise Radio Tracking Survey, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Gopher Tortoise (*Gopherus polyphemus*)

Status: Candidate (Federal) and Threatened (State)

Gopher tortoises are present on all four properties of the NAS JAX Complex. Gopher tortoises prefer xeric uplands with open canopy and ample low-lying herbaceous vegetation for foraging. Several species, including the gopher frog, eastern indigo snake, pine snake, and eastern diamondback rattlesnake, depend upon gopher tortoise burrows for shelter. Forest management strategies such as thinning and prescribed burning help open canopy and promote the growth of forage material. Gopher tortoises are vulnerable to predation by nuisance animals such as coyotes, feral cats, and raccoons, so control of such species is beneficial. The gopher tortoise has been observed on NAS Jacksonville along the sides of bunkers and blast walls. Fake bunkers have been erected to

discourage burrowing in actual bunker sites. Because the gopher tortoises are located within a mission-sensitive area on NAS Jacksonville and gopher tortoise habitat is abundant at OLF Whitehouse, the Complex has prepared and is implementing a Gopher Tortoise Management and Relocation Plan. Relocation areas may include suitable habitat on OLF Whitehouse along the mowed apron as well as the dry sandy areas of Rodman Bomb Target. This INRMP protects habitat for gopher tortoises through active management of factors such as landscaping and grounds maintenance (Section 5.1.5; i.e., maintain natural environments and minimize habitat fragmentation), invasive species control (Section 5.1.6; i.e., control succession of native forage vegetation and pine ecosystems by non-native trees and plants), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and forest protection (Section 5.2.2; i.e., protect forest ecosystems by preventing wildfires and proactively treating plights and insect infestations). Projects described in this INRMP that benefit and conserve gopher tortoise habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Gopher Tortoise Management, Gopher Tortoise Radio Tracking Survey, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Monarch Butterfly (*Danaus plexippus plexippus*)

Status: Petitioned for Listing (Federal)

The monarch butterfly is found throughout the United States during warm months, but migrates to Mexico during winter. Monarch caterpillars exclusively eat milkweed leaves, so the presence of milkweed (*Asclepias* spp.) is a crucial habitat requirement. Milkweed protection is therefore a key component of monarch butterfly conservation. This INRMP protects habitat for monarch butterflies through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff, maintain chemical-free vegetative buffers), landscaping and grounds maintenance (Section 5.1.5; i.e., maintain natural environments and minimize habitat fragmentation), invasive species control (Section 5.1.6; i.e., control succession of native ecosystems by non-native trees and plants), and silvicultural activities (Section 5.2.1; i.e., thinning and prescribed burns). Projects described in this INRMP that benefit and conserve monarch butterfly habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, and Forest Fire Protection (see Appendix A for descriptions).

Shortnose Sturgeon (*Acipenser brevirostrum*)

Status: Endangered (Federal)

The shortnose sturgeon is the smallest of sturgeons, rarely exceeding 3.5 feet in length and 14 pounds in weight. It has a short, conical snout with four barbels in front of its large underslung subterminal mouth. Shortnose sturgeons inhabit estuaries and coastal rivers and do not appear to make long saltwater migrations as other sturgeon species do. They are anadromous and spawn in freshwater, but not every year; males generally spawn every other year and females every third year. Newly-hatched fry are poor swimmers and drift with the currents along the bottom. As they grow and mature, the fish move downriver into the most brackish parts of estuarine systems. The St Johns River, adjacent to NAS Jacksonville, provides suitable habitat for adult and large juvenile shortnose sturgeon. This INRMP protects water quality for shortnose sturgeon by managing factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff, maintain chemical-free vegetative buffers), erosion control (Section 5.1.2; i.e., prevent sedimentation), stormwater control (Section 5.1.3; i.e., manage non-point and point source pollution), and floodplain management (Section 5.1.4; i.e., maintain attenuation and filtering capacity of wetlands within the floodplain). Mulberry Cove Marina at NAS Jacksonville is a member of the Clean Marina Program, indicating that water quality standards have been achieved and continue to be met at the facility (see Section 2.2.5.5). Projects described in this INRMP that benefit and conserve shortnose sturgeon habitat include the Wildlife Conservation Management and Endangered and Threatened Species Habitat Protection (see Appendix A for descriptions).

Southern Hog-nosed Snake (*Heterodon simus*)

Status: Petitioned for Listing (Federal)

Southern hog-nosed snakes are most often associated with well drained, xeric, sandy soils where longleaf pine and scrub oaks are the characteristic woody vegetation. Wiregrass is often a significant component of the groundcover. Such habitats are necessarily fire-maintained. Ruderal habitats, including fallow fields, may also be used. Management activities directed at gopher tortoises on the Complex would also benefit Southern hog-nosed snakes. This INRMP protects habitat for Southern hog-nosed snakes through active management of factors such as landscaping and grounds maintenance (Section 5.1.5; i.e., maintain natural environments and minimize habitat fragmentation), invasive species control (Section 5.1.6; i.e., control succession of native ecosystems by non-native trees and plants), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and forest protection (Section 5.2.2; i.e., protect forest ecosystems by preventing wildfires and proactively treating plights and insect

infestations). Projects described in this INRMP that benefit and conserve Southern hog-nosed snake habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Gopher Tortoise Management, Gopher Tortoise Radio Tracking Survey, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Spotted Turtle (*Clemmys guttata*)

Status: Petitioned (Federal)

The spotted turtle is a small turtle (max carapace length is about 15 cm) that inhabits a variety of wetland types, including vernal pools, swamps, marshes, small streams, wet meadows, and wet forests. Loss of wetlands habitat and invasive plants in wetlands habitats are the principal threats to the species. This INRMP protects habitat for spotted turtles through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff, maintain chemical-free vegetative buffers), erosion control (Section 5.1.2; i.e., prevent sedimentation), stormwater control (Section 5.1.3; i.e., manage non-point and point source pollution), and floodplain management (Section 5.1.4; i.e., maintain attenuation and filtering capacity of wetlands within the floodplain). Projects described in this INRMP that benefit and conserve spotted turtle habitat include Wildlife Conservation Management and Endangered and Threatened Species Habitat Protection (see Appendix A for descriptions).

Wood Stork (*Mycteria americana*)

Status: Threatened (Federal)

Two breeding colonies of wood storks have been confirmed in Duval County. Wood storks are large, colonial wading birds that feed and nest in fresh and brackish open-water habitats, such as salt marshes, ponds, ditches, and mangrove and cypress swamps. These birds nest in colonies in woody vegetation over standing water, which provides protection for eggs. The primary threat and decline of the wood stork has resulted from loss of suitable feeding and rookery habitats. Primary management includes appropriate maintenance of wetland habitats. NAS JAX Complex managers will protect aquatic communities by monitoring water quality and planting native emergent vegetation. Managers will also consult the USFWS Wood Stork Recovery Plan for future wood stork management on NAS JAX Complex properties. This INRMP protects habitat for wood storks through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff and preserve habitat for aquatic prey), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), forest protection (Section 5.2.2; i.e., protect forest ecosystems by preventing wildfires and proactively treating

plights and insect infestations), and migratory birds (Section 5.3.2; i.e., maintain knowledge of seasonality and locations). Projects described in this INRMP that benefit and conserve wood stork habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Survey and Monitoring of Migratory Bird Species, Forestry Support Program, and Forest Fire Inventory (see Appendix A for descriptions).

5.3.3.2 Selected State-Listed Animal Species

Florida Black Bear (*Ursus americanus floridanus*)

Status: Managed Under the Florida Black Bear Management Plan (State)

Florida black bears have very large home ranges, and utilize a wide variety of habitats depending upon food availability and other factors. Large undeveloped wooded tracts, pine flatwoods, hardwood swamps, cypress swamps, and mixed hardwood hammocks are all suitable, but areas with multiple forest types are most desirable. Growing-season prescribed burns promote the growth and fruiting of vegetation upon which the Florida black bear feeds. Winter burns promote the spread of saw palmetto, which has no nourishment value, and reduce the availability of berries and runner oak cover. This INRMP protects habitat for Florida black bears through active management of factors such as wetland management (Section 5.1.1; i.e., preserve water quality for aquatic prey, native vegetation, and drinking supply), invasive species control (Section 5.1.6; i.e., prevent succession of native forage vegetation by non-native plants), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and forest protection (Section 5.2.2; i.e., protect forest ecosystems by preventing wildfires and proactively treating plights and insect infestations). Projects described in this INRMP that benefit and conserve Florida black bear habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Forestry Support Program, and Forest Fire Inventory (see Appendix A for descriptions).

Least Tern (*Sterna antillarum*)

Status: Threatened (State)

The least tern is a shorebird that prefers nesting on sandy beaches with pebbles and similar sized shells and short, sparse vegetation. Their eggs and chicks are very effectively camouflaged. The primary threat to least terns is human encroachment resulting in loss of habitat. The least tern breeds along the St. Johns River northeast of NAS JAX Complex lands and is also known to nest on gravel rooftops on NAS Jacksonville. Management for this species will include maintenance of suitable shoreline

habitats and protection from human disturbance. Rooftop least tern colonies are susceptible to human disturbance. Human presence on a rooftop may lead to the loss of chicks and eggs as the result of being crushed, exposed to the elements, taken by opportunistic predators, or abandoned. Consequently, FWC has requested that all maintenance rooftop and HVAC repairs where least terns nest should be completed prior to the start of the nesting season (before March 15) to minimize the risk of any unnecessary disturbance during the breeding season, which lasts from March 15 to September 1. The FWC Regional Shorebird Biologist shall be contacted when emergency repairs arise on an active rooftop¹.

Rooftop nests will benefit from removing predator access (e.g., removing tree limbs or other points of contact that allow for predator access), covering any holes/gaps in roof that may entrap chicks, covering exposed tar with additional gravel, and ensuring proper rooftop drainage. If ground nesting is detected, the FWC recommends that the area be posted with twine and FWC "Do Not Enter" signs with designated buffer zones delineated according to the Florida Shorebird Alliance (FSA) Posting Guidelines:

<http://www.flshorebirdalliance.org/resources/instructions-manuals.aspx>.

The FWC recommends that breeding season surveys be conducted in potential least tern nesting habitats. The person monitoring shall be familiar with the general information, data collection protocols, and procedures outlined on the FWC's Florida Shorebird Database (FSD) website. All data should be uploaded to the FSD site within one week of collection. If it necessary to conduct a survey on an active nesting rooftop, a scientific collection permit would be necessary.

This INRMP protects habitat for least terns through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff and preserve habitat for aquatic prey), erosion control (Section 5.1.2; i.e., prevent sedimentation and degradation of nesting habitat), landscaping and grounds maintenance (Section 5.1.5; i.e., maintain airfield grasses to discourage potential BASH conflicts), and migratory birds (Section 5.3.2; i.e., maintain knowledge of seasonality and locations). Projects described in this INRMP that benefit and conserve least tern habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, and Survey and Monitoring of Migratory Bird Species (see Appendix A for descriptions).

¹ The FWC Regional Shorebird Biologist, as of 2019, is Jean Olbert, Jean.Olbert@MyFWC.com or 352.644.3539.

Little Blue Heron (*Egretta caerulea*)

Status: Threatened (State)

The little blue heron is a wading bird that ranges throughout the southeastern United States. Population estimates indicate a decrease due to destruction and elimination of wetlands. Maintaining the open character of the depression marshes for foraging, protecting the hydrology of all wetlands, and preventing disturbance of potential breeding areas (e.g., dome swamps, willow thickets, and buttonbush thickets) will benefit local populations of wading birds. This INRMP protects habitat for little blue herons through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff and preserve habitat for aquatic prey), erosion control (Section 5.1.2; i.e., prevent sedimentation and degradation of foraging habitat), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and migratory birds (Section 5.3.2; i.e., maintain knowledge of seasonality and locations). Projects described in this INRMP that benefit and conserve little blue heron habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Survey and Monitoring of Migratory Bird Species, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Snowy Egret (*Egretta thula*)

Status: Not Listed, but is part of the Imperiled Species Management Plan (State)

Snowy egrets are wading birds that have experienced a major decline in the 1970s due to destruction of wetland habitats. Maintaining the open character of the depression marshes for foraging, protecting the hydrology of all wetlands, and preventing disturbance of potential breeding areas, such as dome swamps, willow thickets, and buttonbush thickets, will benefit populations of wading birds on the Complex. This INRMP protects habitat for snowy egrets through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff and preserve habitat for aquatic prey), erosion control (Section 5.1.2; i.e., prevent sedimentation and degradation of foraging habitat), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and migratory birds (Section 5.3.2; i.e., maintain knowledge of seasonality and locations). Projects described in this INRMP that benefit and conserve snowy egret habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Survey and Monitoring of Migratory Bird Species, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Tricolored Heron (*Egretta tricolor*)

Status: Threatened (State)

The tricolored heron is a wading bird with dark blue upperparts, white belly and foreneck, and a brown throat. It nests mainly near salt water in thickets of tidal marshes, but also in rushes of freshwater marshes. Maintaining the open character of the depression marshes for foraging, protecting the hydrology of all wetlands, and preventing disturbance of potential breeding areas, such as dome swamps, willow thickets, and buttonbush thickets, will benefit populations of wading birds on the Complex. This INRMP protects habitat for tricolored herons through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff and preserve habitat for aquatic prey), erosion control (Section 5.1.2; i.e., prevent sedimentation and degradation of foraging habitat), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and migratory birds (Section 5.3.2; i.e., maintain knowledge of seasonality and locations). Projects described in this INRMP that benefit and conserve tricolored heron habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Survey and Monitoring of Migratory Bird Species, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

White Ibis (*Eudocimus albus*)

Status: Not Listed, but is part of the Imperiled Species Management Plan (State)

The white ibis is a wading bird found in coastal areas from North Carolina to Florida and west to Texas. The decline of the white ibis is primarily attributed to loss of habitat. White ibis have been observed roosting in a cypress wetland on the NAS JAX Complex. They are frequent visitors to the Rodman Bomb Target and nesting potentially occurs in some of the large wetlands on that property. Management for this species includes the maintenance of wetland habitats. This INRMP protects habitat for white ibis through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff and preserve habitat for aquatic prey), erosion control (Section 5.1.2; i.e., prevent sedimentation and degradation of foraging habitat), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and migratory birds (Section 5.3.2; i.e., maintain knowledge of seasonality and locations). Projects described in this INRMP that benefit and conserve white ibis habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Survey and Monitoring of Migratory Bird Species, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

5.3.3.3 Selected State-Listed Plant Species

Hooded Pitcher Plant (*Sarracenia minor*)

Status: Threatened (State)

The hooded pitcher plant requires open and sunny ecotones, bogs, wet prairies and savannas, and gaps along streams and swamps with moist, acidic soil that are low in nutrients. It occurs along the edges of depression marshes in small isolate populations at NAS Jacksonville, OLF Whitehouse, and Rodman Bomb Target. Natural resource management will maintain the hydrologic regime of sensitive areas by avoiding bedding, ditching, logging activities, and off-road vehicle use. Prescribed burns during the growing season will limit encroachment by woody vegetation and aid in successful reproduction of herbs. This INRMP protects habitat for hooded pitcher plants through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff, maintain chemical-free vegetative buffers), erosion control (Section 5.1.2; i.e., prevent sedimentation into habitat), landscaping and ground maintenance (Section 5.1.5; i.e., note locations to minimize damage during grounds maintenance), and silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]). Projects described in this INRMP that benefit and conserve hooded pitcher plant habitat include Invasive Species Control, Endangered and Threatened Species Habitat Protection, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Pondspice (*Litsea aestivalis*)

Status: Endangered (State)

Pondspice is typically found along the edges of baygalls, flatwoods ponds, and cypress domes. It has been observed at the depression marshes in the northwest portion of the Rodman Bomb Target in every survey since 1996-97 and the population remains healthy and apparently has not declined. This INRMP protects habitat for pondspice through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff, maintain chemical-free vegetative buffers), erosion control (Section 5.1.2; i.e., prevent sedimentation into habitat), invasive species control (Section 5.1.6; i.e., prevent succession by non-native plants), and silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]). Projects described in this INRMP that benefit and conserve pondspice habitat include Invasive Species Control, Endangered and Threatened Species Habitat Protection, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Pine Lily (*Lilium catesbaei*)

Status: Threatened (State)

The pine lily was once considered rare, but is now known to be infrequent, although imperiled. It is found in pine savannas, flatlands, and bogs. Several populations were identified on all the NAS JAX properties except the Yellow Water. Typical management for pine lily includes prescribed fire to maintain an open understory and stimulate flowering. Mowing, though not as effective a tool, may substitute in areas where fire is prohibited. This INRMP protects habitat for pine lilies through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff, maintain chemical-free vegetative buffers), erosion control (Section 5.1.2; i.e., prevent sedimentation into habitat), invasive species control (Section 5.1.6; i.e., prevent succession by non-native plants), and silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]). Projects described in this INRMP that benefit and conserve pine lily habitat include Invasive Species Control, Endangered and Threatened Species Habitat Protection, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Spoon-leaved Sundew (*Drosera intermedia*)

Status: Threatened (State)

The spoon-leaved sundew has been observed only at one location in a drainage ditch at the Yellow Water in 1990. It has not been recorded in any subsequent surveys, suggesting it may be extirpated from the Complex. It requires low habitats that are sunny and constantly moist. This INRMP protects habitat for spoon-leaved sundews through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff, maintain chemical-free vegetative buffers), erosion control (Section 5.1.2; i.e., prevent sedimentation into habitat), stormwater and water quality (Section 5.1.3; i.e., minimize and prevent degradation of water quality in habitat), and invasive species control (Section 5.1.6; i.e., prevent succession by non-native plants). Projects described in this INRMP that benefit and conserve spoon-leaved sundew habitat include Invasive Species Control and Endangered and Threatened Species Habitat Protection (see Appendix A for descriptions).

Star Anise (*Illicium parviflorum*)

Status: Endangered (State)

The star-anise was observed in a disturbed pine flatwood at NAS Jacksonville in 1990. The area was the site of a former trailer park and the specimens, it was believed at the time, had persisted from an ornamental planting. The star anise has not been recorded

in any subsequent surveys, suggesting it may be extirpated from the Complex. It requires moist habitats and typically grows in stream beds. This INRMP protects habitat for the star anise through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff, maintain chemical-free vegetative buffers), erosion control (Section 5.1.2; i.e., prevent sedimentation into habitat), stormwater and water quality (Section 5.1.3; i.e., minimize and prevent degradation of water quality in habitat), and invasive species control (Section 5.1.6; i.e., prevent succession by non-native plants). Projects described in this INRMP that benefit and conserve habitat for the star anise include Invasive Species Control and Endangered and Threatened Species Habitat Protection (see Appendix A for descriptions).

5.3.3.4 Other Rare Animal and Plant Species

Bachman's Sparrow (*Aimophila aestivalis*)

Status: None

Bachman's sparrow prefers open-canopy pine communities including sandhill and flatwoods that have a dense herbaceous cover or a low dense shrub cover. Areas supporting or potentially supporting Bachman's sparrow should be managed to have an open canopy, a sparse to absent tall shrub layer, and a dense low shrub and herbaceous cover. Habitat will be improved and maintained by thinning planted pine stands and implementing regular prescribed burning. This INRMP protects habitat for Bachman's sparrows through active management of factors such as landscaping and grounds maintenance (Section 5.1.5; i.e., maintain airfield grasses to discourage potential BASH conflicts), invasive species control (Section 5.1.6; i.e., prevent succession of native forest vegetation by non-native trees and plants), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and forest protection (Section 5.2.2; i.e., protect forest ecosystems by preventing wildfires and proactively treating plights and insect infestations). Projects described in this INRMP that benefit and conserve Bachman's sparrow habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Survey and Monitoring of Migratory Bird Species, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Diverseleaf Crownbeard (*Verbesina heterophylla*)

Status: None

There are a few small vegetative patches of diverseleaf crownbeard in the flatwoods and roadsides in the vicinity of the weapons magazine on NAS Jacksonville. Typical management includes prescribed fire to maintain an open understory and stimulate

flowering. Mowing may substitute in areas where fire is prohibited. This INRMP protects habitat for diverseleaf crownbeard through active management of factors such as landscaping and grounds maintenance (Section 5.1.5; i.e., note locations to minimize damage during grounds maintenance), invasive species control (Section 5.1.6; i.e., prevent succession by non-native plants), land impact guidelines (Section 5.1.8; i.e., note locations to minimize impacts during on-base construction activities), and silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]). Projects described in this INRMP that benefit and conserve diverseleaf crownbeard habitat include Invasive Species Control, Endangered and Threatened Species Habitat Protection, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Florida Threeawn (*Aristida rhizomophora*)

Status: None

The Florida threeawn is a grass that was encountered frequently across OLF Whitehouse during vegetative surveys in 1990 and 1996-97. It has not been noted in subsequent surveys, but this may be due to the fact that it is not a listed species and was therefore not targeted for recording. It inhabits pine flatwoods and plantations and is most common in wetter portions of the ecotone between the pine flatwoods and grassy wet prairies. It flowers only after burns or mechanical disturbance. This INRMP protects habitat for Florida threeawn through active management of factors such as landscaping and grounds maintenance (Section 5.1.5; i.e., note locations to minimize damage during grounds maintenance), invasive species control (Section 5.1.6; i.e., prevent succession by non-native plants), land impact guidelines (Section 5.1.8; i.e., note locations to minimize impacts during on-base construction activities), and silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]). Projects described in this INRMP that benefit and conserve Florida threeawn habitat include Invasive Species Control, Endangered and Threatened Species Habitat Protection, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Great Egret (*Ardea alba*)

Status: None

Great egrets are wading birds. They have been observed foraging in ponds and open depression marshes at the NAS JAX Complex. Protecting the hydrology of all wetlands, and preventing disturbance of potential breeding areas, such as domes swamps, willow thickets, and buttonbush thickets, will benefit populations of wading birds on the Complex. This INRMP protects habitat for great egrets through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff and preserve habitat

for aquatic prey), erosion control (Section 5.1.2; i.e., prevent sedimentation and degradation of foraging habitat), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and migratory birds (Section 5.3.2; i.e., maintain knowledge of seasonality and locations). Projects described in this INRMP that benefit and conserve great egret habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Survey and Monitoring of Migratory Bird Species, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Loggerhead Shrike (*Lanius ludovivianus*)

Status: None

Loggerhead shrikes occur in sparsely canopied areas that have occasional tall shrubs, abundant to absent short shrubs, and abundant herbaceous cover. At NAS Jacksonville, they are commonly found in the housing areas and other mowed areas with occasional shrubs. Continued maintenance of these mowed areas will maintain suitable habitat for loggerhead shrikes. Thinning of pine stands and mowing to maintain low shrub stature will create additional habitat for this declining species. This INRMP protects habitat for loggerhead shrikes through active management of factors such as landscaping and grounds maintenance (Section 5.1.5; i.e., maintain airfield grasses to discourage potential BASH conflicts), invasive species control (Section 5.1.6; i.e., prevent succession of native forest vegetation by non-native trees and plants), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and forest protection (Section 5.2.2; i.e., protect forest ecosystems by preventing wildfires and proactively treating plights and insect infestations). Projects described in this INRMP that benefit and conserve loggerhead shrike habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Survey and Monitoring of Migratory Bird Species, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Sandhill Crane (*Grus canadensis*)

Status: None

Sandhill cranes are tall long-necked birds with a distinctive red crown. They overwinter in Florida from late October through early April. They make nests on the ground or in shallow water in large marshes in about early March and the eggs hatch after a 30-day incubation period. They have been observed foraging in depression marshes at Rodman Bomb Target. Protecting the hydrology of all wetlands, and preventing disturbance of potential breeding areas, such as dome swamps, willow thickets, and buttonbush

thickets, will benefit populations of sandhill cranes on the property. This INRMP protects habitat for sandhill cranes through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff and preserve habitat for aquatic prey), erosion control (Section 5.1.2; i.e., prevent sedimentation and degradation of foraging habitat), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and migratory birds (Section 5.3.2; i.e., maintain knowledge of seasonality and locations). Projects described in this INRMP that benefit and conserve sandhill crane habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Survey and Monitoring of Migratory Bird Species, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Rafinesque's Big-eared Bat (*Corynorhinus rafinesquii*)

Status: None

The Rafinesque's big-eared bat inhabits riparian areas in forests. It was documented along the Oklawaha River on Rodman Bomb Target. Roosts often are in hollow trees, occasionally under loose bark, or in abandoned buildings in or near wooded areas. This INRMP protects habitat for the Rafinesque's big-eared bat through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff, maintain chemical-free vegetative buffers to minimize impacts to insect prey), erosion control (Section 5.1.2; i.e., prevent sedimentation into foraging areas), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and forest protection (Section 5.2.2; i.e., protect forest ecosystems by preventing wildfires and proactively treating plights and insect infestations). Projects described in this INRMP that benefit and conserve Rafinesque's big-eared bat habitat include Invasive Species Control, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Southeastern Myotis (*Myotis austroriparius*)

Status: None

The southeastern myotis is a bat that sleeps by day and hunts insects by night – typically over freshwater ponds and swamps. It occurs at every property on the NAS JAX Complex, associated with wetlands. Cavity trees suitable for roosting and maternity colonies will be protected. Pine stand thinning will provide foraging areas in addition to wetlands. The installation of bat houses will be considered. This INRMP protects habitat for the southeastern myotis through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff, maintain chemical-free vegetative buffers to

minimize impacts to insect prey), erosion control (Section 5.1.2; i.e., prevent sedimentation into foraging areas), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and forest protection (Section 5.2.2; i.e., protect forest ecosystems by preventing wildfires and proactively treating plights and insect infestations). Projects described in this INRMP that benefit and conserve southeastern myotis habitat include Invasive Species Control, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Yellow-crowned Night Heron (*Nyctanassa violacea*)

Status: None

Yellow-crowned night herons have been observed feeding in the wetlands on NAS Jacksonville and Rodman Bomb Target. Wetland protection will ensure continued habitat for this uncommon heron. This INRMP protects habitat for yellow-crowned night herons through active management of factors such as wetlands (Section 5.1.1; i.e., control pesticide runoff and preserve habitat for aquatic prey), erosion control (Section 5.1.2; i.e., prevent sedimentation and degradation of foraging habitat), silvicultural activities (particularly thinning and prescribed burns [Section 5.2.1]), and migratory birds (Section 5.3.2; i.e., maintain knowledge of seasonality and locations). Projects described in this INRMP that benefit and conserve yellow-crowned night heron habitat include Invasive Species Control, Protected Species Surveys, Wildlife Conservation Management, Endangered and Threatened Species Habitat Protection, Forestry Program Support, and Forest Fire Protection (see Appendix A for descriptions).

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – wetland provide habitat for many rare species;
- Soil Conservation and Erosion, Section 5.1.2 – control sedimentation into wetland habitat;
- Stormwater and Water Quality, Section 5.1.3 – control water quality for rare aquatic species;
- Floodplains, Section 5.1.4 – maintaining floodplain conditions benefits rare species;
- Landscaping and Grounds Maintenance, Section 5.1.5 – be aware of habitat utilization by rare species during grounds maintenance;
- Invasive, Exotic, and Noxious Species, Section 5.1.6 – control exotic species, especially those that compete with native rare species;
- Urban Forestry, Section 5.1.7 – utilize native tree species that provide habitat for rare animal species;
- Land Impact Guidelines, Section 5.1.8 – Land use must not adversely affect protected species or their habitats;

- Silviculture, Section 5.2.1 – thinning and controlled burns benefit upland rare species such as gopher tortoises;
- Forest Protection, Section 5.2.2 – controlling wildfires prevents damage to rare species;
- Fisheries Management 5.3.1 – ensure fisheries management is consistent with habitat management for rare aquatic species;
- Migratory Birds, Section 5.3.2 – combine migratory bird surveys with efforts to inventory protected species;
- Nuisance Wildlife and BASH, Section 5.3.4 – ensure BASH controllers are aware of rare species and reduce predation by nuisance carnivores;
- Outdoor Recreation, Section 5.4 – properly educate recreational participants in stewardship of the resource and aquatic environment;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on protected species rules and regulations; and
- GIS, Section 5.5.2 – utilize GIS tools to improve management of rare species and their habitats.

Ecosystem Management

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

Military Mission

Federal law prohibits harassment and all other forms of take for federally-protected species. The NAS JAX Complex must maintain a working knowledge of the protected species and their required habitats on its properties and take prudent steps to protect those species and habitats. Failure to do so could result in regulatory action by the USFWS, NMFS, and FDEP, which could delay or otherwise hinder military training operations at the Complex. The NAS JAX Complex must consult with NMFS for any action which may destroy or adversely modify critical habitat for the Gulf sturgeon.

Laws, Executive Orders, Regulations, Directives, and Memoranda Relevant to Threatened and Endangered Species

- ESA, 16 U.S.C. 35, 32 CFR 190, provides for the identification and protection of threatened and endangered species of fish, wildlife, and plants and their critical habitats. It requires federal agencies to ensure that no agency action is likely to jeopardize the continued existence of a threatened or endangered species.

- MBTA, as amended 16 U.S.C. 703-712, prohibits the taking or harming of a migratory bird, its eggs, nests, or young without the appropriate permit.
- Sikes Act, as amended 16 U.S.C. 670a-o, requires each military department to manage fish and wildlife resources in accordance with a tripartite cooperative plan agreed to by the USFWS and state wildlife agency.
- Marine Mammal Protection Act of 1972, 16 U.S.C. 1361-1407, prohibits the taking or harming of marine mammals without the appropriate permit.
- Bald and Golden Eagle Protection Act, 16 U.S.C. 668-668c, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs.
- Magnuson-Stevens Fishery Conservation and Management Act (1996 Reauthorization), 16 U.S.C. 1855(b), federal agencies must consult with the Secretary of Commerce on all activities, or proposed activities, authorized, funded, or undertaken by the agency, that may adversely affect EFH.
- 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.
- EO 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
- OPNAVINST 5090.1D, 12-3.5, discusses laws that govern natural resources management relating to the protection and management of fish and wildlife resources.
- Florida Statutes, Chapter 370.12, regulates the taking, killing, destroying, harassing, disturbing, and molesting of any marine turtle.
- Florida Statutes, Chapter 370.12, Florida Endangered and Threatened Species Act, is to conserve, protect, and manage the threatened and endangered species and their habitats.

Additional Sources of Information

Habitat Conservation Planning Handbook
<http://endangered.fws.gov/hcp/hcpbook.htm>

Florida Fish and Wildlife Conservation Commission
<http://myfwc.com/>

U.S. Fish and Wildlife Service
<http://www.fws.gov/>

Effects of Fire on Threatened and Endangered Plants
<http://fire.r9.fws.gov/ifcc/T&EPlants/T&EPlants.htm#Abstract>

Fire Effects on Plants and Wildlife
<http://www.fs.fed.us/database/feis/>

Prevention and Control of Wildlife Damage and Wildlife Diseases and Humans
<http://www.ces.ncsu.edu/nreos/wild/wildlife/wdc/index.html>

Florida Natural Areas Inventory
<http://www.fnai.org/>

5.3.4 Nuisance Wildlife and BASH

Nuisance wildlife causes inconveniences to humans, threatens health and safety of human populations, and has the potential to cause property damage. Effects can be relatively minor, such as reducing the aesthetic qualities of an area, or major, such as damaging landscaped areas, damaging property, and causing personal injury. Nuisance wildlife also may act as vectors for human disease.

IPM is an acceptable, environmentally responsible, and economically practical method of controlling pest animal populations. IPM incorporates a variety of cultural, biological, and chemical methods to efficiently manage pest populations while lowering dependence on chemical controls. A number of animal pests occur on the NAS JAX Complex, including fire ants, cockroaches, termites, and other invertebrates, and the control of these pests is an integral part of ecosystem management practices.

Mammal and bird populations, especially in the vicinity of runways, pose a BASH risk to aircraft and must be minimized and controlled to prevent costly and potentially-deadly incidents.

Issues

Termites, rodents, feral cats, and some species of birds and other small mammals have caused structural damage at buildings on NAS JAX Complex. Fire ants create nuisances and control costs by building ant mounds across the landscape. The climate and environment around the Complex are ideal for the proliferation of insects such as mosquitoes and ticks which act as vectors for blood-borne diseases. Many people suffer from allergens to dander and certain insect bites or stings. The wet habitats all across the Complex harbor alligators and venomous snakes that must be regarded with caution by base tenants and visitors. These habitats also attract numerous bird species in large populations, creating an ever-present risk of BASH. There were 72 reported wildlife strikes with aircraft at NAS Jacksonville between 2010 and 2012, seven of which caused damage, totaling approximately \$137,640. There were two reported wildlife strikes with aircraft at OLF Whitehouse, neither of which resulted in reported damage.

Goals and Objectives

- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;
- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;

- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;
- Control nuisance wildlife and wildlife diseases that may adversely affect human health or welfare, the health of the ecosystem, and the military mission;
- Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality;
- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Preserve and protect threatened and endangered species and species of special concern to ensure no reduction in population sizes;
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP; and
- Incorporate the concept of ecosystem management into all planning and management processes.

Projects

- Invasive Species Control (Project 1 in Appendix A);
- Wildlife Conservation Management (Project 3 in Appendix A);
- Survey and Monitoring of Migratory Bird Species (Project 7 in Appendix A);
- Forestry Program Support (Project 9 in Appendix A); and
- Wildlife Education and Installation Indoctrination Center (Project 14 in Appendix A).

Management Strategies

- Implement grounds maintenance practices consistent with the BASH Plan;
- The BASH Plan will be continuously updated and monitored to meet the needs of the Complex;
- Establish an awareness program to educate the public on indicators of wildlife population problems and diseases. Use pamphlets, flyers, and command units to disseminate information;
- Continue to monitor the health and size of animal populations, and control populations as needed;
- Monitor and forecast pest populations to determine whether insect infestations are present, and if so, the type of pests, degree of infestation (small, medium, or large), and the size of the area or number of plants under attack;
- Educate residents of the NAS JAX Complex about the ecological and health benefits of keeping pet cats indoors and eliminating resident populations of feral cats;
- Ensure grounds maintenance personnel receive a copy of the BASH Plan and are aware of the locations in which to manage in accordance with the Plan;

- Use FWC guidelines for the protection of listed species from proposed development or land clearing impacts;
- Institute wildlife education and stewardship programs;
- Ensure implementation of policies that minimize adverse impacts to ecosystem resources from land disturbance activities;
- Maintain mowing schedule and grass height around the airfields to optimize BASH controls;
- Compile GIS data coverages and maintain and update data coverages of populations and habitats of nuisance wildlife problems and BASH issues; and
- Continually verify that natural resources personnel obtain proper training and certifications.

Long-Term Management

Aviator safety is among the Navy's highest priorities. BASH is one of the greatest threats to safety during flight training operations. The Navy therefore entered into a Memorandum of Understanding (MOU) with USDA Animal and Plant Health Inspection Service, Wildlife Services, on 1 October 2010 to establish and continue an Integrated Wildlife Damage Management (IWDM) program at various installations, including the NAS JAX Complex. The MOU will last 5 years. The primary objective of this program is to assist and provide technical recommendations regarding wildlife hazards to aircraft and the protection of human health and safety. A secondary objective of the MOU is to reduce damage to property and natural resources caused by wildlife. Additional objectives include:

- Supplement and enhance the overall Natural Resources Program;
- Monitor wildlife activity while evaluating the effectiveness of IWDM program efforts;
- Facilitate the acquisition and renewal of an annual migratory bird depredation/salvage permit and state depredation permits, as necessary;
- Assist in wildlife-strike reporting and monthly briefings on the status of the BASH program;
- Assist with the review and revision of the NAS JAX Complex BASH Plan to ensure updated, effective techniques are in place to reduce the threat of wildlife strikes to aircraft;
- Assist in the collection, preparation and shipment of wildlife strike remains to the Smithsonian Institution for positive identification;
- Serve as a member of the NAS JAX Complex Bird Hazard Working Group;
- Evaluate off-station airfields frequented by military aircraft where repeated BASH strikes have occurred, as directed by NAS JAX Complex points of contact.
- Train Navy personnel that may be part of a Bird Detection and Dispersal Team (BDDT) in accordance with the Weapons Division Qualification/Certification program;

- Train BDDT members on the use of active scare techniques and placement of static wildlife deterrent devices; and
- Train local squadrons detailing bird and animal strike hazards.

USDA APHIS WS has assigned one full-time wildlife biologist, subject to the MOU, who will employ appropriate methods for IWDM, including approved traps, pyrotechnics, firearms, and bird toxicants (e.g., Alpha Chloralose, Avitrol, and DRC-1339). The biologist assigned to NAS JAX is stationed at Naval Station Mayport and shares time with NAS JAX. IWDM will compliment activities of the Natural Resources Program and will coordinate activities with the NRM and Airfield Operations Officer, as well as local, state and federal officials.

The BASH Plan for the NAS JAX Complex is subject to CNIC Instruction 3700, *Navy BASH Program Implementing Guidance*, of 7 July 2011. This instruction holds the Environmental Division and NRM responsible for ensuring the BASH program is compliant with all applicable environmental laws and regulations and DoD and Navy policies, directives, and instructions. Section 5(c)(2)(g) of the Instruction requires oversight of the USDA Wildlife Biologist and regular coordination of efforts and strike identification with the NRM.

The NAS JAX Complex will manage all habitats surrounding an airfield, natural or man-made, in such a way as to discourage bird and wildlife hazards. Thorough and periodically updated ecological studies of airfields and their vicinity are vital to reduce BASH. The NAS JAX Complex will determine the management practices that will best discourage birds/animals from flying/congregating in areas likely to cause problems, and implement those management practices. Wildlife occurs at or near airfields generally because of food, water, or shelter, and because of local migrations. By managing areas to be less attractive to nuisance wildlife, it is possible to reduce hazards.

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

- Knowledge of the diseases in the area and the specific times of year that present the greatest risk of exposure;
- Knowledge of and recognition of early symptoms of diseases and the condition of exposure;
- The use of extreme caution when approaching or handling a wild or feral animal, especially one that looks sick or abnormal;
- The use of protective measures against fungal diseases where there is an accumulation of animal feces (e.g., under a bird roost);

- Protection from vector-borne disease in high-risk areas using measures such as mosquito or tick repellent, and wearing special clothing; and
- Reduction in host populations and their ectoparasites.

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

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

The NAS JAX Complex would use recommended IPM practices to control pests occurring on properties. The primary pests include fire ants, mosquitoes, cockroaches, termites, and biting flies. Because of the technical nature of this program, the NAS JAX Complex would utilize sources of technical information, such as university researchers, to remain advised of current IPM techniques. Additionally, Complex grounds managers would be provided with continual training and education on the most recent IPM techniques and issues. Integrated pest management practices together form a total management system which includes chemical, cultural, biological, genetic, and mechanical controls.

- **Chemical Controls** often form part of an IPM strategy. The key is to use the pesticides to complement, rather than hinder, other strategy elements and to limit negative environmental effects. It is also important to understand the life cycle of a pest so that the pesticide can be applied when the pest is at its most vulnerable, and to achieve maximum effect at minimum levels of pesticide. Chemical controls include the following:
 - **Conventional:** include carbamates, chlorinated hydrocarbons, some botanicals and analogs, new compounds; and
 - **Biorational:** include pheromones, antifeedants, heat/cold, minerals, oils, some botanicals, and microbials
- **Cultural Controls** include plant variety and site selection rotations, cultivations, and sanitation. These control measures are often referred to as the older forms of pest control.
- **Biological Controls** maintain pests at levels that do not cause great economic or aesthetic losses. The principle behind biological pest control is that a given pest can be killed by predators, parasites, or pathogens. By introducing or encouraging such adversaries, the population of pest organisms should decline. There are three general approaches to biological pest control: importation, augmentation, and conservation.

- **Importation** involves importing a specific organism to control another; however, there are dangers with this approach. This method requires extensive research before a control organism is released in order to determine whether it will attack species other than the pest species.
- **Augmentation** consists of manipulating existing natural enemies to increase their effectiveness. This can be achieved by mass production and periodic release of natural enemies of the pest, and by genetic enhancement of the enemies to increase their effectiveness at control.
- **Conservation** involves identifying and modifying factors that may limit the effectiveness of the natural enemy. In some situations, this may include reducing the application of pesticides, as pesticides may kill predators as well as killing pests. Sometimes part of a crop area is left untreated so that natural enemies will survive and recolonize the treated areas.
- **Genetic Controls** include the transfer of resistance genes into a plant, or the engineering of a disadvantageous trait in the pest, then releasing modified individuals into the pest control area. Another method is the introduction of sterile members of the pest species.
- **Physical or Mechanical Controls** alter environmental factors in a way that reduces pest populations. These controls may be performed by the individual groundskeeper; examples include crop rotation and pruning. Another physical control method, sometimes called “mating disruption,” involves the use of sex pheromones produced by females to attract males for mating. Many of these pheromones are reproduced synthetically in the laboratory and are available commercially. Quantities of the pheromone placed around an orchard can disrupt mating by confusing male insects, which are then less likely to find a mate.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – ensure pesticides do not contaminate wetlands and manage wetlands near airfields to reduce BASH;
- Soil Conservation and Erosion, Section 5.1.2 – control sedimentation into wetland habitat;
- Stormwater and Water Quality, Section 5.1.3 – prevent contamination of water quality by pesticides;
- Floodplains, Section 5.1.4 – ensure continued attenuation capacity of the floodplain;
- Landscaping and Grounds Maintenance, Section 5.1.5 – utilize IPM practices during landscaping and grounds maintenance;
- Invasive and Exotic Species, Section 5.1.6 – control of nuisance animals may correlate with control of invasive and exotic species;
- Urban Forestry, Section 5.1.7 – consider BASH risks when selecting trees and locations for urban forestry;
- Land Impact Guidelines, Section 5.1.8 – consider ways to reduce BASH risks through land use projects;
- Silviculture, Section 5.2.1 – utilize IPM to reduce risk of disease and infestation of forest trees;
- Forest Protection, Section 5.2.2 – burn to accentuate the environmental conditions of native plants and wildlife;

- Fisheries Management, Section 5.3.1 – ensure pesticide use does not contaminate fishing areas;
- Migratory Birds, Section 5.3.2 – ensure BASH control complies with the MBTA;
- Threatened and Endangered Species, Section 5.3.3 – control nuisance animals, such as feral cats, that predate on protect species;
- Outdoor Recreation, Section 5.4 – educate recreational users about precautions against disease-bearing insects and hazardous wildlife;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on IPM and BASH procedures and laws; and
- GIS, Section 5.5.2 – map habitat types around airfields to identify BASH risks and solutions.

Ecosystem Management

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

Military Mission

Nuisance wildlife and the outbreak of disease on the NAS JAX Complex could pose a threat to implementation of the military mission through the infection of military personnel and the consequent limitation of access to areas of the Complex to control a problem. Structural damage to military infrastructure from infestation could also result in delays and costs to operations. BASH is a serious issue and can potentially threaten the military mission by causing accidents in the air and on the runway. Accidents may cause equipment damage as well as bodily harm to aircraft personnel.

Laws, Executive Orders, Regulations, Directives, and Memoranda Relevant to Nuisance Wildlife and BASH

- ESA, 16 U.S.C. 35, 32 CFR 190, provides for the identification and protection of threatened and endangered species of fish, wildlife, and plants and their critical habitats. It requires federal agencies to ensure that no agency action is likely to jeopardize the continued existence of a threatened or endangered species.
- MBTA, as amended 16 U.S.C. 703-712, prohibits the taking or harming of a migratory bird, its eggs, nests, or young without the appropriate permit.
- Bald and Golden Eagle Protection Act, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs.
- EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, imposes substantive obligations on the United States for the conservation of migratory birds and their habitats.
- 2003 National Defense Authorization Act, exempts the Armed Forces from the incidental taking of migratory birds during military readiness activities.

- OPNAVINST 5090.1C, 12-3.12(b), discusses preparation and implementation of BASH plans.
- CNIC Instruction 3700, 7 July 2011, establishes policies and procedures for implementing the BASH plan, establishes mandatory BASH event reporting and remains collection procedure and establishes BASH program procedures.
- EO 13112, 3 February 1999, requires executive agencies to restrict the introduction of exotic organisms into natural ecosystems.
- OPNAVINST 5090.1D, 12-3.10, discusses Navy policy regarding invasive species.
- FIFRA, 7 U.S.C.136, states that a pesticide that is federally registered by the EPA is not legal for use until it is also registered by the individual state.
- Forest Pest Suppression Memorandum of Agreement between the Department of Agriculture and DoD, 11 December 1990, is the planning, coordination, and execution of field operations to prevent and suppress damaging forest insects and disease outbreaks.
- OPNAVINST 5090.1D, 12-3.8(g), discusses the use of pesticides on Navy installations.
- Armed Forces Pest Management Board, Technical Information Memorandum No. 37, presents guidelines for reducing feral cat populations on military installations in the U.S.
- CNO Policy Letter (Ser. N456M/1U595820), 10 Jan 2002, requires Navy commands to institute proactive pet management procedures to prevent the establishment of feral cat and dog populations.
- OPNAVINST 5090.1D, 12-3.10(b), discusses Navy policy regarding feral cat and dog control, and explicitly prohibits the use of Trap-Neuter-Release and similar programs.

Additional Sources of Information

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

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

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

USDA APHIS Wildlife Damage Management
http://www.aphis.usda.gov/wildlife_damage/

Wildlife Disease/Health Related Links
<http://wildlifedisease.nbio.gov/>

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

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

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

DoD Partners in Flight BASH Planning
<http://www.dodpif.org/groups/bash.php>

Air Force Safety Center
<http://www.afsc.af.mil/organizations/bash/index.asp>

5.4 OUTDOOR RECREATION

The Sikes Act requires that sustainable use by the public of natural resources take place to the extent that the use is not inconsistent with the needs of the fish and wildlife resources. Outdoor recreation is the use of natural resources, including indoor interpretive centers, where the primary focus is on the understanding and application of the natural environment. Outdoor recreation includes nature trails, picnic and camping areas, consumptive and non-consumptive uses of natural resources, establishment and management of recreational trails, scenic rivers, equestrian areas, the use of off-road vehicles, as well as other uses of natural resources. It does not include other highly developed outdoor uses such as golf courses, tennis courts, ball/athletic fields, or swimming pools. Outdoor recreation opportunities are dependent upon the natural environment and can be classified as concentrated or dispersed.

The MWR Department is the primary entity responsible for maintaining and developing recreational activities at NAS JAX, with the exception of natural resources-based outdoor recreational activities such as nature trails and hunting, which are the responsibility of the NAS JAX NRM.

The NPS completed an Outdoor Recreation Management Plan for selected properties within the NAS JAX Complex in 1998. This plan contains detailed information on dispersed and concentrated outdoor recreational opportunities, and is available from the NAS JAX NRM.

Issues

Information pertaining to the demand for natural resources-based outdoor recreational activities at the NAS JAX Complex is limited; however, the demand is expected to increase. A participant survey is necessary to determine demand for specific natural resources-based outdoor recreational opportunities and to provide the detailed information needed for future planning. As deemed appropriate by the NRM, the NAS JAX Complex will provide additional natural resources-based outdoor recreational opportunities for Navy personnel as well as the public.

Goals and Objectives

- Provide facilities and develop policies that allow for recreational and educational uses of natural resources, and result in positive effects to these natural resources while improving the quality of life;
- Protect and maintain natural resources within the NAS JAX Complex by continuing and enhancing ecologically appropriate and beneficial land uses and management practices, while ensuring the continuation of the military mission;
- Protect, maintain, and restore native vegetative communities and plant and wildlife populations, while improving the quality of life and ensuring continuation of the military mission;

- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;
- Maintain existing and develop additional outdoor recreational trails, interpretive centers, and/or facilities to support present and future natural resources-based outdoor recreation at the NAS JAX Complex;
- Implement existing and further develop (where needed) natural resources-based outdoor recreation programs to support present and future outdoor recreation at the NAS JAX Complex;
- Control nuisance wildlife and wildlife diseases that may adversely affect human health or welfare, the health of the ecosystem, and the military mission;
- Continue existing, and establish new programs and procedures to monitor, maintain, and enhance wetlands and water quality;
- Maintain the ecological integrity of wetland and upland communities for the protection of native plant and animal species, including numerous federally and state listed species;
- Preserve and protect threatened and endangered species and species of special concern to ensure no reduction in population sizes;
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP; and
- Incorporate the concept of ecosystem management into all planning and management processes.

Projects

- Wildlife Conservation Management (Project 3 in Appendix A);
- Endangered and Threatened Species Habitat Protection (Project 4 in Appendix A);
- Survey and Monitoring of Migratory Bird Species (Project 7 in Appendix A); and
- Wildlife Education and Installation Indoctrination Center (Project 14 in Appendix A).

Management Strategies

- Continue updating the baseline information pertaining to present usage of natural resources-based outdoor recreation activities;
- Continue to develop recreational trails and/or interpretive centers in areas exhibiting unique cultural, natural, historical, or archeological resources;
- Expand, improve, and provide additional facilities for outdoor recreational opportunities;
- Ensure distribution and review of the Outdoor Recreation Management Section report, prepared by the National Park Service for the NAS JAX Complex, by all appropriate programs and departments (e.g., MWR). As appropriate, develop report recommendations into projects and activities;
- Further develop recreational fishing opportunities at the Complex;

- Promote 50-foot buffers for all wetlands, and ensure land use and land management practices that will not adversely affect wetland resources;
- Continue adhering to BMPs in the SWPPP (NAS JAX 2018) and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (FDEP 2008) to ensure watershed protection;
- Continue to implement programs and activities for the protection and enhancement of threatened and endangered plant and animal species and their habitats;
- Continue to develop a soil erosion control plan and reduce the rate of soil erosion through the implementation of long-term measures and projects;
- Continue to monitor the health and size of animal populations, and control populations as needed; and
- Continually verify that natural resources personnel obtain proper training and certifications.

Long-Term Management

The Outdoor Recreation Section of the Natural Resources Plan (NRP) for the NAS JAX Complex makes numerous management recommendations for outdoor recreation. However, because present data of user preference and demand are insufficient for decision-making about future needs or for evaluating the carrying capacity of the outdoor, natural environment, NAS JAX natural resource managers will occasionally prepare and administer a survey of recreational users about existing outdoor recreational opportunities, usage, and needs by property in conjunction with the implementation of the management guidelines identified below. To ensure consistency with the military mission of the NAS JAX Complex and to minimize harm to the natural environment, all management recommendations will be implemented in coordination between the MWR and the NRM. For example, the use of private off-road vehicles for recreation will be prohibited on all NAS JAX Complex properties. Furthermore, future recreational activities will be evaluated for use by the general public.

The 1998 plan by NPS identified a number of areas on the NAS JAX Complex as Special Interest Areas because of the outdoor recreation and interpretation opportunities or their significance in terms of the natural resources management program (e.g., ecological, historic, natural resources, scenic, zoological, and/or endangered and threatened species). Specific sites include Tillie K. Fowler Park, Mulberry Cove, Plant Chapel, Senior Officers Quarters, Warehouse District, St. Johns River shoreline area, Weapons Magazine, Black Point (which has been designated as a Watchable Wildlife Area), and all natural communities. The 1998 NRP also recommended projects to identify and develop dispersed and concentrated recreational opportunities on the facility.

Recommendations for special interest areas include an update of field investigations to determine if any endangered or threatened species or species of special concern now reside on, or frequent the special areas; and develop conservation management objectives for rare ecological areas.

Recommendations for dispersed recreational opportunities include the following:

- Continue to produce and update brochures and pamphlets about recreational opportunities available at the NAS JAX Complex;
- Conduct periodic random surveys to obtain information on usage levels, fish caught, and angler preferences in order to evaluate the fishing program;
- Develop a bicycle trail from the housing area to the gym/pool, and along Birmingham Avenue to Manatee Point and to the Black Point Watchable Wildlife Area; and
- Train security personnel on enforcement of fish and game laws and regulations.

Recommendations for concentrated recreational opportunities include:

- Maintain a vista on the shoreline at the campground to enhance river viewing opportunities for campers (maintenance of the RV park and campground are the responsibility of MWR);
- Coordinate outdoor education needs and programs between NAS Jacksonville and Tillie K. Fowler Park;
- Continue to organize school group visits to the Black Point Watchable Wildlife Area and Interpretive Center;
- Design and write information pamphlets about natural resources that are relevant to outdoor recreation opportunities;
- Apply to federal and state agencies to have Black Point formally designated a Watchable Wildlife Area;
- Continue community involvement in manatee conservation by updating information brochures and offering training for the manatee-in-distress rescue team.

Ecosystem management practices are enhanced by environmental stewardship and by educating the general public about environmental conservation issues, problems, and solutions. By providing natural recreational and educational opportunities on the installation, NAS JAX natural resource managers will help promote public awareness of vital environmental resources and issues, thereby providing a regionally-specific educational resource. In addition, using volunteer groups and installation personnel for the physical construction of recreational and educational facilities provides opportunities for educating group members on the values and characteristics of a healthy environment and on some of the problems and solutions associated with human use of the environment.

Hunting is allowed on OLF Whitehouse and Rodman Bomb Target as a scheduled activity during the hunting season. Hunting days (typically weekends) depend upon availability of volunteer check station operators. Active duty military, reservists, retired military, and civilians are authorized to hunt in designated areas. Authorized hunters are allowed to sponsor one guest, including dependents. Hunting seasons, guidelines for species, and bag limits are regulated under a tripartite agreement among DoN, the State of Florida, and the USFWS. NAS Jacksonville Instruction (NASJAXINST) 5090.10H (Appendix C) explains the hunting regulations, which were developed by Natural Resources personnel in the in accordance with all appropriate state and federal guidelines.

Integration with Other Natural Resources Management Activities

- Wetlands, Section 5.1.1 – ensure recreational opportunities do not compromise wetlands;
- Soil Conservation and Erosion, Section 5.1.2 – control sedimentation during recreational activities;
- Stormwater and Water Quality, Section 5.1.3 – ensure recreational opportunities do not compromise water quality;
- Floodplains, Section 5.1.4 – development of new recreational facilities must not compromise attenuation capacity of the floodplain;
- Landscaping and Grounds Maintenance, Section 5.1.5 – develop aesthetically pleasing landscapes for recreation;
- Invasive and Exotic Species, Section 5.1.6 – reduce invasive and exotic species to enhance the outdoor recreational experience;
- Urban Forestry, Section 5.1.7 – utilize urban forestry principles to enhance recreational experiences;
- Land Impact Guidelines, Section 5.1.8 – preserve recreational opportunities when planning land use projects;
- Silviculture, Section 5.2.1 – use BMPs to reduce sedimentation and contamination of water quality for aquatic activities;
- Forest Protection, Section 5.2.2 – protect forest health to the benefit of pleasant recreational experiences;
- Fisheries Management, Section 5.3.1 – manage fisheries to the benefit of pleasant recreational experiences;
- Migratory Birds, Section 5.3.2 – avid bird watchers may be able to provide information;
- Threatened and Endangered Species, Section 5.3.3 – ensure recreational activities do not harass protected species, and make wildlife observers aware of rare species;
- Nuisance Wildlife and BASH, Section 5.3.4 – control nuisance wildlife to enhance the outdoor recreational experience;
- Natural Resources Training, Section 5.5.1 – ensure personnel are current on applicable laws and recreational policies and regulations; and
- GIS, Section 5.5.2 – utilize maps to the benefit of outdoor recreation.

Ecosystem Management

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

Military Mission

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

Laws, Executive Orders, Regulations, Directives, and Memoranda Relevant to Outdoor Recreation

- Sikes Act and Improvement Act 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.
- Outdoor Recreation – Federal/State Program Act, 16 U.S.C. 460c, defines a program for managing lands for outdoor recreation.
- OPNAVINST 5090.1D, 12-3.11, discusses natural resources management relating to the protection and management of outdoor recreational resources.
- National Historic Preservation Act, 16 U.S.C. 470-470m, establishes a program for the preservation of historic properties throughout the nation and for other purposes.
- EO 11989, establishes policies and procedures to ensure the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands.
- NAVFAC MO – 100.4, provides technical guidance for establishing goals and objectives and planning requirements for outdoor recreation.
- DODINST 4715.3 of May 1996, states DoD installations may engage in public awareness and outreach programs to educate the public regarding the resources on military lands and DoD efforts to conserve those resources.
- SECNAVINST 5090.8, requires integration of environmental protection, natural resources, and cultural resources programs into DoN operations and activities.
- State of Florida Freshwater and Saltwater Fishing Regulations.

Additional Sources of Information

FDEP, Division of Recreation and Parks
<http://www.dep.state.fl.us/parks/>

National Park Service
<http://www.nps.gov/index.htm>

FWC, Hunting in Florida
<http://myfwc.com/hunting/>

FWC, Fishing in Florida
<http://myfwc.com/fishing/>

5.5 TRAINING

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

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

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

Partnerships are often necessary and effective in implementing an INRMP while maintaining cost-effectiveness. Cooperative agreements are often used in partnerships with states, local governments, non-governmental organizations, and individuals to provide for the benefit, maintenance, and improvement of natural resources on DoD Installations. Cooperative agreements are authorized to implement INRMP projects (OPNAVINST 5090.1D CH-5). NAVFAC SE is tasked with providing the technical and administrative guidance for the

development of cooperative agreements to implement natural resources plans and execute cooperative agreements on behalf of Installation commanders upon request.

5.5.1 Training of Natural Resource Personnel

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

Wildland Fire Personnel Training

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. The NAS JAX Complex's requirements for personnel qualifications will be reviewed.

Timber Marketing

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

Pesticide Applicator Training

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

Federal Personnel

Federal personnel applying any pesticide on Federal land need DoD certification in accordance with OPNAVINST 6250.4B. Only Federal employees under hiring programs with duties as pesticide applicators can participate in the on-the-job (OTJ) training program. During this time, the new employee works under the direct supervision (see paragraph 2 below) of a certified pesticide applicator until they are qualified (1 year OTJ experience) and satisfactorily complete the DoD Pest Management Certification Course and can work independently.

Civilian Contractors

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

Inspectors

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

Supervisor

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

Training and Certification

Training and certification will be conducted at government expense for DoD personnel. Certified pest control personnel shall be re-certified in accordance with Florida or DoD requirements as specified above. Employed pesticide applicators must be certified and the quality assurance evaluator must be trained in the following categories when appropriate. Certification and training is required when performing

pest control operations that involve restricted-use or state-limited-use pesticides, to supervise other employees conducting pest control involving restricted-use or state-limited-use pesticides, or to evaluate contractor performance relating to pest control within these categories:

- Forest pest control (DoD and EPA category 2);
- Ornamental and turf pest control (DoD and EPA category 3);
- Aquatic pest control (DoD and EPA category 5);
- Right-of-way pest control (DoD and EPA category 6);
- Industrial, Institutional, Structural, and Health-related pest control (DoD and EPA category 7);
- Public health (DoD and EPA category 8); and
- Aerial Application (DoD and EPA category 11) if planned to be used.

Continuing Education and Training

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

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

Issues

Training is important to ensure the limited staff at the NAS JAX Complex is able to accomplish all necessary facets of natural resources management on the Complex. Personnel should also be knowledgeable of environmental laws pertaining to federal lands and DoD installations.

Goals and Objectives

- Protect and maintain natural resources within the NAS JAX Complex by continuation and enhancement of ecologically appropriate and beneficial land use and management practices, while ensuring the continuation of the military mission;
- Protect and enhance forest resources by practicing ecologically sound forest management leading to sustained yield of quality forest products, watershed protection, and wildlife habitat;
- Protect, maintain, and restore native communities of plant and animal life, while improving the quality of life and ensuring the military mission;
- Provide facilities and develop policies that allow for recreational and educational uses of natural resources, and result in positive effects to these natural resources while improving the quality of life;
- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP;
- Incorporate the concept of ecosystem management into all planning and management processes;
- Implement training, education, and stewardship initiatives for ecosystem management;
- Preserve and protect threatened and endangered species, and species of special concern, to prevent reduction of individuals or populations; and
- Establish a planning team to review and update the INRMP in accordance with OPNAVINST 5090.1D, CH-12.

Projects

- Invasive Species Control (Project 1 in Appendix A);
- Endangered and Threatened Species Habitat Protection (Project 4 in Appendix A);
- Natural Resources Training (Project 8 in Appendix A);
- Forestry Program Support (Project 9 in Appendix A);
- INRMP Update (Project 13 in Appendix A); and
- Wildlife Education and Installation Indoctrination Center (Project 14 in Appendix A).

Management Strategies

- Staffing needs shall be continuously reviewed for adequacy and filled to meet those needs;
- Continue to purchase equipment (i.e., an all-terrain vehicle (ATV)/utility vehicle) needed for access areas too difficult to reach on the Complex, as well as other needed supplies;

- Continue to obtain tools and capabilities (e.g., GPS/GIS mapping and digital photography) that will assist in managing natural resources and meeting the goals of the INRMP;
- Continue to utilize the review board within the Public Works Department to review all projects that potentially affect natural resources, including soil and water quality. The NRM of the Natural Resources Program will continue to be a part of the review board;
- Continue to integrate the management concepts of the INRMP into all appropriate working programs and department plans (e.g., PMP, Urban Forestry Plan, Grounds and Surfaced Area Maintenance Plan, and SWPPP);
- Continue the use of Computer-Aided Drafting and a GIS for construction, environmental, engineering, and natural resources mapping. The NAS JAX Complex will continue to build and/or acquire appropriate Complex and region-wide data coverages;
- Continue to ensure that all cooperative agreements, memoranda, or other agreements between the Complex and federal and state agencies that oversee and regulate natural resources protection, are current, and those agreements have been established with all necessary agencies;
- Continue an ecosystem management awareness and training/education program available to all interested NAS JAX Complex personnel;
- Continue the technical education and training program for all contract and installation personnel involved in activities that may directly or indirectly affect ecosystem management success;
- Continue to implement programs and initiatives that foster citizen participation in ecosystem education and stewardship; and
- Evaluate the effectiveness of INRMP implementation and recommend improvements.

Long-Term Management

Adequate staffing and training are essential components of long-term natural resources management at the NAS JAX Complex. Partnerships and cooperation with regulatory agencies, NAVFAC SE, university researchers, conservation groups, and non-government organizations are also vital to the continued success of management activities. The natural resources program may enlist the assistance of interns through the Student Conservation Association (SCA), a partnership that has proven valuable to accomplishing research on Navy installations while helping to educate the next generation of natural resources managers.

Integration with Other Natural Resources Management Activities

Training natural resources personnel at the NAS JAX Complex is important to successfully accomplish every natural resources management activity described in this INRMP, from wetland management (Section 5.1.1) and soil conservation (Section 5.1.2) to grounds maintenance (Section 5.1.6), silvicultural activities (Section 5.2.1), BASH (Section 5.3.4), and threatened and endangered species conservation (Section 5.3.3). Staff training is not only integrated into all of these activities, but it is essential to successful integration *between* all of these activities as well.

Ecosystem Management

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

Military Mission

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

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

- Sikes Act, as amended 16 USC 670 a-o, requires each military department to manage fish and wildlife resources in accordance with a tripartite cooperative plan agreed to by the USFWS and state wildlife agency, to provide its personnel with professional training in fish and wildlife management.
- Fish and Wildlife Conservation Act, 16 USC 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.
- OPNAVINST 6250.4B, 27 August 1998, DoD Pest Management Programs, provides the DON with policies for implementing pest management programs directed against pests that conflict with or adversely affect the mission of the DoD; affect the health and well-being of the DON personnel and their dependants; attach or damage real property, supplies, or equipment; adversely affect the environment; or are otherwise undesirable.
- DoD Instruction 4150.7, requires a supervisor to be at the specific location where pest management work is conducted, providing instruction and control, and maintaining a line-of-sight view of the work performed.
- OPNAVINST 5090.1D, CH-12, discusses natural resources management at Navy installations.

Additional Sources of Information

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

FDACS, Pesticide Application
<http://www.freshfromflorida.com/onestop/aes/pestapp.html>

National Wildfire Coordination Group
<http://www.nwccg.gov/>

FDACS, Wildland Fire and Fire Prevention
<http://www.floridaforestservice.com/wildfire/>

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

Naval Civil Engineering Officer's Corps School (CECOS)
<http://www.cecosweb.com/>

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

5.5.2 Geographical Information Systems, Data Integration, and Reporting

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

Issues

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

Goals and Objectives

- Protect and maintain natural resources within the NAS JAX Complex by continuation and enhancement of ecologically appropriate and beneficial land use and management practices, while ensuring the continuation of the military mission;
- Protect and enhance forest resources by practicing ecologically sound forest management leading to sustained yield of quality forest products, watershed protection, and wildlife habitat;
- Protect, maintain, and restore native communities of plant and animal life, while improving the quality of life and ensuring the military mission;
- Provide facilities and develop policies that allow for recreational and educational uses of natural resources, and result in positive effects to these natural resources while improving the quality of life;
- Protect and conserve the ecological value and diversity of natural resources by fostering knowledge of, and participation in, adaptive ecosystem management;
- Ensure that land management and land use decisions comply with all applicable laws, executive orders, regulations, directives, and instructions, and that adverse impacts to the natural environment are minimized;
- Provide adequate staffing, equipment, technology, and training to the Natural Resources Program to ensure proper implementation of this INRMP; and
- Incorporate the concept of ecosystem management into all planning and management processes;

Projects

- Protected Species Surveys (Project 2 in Appendix A);
- Wildlife Conservation Management (Project 3 in Appendix A);
- Endangered and Threatened Species Habitat Protection (Project 4 in Appendix A);
- Gopher Tortoise Radio Tracking Survey (Project 6 in Appendix A);
- Survey and Monitoring of Migratory Bird Species (Project 7 in Appendix A);
- Natural Resources Training (Project 8 in Appendix A);
- Forestry Program Support (Project 9 in Appendix A); and
- INRMP Update (Project 13 in Appendix A).

Management Strategies

- Continue to obtain tools and capabilities (e.g., GPS/GIS mapping and digital photography) that will assist in managing natural resources and meeting the goals of the INRMP;
- Continue to integrate the management concepts of the INRMP into all appropriate working programs and department plans (e.g., PMP, Urban Forestry Plan, Grounds and Surfaced Area Maintenance Plan, and SWPPP);
- Continue the use of Computer-Aided Drafting and a GIS for construction, environmental, engineering, and natural resources mapping. The NAS JAX Complex will continue to build and/or acquire appropriate Complex and region-wide data coverages;
- Continue an ecosystem management awareness and training/education program available to all interested NAS JAX Complex personnel; and
- Continue the technical education and training program for all contract and installation personnel involved in activities that may directly or indirectly affect ecosystem management success.

Long-Term Management

The NAS JAX Complex depends upon the NAVFAC SE Georeadiness Center to maintain GIS databases and produce maps used for daily decisions and 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. All impacts on Federal land from a proposed project must be considered before the project can be implemented, in accordance with NEPA. These impacts may affect natural resources such as endangered species, water, and timber, so detailed maps are required to assess the impacts potential on resources. A list of data layers that should be developed and maintained includes:

- Rare, threatened and endangered species occurrences;
- Streams and wetlands;
- Archaeological sites;

- Fishing areas;
- Forest stand inventory data;
- Fire breaks and prescribed burning areas;
- Solid waste management areas;
- Hazardous waste management;
- Groundwater and soil remediation areas;
- Stormwater pollution prevention; and
- Air pollution emission sources.

The NRM also have access to ancillary data such as infrastructure, installation boundaries, and geodetic reference points via the NAVFAC SE Georeadiness Center. The NAVFAC SE Georeadiness Center maintains a server where finalized data, intermediate working data, and all supporting files are stored. Data for the Navy's training mission, such as training area boundaries, short range fire ranges, and training impact areas, are maintained by the NAS JAX Complex.

Integration with Other Natural Resources Management Activities

GIS is integrated into every natural resources management activity described in this INRMP, from wetland management (Section 5.1.1) and soil conservation (5.1.2) to grounds maintenance (Section 5.1.6), silvicultural activities (Section 5.2.1), BASH (Section 5.3.4), and threatened and endangered species conservation (Section 5.3.3). Data from surveys, studies, and other projects completed for any all of these management activities should be submitted to the NRM and NAVFAC SE to ensure inclusion in the applicable GIS databases. This will also facilitate integration between the management activities themselves.

Ecosystem Management

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

Military Mission

Uninterrupted performance of the military mission at the NAS JAX Complex depends upon compliance with environmental laws and policies and delineating environmentally-sensitive areas such as wetlands and the occurrences of protected species and their habitats. GIS is a crucial

tool in this delineation and the accessibility of GIS databases by various departments at the NAS JAX Complex facilitates the avoidance and minimization of impacts to sensitive areas.

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

- Sikes Act, as amended 16 USC 670 a-o, requires each military department to manage fish and wildlife resources in accordance with a tripartite cooperative plan agreed to by the USFWS and state wildlife agency, to provide its personnel with professional training in fish and wildlife management.
- Fish and Wildlife Conservation Act, 16 USC 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.
- OPNAVINST 5090.1D, CH-12, discusses natural resources management at Navy installations.

Additional Sources of Information

Georeadiness Explorer

<https://rsims.navfac.navy.mil/RSIMS/MapView/Default.aspx?MapID=3879>

GIS.com

<http://www.gis.com/>

6

Implementation

Over the course of its implementation, this INRMP will:

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

6.1 PLAN IMPLEMENTATION AND REVIEW

The annual INRMP reviews and metrics located at the Natural Resources Data Call Station website will be used to assess implementation. A general summary of major actions/projects during the next 5 years and programs they support are provided in Appendix A. Projects will be developed during the budgetary process and coordinated with CNRSE natural resources personnel.

6.2 PLANNING AND MISSION SUSTAINABILITY

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

Frequent and close coordination between the NAS JAX NRM and the Airfield Operations office will be necessary to implement this plan and ensure minimal impacts and conflicts with military

training. The Airfield Operations office will schedule and manage airfield use and must be aware of proposed management actions on the properties. All actions that involve contractors or workers must coordinate with NAS JAX natural resources staff. These actions will include, but are not limited to, timber harvest, invasive species control, and plant and animal surveys. In addition, the natural resources staff must know when and where military training is occurring so work can be coordinated with those activities. Airfield Operations provides a list of the range and training areas scheduled for use on a regular basis to assist with work planning.

6.3 PARTNERSHIPS

The magnitude and complexity of the management requirements necessitate outside assistance. This assistance can vary, but usually takes the form of a partnership, which may include funding, technical and logistical support, GIS or use of FWC biologists, or an agreement between agencies to achieve common goals. Agencies with shared goals include:

- NRCS to provide expertise on soil erosion control;
- USACE to develop wetland restoration and mitigation credit banks;
- USFWS to assist in identifying conservation measures for enhancement of threatened and endangered species and their habitat;
- FWC to assist in developing and implementing hunting and fishing regulations, feral hog depredation, and fish pond stocking;

6.4 FUNDING

Funding for implementation of the INRMP will come from the CNRSE or NAVFAC SE natural resources fund. The natural resources programs and projects described in this INRMP are divided into mandatory and stewardship categories to reflect implementation priorities. Every effort will be made to acquire O&M(N) Environmental or other funding to implement DoD mandatory projects, in the timeliest manner possible. Stewardship projects will be funded through fish and wildlife licenses or other fund sources as funds and personnel become available.

Forestry funding is provided through NAVFAC SE from the sale of timber products. Funding for special projects in natural resources may be available from NAVFAC SE through surplus funding sources or forestry reserve accounts. Non-compliance funding may come from Legacy Act. Funding for compliance with environmental legislation and regulations is requested through the Navy Environmental Program Requirements Web (EPRWeb). Compliance projects falling under the EPRWeb include species surveys, assessments, management, protection, INRMPs, wetlands protection, conservation mapping, nonpoint source pollution, watershed management, cultural resource surveys, protection and plans, archaeological curation, conservation of soil and water or fish and wildlife, forest management and outdoor recreation (wildlife). All projects must be

conducted in strict compliance with the Anti-Deficiency Act (13 USC 1341), which requires that all obligations or commitments made by the Federal government be funded at levels that do not exceed the Congressional appropriations.

Table A-1 in Appendix A summarizes the projects scheduled at the NAS JAX Complex. One of the objectives of the INRMP is to plan for no net loss of military mission. Partnerships, proper funding, and compliance with NEPA requirements will ensure that the Navy will achieve its military mission.

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A

NAS JAX Complex Projects

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Appendix A describes the projects to be implemented by the NAS JAX Complex. Projects were identified by the NAS JAX Complex NRM in cooperation with foresters, fish and wildlife biologists, and soil conservationists at NAVFAC, SE, as well as with federal, state, and county wildlife biologists, foresters, and land managers. Appendix A discusses the purpose, relevance to the goals and objectives listed in Section 4, location, description, baselines, monitoring, and legal requirements of each project.

The NAS JAX Complex intends to implement the projects as described in Appendix A to the greatest extent possible. The implementation of projects is largely dependent upon availability of funds. Funding for implementation of the INRMP will come from the CNRSE or NAVFAC SE natural resources fund. Every effort will be made to acquire O&M(N) Environmental or other funding to implement DoD mandatory projects, in the timeliest manner possible. Stewardship projects will be funded through fish and wildlife licenses or other fund sources as funds and personnel become available. Forestry funding is provided through NAVFAC SE from the sale of timber products. Funding for special projects in natural resources may be available from NAVFAC SE through surplus funding sources or forestry reserve accounts. Non-compliance funding may come from Legacy Act. Funding for compliance with environmental legislation and regulations is requested through the Navy Environmental Program Requirements Web (EPRWeb). The natural resources programs and projects described here are divided into mandatory and stewardship categories to reflect implementation priorities. Every effort will be made to acquire O & M(N) Environmental or other funding to implement DoD mandatory projects in the timeliest manner possible. Stewardship projects will be funded through forestry, agricultural outlease, fish and wildlife, Legacy, or other fund sources as funding and personnel resources become available.

Table A-1 summarizes the projects.

Table A-1. NAS Jacksonville Complex Projects									
Project No.	EPR Web Number	Project Description	INRMP Page Ref.	Scheduled Implementation (FY)	Prime Legal Driver	Funding Priority (*1)	Guidebook Number (*3)	Fund Source	NEPA Requirement
1	00207B0175	Invasive Species Control	A-4	2019 - 2024	1 , 9	M	12106	ENV, STA	No
2	00207B0177	Protected Species Surveys	A-5	2019 - 2024	3 , 8	M	12104	ENV, STA	No
3	00207B0196	Wildlife Conservation Management	A-6	2019 - 2024	2 , 8	M	12101	ENV, STA	No
4	00207B0203	Endangered and Threatened Species Habitat Protection	A-7	2019 - 2024	2 , 3	M	12104	ENV, STA, LY, NRR	No
5	00207B0180	Gopher Tortoise Management	A-8	2019 - 2024	3 , 8	M	12104	ENV, STA	No
6	00207B0231	Gopher Tortoise Radio Tracking Survey	A-9	2019 - 2024	3 , 8	M	12104	ENV, STA	No
7	00207B0189	Survey and Monitoring of Migratory Bird Species	A-10	2019 - 2024	5 , 8	M	12101	ENV, STA	No
8	00207B0005	Natural Resources Training	A-11	2019 - 2024	3 , 8	M	12940	ENV, STA	No
9	00207B0186	Forestry Program Support	A-12	2019 - 2024	8	M	12108	FR, FOR	No
10	00207B0190	Forest Inventory	A-13	2019 - 2024	8	M	12108	FR, FOR	No
11	00207B0186	Forest Fire Protection	A-14	2019 - 2024	8	M	N/A	FR, FOR	No
12	00207B0186	Forest Product Sales	A-15	2019 - 2024	8	M	N/A	FR, FOR	No
13	00207B0269	Least Tern Nest Sites	A-16	2019 - 2024	2 , 5	M	12104	ENV	No
14	00207B0045	INRMP Update	A-17	2019 - 2024	2	M	12103	ENV	No
15	00207B0300	Wildlife Education and Installation Indoctrination Center	A-18	2019 - 2024	2	M	12103	ENV	No

(*1) M = Mandatory Project S = Stewardship Project

(*2) From the EPRWeb Guidebook

(*3) Chapter 12 of the EPRWeb Guidebook

ENV - Environmental O&MN

FOR - Forestry

FR - Forestry Reserve

LY - Legacy

MWR - Morale, Welfare, and Recreation

NRR - Natural Resources Reserve

STA - Station O&MN

Primary Legal Drivers

- | | | | |
|------------------------|---------------------------|-----------------|--|
| (1) 7 USC 2814 | Federal Noxious Weed Act | (6) 16 USC 2912 | North American Wetlands Conservation Act |
| (2) 16 USC 670a-f | Sikes Act Improvement Act | (7) 16 USC 590A | Soil and Water Conservation Act |
| (3) 16 USC 1531 & 1536 | Endangered Species Act | (8) 32 CFR 190 | Natural Resources Management Program |
| (4) 33 USC 1251 | Clean Water Act | (9) EO 13112 | Invasive Species |
| (5) 16 USC 703 | Migratory Bird Treaty Act | (10) EO 11990 | Wetlands Protection |

Project No. 1: Invasive Species Control

Purpose:	Control invasive and exotic plant and animal species at the NAS JAX Complex to acceptable levels to promote native ecosystems.
Goals and Objectives:	<p>Goal 1, Objective 1.5, Strategy 1.5.1- Landscape management.</p> <p>Goal 1, Objective 1.5, Strategy 1.5.2 – Xeriscape with native plants.</p> <p>Goal 3, Objective 3.1, Strategy 3.1.2 - Monitor and enhance natural communities.</p> <p>Goal 3, Objective 3.2, Strategy 3.2.2 – Protect and enhance protected species and their habitats.</p>
Location:	Complex-wide.
Description:	<p>The following items are some of the primary tasks to be accomplished by in-house personnel and contractors at NAS JAX for this project:</p> <ol style="list-style-type: none"> 1) Provide assistance for harassment and control of vertebrate pests (e.g., feral cats, coyotes) on NAS Jacksonville. 2) Provide control of noxious and invasive plant species. 3) Provide technical assistance concerning other wildlife related issues on base. 4) Survey the properties to identify locations and types of species for which control is feasible and practical. Control strategies will be developed for each target species to include the use of harassment techniques, physical removal, chemical control, and biological agents. <p>Invasive species such as wild taro and air potato are encroaching further up the installation shoreline along the St. Johns River creating security and erosion hazards. A recently-discovered infestation of the invasive species, <i>Ardisia crenata</i>, is rapidly spreading through wetlands on NAS Jacksonville. As with the air potato and wild taro, chemical control has been implemented, but funding is required for further treatment and eventual eradication.</p>
Baseline:	Baseline will be established during initial project surveys.
Monitoring:	This project will provide the monitoring necessary for the evaluation and removal of invasive and exotic species when present.
Legal Drivers:	Federal Noxious Weed Act of 1974, 7 U.S.C. 2801, Sec. 2814 (a); Executive Order (EO) 13112 – <i>Invasive Species</i> .
Related Legal:	DOD Pest Management Program; Endangered Species Act, 16 U.S.C. 1531 et seq.; Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. 136; OPNAVINST 5090.1D, Chapter 12.

Accomplishments:

More than 1,000 acres of NAS JAX were surveyed for invasive plants in May 2016 in order to identify and prioritize areas for treatment².

² Gulf Coast Research Corporation (GSRC). 2016. Invasive exotic plant surveys, Naval Air Station Jacksonville. Prepared for NAVFAC SE. Prepared by GSRC, Baton Rouge, Louisiana.

Project No. 2: Protected Species Surveys

Purpose:	Monitor the health and populations of protected plant and animal species present on the NAS JAX Complex and ensure compliance with federal and state wildlife laws, regulations, and policies.
Goal and Objective:	Goal 2, Objective 2.2, Strategy 2.2.1 – Evaluate forest management practices and their effects on ecosystems and wildlife habitat. Goal 3, Objective 3.1, Strategy 3.1.2 – Monitor and enhance natural communities. Goal 3, Objective 3.2, Strategy 3.2.1 – Conduct surveys of rare, threatened, and endangered species every five years.
Location:	NAS Jacksonville, OLF Whitehouse, and Rodman Bomb Target.
Description:	This project will update inventory and distribution of rare and protected species and their habitats on NAS Jacksonville, OLF Whitehouse, and Rodman Bomb Target. Surveys will include rare, threatened and endangered plant and animal species and important habitats. Surveys and inventories will analyze the health and numbers of species and assist with the identification of wildlife indicators throughout the properties. Species inventories are essential in the development of management plans to implement the Station INRMP and compliance with federal and state laws.
Baseline:	Surveys conducted in 1990, 1996-97, 2004, and 2009-11.
Monitoring:	Monitoring will be conducted annually from 2014 to 2018.
Legal Drivers:	Endangered Species Act, 16 U.S.C. 1531 et seq.; Natural Resources Management Program, 32 C.F.R. 190.
Related Legal:	Sikes Act, as amended 16 USC 670 a-o; Migratory Bird Treaty Act, as amended, 16 U.S.C. 703 et seq.; Fish and Wildlife Conservation Act, 16 U.S.C. 2901; OPNAVINST 5090.1D, Chapter 12.
Accomplishments:	Although pre-dating the establishment of this project, a survey for rare and listed plant species at NAS JAX, OLF Whitehouse, and Yellow Water Housing was conducted in 1990 ³ . A survey for pondberry, flatwoods salamanders, indigo snakes, wood stork nesting areas, and other rare species was conducted across all four NAS JAX Complex properties in 2003-04 ⁴ . A rare, threatened, and endangered animal and plant survey was conducted at Rodman Bomb Target in 2009 ⁵ , at NAS JAX in 2009-10 ⁶ , and at OLF

³ Environmental Services and Permitting, Inc. (ESP). 1990. Endangered species survey and the Jacksonville, Florida, Naval Complex. Prepared for NAS Jacksonville. Prepared by ESP, Gainesville, Florida.

⁴ Florida Natural Areas Inventory (FNAI). 2004. Field survey for selected rare species at NAS Jacksonville, Rodman Bomb Target, OLF Whitehouse, and Yellow Water Housing Area. Tallahassee, Florida.

⁵ Gulf South Research Corporation (GSRC). 2009. Endangered, threatened and rare species survey update, Rodman Bombing Range, Putnam County, Florida. Baton Rouge, Louisiana.

⁶ GSRC. 2010. Rare, threatened, and endangered species survey, Naval Air Station Jacksonville, Duval County, Florida. Baton Rouge, Louisiana.

Whitehouse in 2010-11⁷. A survey for Eastern indigo snakes was conducted at OLF Whitehouse in the winter of 2014-15 using a trained wildlife detector dog; no indigo snakes were detected⁸.

⁷ GSRC. 2011. Rare, threatened, and endangered species surveys of Outlying Landing Field Whitehouse, Jacksonville, Duval County, Florida. Baton Rouge, Louisiana.

⁸ Stevenson, Dirk J. and Stephen Spear. 2015. Wildlife detector dog surveys for Eastern indigo snakes at three Navy installations in North Florida. Prepared for the U.S. Department of the Navy. Prepared by The Orianne Society, Athens, Georgia.

Project No. 3: Wildlife Conservation Management

Purpose:	Assist natural resources staff in implementing the requirements outlined in the Fish and Wildlife Management Section on the NAS JAX Complex. This includes providing for hunting and fishing programs.
Goal and Objective:	Goal 3, Objective 3.1, Strategy 3.1.2 – Monitor and enhance natural communities. Goal 4, Objective 4.2, Strategy 4.2.1 - The NAS JAX Complex will further develop outdoor recreational opportunities at the Complex.
Location:	Complex-wide.
Description:	This project will provide for the supplies and equipment necessary to carry out a comprehensive program for management of game and non-game species on all installation properties. The program will include population surveys, habitat improvement and protection, forest protection not covered by commercial forestry program, and administration of wildlife management and conservation education programs.
Baseline:	Reports of the effort and materials required to carry out management of game and non-game species to date, as well as reports of effort and materials that have been lacking.
Monitoring:	Natural resources managers will monitor progress and maintain logs of effort and materials required to accomplish project objectives.
Legal Driver(s):	Sikes Act, as amended 16 USC 670; Fish and Wildlife Conservation Act, 16 USC 2901.
Related Legal:	DOD Directive 4700.4, NR Management Program; DOD INST. 4715.3, Environmental Conservation Program, OPNAVINST 5090.1D, Chapter 12.
Accomplishments:	The Student Conservation Association intern program was used to perform a survey of mammals and herpetofauna on NAS JAX in 2005-06 ⁹ . A survey of land cover, longleaf pine habitat, black bear, herpetofauna, and rare plant occurrence, and gopher tortoise activity on Rodman Bomb Target was accomplished in 2017-18 ¹⁰ .

⁹ Labella, Laura. 2006. Naval Air Station Jacksonville mammal and herpetological survey. Prepared for NAS JAX. Prepared in fulfillment of an SCA internship.

¹⁰ LG2 Environmental Solutions, Incorporated (LG²ES). 2018. Habitat, flora, and fauna survey, Rodman Bomb Target, Naval Air Station Jacksonville, Florida. Prepared for NAVFAC Southeast. Prepared by LG²ES, Jacksonville, Florida.

Project No. 4: Endangered and Threatened Species Habitat Protection

Purpose:	Conduct management and implement projects to enhance habitat for rare, threatened, and endangered species, as well as other wildlife and natural communities.
Goal and Objective:	<p>Goal 2, Objective 2.2, Strategy 2.2.1 – Evaluate forest management practices and their effects on ecosystems and wildlife habitat.</p> <p>Goal 3, Objective 3.1, Strategy 3.1.1 – Use prescribed burns and thinning to improve forest habitat quality.</p> <p>Goal 3, Objective 3.1, Strategy 3.1.2 – Monitor and enhance natural communities.</p>
Location:	Complex-wide.
Description:	<p>This project will enhance, protect and modify species habitat and resources for rare, threatened and endangered plants and animals throughout the NAS JAX Complex.</p> <p>This project will provide educational signage at two locations along the NAS Jacksonville shoreline to alert personnel to necessary precautions to be taken to protect habitat for the endangered Florida manatee and wood stork, and the threatened American alligator. The signs are to be placed in areas of high human activity adjacent to Mulberry Cove, which is a proposed federal manatee refuge.</p>
Baseline:	Existing signage and natural resources education resources at the NAS JAX Complex.
Monitoring:	None.
Legal Driver(s):	Endangered Species Act, 16 U.S.C. 1531 et seq.; Marine Mammal Protection Act.
Related Legal:	Conservation Programs on Military Installations (Sikes Act) as amended, 16 U.S.C. 670 (a) et seq; Fish and Wildlife Conservation Act, 16 U.S.C 2901 et seq.; Executive Order 11990 – Wetlands Protection; Executive Order 13112 – Invasive Species; OPNAVINST 5090.1D, Chapter 12.
Accomplishments:	The first effort to identify rare plant and animal species at the NAS JAX Complex and to classify the habitats across the properties was accomplished in 1996-97 ¹¹ the rare, threatened, and endangered animal and plant surveys conducted at Rodman Bomb Target in 2009 ¹² , at NAS JAX in 2009-10 ¹³ , and at OLF Whitehouse in 2010-

¹¹ Florida Natural Areas Inventory (FNAI). 1997. Survey of Natural Communities, Rare Plants, and Rare Animals at Naval Air Station Jacksonville, Outlying Landing Field Whitehouse, Rodman Bomb Target, Pine Island Tower Site, and Nine Mile Tower Site. Florida Natural Areas Inventory. Tallahassee, Florida.

¹² Gulf South Research Corporation (GSRC). 2009. Endangered, threatened and rare species survey update, Rodman Bombing Range, Putnam County, Florida. Baton Rouge, Louisiana.

¹³ GSRC. 2010. Rare, threatened, and endangered species survey, Naval Air Station Jacksonville, Duval County, Florida. Baton Rouge, Louisiana.

11¹⁴ were also partially funded by this project, as was a survey for rare plants at Rodman Bomb Target in 2018¹⁵.

¹⁴ GSRC. 2011. Rare, threatened, and endangered species surveys of Outlying Landing Field Whitehouse, Jacksonville, Duval County, Florida. Baton Rouge, Louisiana.

¹⁵ LG2 Environmental Solutions, Incorporated (LG²ES). 2018. Habitat, flora, and fauna survey, Rodman Bomb Target, Naval Air Station Jacksonville, Florida. Prepared for NAVFAC Southeast. Prepared by LG²ES, Jacksonville, Florida.

Project No. 5: Gopher Tortoise Management

Purpose:	Develop and implement a management plan for gopher tortoises at the NAS JAX Complex. The plan will allow for the safe relocation of gopher tortoises to Rodman Bomb Target or OLF Whitehouse if necessary for mission requirements.
Goal and Objective:	Goal 2, Objective 2.2, Strategy 2.2.1 – Evaluate forest management practices and their effects on ecosystems and wildlife habitat. Goal 3, Objective 3.1, Strategy 3.1.2 – Monitor and enhance natural communities. Goal 3, Objective 3.2, Strategy 3.2.1 – Conduct surveys of rare, threatened, and endangered species every five years.
Location:	Complex-wide.
Description:	Develop a management plan to facilitate the relocation of tortoises from the golf course and weapons areas at NAS Jacksonville. Relocate remaining tortoises at NAS JAX to Rodman Target and OLF Whitehouse. Restore desirable native longleaf pine-wiregrass communities to sustain healthy populations of gopher tortoises at outlying properties in accordance with the Gopher Tortoise Candidate Conservation Agreement (CCA). This would occur after identifying an area for restoration. Site preparation may include root-raking and spot-piling, tandem chopping, and harrowing. Longleaf pine seedlings will be purchased, transported and planted at specified spacing. The gopher tortoise management plan will be updated every five years to include a survey of restored habitat. And to include increases and decreases in tortoise population and habitat, and impacts to the military mission.
Baseline:	Previous gopher tortoise surveys and studies completed on the NAS JAX Complex.
Monitoring:	Phase Three will provide monitoring data for gopher tortoises to ensure the implementation of proper management techniques.
Legal Driver(s):	Endangered Species Act, 16 U.S.C. 1531 et seq.; Natural Resources Management Program, 32 C.F.R. 190.
Related Legal:	Sikes Act, as amended 16 USC 670 a-o; Fish and Wildlife Conservation Act, 16 U.S.C. 2901; OPNAVINST 5090.1D, Chapter 12.
Accomplishments:	The gopher tortoise management plan has not been developed and tortoises have not been relocated from NAS Jacksonville, but surveys of gopher tortoise abundance and distribution on NAS JAX Complex properties has been accomplished as part of projects described in Projects 2, 3, and 4. Installation managers will continue to work with conservation partners to determine if and when a relocation plan will be developed.

Project No. 6: Gopher Tortoise Radio Tracking Survey

Purpose:	determine the success of these conservation efforts and in compliance with the Navy's commitment to the Gopher Tortoise Candidate Conservation Agreement.
Goal and Objective:	Goal 2, Objective 2.2, Strategy 2.2.1 – Evaluate forest management practices and their effects on ecosystems and wildlife habitat. Goal 3, Objective 3.1, Strategy 3.1.2 – Monitor and enhance natural communities. Goal 3, Objective 3.2, Strategy 3.2.1 – Conduct surveys of rare, threatened, and endangered species every five years.
Location:	OLF Whitehouse.
Description:	This project provides for the continued monitoring of gopher tortoises relocated from mission sensitive areas on NAS Jacksonville to approved areas on the installation. Prospective recipient sites at OLF Whitehouse may be approved in the future. Monitoring will be accomplished by the attachment of VHF radio transmitters to the carapace of individual tortoises. Their burrow sites and movements will be tracked by hand held receivers and plotted on aerial maps so information may be shared with other federal and state agencies. An Annual assessment reports will be required pursuant to procedures outlined in the Gopher Tortoise Candidate Conservation Agreement. OLF Whitehouse has a healthy gopher tortoise population and current long leaf pine habitat conversions have been accomplished to create habitat in a section of the property away from the airfield.
Baseline:	None.
Monitoring:	Annual monitoring is programmed through 2018.
Legal Driver(s):	Endangered Species Act, 16 U.S.C. 1531 et seq.; Natural Resources Management Program, 32 C.F.R. 190.
Related Legal:	Sikes Act, as amended 16 USC 670 a-o; Fish and Wildlife Conservation Act, 16 U.S.C. 2901; OPNAVINST 5090.1D, Chapter 12.
Accomplishments:	Trackers were placed on gopher tortoise moved from mission sensitive areas to other areas of NAS Jacksonville. No gopher tortoises have been moved to OLF Whitehouse to date. Additional trackers have been purchased for future relocations.

Project No. 7: Survey and Monitoring of Migratory Bird Species

Purpose:	Determine migratory bird species at the NAS JAX Complex and potential migratory bird management practices.
Goal and Objective:	Goal 3, Objective 3.2, Strategy 3.2.1 – Conduct surveys of rare, threatened, and endangered species every five years.
Location:	NAS Jacksonville, OLF Whitehouse, and Rodman Bomb Target.
Description:	<p>This project provides for continuing study of migratory bird patterns affecting aircraft operations at the NAS Jacksonville and outlying properties.</p> <ol style="list-style-type: none"> 1. Conduct 10-minute point counts at the ~150 existing points already in place on NAS Jacksonville, OLF Whitehouse, and Rodman Bomb Target. 2. Add additional points at Rodman Bomb Target in bottomland hardwoods. 3. Conduct counts around the airfield at NAS Jacksonville specifically for painted buntings. 4. Collect botanical data at all points. Data will be used to evaluate whether or not changes in bird detection frequencies are caused by changing biological conditions or by other sources such as military readiness activities. 5. Use this data and past data to evaluate impacts to migratory birds from military readiness activities. 6. Provide GIS data for ArcView 8.2. Information collected will also be used to ensure required updates are made to the existing Bird Aircraft Strike Hazard (BASH) Plan. This eliminates the need for external updates to the BASH Plan. The BASH Instruction is formally updated in-house every five years or on an as-needed basis if required by findings of the annual survey data or major change in operational mission.
Baseline:	Existing migratory bird surveys.
Monitoring:	As funded.
Legal Driver(s):	Migratory Bird Treaty Act, 16 U.S.C. 703; Natural Resources Management Program, 32 C.F.R. 190.
Related Legal:	Fish and Wildlife Conservation Act, 16 U.S.C. 2901; Endangered Species Act, 16 U.S.C. 1531 et seq.; DOD 4715, Sikes Act, as amended, 16 U.S.C. 670 a-o; OPNAVINST 5090.1D, Chapter 12.
Accomplishments:	NAVFAC field biologists conducted a survey of neotropical migratory birds at NAS JAX, OLF Whitehouse, and Rodman Bomb Target in

1997-2004¹⁶. Bird surveys at NAS Jacksonville, OLF Whitehouse, and Rodman Bomb Target were components of the site-specific series of surveys performed between 2009-11^{17, 18, 19}. A seasonal migratory bird survey of NAS JAX, OLF Whitehouse, and Rodman Bomb target was performed in 2016-17²⁰.

¹⁶ Burst, Tom and Rod Fleming. 2004. Neotropical migratory bird survey, NAS Jacksonville including OLF Whitehouse and Rodman Target. Prepared for NAS Jacksonville. Prepared by NAVFAC Southern Division, Charleston, South Carolina.

¹⁷ Gulf South Research Corporation (GSRC). 2009. Endangered, threatened and rare species survey update, Rodman Bombing Range, Putnam County, Florida. Baton Rouge, Louisiana.

¹⁸ GSRC. 2010. Rare, threatened, and endangered species survey, Naval Air Station Jacksonville, Duval County, Florida. Baton Rouge, Louisiana.

¹⁹ GSRC. 2011. Rare, threatened, and endangered species surveys of Outlying Landing Field Whitehouse, Jacksonville, Duval County, Florida. Baton Rouge, Louisiana.

²⁰ LG2 Environmental Solutions, Incorporated (LG2ES). 2018. Neotropical migratory bird survey of NAS JAX, OLF Whitehouse, and Rodman Bomb Target, Naval Air Station Jacksonville, Florida. Prepared for NAVFAC Southeast. Prepared by LG2ES, Jacksonville, Florida.

Project No. 8: Natural Resources Training

Purpose:	Maintain a natural resources staff that is knowledgeable of pertinent issues and capable of managing them effectively.
Goal and Objective:	Goal 2, Objective 2.2, Strategy 2.2.1 – Evaluate forest management practices and their effects on ecosystems and wildlife habitat. Goal 5, Objective 5.1, Strategy 5.1.4 – Obtain tools and capabilities to assist in managing natural resources and meeting INRMP goals. Goal 5, Objective 5.2, Strategy 5.2.3 – Continue to use GIS to build and acquire appropriate Complex-wide coverages. Goal 5, Objective 5.3, Strategy 5.3.1 – Continue ecosystem management and technical training programs.
Location:	Complex-wide.
Description:	Natural resources personnel shall attend training courses, workshops and conferences to enhance their knowledge and skill, maintain professional licenses (e.g., pesticide applicators, forest management licenses), and keep current with the latest in research and technology to aid in the performance of their prescribed duties.
Baseline:	Existing corporate knowledge.
Hours:	Most workshops and training opportunities require one-to-five days to complete, including one-to-two travel days.
Legal Driver(s):	Endangered Species Act of 1973 (ESA) as amended, 16 U.S.C. 1531 et. seq.; Natural Resources Management Program, 32 C.F.R. 190.
Related Legal:	Sikes Act, as amended 16 USC 670 a-o; Migratory Bird Treaty Act, as amended, 16 U.S.C. 703 et seq.; Fish and Wildlife Conservation Act, 16 U.S.C. 2901; OPNAVINST 5090.1D, Chapter 12.
Accomplishments:	The Natural Resources Manager receives training as appropriate, including participation at the National Military Fish and Wildlife Association meeting at least once every five years.

Project No. 9: Forestry Program Support

Purpose:	Fund a portion of the costs to implement the forestry requirements outlined in the INRMP.
Goal and Objective:	Goal 1, Objective 1.1, Strategy 1.1.5 – Ensure best management practices (BMPs) are used in forest management activities. Goal 2, Objective 2.1, Strategy 2.1.1 - Manage forest stands as outlined in the Forest Management Plan (Appendix B). Goal 2, Objective 2.1, Strategy 2.1.3 – Perpetuate the prevailing pine forests.
Location:	Complex-wide.
Description:	Forest management will help ensure compliance with aviation safety regulations regarding clear zones and provide enhanced ecosystem and game management opportunities for the NAS JAX Complex. Contractor labor will be used until an FTE is approved for this on-going requirement. Tasks to be performed include prescribed burning, timber marking, improvement cutting, maintenance of logging roads and fire breaks, herbicide application for brush removal and invasive species control, and oversight of timber sales.
Baseline:	The Complex, in coordination with NAVFAC, SE, will update the Forest Management Information System (FMIS) to serve as the baseline for all forestry work.
Monitoring:	Annual monitoring will occur to ensure effectiveness of forest management and to determine needs for additional unplanned work.
Legal Driver(s):	Natural Resources Management Program, 32 C.F.R. 190.
Related Legal:	Conservation Programs on Military Installations (Sikes Act), 16 U.S.C. 670 (a)-(o); Environmental Natural Resources Protection Manual, 11015.2; Federal Noxious Weed Act of 1974, 7 U.S.C. 2801; Executive Order 13112 – <i>Invasive Species</i> ; DODINST 7310.5; OPNAVINST 5090.1D, Chapter 12; Military Construction Authorization Act – Sale of Certain Interest in Lands, Logs, 10 U.S.C. 2665.
Accomplishments:	This project annually funds a forestry technician position to help manage forest stands on the NAS JAX Complex.

Project No. 10: Forest Inventory

Purpose:	Current data in the Forest Management Information System (FMIS) needs to be updated every five years. An accurate inventory of all forest stands is necessary for planning and implementation of forest management activities.
Goal and Objective:	Goal 1, Objective 1.1, Strategy 1.1.5 – Ensure best management practices (BMPs) are used in forest management activities. Goal 2, Objective 2.1, Strategy 2.1.1 - Manage forest stands as outlined in the Forest Management Plan (Appendix B). Goal 2, Objective 2.1, Strategy 2.1.3 – Perpetuate the prevailing pine forests.
Location:	Complex-wide.
Description:	This project will fund survey updates and forest resources inventories on NAS Jacksonville and outlying properties needed as a result of changes in land use, construction projects, changes in property ownership, FAA requirements, and mitigation projects. Existing forest stands that have been altered will be re-surveyed and mapped in accordance with the Forestry Management Section of the INRMP.
Baseline:	Existing FMIS data.
Monitoring:	Information obtained from these stand surveys will be used, in part, to monitor the success of the NAS JAX Complex's prescribed burns and thinning activities.
Legal Driver(s):	Natural Resources Management Program, 32 C.F.R. 190.
Related Legal:	Conservation Programs on Military Installations (Sikes Act), 16 U.S.C. 670 (a)-(o); Environmental Natural Resources Protection Manual, 11015.2; Federal Noxious Weed Act of 1974, 7 U.S.C. 2801; Executive Order 13112 – <i>Invasive Species</i> ; DODINST 7310.5; OPNAVINST 5090.1D, Chapter 12; Military Construction Authorization Act – Sale of Certain Interest in Lands, Logs, 10 U.S.C. 2665.
Accomplishments:	This project has never been funded and is in place for contingency purposes. Supplies for forestry are purchased from the forestry reserve and Navy Conservation general support.

Project No. 11: Forest Fire Protection

Purpose:	This project provides for the equipment necessary to conduct prescribed burns. Prescribed fire is the primary management tool for many INRMP goals and objectives.
Goal and Objective:	<p>Goal 1, Objective 1.1, Strategy 1.1.5 – Ensure best management practices (BMPs) are used in forest management activities.</p> <p>Goal 2, Objective 2.1, Strategy 2.1.1 – Manage forest stands as outlined in the Forest Management Plan (Appendix B).</p> <p>Goal 2, Objective 2.1, Strategy 2.1.3 – Perpetuate the prevailing pine forests.</p> <p>Goal 2, Objective 2.2, Strategy 2.2.1 – Evaluate forest management practices and their effects on ecosystems and wildlife habitat.</p> <p>Goal 3, Objective 3.1, Strategy 3.1.1 – Use prescribed burns and thinning to improve forest habitat quality.</p>
Location:	OLF Whitehouse and Rodman Bomb Target.
Description:	<p>Fire Management includes prescribed burning and wildfire control. The NAS JAX Complex will burn forest stands on a three-to-five-year rotation or at the discretion of the Regional NRM. Burns will be scheduled in the winter to reduce fuel loads to allow growing season burns in subsequent years. Dormant season burns can be alternated with growing season burns as long as fuel loading is reduced first. Prescribed burning is dependent upon weather conditions and mission-related activities. Wildfire control will be administered as needed.</p> <p>Existing barriers (e.g., roads and wetlands) will be used as fire breaks where feasible, but firebreaks must be established and maintained where existing barriers are not present. Equipment necessary to conduct fire management includes: crawler tractor; transport truck; all-terrain vehicles (ATV's); and other fire ignition and suppression equipment. Equipment available to the Regional Forestry Program is also available to NAS JAX.</p>
Baseline:	The NAS JAX Complex, in coordination with NAVFAC SE, will update the FMIS to serve as the baseline for all forestry work.
Monitoring:	Annual review of Forest Management to determine necessary program changes.
Legal Driver(s):	Natural Resources Management Program, 32 C.F.R. 190.
Related Legal:	Endangered Species Act, 16 U.S.C. 1531 et seq.; Federal Noxious Weed Act of 1974, 7 U.S.C. 2801; Executive Order 13112 – <i>Invasive Species</i> ; Sikes Act, as amended 16 U.S.C. 670 a-o; DODINST 7310.5; OPNAVINST 5090.1D, Chapter 12; Military Construction Authorization Act – Sale of Certain Interest in Lands, Logs, 10 U.S.C. 2665.

Accomplishments:

Recent prescribed burns were implemented in 2002, 2008, and 2014 at Rodman Bombing Range. Prescribed fire were implemented in 2003 and 2009 at OLF Whitehouse Fire. Fire breaks were constructed at OLF Whitehouse and NAS Jacksonville and are maintained annually.

Project No. 12:**Forest Product Sales**

Purpose:	Properly manage forest resources by removing low quality trees, improving forest health and productivity, enhancing wildlife habitat, and producing revenue.
Goal and Objective:	Goal 1, Objective 1.1, Strategy 1.1.5 – Ensure best management practices (BMPs) are used in forest management activities. Goal 2, Objective 2.1, Strategy 2.1.1 – Manage forest stands as outlined in the Forest Management Plan (Appendix B). Goal 2, Objective 2.1, Strategy 2.1.3 – Perpetuate the prevailing pine forests.
Location:	Complex-wide.
Description:	This project involves annual timber sales. Estimated income from forest products depends on local market conditions and is approximately \$40,000 to \$100,000 per year.
Baseline:	The NAS JAX Complex, in coordination with NAVFAC SE, will update the FMIS to serve as the baseline for all forestry work.
Monitoring:	Timber cruises and stand surveys as necessary.
Legal Driver(s):	Natural Resources Management Program, 32 C.F.R. 190.
Related Legal:	Endangered Species Act, 16 U.S.C. 1531 et seq.; Federal Noxious Weed Act of 1974, 7 U.S.C. 2801; Executive Order 13112 – <i>Invasive Species</i> ; Sikes Act, as amended 16 U.S.C. 670 a-o; DODINST 7310.5; OPNAVINST 5090.1D, Chapter 12; Military Construction Authorization Act – Sale of Certain Interest in Lands, Logs, 10 U.S.C. 2665.

Project No. 13: Least Tern Nest Site

Purpose:	Preserve and protect nesting least terns and chicks. The least tern is a state-listed threatened species.
Goal and Objective:	Goal 3, Objective 3.2, Strategy 3.2.2 – Preserve and Protect Threatened and Endangered Species
Location:	Select flat rooftops at NAS Jacksonville.
Description:	<p>This project will protect and ensure least tern nest and chick survival at potential nesting sites by several measures:</p> <ul style="list-style-type: none"> • Limit predator access to rooftops (ex: cut back tree branches that may allow predators to climb onto the roof); • Conduct all maintenance rooftop and HVAC repairs prior to the start of the breeding season (March 15th) to minimize unnecessary human disturbance; <ul style="list-style-type: none"> ○ Contact the FWC Regional Shorebird Biologist when emergency repairs are needed with active nesting on the roof; • Cover exposed tar prior to the start of the breeding season; • Cover any holes or gaps in the roof where chicks can become entrapped prior to the breeding season; • Ensure the rooftops are draining properly to avoid flooding during rain events;
Baseline:	Existing rooftop surveys.
Monitoring:	Rooftops are monitored for least terns.
Legal Driver(s):	MBTA; 16 USC 703; Natural Resources Management Program, 32 CFR 190.
Related Legal:	DOD 4715, Sikes Act, as amended, 16 U.S.C. 670 a-o; OPNAVINST 5090.1D, par 12-3.5.b.1.
Accomplishments:	An attempt was made to create an alternative, non-rooftop, least tern nesting site on NAS Jacksonville between 2013-2015. That effort, however, proved to be futile and was abandoned in agreement with FWC and USFWS. Resources for this project are now focused on documenting nesting least terns on airfield nesting rooftops and mitigating negative impacts to nests and chicks.

Project No. 14: INRMP Update

Purpose:	Update and revise the INRMP as required by the Sikes Act Improvement Act.
Goal and Objective:	Goal 5, Objective 5.4, Strategy 5.4.1 – Evaluate the effectiveness of this INRMP and recommend improvements.
Location:	Complex-wide.
Description:	This project will ensure the INRMP is kept current reflecting installation and regional management direction, current projects, new natural resources information, current regulatory concerns and policies, and mission requirements. The current INRMP was revised in 2012, but it is critical that the INRMP is regularly revised to address species management to prevent impacts to the mission or delays to construction projects. INRMP updates are required to document survey results, add newly listed species, and address habitat management to avoid critical habitat designation which would impact the installation mission. This money also funds annual INRMP reviews with regulators.
Baseline:	Existing INRMP; current surveys.
Monitoring:	None.
Legal Driver(s):	Conservation Programs on Military Installations (Sikes Act) as amended, 16 U.S.C. 670 (a) et seq.
Related Legal:	DODINST 7310.5; OPNAVINST 5090.1D, Chapter 12; USMC-MCO P5090.2.; National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. 4321 et seq.
Accomplishments:	This INRMP is reviewed annually with USFWS, FWC, and NMFS. Revisions are made, as appropriate, every one-to-two years. The last five-year update to ensure the operation and effect of this INRMP was accomplished in 2019.

Project No. 15: Wildlife Education and Installation Indoctrination Center

Purpose:	This project will keep the existing NAS Jacksonville Nature Center in sufficient supplies to maintain and care for the living exhibits and educational material.
Goal and Objective:	<p>Goal 5, Objective 5.1, Strategy 5.1.4 – Obtain tools and capabilities to assist in managing natural resources and meeting INRMP goals.</p> <p>Goal 5, Objective 5.3, Strategy 5.3.1 – Continue ecosystem management and technical training programs.</p> <p>Goal 5, Objective 5.3, Strategy 5.3.1 – Implement programs and initiatives that foster citizen participation in ecosystem education and stewardship.</p>
Location:	NAS Jacksonville and Tillie Fowler Park.
Description:	The Center is a key part of the NAS Jacksonville Natural Resources program and is used for new military and civilian employee education. It hosts the Navy Entomology Center of Excellence (NECE) and CECOS classes as well as school and community groups. Subject matter includes compliance with laws and regulations, information about ecosystems on the Complex, flora and fauna (including protected and managed species, invasive species, and hazardous species), pollution prevention, and recycling.
Baseline:	Ongoing education programs, particularly at the Black Point Interpretive Center.
Monitoring:	None.
Legal Driver(s):	Conservation Programs on Military Installations (Sikes Act) as amended, 16 U.S.C. 670 (a) et seq.
Related Legal:	Endangered Species Act, 16 U.S.C. 1531 et seq.; Federal Noxious Weed Act of 1974, 7 U.S.C. 2801; Fish and Wildlife Conservation Act, 16 U.S.C 2901 et seq.; Executive Order 11990 – Wetlands Protection; Executive Order 13112 – Invasive Species; OPNAVINST 5090.1D, Chapter 12.
Accomplishments:	Modest funds (~\$2,000) are expended annually for supplies to maintain the live exhibits at the Wildlife Education and Installation Indoctrination Center.

B

NAS JAX Stand Information (FMIS)

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Stand Information (FMIS 024)

NAS JACKSONVILLE

COMPARTMENT: 1

RU	Acres	Cover Code	Cond	Orgn	O Year	Land	Trees Per Acre	DBH	Height	BA	S Vol (CU FT)	% S Vol S/T	H Vol (CU FT)	% H Vol S/T	Growth (RPI)	Site	Year
N207010001	18	84	21	2	1975	1	690	7	53	200	2,700	0	0	0	4.10	80	1996
N207010002	0	99	21	2	1975	40	401	2	11	9	13	0	0	0	4.60	0	2003
N207010003	4	84	21	2	1975	1	634	9	55	210	2,410	0	0	0	4.40	90	1996
N207010004	12	84	21	2	1975	1	621	9	54	190	2,340	0	0	0	4.20	90	1996
N207010005	8	84	21	2	1975	1	600	8	50	200	2,250	0	0	0	4.30	90	1996
N207010006	15	84	31	1	1949	11	85	11	80	80	2,250	40	0	0	8.70	90	1996
N207010007	31	84	30	2	1964	11	100	11	85	80	2,700	40	0	0	7.70	90	1996
N207010008	48	113	30	1	1952	11	145	9	53	61	0	0	844	16	11.50	70	1996
N207010009	2	81	31	1	1948	11	197	11	74	130	2,530	82	0	0	11.40	90	1996
N207010010	1	84	21	2	1975	11	362	7	47	90	1,800	20	0	0	4.70	90	1996
N207010011	1	84	21	2	1975	1	391	8	48	110	1,980	0	0	0	5.30	90	1996
N207010012	0	99	2	1	0	40	0	0	0	0	0	0	0	0	0.00	0	1996
N207010013	0	99	2	1	0	40	0	0	0	0	0	0	0	0	0.00	0	1996
N207010014	2	84	30	2	1978	10	317	7	45	90	1,800	0	0	0	5.50	80	1996
N207010015	3	84	21	2	1975	10	430	7	45	100	2,070	0	0	0	5.00	90	1996
N207010016	1	84	21	2	1978	10	283	7	30	90	1,350	0	0	0	4.10	80	1996
N207010017	0	99	21	2	1978	40	279	1	8	4	7	0	0	0	4.90	0	1996
N207010018	0	99	21	2	1978	40	274	1	8	4	8	0	0	0	4.40	0	1996
N207010019	0	99	21	2	1978	40	281	1	8	4	4	0	0	0	5.30	0	1996
N207010020	2	81	31	1	1950	11	86	13	77	97	2,374	99	0	0	11.80	90	1996
N207010021	1	84	21	2	1978	11	250	1	8	2	12	0	0	0	4.20	90	1996
N207010022	5	84	31	1	1936	11	35	15	80	33	915	98	0	0	13.10	85	1996
N207010023	8	84	31	1	1936	11	47	13	77	45	971	98	0	0	13.40	80	1996
N207010024	2	84	31	1	1936	11	178	11	76	120	2,194	79	0	0	12.30	80	1996
N207010025	19	84	31	1	1936	11	179	10	75	89	1,836	68	0	0	13.60	85	1996
N207010026	0	99	2	1	0	40	0	0	0	0	0	0	0	0	0.00	0	2003
N207010027	1	84	21	2	1976	1	300	6	47	110	2,250	0	0	0	5.40	90	1996
N207010028	6	84	30	2	1965	1	523	8	55	120	2,250	10	0	0	9.40	90	1996
N207010029	10	84	30	2	1966	1	450	9	55	110	2,250	0	0	0	6.80	100	1996
N207010030	8	84	31	1	1937	1	94	13	85	90	2,320	100	0	0	12.60	90	1996
N207010031	4	84	30	2	1965	1	555	9	55	120	2,700	0	0	0	7.30	90	1996
N207010032	3	84	31	2	1955	1	56	12	65	70	2,250	100	0	0	10.40	90	1996
N207010033	3	84	30	2	1966	1	150	9	60	70	1,350	0	0	0	8.70	90	1996
N207010034	0	99	2	1	0	40	0	0	0	0	0	0	0	0	0.00	0	1996

Stand Information (FMIS 024)
NAS JACKSONVILLE

N207010035	19	84	31	1	1953	17	100	11	70	90	2,085	47	0	0	11.80	90	1996
N207010036	5	81	31	1	1948	17	100	8	75	80	1,340	35	0	0	8.80	90	1996
N207010037	6	84	31	1	1947	17	83	11	75	80	1,320	40	0	0	8.70	90	1996
N207010038	11	84	31	1	1946	17	192	11	75	90	1,656	69	0	0	12.40	80	1996
N207010039	2	84	30	2	1965	17	125	9	60	98	1,420	20	0	0	9.20	90	1996
N207010040	5	84	31	1	1938	17	76	14	85	90	1,320	97	0	0	11.80	85	1996
N207010041	1	84	30	2	1964	17	150	8	55	90	1,320	0	0	0	8.70	90	1996
N207010042	8	84	31	1	1953	1	400	10	80	130	2,400	50	0	0	10.60	100	1996
N207010043	1	84	30	2	1964	1	325	9	65	120	2,650	35	0	0	10.80	90	1996
N207010044	10	84	31	1	1945	1	80	13	70	80	1,574	99	0	0	10.70	80	1996
N207010045	0	99	2	1	0	40	0	0	0	0	0	0	0	0	0.00	0	1996
N207010046	47	84	30	2	1964	1	225	10	65	80	2,250	50	0	0	11.70	90	1996
N207010047	6	84	31	1	1950	1	50	13	79	43	884	98	0	0	12.60	100	1996
N207010048	22	84	30	2	1964	1	230	10	65	60	1,800	60	0	0	10.90	90	1996
N207010049	5	84	30	1	1959	1	467	9	65	120	2,750	55	0	0	9.70	90	1996
N207010050	4	84	30	2	1965	17	130	8	55	100	1,719	0	0	0	8.60	90	1996
N207010051	9	84	31	2	1944	17	99	12	80	90	1,800	87	0	0	12.20	90	1996
N207010052	3	84	31	1	1955	17	90	11	70	93	1,528	66	0	0	10.70	90	1996
N207010053	2	84	31	1	1957	17	95	11	75	90	1,335	81	0	0	8.60	100	1996
N207010054	14	84	31	1	1946	17	95	11	75	90	1,314	48	0	0	9.40	90	1996
N207010055	4	84	30	2	1964	17	125	9	60	90	1,350	0	0	0	8.20	90	1996
N207010056	14	70	31	1	1944	1	100	10	70	110	1,320	98	0	0	11.60	70	1996
N207010057	4	84	30	2	1966	17	115	9	60	80	1,320	10	0	0	8.70	90	1996
N207010058	5	84	21	2	1976	1	300	6	30	110	900	0	0	0	4.20	90	1996
N207010059	58	82	31	1	1929	1	121	14	80	120	1,200	97	1,018	22	13.40	80	1996
N207010060	5	82	33	1	1919	1	82	16	100	24	860	98	0	0	14.40	95	1996
N207010061	6	81	30	1	1953	11	225	11	65	90	2,095	18	0	0	14.60	90	1996
N207010062	2	84	31	2	1966	17	90	10	60	70	1,350	40	0	0	8.70	90	1996
N207010063	19	84	31	1	1953	17	100	12	80	90	1,540	55	0	0	10.60	100	1996
N207010064	20	84	31	2	1964	17	100	12	75	70	1,240	55	0	0	9.20	90	1996
N207010065	26	84	31	2	1964	17	125	10	65	80	1,320	55	0	0	11.70	90	1996
N207010066	21	70	31	1	1944	17	95	12	70	70	1,440	95	0	0	5.20	70	1996
N207010067	3	84	30	2	1976	17	110	6	30	90	1,080	0	0	0	5.20	90	1996
N207010068	4	82	31	1	1929	17	75	14	80	90	1,320	80	1,320	20	13.40	80	1996
N207010069	190	118	33	1	1959	11	121	14	88	72	1,188	51	216	0	9.00	90	2004
N207010070	7	118	33	1	1956	11	200	14	96	159	4,202	20	0	0	12.00	90	2004
N207010071	72	113	30	1	1964	11	487	10	80	126	0	0	987	6	0.00	70	2004
N207010072	12	118	33	1	1956	11	40	14	80	60	0	0	0	0	0.00	90	2004

Subtotal: 870

106,074

4,385

Stand Information (FMIS 024)
NAS JACKSONVILLE

COMPARTMENT: 2

RU	Acres	Cover Code	Cond	Orgn	O Year	Land	Trees Per Acre	DBH	Height	BA	S Vol (CU FT)	% S Vol S/T	H Vol (CU FT)	% H Vol S/T	Growth (RPI)	Site	Year
N207020001	60	85	33	1	1933	1	124	14	90	124	2,061	70	651	7	17.00	90	2003
N207020002	67	84	33	2	1953	1	103	14	90	83	1,862	80	0	0	11.00	90	2005
N207020003	36	113	34	1	1952	1	312	4	30	28	0	0	0	0	16.80	50	1983
N207020004	331	84	31	2	1966	1	258	9	85	105	2,709	10	0	0	16.00	90	2005
N207020005	6	113	34	1	1955	1	312	4	30	28	0	0	0	0	16.80	50	1983
N207020006	16	113	34	1	1953	1	312	4	30	28	0	0	0	0	16.80	50	1983
N207020007	0	99	2	1	2003	40	0	0	0	0	0	0	0	0	0.00	0	2003
N207020008	78	84	31	2	1970	1	164	11	76	95	2,119	52	0	0	6.00	100	2003
N207020009	25	84	32	2	1975	1	207	8	68	73	1,662	5	0	0	12.00	90	2003
N207020010	11	84	32	2	1966	1	380	7	60	98	2,211	4	0	0	11.00	90	2003
N207020011	3	84	21	2	1970	1	208	4	28	40	190	0	0	0	4.00	90	1983
N207020012	20	113	34	1	1937	1	312	4	30	28	0	0	0	0	16.80	50	1983
N207020013	7	85	32	1	1960	1	300	7	80	161	483	97	2,612	8	21.00	110	2003
N207020014	6	113	34	1	1925	1	280	6	40	55	0	0	480	0	15.60	50	1983
N207020015	5	81	33	1	1968	1	140	10	35	74	1,627	51	0	0	14.00	90	2003
N207020016	2	84	14	1	1966	1	36	7	48	22	45	0	0	0	3.40	90	1983
N207020017	124	84	31	2	1966	1	149	10	74	67	1,677	18	0	0	13.00	100	2003
N207020018	45	82	33	1	1940	18	153	14	93	129	773	93	2,377	9	9.00	90	2003
N207020019	14	84	32	2	1969	1	177	19	73	103	2,371	46	0	0	13.00	100	2003
N207020020	45	84	32	2	1966	1	266	10	85	135	3,518	41	0	0	20.00	90	2003
N207020021	51	114	30	1	1946	1	308	8	48	109	0	0	1,425	14	8.80	60	1983
N207020022	29	84	32	2	1966	1	247	10	72	112	2,816	16	0	0	16.00	90	2003
N207020023	57	84	21	2	2002	1	751	1	6	0	0	0	0	0	2.00	0	2003
N207020024	45	70	21	2	2005	1	800	0	0	0	0	0	0	0	0.00	90	2005

Subtotal: 1,083

26,124

7,545

COMPARTMENT: 3

RU	Acres	Cover Code	Cond	Orgn	O Year	Land	Trees Per Acre	DBH	Height	BA	S Vol (CU FT)	% S Vol S/T	H Vol (CU FT)	% H Vol S/T	Growth (RPI)	Site	Year
N207030001	94	84	32	2	1965	1	330	8	70	98	2,347	5	0	0	16.00	90	2003

Stand Information (FMIS 024)

NAS JACKSONVILLE

N207030002	18	84	21	2	1994	1	675	2	16	0	0	0	0	0	3.00	90	2001
N207030003	19	84	33	1	1955	1	275	11	75	130	3,072	30	0	0	17.00	90	2003
N207030004	12	100	33	1	1900	1	61	13	70	55	297	100	0	0	16.60	60	1983
N207030005	1	100	21	1	1968	1	247	4	29	25	202	0	0	0	10.20	70	1983
N207030006	79	84	33	1	1947	1	193	12	93	95	2,408	38	0	0	17.00	90	2003
N207030007	2	100	30	1	1948	1	182	8	58	58	1,224	0	0	0	11.20	70	1983
N207030008	2	100	33	1	1900	1	62	13	80	54	312	100	0	0	14.40	60	1983
N207030009	23	84	33	1	1951	1	220	12	80	114	2,878	41	0	0	17.00	90	2003
N207030010	12	84	30	2	1998	1	650	5	43	84	1,017	0	0	0	7.00	90	1983
N207030011	3	100	30	1	1947	1	197	8	51	73	1,011	14	0	0	11.80	60	1983
N207030012	0	99	2	1	1944	40	0	0	0	0	0	0	0	0	0.00	60	1983
N207030013	4	84	32	2	1965	1	370	8	70	109	2,817	0	0	0	14.00	90	2003
N207030014	0	99	2	1	0	40	0	0	0	0	0	0	0	0	0.00	0	1994
N207030015	7	84	30	2	1975	1	170	6	55	29	495	0	0	0	11.00	90	2003
N207030016	2	100	30	1	1948	1	380	9	50	187	2,410	9	0	0	13.40	60	1983
N207030017	0	84	2	1	1994	40	0	0	0	0	0	0	0	0	0.00	0	1994
N207030018	14	100	33	1	1890	1	99	13	70	88	522	100	0	0	18.80	60	1983
N207030019	12	100	33	1	1900	1	106	13	75	102	706	100	0	0	18.30	70	1983
N207030020	0	99	2	1	1985	40	0	0	0	0	0	0	0	0	0.00	0	2001
N207030021	7	84	33	2	1965	1	90	12	80	61	1,555	57	0	0	15.00	90	2003
N207030022	24	84	32	2	1976	1	247	8	58	80	1,803	3	0	0	12.00	90	2003
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N207030027	23	84	31	1	1965	1	165	10	65	72	1,566	18	0	0	11.00	90	2003
N207030028	13	84	33	1	1952	1	210	12	85	121	2,497	34	306	0	15.00	85	2003
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N207030033	0	84	31	1	1953	40	0	0	0	0	0	0	0	0	0.00	100	1983
N207030034	0	84	30	1	1957	40	0	0	0	0	0	0	0	0	0.00	100	1983
N207030035	1	84	31	1	1957	1	75	3	18	0	0	0	0	0	4.00	100	2003
N207030036	1	84	33	1	1945	1	180	14	80	62	1,593	18	0	0	12.00	80	2003
N207030037	5	84	33	1	1949	1	330	12	72	127	2,990	22	0	0	11.00	100	2003
N207030038	128	85	31	1	1938	1	54	14	92	47	403	73	703	17	15.00	85	2003
N207030039	300	101	31	1	1940	1	353	10	66	222	2,901	38	1,121	100	11.70	70	1983
N207030040	305	101	31	1	1940	1	353	10	66	222	2,901	38	1,121	100	11.70	70	1983
N207030041	545	101	31	1	1940	1	353	10	66	222	2,901	38	1,121	100	11.70	70	1983

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**Hunting and Fishing Procedures and
Regulations**

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NAS JACKSONVILLE INSTRUCTION 5090.10E: Hunting and Fishing Procedures and Regulations

NASJAXINST 5090.10E
Code 064/WP/5000

Subj: FISHING AND HUNTING ON NAVAL AIR STATION (NAS), JACKSONVILLE
AND OUTLYING PROPERTIES

Ref: (a) 50 CFR 1-91, Wildlife and Fisheries
(b) Title 39 Florida Administrative Code, Florida Wildlife Code
(c) OPNAVINST 5090.1B
(d) 32 CFR Part 190
(e) DoD 4700.4

Encl: (1) Map of NAS Jacksonville Fishing Areas
(2) Manatee Protection Zones
(3) Hunting Registration Document
(4) Privacy Act Statement
(5) Waiver of Liability Agreement
(6) Map of OLF Whitehouse Hunting Areas
(7) Map of Rodman Bomb Target Range Hunting Areas

1. Purpose. To promulgate hunting and fishing regulations and procedures on NAS Jacksonville including its outlying properties at Outlying Field (OLF), Whitehouse and the Rodman Bomb Target Range.

2. Cancellation. NASJAXINST 5090.10D

3. Background. It is the policy of this command to provide for and promote natural resources management programs in order to receive the benefits that are available on a sustained yield basis. These programs will be consistent with the regulations of the U.S. Fish and Wildlife Service (FWS) and the Florida Fish and Wildlife Conservation Commission (FWC) and other applicable federal and state laws governing the use of such resources, in particular references (a) through (e). Adequate enforcement measures will be taken to ensure the conservation of the fish and wildlife resources under the stewardship of the Commanding Officer, NAS Jacksonville. Persons charged with administering the requirements in this instruction shall coordinate and cooperate with federal and state wildlife officials.

4. Requirements. The following requirements apply to hunting and fishing on NAS Jacksonville and its outlying parcels:

a. General.

(1) Military personnel stationed in Florida are considered to be residents when purchasing State hunting and fishing licenses. Hunting and fishing licenses are available for sale at the Marina and at the Information, Tickets, and Tours (ITT) Office.

(2) Pursuant to Ref. (e) and the Sikes Act, 16 USC 670(a), Naval Air Station Jacksonville will collect a permit fee of \$10.00 per season for hunting activities on OLF Whitehouse and Rodman Target. A fee of \$5.00 per season will be collected for consumptive fishing activities on NAS Jacksonville. Station hunting permits are available for sale at the ITT NASJAXINST 5090.10E

Office. Fees will not be charged for senior citizens, children under 16, or the physically handicapped. The fishing permit fee does not apply to the catch and release programs at Casa Linda Lake and Turtle Pond.

b. Fishing.

(1) All persons fishing in Florida, except residents 65 years of age and older and children under the age of 15, must possess a valid Florida fishing license when fresh and/or saltwater fishing in the territorial boundaries of the State of Florida. Shrimping is considered to be "fishing" under this instruction.

(2) All Florida laws pertaining to fishing and the taking of saltwater fish and seafood apply on this Station.

(3) Military personnel, their families and guests, reservists and civilian employees of the Station are authorized to fish in approved areas on the Station.

(4) Approved fishing areas on the Station include:

(a) The St. Johns River bordering the Station except at the Station boathouse pier, the seaplane ramps, the secured runway area and the wastewater treatment plant discharge area.

(b) Casa Linda Lake except the west side (golf course side) between 0800 and sunset.

(c) The south and east sides of Turtle Pond between 0800 and sunset.

(d) Fishing is allowed on the entire shoreline of Casa Linda Lake and Turtle Pond from sunset to 0800.

(e) Bachelor Officer's Quarters (BOQ) pier (#1850) is to be used only by BOQ residents and their guests; all persons fishing from pier #1850 must have a Combined Bachelor Quarters key to prove BOQ residency.

(f) The Admiral's pier (#1849) is primarily for the use of the Admiral and his/her guests.

(g) The Commanding Officer's pier (#1848) is primarily for the use of the Commanding Officer and his/her guests.

(h) Pier #2060, located just south of the BOQ and the Fisherman's Cove Picnic Area pier (#291) located on Mulberry Cove are open to any person authorized to fish on the Station.

(5) No fishing is allowed on the boat ramp or piers at the Station Marina, the deck of the Mulberry Cove Nature Walk, or Lake Scotlis. Enclosure (1) provides a map of the fishing areas on the Station.

(6) Per the recommendation of the U.S. Fish and Wildlife Service, the following restrictions apply:

NASJAXINST 5090.10E

(a) Gigs or snatch hooks are prohibited

(b) Gill net fishing is prohibited

(c) Daily game fish bag limits are: five black bass minimum of 14 inches long with only one 22 inches or longer, six catfish, and 25 bream (bluegill, redear sunfish, spotted sunfish).

(7) Shrimping by cast net is permitted in the St. Johns River on the Station boundary. Shrimpers are prohibited from leaving shrimp heads, shrimp bait and shrimping gear on piers and seawalls. If used, food cans to attract shrimp are to be tethered while shrimping and removed from the river when shrimping is completed. Littering is prohibited.

(8) Fishing is prohibited from motorized boats in the Manatee Protection Zones depicted in enclosure (2).

(9) All fish caught in Casa Linda Lake and Turtle Pond shall be released (i.e., catch and release). Boats and swimming are not allowed in these areas.

(10) Persons fishing on the Station are responsible for their own safety. Fishing on the Station is a privilege and persons not adhering to the requirements or restrictions of this instruction or other applicable laws or regulations will lose Station fishing privileges and may be subject to prosecution and penalties.

c. Hunting

(1) Hunting is permitted at Outlying Field (OLF) Whitehouse and the Rodman Bomb Target Range as specified in enclosures 6 and 7. Hunting is prohibited on NAS Jacksonville. Scheduled hunting days on Rodman Bomb Target Range and OLF Whitehouse will be published seasonally by the Station Volunteer Game Wardens, and will be posted at Building 9 on NAS Jacksonville. The Commanding Officer reserves the right to authorize special deer population control hunts in areas normally closed to hunting; procedures for such hunts to be promulgated and approved separately.

(2) Active duty military, reservists, retired military and current civilian employees of the Station including the outlying properties are

authorized to hunt in the approved areas. Priority is given to active duty military, reservists, retired military and current civilian employees in that order. Authorized hunters are allowed to sponsor one guest (including dependents) at a time. Minor guests must be legal dependents of the sponsor.

(3) Eligible applicants must satisfy the following requirements to hunt on OLF Whitehouse and/or the Rodman Bomb Target Range:

(a) Possess a valid State of Florida hunting license.

(b) Possess a valid Station Hunting Permit.

NASJAXINST 5090.10E

(c) Complete an approved Hunter Education Course. The Station will offer the Hunter's Education Course free of charge on an annual basis through the FWC. This 16-hour class includes 12 classroom hours and 4 hours on the range. Contact the Hunting Program Coordinator at (904)653-1046 for more information and scheduling. This is a one-time requirement, but each hunter must show proof of attendance each season. A certificate will be issued to each successful hunter upon completion of the class. Archery hunters must have successfully completed an advanced archery course.

(d) Complete a Station Hunter Orientation Class (approximately one-hour long) provided by the Station Volunteer Game Wardens. This class will be provided as part of the Hunter Education Course and will be offered as a separate class for hunters who already have completed the course. Contact the Hunting Program Assistant Director at (904)704-2498 for class scheduling.

(e) Persons desiring a Station hunting permit shall bring their State of Florida hunting license, proof of completion of Hunter Education Course and Station Hunter Orientation class, and appropriate information to complete enclosures (3), (4), and (5) to the ITT Office along with the applicable fee.

(f) After completion of the above requirements, an NAS Jacksonville Hunting Permit will be issued. All hunting permits expire on 30 June following the normal hunting season.

(4) Dependent minor children must be accompanied at all times by a permitted hunter who is the minor's parent or legal guardian.

(5) Military operational and/or security requirements take priority over hunting activities and hunting areas may be closed on short notice. Hunters are required to leave the affected area when directed by authorized military or civilian personnel conducting official business.

(6) No hunting is allowed within 100 yards of any building, inhabited area, runway, taxiway or recreational area, unless specifically authorized.

(7) Hunters are authorized to use shotguns, muzzle loading guns and bows and arrows as official State of Florida hunting seasons allow at OLF

Whitehouse and Rodman Bomb Target Range. Hunting with rifles is only authorized at the Rodman Bomb Target Range and a zone at OLF Whitehouse as official State of Florida hunting seasons allow. Hunting with crossbows and handguns is prohibited.

(8) Shooting from any moving vehicle is prohibited. Attempting to take wildlife on or upon the right-of-way of any federal, state or county maintained road is prohibited. Hunting with dogs is prohibited.

(9) State Wildlife Law Enforcement Officers, by cooperative agreement, may assist Station Game Wardens in enforcing Federal, State, and Station wildlife regulations.

NASJAXINST 5090.10E

(10) Hunters are responsible for their own safety, damage to government property or any injury they may cause to themselves or other persons. Hunters damaging Station property will be held financially responsible, have their hunting privileges revoked, and face possible prosecution.

(11) Hunters are allowed to 'scout' up to 7 days prior to the season's opening. They are required to follow the normal check in and check out procedures.

(12) Only portable tree stands are allowed. Nails, spikes, or screws may not be used to attach stands to trees.

(13) Littering is prohibited and all trash must be removed by the hunter at the conclusion of the day's hunt.

(14) All wildlife wounded or killed either accidentally or intentionally must be reported when checking out of the hunting area.

(15) Consumption of alcoholic beverages is not allowed at any time during or immediately before hunting. Failure to comply will result in permanent revocation of hunting privileges.

(16) A minimum of 500 square inches of daylight fluorescent orange material must be worn at all times when hunting except in turkey blinds and archery stands.

(17) Hunters can check in to hunt up to one hour before sunrise and must leave hunting areas within one hour after sunset.

(18) Hunting with handguns is prohibited on the Station's outlying properties. Failure to comply will result in the weapons being confiscated and hunting permits being permanently revoked.

(19) When not hunting, all firearms shall be transported with trigger locks in place.

(20) Taking or harassing of fox squirrels, bear, alligators, gopher tortoises, snakes or other non-game species, threatened or endangered species, or species of special concern, as designated by the FWC and/or the U.S. FWS, is prohibited. Anyone caught taking or harassing the above

mentioned species will have their hunting permit permanently revoked and may face prosecution.

(21) Bag limits for game animals are the same limits as those determined by the Florida Fish and Wildlife Conservation Commission unless the Station Natural Resources Manager places more restrictive limits.

(22) Hunting with horses or off-road vehicles is prohibited.

(23) The Station will follow the State of Florida's hunting season for the Central Florida Zone as defined by the Florida Fish and Wildlife Conservation Commission, unless otherwise specified by the Station NASJAXINST 5090.10E

Natural Resources Manager. Information on the current hunting season, bag limits, etc. will be posted at Building 9 on NAS Jacksonville.

(24) A positive identification of game is required before firing any weapon (i.e., no practice shooting).

(25) The following restrictions and procedures apply for hunting at OLF Whitehouse:

(a) Hunting is authorized in Area 2 as identified on Enclosure (6). These areas have been posted with red and white signs, and may be closed for military operations without prior notice. Hunting is not allowed in the fenced in airfield area.

(b) All hunters will meet at the Main Gate at OLF Whitehouse for entry to OLF Whitehouse. Prior to proceeding to hunting areas, all hunters will report to the Game Warden Office, at Bldg. 10 (old fire station), with their Station Hunting Permit. All weapons and ammunition must remain locked up in their vehicles while reporting.

(c) Each hunter must sign out a key to the applicable hunting zone if necessary. The hunter will also receive a vehicle pass and a Hunting Area pass for the assigned hunting zone. The vehicle pass must be placed on the dashboard of the vehicle and the Hunting Area pass must be in possession of the hunter at all times while hunting.

(d) Hunters found in an area other than the one to which they were assigned will lose their hunting privileges for 30 days. Second time offenders will lose their hunting privileges for the remainder of the season.

(e) All hunters are required to check out when finished hunting. At OLF Whitehouse, the hunter will return to the Game Warden Office and check out, and then be let out of the Main Gate. All keys and passes must then be returned to the Game Warden Office where the hunter will sign out and report all killed or wounded game. All game killed or wounded must be reported.

(26) The following restrictions and procedures apply for hunting at the Rodman Bomb Target Range:

(a) There are 13 hunting areas (Areas 1A through 12B) as identified in enclosure (7) with one hunter per area, All area checkpoints will be identified by a 18" x 18" white sign with black letters.

(b) Area assignments are on a first call, first served basis Hunters are required to sign up in advance and can request reservations for a particular area assignment by calling the Hunting Program Director at (904) 813-9165 between the hours of 0800-1500 Monday through Thursday. Reservations will be accepted up to three days in advance for active duty military and two day in advance for all others.

NASJAXINST 5090.10E

(c) All hunters will meet on hunt days at the State Road 19 gate at 0500 for morning hunts or at 1300 for afternoon hunts. Hunters must have a NAS Jacksonville Hunting Permit in their possession. Reservations for hunters who do not arrive on time will not be honored. Hunters will be escorted to the Game Warden Office (Trailer) and will be assigned a hunting area and be given a Vehicle Pass and Hunting Area Pass for that particular area. The Vehicle Pass must be placed on the dashboard of the vehicle and the hunting area pass must be in the hunter's possession while hunting. Hunters found hunting in an area other than the one to which they are assigned will lose their hunting privileges for 30 days. Second time offenders will lose their hunting privileges for the remainder of the season.

(d) After checking in at the Game Warden Office, hunters will be allowed to proceed to their assigned areas. Hunters should park their vehicles as close to the checkpoint for their respective area as possible.

(e) The Duty Game Warden will make a routine patrol of all areas. If a hunter wants to leave for any reason, he/she should proceed to his/her respective checkpoint or the tower as shown on enclosure, (8) and wait for the Duty Game Warden to arrive.

(f) In the event of an emergency, a handheld radio will be located in the Game Warden office to call the Duty Game Warden if he/she is not in the office.

(g) At the 0500 and 1300 check-ins, the Duty Game Warden and the hunters will agree on a schedule for the day and times and places to meet in the event a hunter wants to leave early. Only hunters desiring to leave early are required to attend those meetings.

(h) At Rodman Bomb Target Range, hunters will check out with the Duty Game Warden at the conclusion of the hunt. All keys and passes must then be returned to the Game Warden Office where the hunter will sign out and report all killed or wounded game. All game killed or wounded must be reported.

5. Action

a. The Station Natural Resources Manager shall:

(1) Oversee the fishing and hunting programs on NAS Jacksonville and its outlying properties.

(2) Initiate and request funding for all projects related to hunting and fishing.

(3) Ensure that monies collected for hunting and fishing activities are utilized for wildlife conservation programs at NAS Jacksonville and outlying properties.

(3) Periodically review and update this instruction.

NASJAXINST 6090.10E

b. The Station Volunteer Game Wardens shall:

(1) Be responsible for enforcement of all fish and wildlife regulations, including the provisions of this instruction. Call in State Wildlife Law Enforcement Officers for any violations of State and Federal wildlife laws. Refer violations to the Station Legal Officer for appropriate action.

(2) Cooperate and coordinate enforcement actions with other federal and state fish and wildlife agencies.

(3) Conduct routine patrols of fishing and hunting areas to ensure compliance with all applicable regulations.

(4) Contact Pinecastle Operations at (352) 759-3184/2929, every Thursday and every hunting day concerning military operations at Rodman Bomb Target Range. Military operational requirements take priority over hunting.

E. W. DOBSON, JR.

Distribution:
(NASJAXINST 5605.IFF)
LIST J-1
LIST X-1

D

Interagency Correspondence

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DEPARTMENT OF THE NAVY

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P. O. BOX 190010
2155 EAGLE DRIVE
NORTH CHARLESTON, S. C. 29419-9010

ES13RF
November 4, 2004

Mr. Dave Hankla
US Fish & Wildlife Service
6620 Southpoint Drive South, Suite 310
Jacksonville, FL 32216-0958

Subj: INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE
JACKSONVILLE COMPLEX, JACKSONVILLE, FLORIDA.

Dear Mr. Hankla:

The enclosed draft Integrated Natural Resources Management Plan (INRMP) has been prepared for the Jacksonville Complex. The purpose of this document is to meet statutory requirements under the Sikes Act Improvement Act (SAIA), 16 U.S.C. § 670a et seq. In November 1997, the Sikes Act was amended to require the Secretary of Defense to carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. To facilitate this program, the amendments require the Secretaries of military departments to prepare and implement INRMP's for military installations in the United States that have significant natural resources.

Furthermore, the SAIA mandates that the INRMP reflect the mutual agreement with the US Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission, which include conservation, protection and the management of fish and wildlife resources and will be demonstrated by the signing of the INRMP by the appropriate agency representatives. Management of fish and wildlife resources will be achieved by the implementation of beneficial practices (e.g., prescribed burning, forest thinning, wetland buffers and water quality protection). Because of the positive impacts to the Installation and surrounding natural resources, the Navy contends that these and other management practices described within this INRMP are not likely to adversely affect any listed species or designated critical habitat.

Naval Facilities Engineering Command, Southern Division, requests your agency's review, comment and concurrence with the Navy's determination that no listed species or designated critical habitat will be adversely impacted by the implementation of this INRMP. We would appreciate your active participation in the preparation process by providing written comments of the enclosed INRMP to our office by December 10, 2004.

If you have any questions, please contact me at (843) 820-5593 or Mr. Rod Fleming at (843) 820-5721.

Sincerely,

A handwritten signature in black ink, appearing to read "W. A. Drawdy".

WILLIAM A. DRAWDY
Head, Natural Resources Branch

Enclosure

(1) Integrated Natural Resources Management Plan (INRMP) for the Jacksonville Complex, Jacksonville, Florida



DEPARTMENT OF THE NAVY

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P. O. BOX 190010
2155 EAGLE DRIVE
NORTH CHARLESTON, S. C. 29419-9010

ES13RF
November 4, 2004

Mr. Scott Johns
Florida Fish and Wildlife Conservation Commission
PO Box 177
Olstee, FL 32072

Subj: INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE
JACKSONVILLE COMPLEX, JACKSONVILLE, FLORIDA.

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Sincerely,



WILLIAM A. DRAWDY
Head, Natural Resources Branch

Enclosure

(1) Integrated Natural Resources Management Plan (INRMP) for the Jacksonville Complex, Jacksonville, Florida

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION



RODNEY BARRETO
Miami

SANDRA T. KAUPE
Palm Beach

H.A. "HERKY" HUFFMAN
Enterprise

DAVID K. MEEHAN
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KENNETH D. HADDAD, Executive Director
VICTOR J. HELLER, Assistant Executive Director

OFFICE OF THE EXECUTIVE DIRECTOR
(850)487-3796 TDD (850)488-9542
January 7, 2005

W.A. Drawdy
Head, Natural Resources Branch
Department of the Navy
Southern Division
Naval Facilities Engineering Command
P.O. Box 190010
North Charleston, SC 29419-9010

Mr. Drawdy,

On behalf of the Florida Fish and Wildlife Conservation Commission, we believe your group has effectively addressed the issues important to natural resources management at the Jacksonville Complex, including NAS Jacksonville and NAS Mayport. The presentation of the INRMP, which was attended by Mr. Jim Garrison of our office, was clear and detailed. Our questions were addressed and we were satisfied with the responses. We have no further comments concerning this issue and look forward to working with your office again on future INRMP's.

Sincerely,

A handwritten signature in black ink that reads "Scott Johns".

Scott Johns
District Wildlife Biologist
North Central Region
Florida Fish and Wildlife Conservation Commission

cc: Mr. Roland Garcia
Mr. Matt Pollock

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DEPARTMENT OF THE NAVY

NAVAL AIR STATION
JACKSONVILLE, FLORIDA 32212-5000

IN REPLY REFER TO:
NASJAXINST 5090.12A
Code 064/WP/5000

30 SEP 2005

NAS JACKSONVILLE INSTRUCTION 5090.12A

Subj: NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) REVIEW OF PROPOSED FEDERAL PROJECTS/ACTIONS ON NAVAL AIR STATION (NAS) JACKSONVILLE

Ref: (a) OPNAVINST 5090.1B CH-2
(b) DOD Directive 6050.7
(c) 32 CFR 775
(d) SECNAVINST 5000.2B
(e) NASJAXINST 11010.1

Encl: (1) NAS Jacksonville Project Environmental Review Sheet
(2) NAS Jacksonville Project Design Environmental Comments Sheet

1. Purpose. To ensure that proposed federal projects/actions on NAS Jacksonville are planned, designed and performed in compliance with all federal, state and local environmental laws and regulations.

2. Scope. This instruction applies to all proposed federal projects/actions on NAS Jacksonville and its outlying properties, including actions initiated by action proponents.

3. Cancellation. NASJAXINST 5090.12.

4. Background. The potential exists that new federal projects/actions may be performed without adequately considering the environmental impacts and permit requirements. Thorough project/action evaluation by the Environmental Department reduces potential violations of environmental laws and regulations and subsequent fines. References (a), (b), (c) and (d) set forth the policy and guidance for federal projects/actions on Navy facilities and recommend procedures to ensure that all impacts are assessed during initial planning and prior to the start of new federal projects/actions.

5. Definitions.

a. Action Proponent. Any individual, command, or organization that develops a proposed federal project/action combined with their selected design agents.

b. Emergency Action. Any action that must be performed immediately to safeguard property, address immediate life/health endangerment conditions, or stop hazardous substance or pollutant discharges.

c. Project/Action Evaluation. An interdisciplinary review and analysis for determining environmental requirements.

d. Proposed Federal Project/Action. Any specific new construction, maintenance, repair, or modification of federal land or facilities or new federal production process or action at any specific location that has not been previously evaluated for environmental requirements.

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6. Policy. The Action Proponent for a proposed federal project/action on NAS Jacksonville must submit a project/action request to the Facilities Department for evaluation and approval through the process established by this instruction.

7. Discussion. The degree to which a proposed federal project/action is evaluated by the Environmental Department depends on the scope of work and its potential impact to the environment or violation of environmental laws and regulations. Any proposed project/action that requires a design or is in an environmentally sensitive area i.e. a wetland, contaminated site, AICUZ or RAICUZ will be reviewed during the initial planning and design phases.

8. Proposed Projects/Action Evaluation Process. Enclosures (1) and (2) will be used to document evaluations of proposed federal projects/actions. Additional forms may be used by the Environmental Department and attached to the review package to provide specific guidance for permits, environmental assessments, environmental impact statements, designs, specifications or operating procedures.

a. Project Environmental Review Sheet (PERS). Enclosure (1) will be used to document the initial evaluation of a proposed federal project/action. The document has two main parts.

(1) The following sections (non-inclusive) are evaluated by Environmental Department media managers: wetlands, flood plain, threatened and endangered species, cultural resources, water, wastewater and stormwater, Installation Restoration Program (IRP)/Petroleum Contamination (PCA), air pollutants, solid and hazardous wastes, storage tanks, environmental permits and comments.

(2) The environmental impact analysis and signature sections are completed by the Environmental Department Director.

(3) The cost for State Historic Preservation Office coordination, permits, environmental assessments and environmental impact statements must be incorporated into federal project/action cost estimates. The Action proponent must submit all required information to the Environmental Department review and coordination with the appropriate regulatory agencies.

(4) All federal project/action requests must include the project title, date submitted, name, address and phone number of preparer and action proponent, project start date, site location map and scope of work in order for the Environmental Department to evaluate the environmental impact.

(5) The Environmental Department will provide the completed PERS for a proposed federal project/action review to the Facilities Department to forward to the Action Proponent.

b. Project Design Environmental Review Sheet (DECS). Enclosure (2) will be used to document Environmental Department comments on the design of a proposed federal project/action. The Environmental Department will provide the completed DECS for a proposed federal project/action to the Facilities Department to forward to the Action Proponent.

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c. Emergency Actions. For emergency actions the Action Proponent is responsible for ascertaining and complying with all environmental requirements. After hours advice can be obtained from the NAS Jacksonville Command Duty Office.

9. Responsibilities

a. Action Proponents for proposed federal projects/actions will:

(1) implement procedures set forth herein;

(2) submit results for all proposed projects/action to the Facilities Department for review and approval in the initial planning stages of project/action development;

(3) ensure funding is available for State Historic Preservation Office coordination, permits, environmental assessments and environmental impact statements, if required;

(4) be available for consultation and provide assistance to the Facilities and Environmental Departments during the evaluation process; and

(5) apply for a digging permit through Facilities Department prior to start of a new project/action that involves excavation on Station land per referenced (e).

b. Environmental Department will:

(1) ensure that environmental evaluations are completed for all significant federal project/action requests submitted to the Facilities Department;

(2) be available for consultation and provide assistance during the evaluation process;

(3) perform and process all reviews in accordance with references (a), (b), (c), and (d) including routing the appropriate documentation via the chain of command, coordination with federal, state, and local regulatory agencies, public announcements and reviews.

(4) provide technical support and assistance during preparation of applicable reviews and permit applications; and

(5) serve as the official representative of the Commanding Officer when coordinating and negotiating with federal and state regulatory authorities.

c. Contracting Officers for proposed federal projects/actions will:

(1) ensure the enclosures (1) and (2) have been completed and the environmental issues are addressed prior to soliciting, bidding, or awarding a federal project/action contract or modification.

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(2) comply with the requirements and recommendations outlined in forms and documents attached to enclosures (1) and (2).

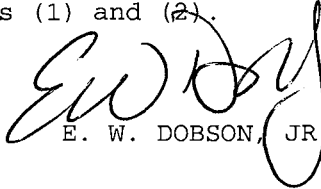
d. Contract Surveillance Representatives for proposed federal projects/actions shall:

(1) ensure that a federal project/action evaluation is completed prior to executing any contract work;

(2) ensure that a federal project/action evaluation is complete for all change orders or amendments initiated during the execution of a contract;

(3) be available for consultation and provide assistance to the Facilities and Environmental Departments during the evaluation process for contract modifications; and

(4) comply with the requirements and recommendations outlined in forms and documents attached to enclosures (1) and (2).



E. W. DOBSON, JR.

Distribution:
(NASJAXINST 5605.1HH)
List J-1

NAS JACKSONVILLE PROJECT ENVIRONMENTAL REVIEW SHEET (PERS)

Project Title:

Project Number:

1. Wetlands

- Project is not sited in a wetland.
 Project is sited in a wetland. See section 11 for required permits.

2. Flood Plain

- Project is not sited in a 100-year flood plain.
 Project is sited in a 100-year flood plain. See section 11 for required permits.

3. Threatened and Endangered Species

- Project has no potential for affecting threatened or endangered species or critical habitats.
 Threatened or endangered species in the vicinity of the project will not be adversely affected.
 Consultation with USFWS underway in accordance with the Endangered Species Act.
 Biological Assessment is required. Estimated completion date is ___/___/___.

4. Cultural Resources

- Project area has been surveyed and no historic properties were identified.
 Historic properties identified, but they will not be adversely affected.
 Project will have an adverse effect on historic properties. Consultation with the State Historic Preservation Office is required.
 Project will affect a site or property of interest to Native Americans.

5. Natural Resources

- | | | |
|--------------------------|--------------------------|---|
| Yes | No | |
| <input type="checkbox"/> | <input type="checkbox"/> | Does project affect flora? If yes see * |
| <input type="checkbox"/> | <input type="checkbox"/> | Does project affect fauna? |
| <input type="checkbox"/> | <input type="checkbox"/> | Does project affect BASH? |
| <input type="checkbox"/> | <input type="checkbox"/> | Does project affect wildlife management area? |
| <input type="checkbox"/> | <input type="checkbox"/> | Does project affect forestry management area? If yes see ** |
| <input type="checkbox"/> | <input type="checkbox"/> | Does project affect erosion? |

* Every effort shall be made to avoid or minimize tree removals. Trees removed for project purposes are to be replaced per the NAS JAX Tree Mitigation Plan.

** **"VALUABLE STANDING TIMBER:** Bidders must be advised that there is marketable standing timber on the construction site within the clearing limits for this project. Fair market value will be determined by Government appraisal. The contractor is required to pay the appraised amount to the government, within 30 days after notice to proceed has been given, to be deposited in the navy's forestry account."

6. Water, Wastewater and Stormwater

Water:

- Construction permit required for extension of water system per 62-555, FAC. See section 11.
 No permit required for a water line to a single building.
 Backflow preventer(s) required. Must be field tested by licensed inspector upon installation.
 Sprinkler system must have rain sensor device per FS 373.62.
 All new water coolers must be sampled for lead after installation IAW OPNAVINST 5090.1B CH1 of 2 Feb 98.
 Well drilling/mod/abandonment must be conducted by a licensed contractor. Permit required per 40C-3, FAC. See section 11.
 Other: _____

Wastewater:

- Construction permit required to connect to collection system per 62-600, FAC. See section 11.
 No permit required per 62-604.110 (single facility, gravity service connection, no pretreatment, compatible discharge)
 Other: _____

Stormwater:

- Environmental Resource Permit required from SJRWMD per 40C-42 because: (See section 11)
 (1) Creates more than 4,000 S.F. impervious surface subject to vehicular traffic;
 (2) Creates more than 5,000 S.F. impervious surface; or
 (3) Project affects 5 acres or more (includes recreation areas, golf course, ball fields, etc.)
 Site included in station Stormwater Master Plan; permit required but may access existing stormwater treatment system.
 (Basin no. _____; pond no. _____; approx. _____ S.F.)
 1-acre site, construction contractor must submit NPDES Notice of Intent ((NOI), implement Stormwater Pollution Prevention Plan, and submit Notice of Termination (NOT). See section 11.
 Below permitting thresholds.
 Upon completion site will be included in station Stormwater Pollution Prevention Plan, NASJAXINST 5090.4. and will require quarterly inspections.
 Other: _____

7. Installation Restoration Program (IRP)/Petroleum Contamination (PCA)

- Facility is not sited on or near a IRP site.
 Facility is not sited on or near a PCA site.
 Facility is sited near an IRP site. Approximately _____ feet away.
 Facility is sited near and PCA site. Approximately _____ feet away.

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NAS JACKSONVILLE PROJECT ENVIRONMENTAL REVIEW SHEET (PERS)

Project Title:

Project Number:

- Facility is on an IPR site.
 Facility is on an PCA site.
 The following activities must be coordinated with the IRP Manager/Navy: excavation, special soil boring and design of facility, and sampling. Personnel working in the site must have 40 hour H&S training and proper PPE.
 The site is projected to be remediated and/or closed out on ___/___/___, prior to commencement of construction activities.
 The nature of the site contamination does not preclude the type of construction activity proposed.
 Land Use Restrictions are in effect.
 The proposed project maybe on acceptable land use but require FDEP/EPA concurrence.
 The proposed project is not acceptable land use.
 There is a Compliance Agreement associated with this site.
 A Remedial Investigation/Feasibility Study was completed on ___/___/___, to accurately delineate the aerial extent of the contamination.

8. Air Pollutants

- Will not be generated by the operation or construction of this facility.
 Will be generated by the operation or construction of this facility. Request for permit determination is required.
 Construction Permit for new air emissions source is not required.
 Construction Permit for new air emissions source is required. See section 11.

9. Solid and Hazardous Wastes**Hazardous waste generation and disposal must be coordinated with the Station HW Manager.**

Asbestos:

- Not present.
 Not present: _____ survey underway.
 Present: _____

Lead Based Paint:

- Not present.
 Not present: _____ survey underway.
 Present: _____

Polychlorinated biphenyls (PCBs):

- Not present.
 Not present: _____ survey underway.
 Present: _____

Other known hazardous or toxic substances and pollutants (e.g. contaminated soils):

- Not present.
 Not present: _____ survey underway.
 Present: _____

10. Storage Tanks (Check all that apply)

- No storage tanks are involved.
 New storage tanks will be installed.
 Material to be stored, quantity _____.
 Existing tanks on the project site will be removed. Ensure ERMD has been notified.
 Contamination exists.
 Contamination unknown.
 Existing tanks on project site will be retained.

11. Environmental Permits

- No permits are required
 The following permits are required prior to construction:
 SJRWMD Environmental Resource Permit for wetland impacts.
 Army Corps of Engineers Permit for wetland impacts.
 SJRWMD Environmental Resource Permit for stormwater impacts.
 Construction permit required for extension of potable water system per 62-555, FAC.
 Construction permit required to connect to sanitary collection system per 62-600, FAC.
 Well drilling/mod/abandonment must be conducted by a licensed contractor. Permit required per 40C-3, FAC.
 NPDES 1-acre site; construction contractor must submit NPDES Notice of Intent (NOI), implement Stormwater Pollution Prevention Plan, and submit Notice of Termination (NOT). See section 11.
 Construction permit for new air emissions source.
 Other: _____

12. Pollution Prevention

- Use affirmatively procured materials and products (Executive Order 13101) if cost is less than 10% higher than virgin materials and quality is similar (web site: <http://www.epa.gov/epaoswer/non-hw/procure/index.htm>) see NASJAXINST 5090.7A.
 Ensure that this project contains the NAVFAC specification 01572 to enhance both recycling and diversion of wastes from landfills. As an alternative, a Construction Waste Management Plan (CWMP) may be submitted. See: section 6 of NASJAXINST 5090.7A.
 Use low noise equipment.

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NAS JACKSONVILLE PROJECT ENVIRONMENTAL REVIEW SHEET (PERS)

Project Title:	Project Number:
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13. Comments

14. Environmental Impact Analysis Process

- _____ Categorical exclusion applies. Routine repair and maintenance of facilities and equipment to maintain existing operations and activities.
- _____ Categorical exclusion applies. New construction that is consistent with existing land use and, when completed, the use or operation of which complies with existing regulatory requirements.
- _____ Categorical exclusion applies.
- _____ Environmental Assessment required. Expected completion date is ____/____/____.
- _____ Finding of No Significant Environmental Impact signed on ____/____/____.
- _____ Environmental Impact Statement required. Expected completion date is ____/____/____.
- _____ Record of Decision signed on ____/____/____.

15. Environmental Director
 Environmental Department
 NAS Jacksonville, FL 32212-5000
 (904)542-2717 Ext. 116 DSN 942-2717
 FAX: 942-4368

Signature:

Date:

Distribution:



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