FINAL 2015

HURLBURT FIELD

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

HURLBURT FIELD, FLORIDA

PREPARED BY AIR FORCE CIVIL ENGINEER CENTER
IN COOPERATION WITH 1 SOCES/CEIE

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Security Instructions/Record of Changes

1. The unclassified title of this plan is the Hurlburt Field Integrated Natural Resources Management Plan.
2. This document is unclassified and requires no special handling.
3. This e-document may be reproduced, in whole or in part, as required for the preparation of supporting documents, checklists, and briefing aids. The approved annual updates and consolidated update will reside on the USAF website: e-Plans. Agencies or individuals without direct access will be given printed or CD copies on request.
4. The provisions of Air Force Instruction (AFI) 10-1101, *Operations Security Program*, and Air Force.
5. System Security Instruction 90-100, *Command, Control, Communication, and Computers System Security Education, Training and Awareness Program*, have been considered in the development and implementation of this plan.
6. This plan will be updated continuously on the e-Plans website by the installation in coordination with the United States Fish and Wildlife Service (USFWS) and the Florida Fish and Wildlife Conservation Commission (Florida FWCC). Certification of all reviews has been delegated to the 1st Special Operations Civil Engineer Squadron, Environmental Element (1 SOCES/CEAN) by the Commander, 1st SOW (1st SOW/CC). Annual and 5 year review cycles per AFI 32-7064 are superseded by the continuous update (annual USFWS & FWCC coordination) cycle of e-plans.
7. Annual review may take one of several forms but the preferred method is to electronically transmit a tracked changes document to the USFWS and Florida FWCC for review of proposed changes. Once the review period is complete the final annual review document is posted electronically. New "wet" signatures are not required for the annual review so long as concurrence is documented. (see appendix …. for concurrence emails)
8. Revisions and annual coordination with USFWS and Florida Wildlife Conservation Commission (FWCC) will be reflected in a summary title page.
9. SUMMARY OF CHANGES:
    a. Text clarified. No substantial changes made.
    b. Acronym list updated to match text.
    c. Noted the addition of Cannon AFB, NM to AFSOC. Several missions at Hurlburt are reduced, but with little impact on the natural community as this was a flight operation (ch 6).
    d. Replacement of housing and the implementation of contractor owned housing (50 year lease) is noted. Minor changes as to responsibility of carrying out invasive species and animal control (ch 6).
    e. Prescribed fire and wildfire control responsibilities are now fully transferred to the Wildland Fire Center at Eglin AFB, Fl for planning, budget and execution (par 7.9).
    f. Goals were revised and aligned with AFCEC central management policy. Budget outline was included. Installation staff and AFCEC responsibilities were clarified (Chapter 8 & 9).
    g. Maps/tables updated.

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LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS

1 SOCES/CEV	1st Special Operations Civil Engineer Squadron/Environmental Management Division
1 SOW	1st Special Operations Wing
96 CEG/CEVSN	96 Civil Engineer Group/ Natural Resources Section (also known as Jackson Guard)
AAC	Air Armament Center
AAC/EMN	Air Armement Center, Environmental Management, Natural Resource Division
AFB	Air Force Base
AFI	Air Force Instruction
AFPD	Air Force Policy Directive
AFSOC	Air Force Special Operations Command
AICUZ	Air Installation Compatible Use Zones
BASH	Bird-Aircraft Strike Hazard
BMP	Best Management Practices
BOMARC	Boeing and University of Michigan Aeronautical Research Center
BX	Base Exchange
CCW	Command and Control Wing
CPAC	Commando Pride Airmen Center
CZMA	Coastal Zone Management Act
DoD	Department of Defense
DODD	Department of Defense Directive
DODI	Department of Defense Instruction
EA	Environmental Assessment
EESOH Counsel	Energy, Environment, Safety, and Occupational Health Counsel
EIAP	Environmental Impact Analysis Process
EO	Executive Order
EOD	Explosive Ordnance Disposal
ESA	Endangered Species Act
ESOH	Environment, Safety, and Occupational Health
ESOHCAMP	Environment, Safety, and Occupational Health Compliance Assessment and Management Program
FBSPA	Florida Beach and Shore Preservation Act
FCMP	Florida Coastal Management Program
FDEP	Florida Department of Environmental Protection
FGDC	Federal Geographic Data Committee
FNAI	Florida Natural Areas Inventory
FWC	Florida Fish and Wildlife Conservation Commission
FY	Fiscal Year
GIS	Geographic Information System
HQ	Headquarters
ICRMP	Integrated Cultural Resource Management Plan
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
MFH	Military Family Housing
mm	Millimeter
MMPA	Marine Mammal Protection Act
MOU	Memorandum of Understanding
mph	Miles per Hour
MS4	Municipal Separate Stormwater Sewer System
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System

LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS CONT'D

NSDI	National Spatial Data Infrastructure
NWI	National Wetlands Inventory
pH	Potential of Hydrogen (a measure of acidity)
POL	Petroleum, Oil, and Lubricant
RCW	Red-cockaded Woodpecker
SAIA	Sikes Act Improvement Act
SDSFIE	Spatial Data Standard for Facilities, Infrastructure, and Environment
SDZ	Surface Danger Zone
SHPO	State Historic Preservation Officer
SOCES	Special Operations Civil Engineer Squadron
SOS	Special Operations Squadron
SOW	Special Operations Wing
STG	Special Tactics Group
SWPPP	Storm Water Pollution Prevention Plan
T&E	Threatened and Endangered
U.S.	United States
US 98	U.S. Highway 98
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USSOC	U.S. Special Operations Command

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1. EXECUTIVE SUMMARY

1.1 The purpose of the Integrated Natural Resources Management Plan (INRMP) is to provide interdisciplinary strategic guidance for the management and protection of the natural resources at Hurlburt Field. The primary objective of the Air Force Natural Resources Program is to ensure continued access to land and airspace required to accomplish the Air Force mission while maintaining the natural resources in a healthy condition. The INRMP is prepared, in cooperation with the United States (U.S.) Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), the Florida Fish and Wildlife Conservation Commission (FWC), and other pertinent groups and agencies, to ensure that natural resources management and other mission activities are integrated and in agreement with all state and federal mandates.

1.2 Implementation of the INRMP will ensure future mission capacity through good stewardship of natural resources, ecosystem management, and addressing mission priorities for Hurlburt Field. The primary goals of the INRMP, representing Hurlburt's consistent management approach are as follows:

- Enhance military mission flexibility and success through sound stewardship practices and ecosystem management.
- Accommodate public use while enhancing collaboration and stewardship consistent with the military mission.
- Conserve and protect natural biodiversity by restoring and maintaining Hurlburt's ecosystems in support of the military mission.

Hurlburt Field's INRMP provides a solid base for planning and review under the National Environmental Policy Act (NEPA) while allowing for management of natural resources in coordination with multiple stakeholders. This management approach facilitates advanced siting by base planners and establishes boundaries and guidance for sensitive areas, reducing overall project costs, and ultimately minimizing the potential for negative environmental impacts. The INRMP prioritizes and identifies conservation goals to benefit the management of threatened and endangered species habitat and jurisdictional wetlands on Hurlburt Field. Regulatory requirements and practice standards outlined by the INRMP for landscape-level management, fosters successful and timely integration of conservation and military activities.

1.1 NATURAL RESOURCES PROGRAM MANAGEMENT

Extensive swamps, marshes, ponds, and bayous occur in and around Hurlburt Field. Approximately 3,431 acres, or 52 percent of the installation, is composed of federal jurisdictional wetlands. These sensitive and important habitats present challenges and, at times, may constrain the military mission at Hurlburt Field. Sometimes the constraints are seasonal, and mission activities are scheduled for specific times of the year to avoid or minimize potential impacts. Constraints may involve comprehensive consultation periods before a mission can be conducted, or measures to monitor the protected species (or its habitat) during the mission. For this reason, Hurlburt Field's Natural Resources staff plays a vital role in the planning stages for many mission activities.

1.2 OUTDOOR RECREATION AND NATURAL RESOURCES MANAGEMENT

Hurlburt Field offers full safe area access to recreation in its natural areas which include camping in designated areas, paintball and hiking on designated trails. Additional camping, hiking and hunting opportunities on the Eglin range are extended to the public for their enjoyment.

Public access to hazard areas on Hurlburt Field is severely restricted or forbidden. Areas designated as off limits meet mission needs such as airfield safety clearance zone, Explosives Safety Quantity Distance Arcs around storage and detonation areas, aircraft and airfield operation and safety restrictions or threatened and endangered species habitat restrictions. Some areas are open to DoD recreation only due to their location near such restricted zones.

Fishing, boating, and other water recreation in the bay are relatively unrestricted by military needs. The public is invited to enjoy the opportunities for recreation at Hurlburt Field.

2. GENERAL INFORMATION

2.1 PURPOSE

The Hurlburt Field INRMP has been prepared to direct the management of natural resources at Hurlburt Field for the next five years (from the date of completion of the INRMP) and is based on an interdisciplinary approach to ecosystem management. Under The Endangered Species Act (ESA) of 1973 (Public Law 93-205) the INRMP outlines a plan to protect and conserve federally listed threatened and endangered (T&E) plants and animals and their habitats on Hurlburt Field.

This INRMP was developed and will be implemented by the Hurlburt Field Environmental Flight, Civil Engineer Squadron, an element of Air Force Special Operations Command (AFSOC), U.S. Air Force. The Plan incorporates the provisions of AFI 32-7064, *Integrated Natural Resources Management*, and guides the activities of the natural resources management program and its interaction with the military mission. Key installation decision makers will be informed of the condition of Hurlburt Field's natural resources, the objectives of natural resources management, and potential or actual conflicts between mission activities and this management plan. Command actions and planned projects that have a potential effect are captured as part of the fully automated NEPA review process, at Eglin Range Command Control Committee (RC3) meetings that apply to Hurlburt, or through periodic informal meetings.

The purpose of this INRMP is to serve as a planning tool for future activities at Hurlburt Field as a detailed road map for the stewardship of all natural resources found on Hurlburt Field. This stewardship is based on an *ecosystem management approach* as defined in AFI 32-7064, *Integrated Natural Resources Management* and in Department of Defense Directive (DODD) 4715.3, *Environmental Conservation Program*. This approach to resource management protects and enhances vital ecosystem services such as water conservation, soil formation, oxygen recharge, and nutrient cycling within the context of mission support. The preservation and enhancement of biodiversity on Hurlburt Field is implemented by detailed objectives outlined in the INRMP that are consistent with Air Force objectives and Hurlburt's mission.

INRMP is prepared in cooperation with the USFWS, NMFS, FWC, Air Force Civil Engineer Center (AFCEC) and Hurlburt Field natural resources. Natural resources managers at Hurlburt Field also communicate with these groups and agencies on a project-by-project basis regularly throughout the year. The goal of these communications is to promote conservation initiatives throughout the installation and encourage input from state and federal partners.

2.2 AUTHORITY

This INRMP is prepared in accordance with the Sikes Act (16 United States Code [USC] 670) as amended by the Sikes Act Improvement Act (SAIA). The Sikes Act mandates not only that each military base prepare an INRMP, but also that they implement the management activities contained in the plan. Department of Defense Instruction (DODI) 4715.3, *Environmental Conservation Program*; Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*; and

AFI 32-7064, *Integrated Natural Resources Management* provide guidance and serve as key components in the process.

Additionally, this INRMP is prepared under authority of DODD 4700.4, *Natural Resources Management Program*, DODD 7310.5, *Accounting for Production and Sale of Lumber and Timber Production*, and AFPD 32-70, *Environmental Quality*.

Other federal and state laws and regulations that impact the management of natural resources at Hurlburt Field and that were considered during the preparation of this INRMP include:

- Federal Water Pollution Control Act of 1977 (the Clean Water Act)
- Endangered Species Act of 1973
- Archaeological Resources Protection Act of 1979
- Multiple-use and Sustained Yield Act of 1960
- Federal Land Policy and Management Act of 1976
- Fish and Wildlife Coordination Act
- Migratory Bird Treaty Act
- Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990
- Title 10 USC 2665 (Forest Management)
- Title 10 USC 2667 (Agricultural Outleasing)
- Executive Order (EO) 11990 (Protection of Wetlands)
- EO 11987 (Exotic Organisms)
- EO 11989 (Off-road Vehicles on Public Land)
- EO 11988 (Floodplain Management)
- EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds)

DODI 4715.3, *Environmental Conservation Program*, is the overarching instruction for Department of Defense (DoD) natural and cultural resource management, and is the primary agent for implementing policy (including the Sikes Act), assigning responsibilities, and prescribing procedures for the integrated management of natural and cultural resources on DoD property. This Instruction also establishes the DoD Conservation Committee that reports to the Environmental Safety and Occupational Health (ESOH) Council Policy Board, and designates "DoD Executive Agents" to lead DoD implementation of primary conservation issues.

AFPD 32-70, *Environmental Quality,* establishes policies to: responsibly manage natural and cultural resources on U.S. Air Force properties, clean up past environmental damage, meet current environmental standards, plan future activities to minimize impacts, and eliminate pollution from U.S. Air Force activities whenever possible. Under this directive, an Air Force Environmental Quality Program was developed, which includes activities such as cleanup,

compliance, conservation, and pollution prevention. Additionally, this directive states that the Air Force will pursue adequate funding to meet environmental legal obligations.

AFI 32-7064, *Integrated Natural Resources Management*, implements AFPD 32-70 and DODI 4715.3. This Instruction provides details on how to manage natural resources on U.S. Air Force installations so that they comply with applicable federal, state, and local laws and regulations. The INRMP facilitates compliance with federal, state, and local environmental requirements. Potential impacts to water and air quality, wetlands, endangered species, marine mammals, migratory birds, and other wildlife, forest, and fire management, and public access are all analyzed under these requirements. The relevant statutes and executive orders listed in this document show the applicability of various natural resources program components to significant laws and regulations.

2.3 RESPONSIBILITY

Multiple installation organizations play a role in managing, protecting, and supporting Hurlburt Field's natural resources. To ensure that the two missions—military training and environmental conservation—are compatible and mutually supportive, it is essential that these organizations work together to promote the overall U.S. Air Force mission. Various organizations and committees are involved in the stewardship of Hurlburt Field's natural resources. These groups meet on a quarterly or semi-annual basis to discuss any issues that may impact natural resources on and adjacent to the installation.

On behalf of the Secretary of the Air Force, the Air Force Civil Engineer Center (AFCEC) maintains centralized control of budgeting, staffing, planning, plan development and assists the base with expertise and guidance as it relates to all aspects of civil engineering, environmental compliance and specifically the execution of the installation INRMP.

2.3.1 Wing Commander

The Hurlburt Field Wing Commander, 1 SOW/CC is responsible for the following aspects of the Hurlburt Field INRMP:

- Approves the INRMP
- Certifies the annual review of the INRMP as valid and current; or delegates the certification of the annual INRMP review to the appropriate designee
- Controls access to and use of installation natural resources
- Assures that funding is requested from AFCEC to meet obligations under the INRMP

2.3.2 EESOH Council

Installation leadership is connected to base level environmental management through the Energy, Environment, Safety, Occupational Health (EESOH) Council. All assigned squadrons and tenant units are represented on this Council by a Unit Environmental Coordinator who is responsible for unit-specific oversight of operations that may impact environmental resources. The Council reviews the overall environmental management system at scheduled intervals to ensure its continuing suitability, adequacy and effectiveness.

- Guide policy for the natural resources program at Hurlburt Field
- Recommend opportunities for improvement and identifies changes to policies, environmental objectives and targets
- The EMS Cross-Functional Team chair works within 1 SOCES and is responsible for facilitating the review process at the base and leadership level.

2.3.3 Asset Management Flight

2.3.3.1 Environmental Management Element (1 SOCES/CEIE)

The Environmental Management Element which includes Natural Resources, Compliance and NEPA staff at Hurlburt Field is responsible for the revision, update and monitoring of the Hurlburt Field INRMP as follows:

- Review Air Force (AF) Form 813, *Request for Environmental Impact Analysis*, to determine natural resource impacts which would result from a proposed action.
- Act in accordance with 32 Code of Federal Regulations Part 989, *Environmental Impact Analysis Process*. Documented on AF Form 813, *Request for Environmental Impact Analysis*.
- Attend the Facilities Review Board to ensure an AF Form 813, *Request for Environmental Impact Analysis* has been or will be submitted for proposed projects that have the potential to impact the environment.
- Collaborate with Natural Resources Manager to address any proposed activity that has the potential to negatively impact natural resources.
- Provide a status of the natural resources management program to the ESOH Council upon request.
- Coordinate with the U.S. Fish and Wildlife Service (USFWS) and the Florida Fish and Wildlife Conservation Commission (FWC) on an annual basis.
- Prepare an update to the Hurlburt Field INRMP as needed in coordination with AFCEC, the USFWS and the FWC.
- Project 5 years of goals for the implementation of the Hurlburt Field INRMP Identify objectives which will support each goal.
- Request appropriate funded projects from AFCEC to achieve each objective.
- Manage funding for projects.
- Manage available manpower to implement the Hurlburt Field INRMP.
- Continuously update and adjust goals and objectives as conditions change on the e-Plan website, annually coordinate.

2.4 MANAGEMENT PHILOSOPHY

2.4.1. Military Mission

The primary objective of the U.S. Air Force natural resources program is to ensure continued access to land and airspace required to accomplish the military mission while maintaining these resources in a healthy condition. Natural resource management and

other mission activities are integrated and in agreement with federal mandates. Hurlburt Field's INRMP is designed to guide mission activities in an attempt to minimize and avoid impacts and to maintain a balance between resources conservation and mission objectives. Procedures to evaluate whether a proposed AF mission-critical project will negatively impact the environment and to identify associated necessary mitigation measures have been established within the INRMP. The plan ensures long-range resources are available for the mission.

2.4.2 Interdisciplinary Approach

Initially, resource management at Hurlburt Field was based on commodity production. Managers were given control of all natural resources under the principles of multiple-use and sustained yield. Conflicts and tensions arose when management for one commodity interfered with management for another. Prior to 1993, Eglin AFB played a significant role and provided guidance and support in certain environmental programs. Currently, the extent of natural resources management support from Eglin is restricted to wildfire suppression and prescribed fire only. In a letter dated 30 December 1993, Lt. Col. F. Thomas Lubozynski, Director, Environmental Management for Eglin AFB, identified the specific environmental responsibilities of Eglin and Hurlburt Field, respectively (Appendix F). Through the process of developing this INRMP, as directed by the Sikes Act and AFI 32-7064, the Environmental Management Element, in coordination with federal, state, and nongovernmental organizations, continues to refine the vision for the future of natural resources management on the installation. As ecosystem boundaries do not conform to political boundaries, Hurlburt Field has entered into partnerships with its primary surrounding landowners. Eglin AFB, other stakeholders, state and federal agencies, and nongovernmental agencies may enter into future partnerships as the need arises. These partnerships may include the sharing of information pertinent to the scientific management of shared ecosystems and the potential sharing of finances, manpower, and other resources to accomplish specific management activities within these shared ecosystems. All agreements and partnerships between Hurlburt Field and any other entity will recognize that these entities may have differing legal requirements and goals. Actions taken and funds expended to implement any agreements or partnerships will be contingent upon approval by senior management, appropriations of funds, availability of manpower and other resources, installation priorities, and other constraints.

2.4.3 AF Principles for Ecosystem Management

Since the early 1990s, the management of natural resources on Hurlburt Field has been based on the concept of ecosystem management, rather than production rates. This paradigm shift, guided by AFI 32-7064, DoD directives, and current scientific literature, attempts to balance the military mission with ecological functions by emphasizing the conservation and enhancement of biological diversity. This can be accomplished by focusing activities on the management of ecosystem types found on Hurlburt Field. Using keystone and rare species as indicators of ecosystem health is the chosen "metric" of success. A species is considered keystone when it influences the ecological composition, structure, or functioning of its community.

Ecosystem management is a land management system that seeks to protect viable populations of all native species, perpetuate natural disturbance regimes on a regional scale, adopt long-term planning timelines, and allow human use at levels that do not result in long-term ecological degradation. As outlined by the DoD under Secretary of Defense–Installations and Environment, DoD natural resources management will uphold the principles as outlined in DOI 4715.3, *Environmental Conservation Program* as follows:

- Maintain or restore native ecosystem types across their natural range where practical and consistent with the military mission.
- Maintain or restore ecological processes such as fire and other disturbance regimes where practical and consistent with the military mission.
- Maintain or restore the hydrological processes in streams, floodplains and wetlands when feasible.
- Use regional approaches to implement ecosystem management on an installation by collaboration with other DoD components as well as other federal, state and local agencies and adjoining property owners.
- Provide for outdoor recreation, agricultural production, harvesting of forest products, and other practical utilization of the land and its resources, provided that such use does not inflict long-term ecosystem damage or negatively impact the AF mission.

In consideration of these requirements from DoD, coordination with outside entities, and a review of current scientific literature, the following management principles on biodiversity conservation, invasive species control and support of the Natural Heritage Program are integrally woven into the following Hurlburt Field INRMP:

- Maintain viable populations of native species, especially keystone and rare species, on Hurlburt Field.
- Identify the presence of exotic and invasive species and implement programs to control and/or eradicate those species; develop joint control strategies with other federal, state and local cooperating agencies and adjacent landowners to increase the effectiveness of control measures. Survey and identify natural communities and species by working with the state Natural Heritage Program office; develop and implement management strategies oriented toward the conservation of Heritage Status Ranked species listed in the Association for Biodiversity Information (ABI) database.

2.4.4 Supporting the Base Comprehensive Planning Process

The INRMP is a key component plan of the Base Comprehensive Plan as detailed in the AFI 32-7062, Air Force Comprehensive Planning. The INRMP identifies natural resource features that need to be considered and incorporated into the Base Comprehensive Plan, General Plan, element management plans and other component plans and studies regarding future installation development.

2.5 CONDITIONS FOR IMPLEMENTATION

2.5.1 Implementation

The 1st Special Operations Civil Engineer Squadron/Environmental Management Element (1 SOCES/CEAN) is responsible for the planning and implementation of the INRMP. Other evaluation mechanisms exist through the Environmental, Energy, Safety, and Occupational Health Compliance Assessment and Management Program (EESOH) or other protocols.

2.5.2 Revisions

Natural resource management is a fluid process that requires frequent reviews and updates to management plans. Thus, periodic reviews and updates will be conducted to account for changes in the military mission, condition of natural resources, the ecosystem and regulatory requirements once the INRMP has been completed. Hurlburt Field's natural resources managers have been assigned responsibility to coordinate reviews. In order to comply with regulations and ensure the continued usefulness of this INRMP, reviews will be conducted as follows:

Annual Review - Annually, the INRMP continuous updates will be formally coordinated with the cooperating partners through notification of updates and acknowledgement of guidance. Five-year funding projections will be key to the annual updates. New and/or unmet requirements cannot be added into the current or planning year budgets requiring a significant look forward to successful and accurate project funding needs.

Five-Year Review - On a five-year cycle, formal submission for review and comment by the Major Command, the USFWS, and the FWC. As of 2014 AFCEC will be utilizing continuous updates on e-Plans website with the goal of reducing the five year review to a much less burdensome process for all signatory parties.

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3. INSTALLATION OVERVIEW

3.1 LOCATION AND AREA

Hurlburt Field is located on 6,634 acres in Okaloosa County within the Florida Panhandle (Figure 3-1). Fifty-two percent of the installation is jurisdictional wetland. The installation is about 35 miles east of Pensacola, is bordered by the city of Mary Esther and Santa Rosa Sound, and is located within the Eglin reservation. Primary highway access to Hurlburt Field is via US 98. Hurlburt Field was formerly known as Eglin Auxiliary Field 9, and the installation retains close organizational and operational ties to Eglin. A Host-Tenant Agreement exists between Air Armament Center (AAC) on Eglin and the 1 SOCES, and gives operational control of Hurlburt Field to the 1 SOCES. There are 8087active duty, 9,164 family members (living on/off base), and 1,968 civilians working and/or living on Hurlburt Field.
http://www.militaryinstallations.dod.mil/ (2014) (See table 3.1)

Hurlburt Field is divided into a western and an eastern section by a 9,600-foot runway and associated airfield. While most of the installation is located north of US 98, the "Soundside area" south of US 98 provides space for officer and enlisted housing, the Soundside Club, the petroleum, oil and lubricant (POL) marine dock, the installation marina and other outdoor recreational facilities. The western section of the installation, north of US 98, contains the flightline support functions for Hurlburt Field's fixed-wing missions, the main cantonment area, additional housing, and less developed areas containing the rifle range and Explosive Ordnance Disposal (EOD) operations. Red Horse operations and training, flightline support facilities for Hurlburt Field's rotary-wing missions, additional family housing, commercial (commissary, Base Exchange [BX], and other concessions), and medical facilities are located east of the airfield.

3.2 INSTALLATION HISTORY

Hurlburt Field was one of the original small pilot and gunnery training fields built on the Eglin AFB complex in the 1940s. The field was named for 1st Lieutenant Donald W. Hurlburt, who was killed in an aircraft accident on the Eglin reservation in 1943. In March of that year, the first east-west runway was built in the location of present-day Tully Street.

In 1955, the 17 Light Bombardment Wing arrived at Hurlburt Field from Minho, Japan to conduct routine training. Three years later, this unit was replaced by the 4751st Missile Wing of the Air Defense Command. Its mission was to test surface-to-air missiles launched from facilities on neighboring Santa Rosa Island.

Hurlburt Field's role in the development of special air warfare operations began in 1961 with the phase out of BOMARC missile testing and the activation of the 4400th Combat Crew Training Squadron. What eventually became the Special Air Warfare Group, provided the Air Force with a counterinsurgency military assistance capability. In 1963, the group became the 1st Air Commando Wing which met the expanded need for special air operations in Vietnam.

In 1968, the Air Commando Wing became the 1st Special Operations Wing (1 SOW) of the U.S. Special Operations Force. Missions of the Air Force Special Operations Force and the 1 SOW were consolidated in 1974 and the Wing was re-designated the 834th Tactical Composite Wing under the Tactical Air Command. In 1975, the Wing once again assumed its name as the 1 SOW.

As part of a consolidation of combat rescue and special operations in 1983, the 1 SOW became part of 23rd Air Force under Military Airlift Command. As part of the 23rd Air Force, Hurlburt Field based 1 SOW personnel and equipment were involved in drug interdiction from the Bahamas, Turk and Caicos Islands, Operation "Urgent Fury" on Grenada, and Operation "Just Cause" in Panama.

In May of 1990, the 23rd Air Force became AFSOC. AFSOC was designated as a major command, and continued in the role of Air Force component of the U.S. Special Operations Command (USSOC). Special Forces units participated in Operation "Desert Storm" in Kuwait and Iraq, and "Continue Hope" in Somalia under this command. The 1 SOW was renumbered the 16 SOW in 1993 and later re-designated as 1 SOW in November 2006.

Figure 3-1. Location of Hurlburt Field and Surrounding Areas

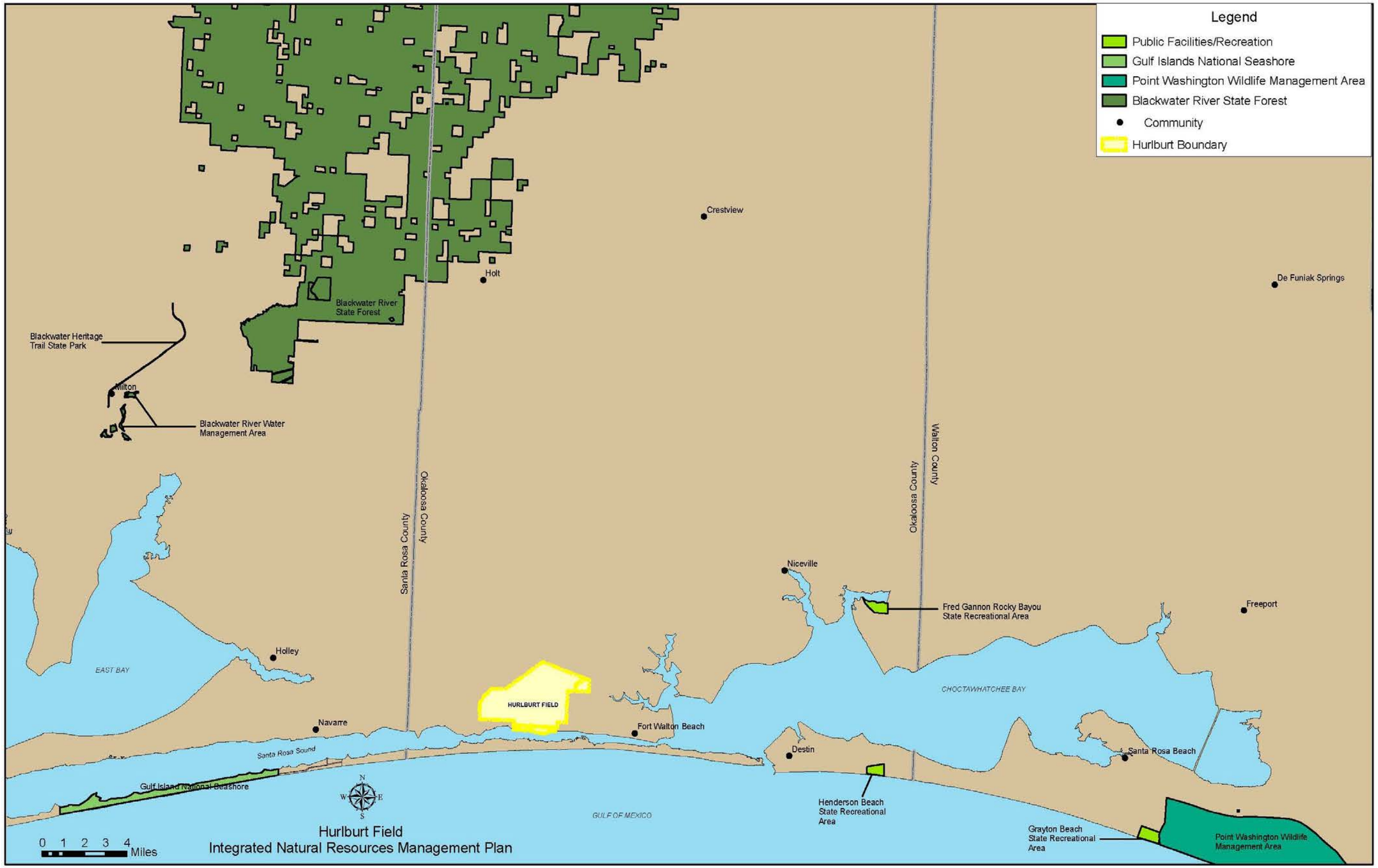

Figure 3-2. Local and Regional Natural Areas Adjacent to Hurlburt Field

3.3 MILITARY MISSION

Hurlburt Field is the home of Headquarters (HQ) AFSOC and is one of two installations in this Major Command. Cannon AFB, New Mexico in the high plains was added in 2009. The AFSOC mission is to organize, train, equip and educate Air Force special operations forces for worldwide deployment and assignment to regional unified command for conducting:

- Unconventional warfare
- Direct action
- Special reconnaissance
- Counterterrorism
- Foreign internal defense
- Humanitarian assistance
- Psychological operations
- Personnel recovery
- Counter-narcotics

The Wing at Hurlburt Field is divided into four groups:

1st Special Operations Group:

- 4th Special Operations Squadron, AC-130U Spooky Gunship
- 8th Special Operations Squadron, CV-22 Osprey
- 9th Special Operations Squadron, MC-130P Combat Shadow
- 11th Intelligence Squadron
- 15th Special Operations Squadron, MC-130H Combat Talon II
- 1st Special Operations Support Squadron
- 23 Special Operations Weather Squadron
- 34th Special Operations Squadron
- 319th Special Operations Squadron, U-28A

1st Special Operations Maintenance Group:

- 1st Special Operations Aircraft Maintenance Squadron
- 1st Special Operations Component Maintenance Squadron
- 1st Special Operations Equipment Maintenance Squadron
- 801st Special Operations Aircraft Maintenance Squadron
- 901st Special Operation Aircraft Maintenance Operations Squadron

1st Special Operations Mission Support Group:

- 1st Special Operations Civil Engineer Squadron
- 1st Special Operations Communications Squadron
- 1st Special Operations Contracting Squadron
- 1st Special Operations Logistics Readiness Squadron
- 1st Special Operations Security Forces Squadron
- 1st Special Operations Force Support Squadron

1st Special Operations Medical Group:

- 1st Special Operations Medical Operations Squadron
- 1st Special Operations Medical Support Squadron
- 1st Special Operations Aerospace Medical Squadron
- 1st Special Operations Dental Squadron

The 1 SOW and Hurlburt Field also play host to several major partner units including AFSOC, 24th Special Operations Wing, 505th Command and Control Wing, Air Force Special Operations Air Warfare Center, and 823rd RED HORSE Squadron.

The 1st Special Operations Wing (1st SOW) at Hurlburt Field, Fl. is one of three Air Force active duty special operations wings and falls under the Air Force Special Operations Command (AFSOC).

The 1st Special Operations Wing is a pivotal component of AFSOC's ability to provide airpower to conduct special operations missions worldwide. The primary mission of the 1st SOW is to rapidly plan and execute specialized and contingency operations in support of national priorities. The wing's core missions include close air support, precision aerospace firepower, specialized aerospace mobility, intelligence, surveillance and reconnaissance (ISR) operations, and agile combat support.

The 4 SOS flies AC-130U Spooky gunships for missions of close air support, armed reconnaissance, and interdiction associated with conventional and joint special operations forces. The 8th SOS utilizes the CV-22 Osprey, a highly specialized Bell-Boeing tilt-rotor aircraft, for insertion, extraction, and re-supply of unconventional warfare forces and equipment into hostile or enemy-controlled territory using air-land or airdrop procedures. Numerous secondary missions include psychological operations, aerial reconnaissance and helicopter air refueling.

The 9 SOS flies the MC-130P Combat Shadow for worldwide clandestine penetration of enemy territory to provide aerial refueling of special operations helicopters. To support the

unconventional warfare mission, the 9 SOS flies low-level, communications-out in close trail formation using night-vision goggles.

The 15 SOS employs the MC-130H Combat Talon II. Specially modified to support unconventional warfare and special operations forces worldwide, the Combat Talon II is capable of penetrating a hostile environment at low altitudes and in inclement weather to insert, extract and resupply special operations forces by low or high altitude airdrop or air-land operations.

The 34th SOS and 319th SOS flies the U-28A, a variation of the Pilatus PC-12 to provide a manned fixed wing, on-call/surge capability for Improved Tactical Airborne Intelligence, Surveillance, and Reconnaissance (ISR) , as well as intra-theater support, in support of Special Operations Forces.

Other components of AFSOC stationed at Hurlburt Field include the 24th Special Operations Wing, the Air Force Special Operations Air Warfare Center (AFSOAWC), the 24th SOW, which has strategically placed units worldwide and is composed of special operations combat control and combat weather teams and pararescue forces, is U.S. Special Operations Command's tactical air/ground integration force and the Air Force's special operations ground force to enable global access, precision, strike and personnel recovery operations.

Core capabilities encompass: airfield reconnaissance, assessment, and control; personnel recovery; joint terminal attack control; and environmental reconnaissance. AFSOAWC's mission is to organize, train, educate, and equip forces to conduct special operations missions; lead major command irregular warfare activities; execute special operations test, evaluation and lessons learned programs; and develop doctrine, tactics, techniques, and procedures for AFSOC.

The mission of 505th Command and Control Wing (505 CCW) ,headquartered at Hurlburt Field but with several geographically separated units across the United States, is to improve Component Numbered Air Forces, as well as joint and coalition forces, warfighter capability through command and control testing, tactics development, and training by using a multi-disciplinary approach to training and development of tactics, techniques, and procedures (TTP) for the Component-NAF Headquarters; testing and training of key C2 systems; and comprehensive, realistic, cutting-edge operational through tactical-level live, virtual, and constructive exercises.

Hurlburt Field training missions are scheduled through Eglin, and, while munitions testing and evaluation take priority over training on the Eglin range, the predominately nighttime operations of Hurlburt Field's special operations aircraft and troops are generally compatible with other daytime uses of the range. Test Area A-77 is the most heavily used Eglin location for air-to-ground live fire training by Hurlburt Field-based units. Special Forces dropped by Hurlburt Field aircraft into drop zones scattered throughout the Eglin range span out in various directions depending upon the training objectives. Other frequently used Eglin live fire ranges include A-78, B-7, and R2914A:C52N. Airdrops and landings are accomplished at R29156A:B6 and R2914A:C61A/C5. Air refueling training takes place over the Gulf of Mexico in W151 designated airspace.

Hurlburt Field aircraft often egress and ingress along the northern border of the Eglin range near Crestview. These flights are associated with nighttime training missions in the mountains of eastern Tennessee and western North Carolina and northern Georgia (AFSOC/1SOW/PA, 2013).

See the Eglin AFB Florida INRMP (2013) for further information on Army air and ground activities in the area. AFSOC generally does not do joint training; however the newly developed assets of the 7th Special Forces could be utilized by AFSOC and the 7th Special Forces could utilize Hurlburt assets.

3.4 SURROUNDING COMMUNITIES

Communities immediately surrounding Hurlburt Field include Fort Walton Beach and Mary Esther. Based on latest data, the estimated population for these areas is listed in Table 3-1.

Table 3-1. Population Data for Surrounding Areas

City/Municipalities	Population
Destin	12,305
Fort Walton Beach	20,293
Shalimar	717
Navarre	31,378
Mary Esther	4059
Cinco Bayou	383
Unincorporated	105,334

Source: www.Census.gov Demographic Profile (2010)

3.5 REGIONAL LAND USE

The region of influence for mission activities at Hurlburt Field includes the surrounding counties of Okaloosa and Santa Rosa. The area immediately adjacent to the installation is primarily commercial and urban residential land; however, the area north of Hurlburt Field consists of military lands managed by Eglin AFB.

3.6 LOCAL AND REGIONAL NATURAL AREAS

Hurlburt Field contains a mixture of ecological communities including swamp, flatwoods, maritime hammock, cypress domes, and sandhill communities. For its physical size, Hurlburt Field plays an important role as a transitional area between coastal and inland ecosystems (1 SOCES, 2013).

Live Oak Creek Preserve is another FNAI site located south of Test Area B-70 and east of Test Area A-73 or about 5.5 miles north of Hurlburt Field. This is a unique riparian area where white-top pitcher-plants grow in nearly pure stands on floating mats. Other unique plant species, including the only known population of Corville's rush on Eglin, are found at the site along this tributary to the East Bay River.

Longleaf pine, wire-grass savannas/flatwoods harboring multiple ephemeral ponds dominate Hurlburt's western side and continue onto the Eglin installation. This landscape's suitable habitat and multiple breeding sites support the largest population of reticulated flatwoods salamander in the world, now listed as endangered. In an even broader context of landscape ecology, Hurlburt Field's natural communities of wetlands, flatwoods, and sandhills are connected northward through Eglin across sparsely populated private lands and on to similar habitats found in Blackwater River State Forest 20 miles north of Hurlburt Field (Figure 3-2). Blackwater River State Forest, in turn, is adjacent to Conecuh National Forest in southern Alabama.

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4. PHYSICAL ENVIRONMENT

4.1 CLIMATE

The climate of Hurlburt Field is subtropical (Table 4-2). Summer weather conditions are dominated by maritime tropical air from the southeast, characterized by high humidity and frequent convective thunderstorms. Winter weather is dominated by continental polar air from the northwest, which frequently results in frontal storms lasting several days. Winter temperatures rarely fall below freezing and frost occurs infrequently. Wind speeds average 5 to 6 miles per hour (mph) in all seasons, and winds are calm approximately 22 percent of the year. Ground-based inversions occur on the installation almost every morning and usually subside quickly with surface heating. The growing season averages about 275 days per year.

Precipitation occurs on average between 50 and 60 days per year and average annual precipitation is about 62 inches. Peak rainfall occurs in July and August, while October and November are usually the driest months. Average monthly rainfall ranges from 3.4 inches in November to 7.4 inches in July. The prevailing winds are northerly year-round, except during May and July, when they are usually from the south and southwest, respectively (U.S. Army Corps of Engineers [USACE], 1994). Hurlburt Field's close proximity to the coast creates daily sea breezes that affect regional prevailing winds.

The region is subject to periodic tropical storms, hurricanes, and tornadoes, generally from June through November. These cyclonic storms are most numerous in the month of September. Occasionally, high winds and heavy rainfall occur to inland areas.

According to the National Weather Service, storm Categories 1 through 5 measure wind speed, storm surge, and frequency using the Saffir/Simpson Hurricane Scale (Table 4-1). Storm surge areas are those regions that are subject to high water due to seawater blown inland during storms (such as storm surge). The portion of Hurlburt Field principally south of US 98 and bordering Santa Rosa Sound occurs in such an area. Storm surge areas are determined from hurricane inundation zones and represent "worst case scenarios" (such as during high tide) (Table 4-1).

Table 4-1. Hurricane Storm Categories in the Hurlburt Field Area

Storm Category	Wind Speed	Storm Surge Elevation	Average Frequency
1	74-95 mph	3.5 Feet	Once in 10 Years
2	96-110 mph	5.0 Feet	Once in 27 Years
3	111-130 mph	10.5 Feet	Once in 42 Years
4	131-155 mph	15.5 Feet	No Historical Occurrence
5	>155 mph	17.5 Feet	No Historical Occurrence

Source: National Hurricane Center, 2007

In the last 100 years, several hurricanes have directly impacted Hurlburt Field. Between 1996 and 2005, both hurricanes and tropical storms affected the Hurlburt Field area (Table 4-3). Prior to 1995, other hurricanes that have impacted the immediate Hurlburt Field area include Hurricane Eloise in 1975 and unnamed storms in 1936 and 1887. Tropical storm Alberto caused some scattered damage in 1994. Tornadoes are very infrequent, with an average of two per year reported within 5 miles of the installation (Air Weather Service, 2005, personal communication).

Table 4-2. Climatic Conditions at Hurlburt Field

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANN	YOR
Mean Temperature (°F)	51	53	59	66	73	79	81	81	78	69	60	54	67	37
Mean Dewpoint Temperature (°F)	41	45	50	55	63	70	73	72	65	56	52	44	57	10
Mean Wet Bulb Temperature (°F)	47	50	55	59	66	73	75	75	70	61	57	50	62	10
99.95% WCPA (FT)	300	450	550	350	250	250	150	200	200	300	350	300	350	10
Mean Precipitation (IN)	4.85	5.27	5.66	3.97	3.52	3.42	6.98	7.20	6.97	4.36	3.55	4.27	61.91	37
Prevailing Wind Direction (Deg.)	35-01	35-01	35-01	35-01	35-01	20-22	20-22	35-01	35-01	35-01	35-01	35-01	35-01	10
Mean Wind Speed (KTS)	6	7	6	6	6	5	4	4	5	5	5	6	5	10
Maximum Wind Speed (KTS)	44	52	48	47	53	64	43	48	74	44	50	56	74	37
Sky Cover GT 5/10 (%)	56.5	57.7	54.8	45.0	48.4	47.9	51.2	49.6	40.0	35.2	46.9	58.1	49.2	10
D/W Thunderstorms	2	3	4	4	5	10	16	15	7	2	2	2	72	37
D/W Fog (Visibly Lt. 7 MI)	17	15	18	16	16	11	12	13	13	12	13	15	171	37

Source: USAF, 2002

ANN = Annual, D/W = Mean number of days with, KTS = Knots per hour (1 knot = 1.15 miles per hour), YOR = Years of record, WCPA = Worst case maximum pressure altitude

Table 4-3. Major Storms in the Vicinity of Hurlburt Field (1995–2005)[1]

Name	Type[2]	Date	Sustained Winds (Miles/Hour)	Peak Gust (Miles/Hour)	Storm Surge (Feet)	Rainfall (Inches)
Dennis	H	2005	49[a]	64[a]	ND	ND
Ivan	H	2004	46[c]	70[c]	6.5[b]	6.06[b]
Helene	TS	22 October 2000	28[a]	40[a]	1	ND
None in 1999						
Earl	H	3 September 1998	35[b]	52[b]	ND	5.45
Georges	H	29 September 1998	52[b]	79[b]	ND	17.08
Danny	H	20 August 1997	35[b]	44[b]	ND	3.76
None in 1996						
Erin	H	3 August 1995	81[c]	98[c]	ND	4.06
Opal	H	4 October 1995	84	144	8.5[d]	6.64

[1]National Hurricane Center Webpage, 2007

[2]H = Hurricane; TS = Tropical Storm

[a]Recorded at Destin Airport, Florida

[b]Recorded at Hurlburt Field

[c]Estimated

[d]USAF, 1996, ND = No data available

4.2 LANDFORMS

Hurlburt Field encompasses 6,634 acres. This includes areas classified as *Improved* grounds, *Semi-improved* grounds, and areas classified as *Unimproved* grounds. Most of the large bodies of open water (other than Santa Rosa Sound to the south) occur northeast of the airfield in the vicinity of the golf course. The largest body of fresh water is Hurlburt Lake, which has a surface area of approximately 25 acres.

Hurlburt Field is located within the Coastal Lowlands physiographic province, characterized by beach ridge plains, shorelines, and marine terraces formed during the Pleistocene epoch. The region consists of level to rolling terrain with upland areas separated by depressional and riverine/bay forested wetlands. The installation is bordered to the north and west by East Bay Swamp, to the east by the city of Mary Esther, and to the south by Santa Rosa Sound. The topography ranges from sea level to approximately 40 feet above mean sea level along the northeast boundary. Slopes range from 0 to 8 percent.

4.3 GEOLOGY AND SOILS

The general geologic sequence found above bedrock in the area of Hurlburt Field includes Jurassic evaporates, carbonates, and sandstones, and shales of Cretaceous and early Eocene age overlain by the Claiborne Group. The Claiborne Group consists of low permeability shales and limestones. The Ocala Group overlies the Claiborne Group and is a permeable limestone composed primarily of fossils. The Buccatunna Clay is at the top of the Ocala Group and is overlain by the Chickasawhay and Tampa Formations, which consist of vesicular limestone and dolomite with enlarged pores and fractures created by solution and acidic groundwater. The groundwater in this aquifer (the Floridan aquifer) is the principal source of water for Hurlburt Field and the surrounding region. Pensacola Clay overlies the Tampa Formation. This clay has very low permeability overall but becomes coarser and more permeable north and east of the installation. The Pensacola Clay is overlain by the surficial (Sand and Gravel) aquifer, which consists primarily of gravel, sands, and clay.

The near-surface mineral resources occurring on Hurlburt Field are sand, gravel, quartz, and clay. These resources are minable from shallow, open pits in the undifferentiated sediments and Pensacola Clay. Hurlburt Field does not contain sinkholes and is considered to be located in an area with no reasonable expectancy of earthquake damage (Earth Tech, 1994).

The soils of Hurlburt Field are derived from sedimentary deposits of fluvial and marine origin. The majority of soils is sandy and has low fertility. Soil density is relatively low, reflecting the high permeability of the surface soils and the relatively low direct runoff in the area. Erosion potential for all soils is considered slight due to the relatively level topography, except along Santa Rosa Sound, where it is moderate. Prime farmland soils do not occur within the installation.

A soil survey was completed for Okaloosa County (U.S. Department of Agriculture [USDA], 1995). There are 12 soil types representing 12 soil series within Hurlburt Field (Figure 4-1). Seven of these are upland soil types, which are scattered throughout all but the northwest portion

of the installation. These soils include Chipley and Hurricane Complex, Foxworth Sand, Kureb Sand, Lakeland Sand, Mandarin Sand, Resota Sand, and Urban Land.

For all Hurlburt soil types the seasonal high water table is generally 2 to 3 feet below the surface from November to April. Consequently, there are moderate to severe development constraints due to wetness, as well as the caving of cut banks. Hurlburt's soils have severe limitations that reduce the choice of crop and pasture plants, require special conservation practices, or both.

1. **Chipley and Hurricane—**This soil complex is somewhat poorly drained and occurs on slopes of 0 to 5 percent.

2. **Foxworth Sand—**This soil type is moderately well drained and occurs on slopes of 0 to 5 percent.

3. **Kureb Sand—**This soil type is well drained and occurs on slopes of 0 to 8 percent.

4. **Lakeland Sand—**This soil type is also well drained and occurs on slopes of 0 to 5 percent.

5. **Mandarin Sand—**This soil is somewhat poorly drained and occurs on slopes of 0 to 3 percent.

6. **Resota Sand—**This soil type is moderately well drained and occurs on slopes of 0 to 5 percent.

7. **Urban Land—**This soil type does not have available descriptive or analytical information because it represents disturbed materials of various origins. It is located in developed areas beneath and surrounding buildings, roadways, and so on.

The remaining five soils are hydric (wetland) soil types. Hydric soils include Beaches, Dorovan Muck, Leon Sand, Rutledge Sand, and Pickney Loamy Sand. Dorovan Muck is the most widespread soil type on installation, dominating wetland areas in the northern half. Rutledge Sand dominates the southwest quadrant and is also frequent in the northeast. The remaining hydric soils are scattered throughout the installation.

Hurlburt wetland soil types all have a high water table of 0 to 2 feet above the surface from November to April. Development constraints are consequently severe due to ponding, and cut banks may cave. Pickney Loamy Sand has very severe limitations that make it generally unsuited to cultivation, and limit its use largely to pasture, range, woodland, or wildlife.

8. **Beaches—**This category of soil occurs along a small portion of the installation bordering Santa Rosa Sound but do not have descriptive or analytical information. However, it is evident that this soil type is subject to fluctuating water tables (on a daily basis due to tidal effects) and storm surge erosion.

9. **Dorovan Muck—**This soil is very poorly drained and occurs on nearly level terrain.

10. **Leon Sand—**This soil is poorly drained and also occurs on nearly level terrain.

11. **Rutledge Sand—**This soil is depressional and is very poorly drained.

12. **Pickney Loamy Sand—**This soil is also depressional and is very poorly drained.

4.4 HYDROLOGY

4.4.1 Groundwater

Hurlburt Field is underlain by a surficial Sand and Gravel aquifer, which includes the Citronelle Formation, and the Floridan aquifer of interbedded limestones and dolomite which is approximately 500 to 600 feet below the surface. The main water supply source at Hurlburt Field is the upper Floridan aquifer, which averages more than 1,000 feet in thickness and produces well yields from several hundred to over 10,000 gallons per minute. The water tends to be hard, but typically does not exceed drinking water standards for nitrate, fluoride, sodium, and chloride. Iron may occasionally exceed such standards. During the last several decades the Floridan aquifer has lowered 90 feet (USGS 1980) as a result of extensive pumping in the region. Should this trend continue, increases in saltwater intrusions and decreases in water storage along Santa Rosa Sound are possible.

The shallow Sand and Gravel aquifer ranges in thickness from about 150 feet in the east to some 200 feet near the center of the installation. Yields of more than 300 gallons per minute are possible in the main producing zone just southeast of Hurlburt Field. Water quality from the aquifer requires treatment prior to potable water use, due to relatively high iron and tannin levels, as well as a low pH (U.S. Air Force, 2002).

4.4.2 Watersheds, Wetlands, and Drainage Patterns

Floodplains are generally flat, lowland areas bordering inland and coastal waters (including offshore islands) that are subject to a 1 percent or greater chance of flooding in any given year, otherwise known as the "100-year floodplain" or "installation flood elevation." Such inland areas are a result of freshwater precipitation and/or runoff, and are generally of long duration, whereas coastal floodplains are often the result of short-duration freshwater precipitation and/or runoff as well as intense storm surges.

Regions of 100-year floodplains are extensive on Hurlburt Field (Figure 4-2 and Figure 5-4). As expected, there is a strong correlation between those areas mapped as wetlands and the 100-year floodplain. Consequently, most of the northwest portion of the installation and much of the northeast occur within floodplains. Scattered, isolated floodplain pockets also occur east and west of the airfield, and a floodplain/storm surge fringe exists where the installation borders Santa Rosa Sound.

Hurlburt Field is generally divided into two drainage basins or watershed regions. The northern two-thirds of the installation predominantly drains north and northwest into East Bay Swamp, while the southern third drains surface waters southward into Santa Rosa Sound. Surface waters in East Bay Swamp and East Bay River flow westward into East Bay. Man-made drainage ditches direct surface water flow (usually intermittent) into wetlands and watersheds to the north or south. Many of these drainages are intercepted by stormwater retention basins, and at least

five small drainages divert surface waters from the main cantonment area south to Santa Rosa Sound (Figure 4-2). Additionally, a very small region of land adjacent to the golf course apparently drains eastward into Cinco Bayou, and thereafter into Choctawhatchee Bay (U.S. Air Force, 2002a).

Wetlands are areas of transition between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water (Mitsch, 2000). Abiotic and biotic environmental factors such as morphology, hydrology, water chemistry, soil characteristics, and vegetation contribute to the diversity of wetland community types. The term *wetlands* describe marshes, swamps, bogs, and similar areas. Local hydrology and soil saturation largely affects soil formation and development, as well as the plant and animal communities found in wetland areas (U.S. Environmental Protection Agency [USEPA], 1995). Wetlands are often categorized by water patterns (the frequency or duration of flooding) and location in relation to upland areas and water bodies. Wetland hydrology is considered one of the most important factors in establishing and maintaining wetland processes and is critical to the groundwater recharge, floodwater storage, nutrient cycling, and wildlife habitat functions of wetland systems. Specific information on wetland resources can be found in Section 5.5 of this document.

4.4.3 Coastal Zone and Barrier Island Issues

The landward boundaries of the State of Florida are defined by the State, in accordance with Section 306(d)(2)(A) of the Coastal Zone Management Act (CZMA), as the entire state of Florida. Federal agency activities that have the potential to impact the coastal zone are required to be consistent, to the maximum extent practicable, with approved state Coastal Zone Management Programs. Federal agencies make determinations as to whether their actions are consistent with approved State plans. Consistency determinations are submitted to the State for review and concurrence. All relevant state agencies must review the Proposed Action and issue a consistency determination. The Florida Coastal Management Program (FCMP) is composed of 23 Florida statutes administered by 11 state agencies and four of the five water management districts.

Additional information regarding coastal zone issues is presented in Section 7.13 of this document.

4.4.4 Lakes and Ponds

All the water bodies within the limits of Hurlburt Field are depicted in Figure 4-2. The largest water body is 25-acre Hurlburt Lake, which receives flow from a number of interconnected golf course ponds, overland flow, seepages, and springs. The vast majority of the other ponded areas also occur in or adjacent to the golf course and/or northeast of the flightline.

Wetlands and floodplains associated with Hurlburt Field are discussed in greater detail in Section 5.5 of this document.

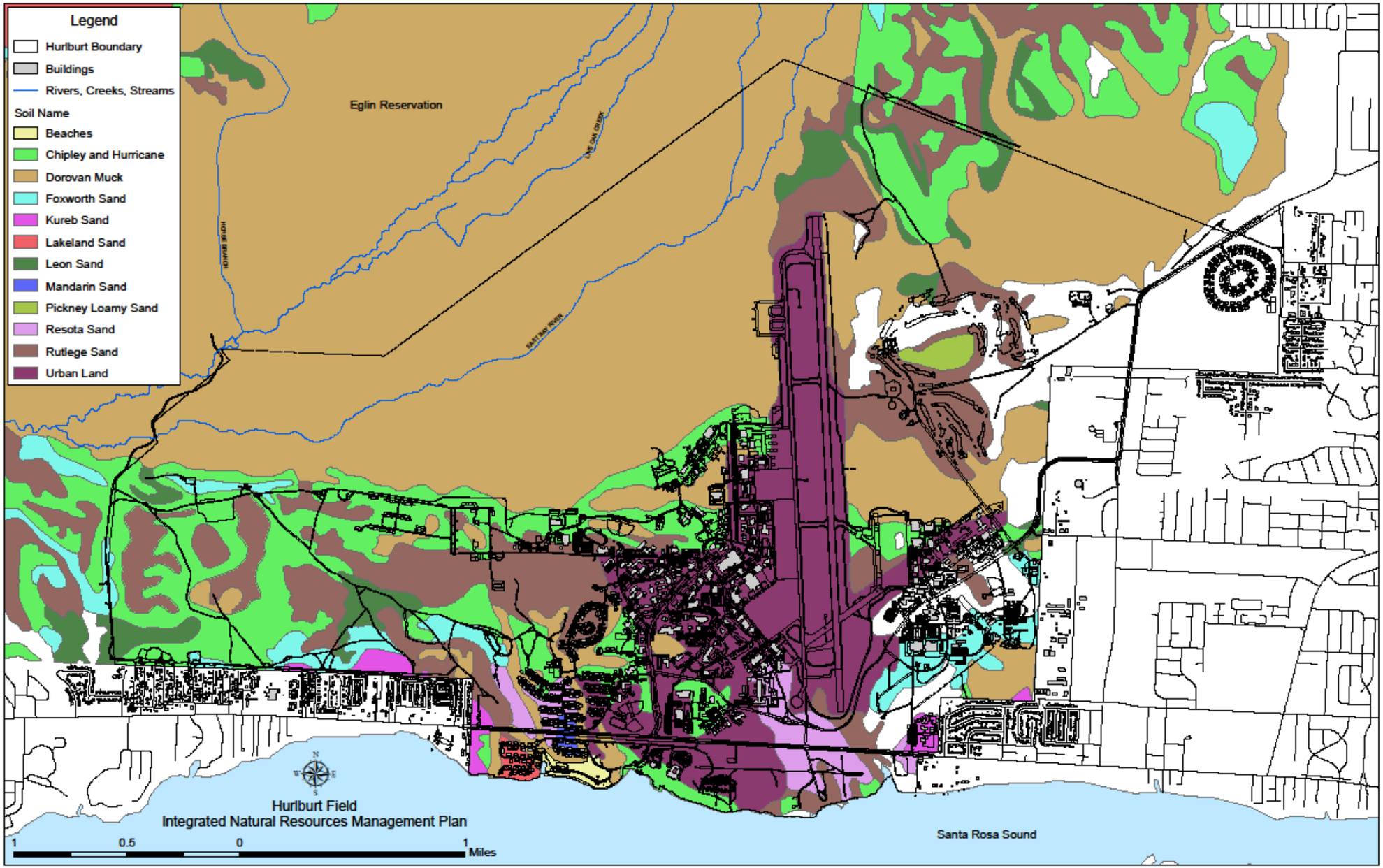

Figure 4-1. Soil Conditions of Hurlburt Field

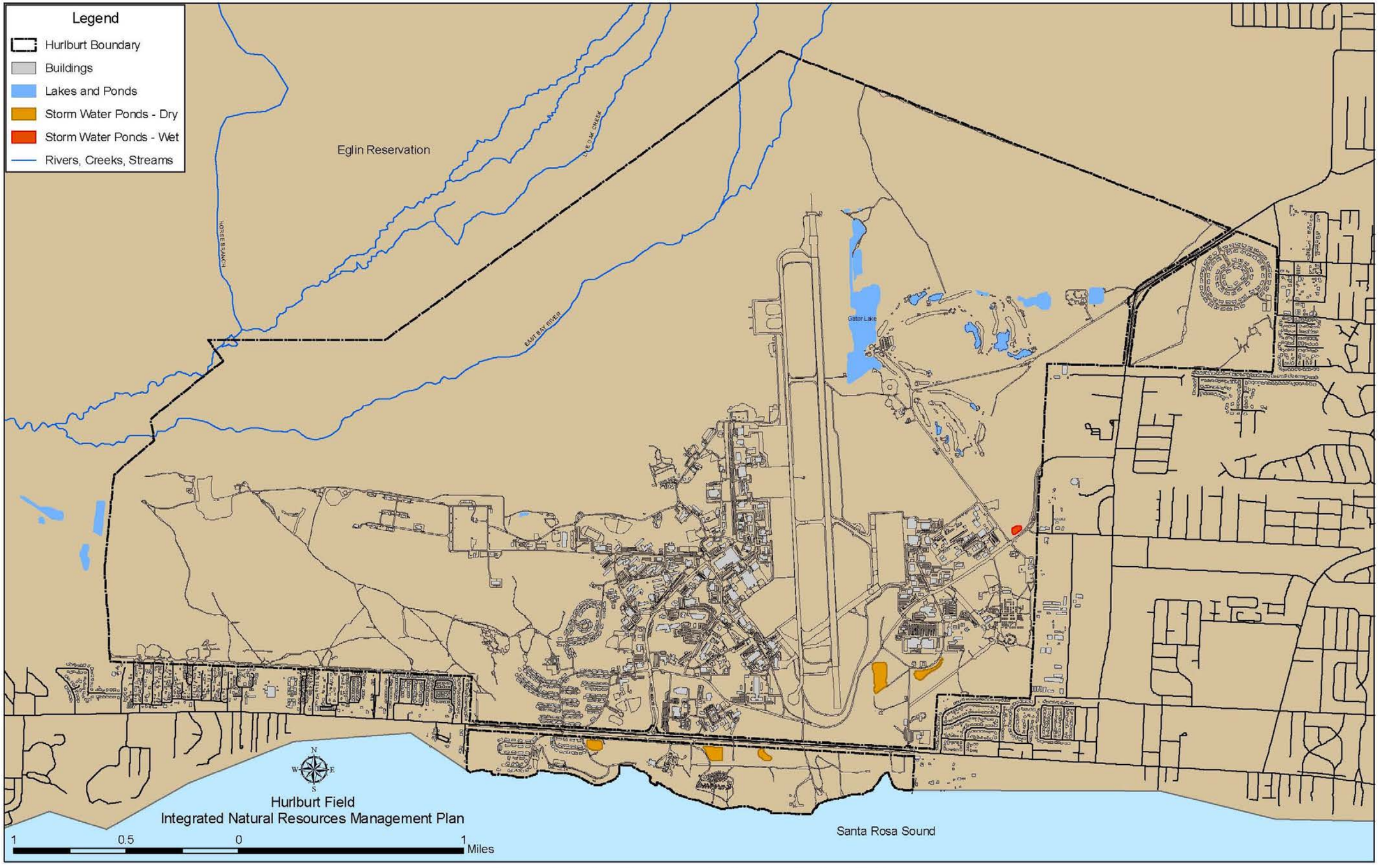

Figure 4-2. Surface Waters on and Adjacent to Hurlburt Field

5. ECOSYSTEM AND BIOTIC ENVIRONMENT

5.1 ECOSYSTEM

A national hierarchy for ecosystem classification has been developed by Robert G. Bailey of the USDA, Forest Service, Inventory and Monitoring Institute. This hierarchy is a regionalization classification and mapping system that links soils, physiography, and habitat types to stratify the landscape into progressively smaller areas (Bailey et al., 1994). Hurlburt Field is located within the Humid Temperate Domain, Subtropical Division, Coastal Plain Mixed Forest Province, and Section 232D Florida Coastal Lowlands (Western).

5.2 VEGETATION

The trees commonly found in the southeastern United States are pines (*Pinus* spp.), oaks (*Quercus* spp.), and members of the laurel and magnolia families. Southeastern forests usually have a well-developed lower stratum of vegetation that includes tree ferns, small palms, shrubs, and herbaceous plants. Forests of longleaf, loblolly, and slash pine dominate large areas of sandy upland xerophytic habitat as a subclimax forest, maintained by frequent fires. Vast areas of gum-bay swamps and scrub-shrub wetlands exist throughout the area. Bald cypress and pond cypress (*Taxodium ascendens*) are dominant trees in swamps and cypress domes throughout the region.

The majority of the pine forests found in the southeastern United States represent second-growth forests established after a disturbance event, such as a catastrophic wildfire or deforestation activity (natural or anthropogenic). Historically, under natural conditions, lightning-caused summer fires were an important component in maintaining pine-dominated ecosystems in the coastal plain area. These fires not only burned through pine stands in upland and flatwoods areas, but would also burn wetlands and hammocks during periods of extreme drought. These periodic fires maintained the pine subclimax forest by controlling hardwood competition, encouraged the growth of herbaceous vegetation, and maintained open water areas within the wetlands by removing layers of peat and sphagnum moss.

5.2.1 Historic Vegetative Cover

FNAI provides a brief compilation of historical documents describing the historical landscape of Hurlburt Field and Eglin AFB in their Natural Community Survey Report (Kindell et al., 1997) and their Rare Plant Survey Report (Chafin and Schotz, 1995; Hipes and Norden, 2003). Descriptions of vegetation prior to the formation of the installation can be found in several documents written in the 1900s.

The surrounding area has an extensive history of natural resource exploitation prior to its establishment as a military reservation. The majority of the area's history relates to timber harvesting of longleaf pine in the late 1800s. The turpentine industry was also very prevalent on Hurlburt Field until the 1930s. A small percentage of the original old growth longleaf pine forests remains and the majority of Hurlburt Field's forests are secondary, having been cut over at least once.

In 1908 the Choctawhatchee National Forest was established and appears to have included the very northern tip of Hurlburt Field. Forestry management made widespread use of prescribed burning until 1927, when forest fire protection was fully implemented (U.S. Air Force, 1993). Subsequent fire suppression within state and national forests, as well as on private lands, undoubtedly permitted successional changes that may be regarded as unnatural. Today, prescribed burns are again implemented.

5.2.2 Current Vegetative Cover

Every 5 years since 1997, FNAI has conducted a comprehensive survey of Hurlburt Field's high quality natural vegetative communities. FNAI has most recently updated this survey and released the *Rare Plant and Animal Inventory of Air Force Special Operations Command, Hurlburt Field, Florida: Final Report* in September 2009. Their Final Report depicts the community types found on Hurlburt Field with descriptions of their vegetative composition (Surdick, 2009). This information is represented in Figure 5-1.

Within the installation, cypress-gum swamp habitat is most prevalent within the northern half of the installation, which borders East Bay Swamp (1 SOCES, 2007). Here the dominant species include black gum (*Nyssa biflora*) and bald cypress. Shrub-dominated wetlands often occur peripheral to cypress-gum swamps and include such species as black titi (*Cliftonia monophylla*), red titi (*Cyrilla racemiflora*), myrtle-leaf holly (*Ilex myrtifolia*), fetterbush (*Lyonia lucida*), and Carolina St. John's wort (*Hypericum nitidum*). Herbaceous wetlands are generally infrequent and small, and harbor sedges in such genera as *Carex*, *Cyperus*, *Rhynchospora*, and *Scirpus*, as well as species of *Panicum* grass, pitcherplants (*Sarracenia* spp.), and butterworts (*Pinguicula* spp.). Mesic hammock areas are restricted to the slopes bordering Santa Rosa Sound and include southern magnolia (*Magnolia grandiflora*), live oak (*Quercus virginiana*), saw palmetto (*Serenoa repens*), and various herbaceous plants.

Pine flatwoods occur commonly throughout the installation. Dominant species include longleaf pine, slash pine (*Pinus elliottii*), running oak (*Quercus pumila*), gallberry (*Ilex glabra*), saw palmetto, sawbrier (*Smilax glauca*), and wiregrass (*Aristida stricta*). Sandhill communities are scattered on slightly higher and drier ground than pine flatwoods.

Sandhill regions are dominated by longleaf pine, saw palmetto, and wiregrass, but also include turkey oak (*Quercus laevis*), sand post oak (*Quercus margaretta*), sparkleberry (*Vaccinium arboreum*), and bracken fern (*Pteridium aquilinum*). Sand pine scrub areas are scattered on the installation and usually consist of sand pine, sand live oak (*Quercus geminata*), myrtle oak (*Quercus myrtiflolia*), saw palmetto, rosemary (*Ceratiola ericoides*), and rusty lyonia (*Lyonia ferruginea*).

Important habitat areas for T&E flora are widespread on Hurlburt Field. The greatest density of rare flora habitats occurs in the western portion of the installation where wet flatwoods, cypress domes, and other wetlands are common. Surveys for rare species in recent years include those documented in Flowers (1997), FNAI (1992; 1994b), Labat-Anderson (1994), Printiss and Hipes (1997), U.S. Air Force (1996), Hipes and Norden (2003)..

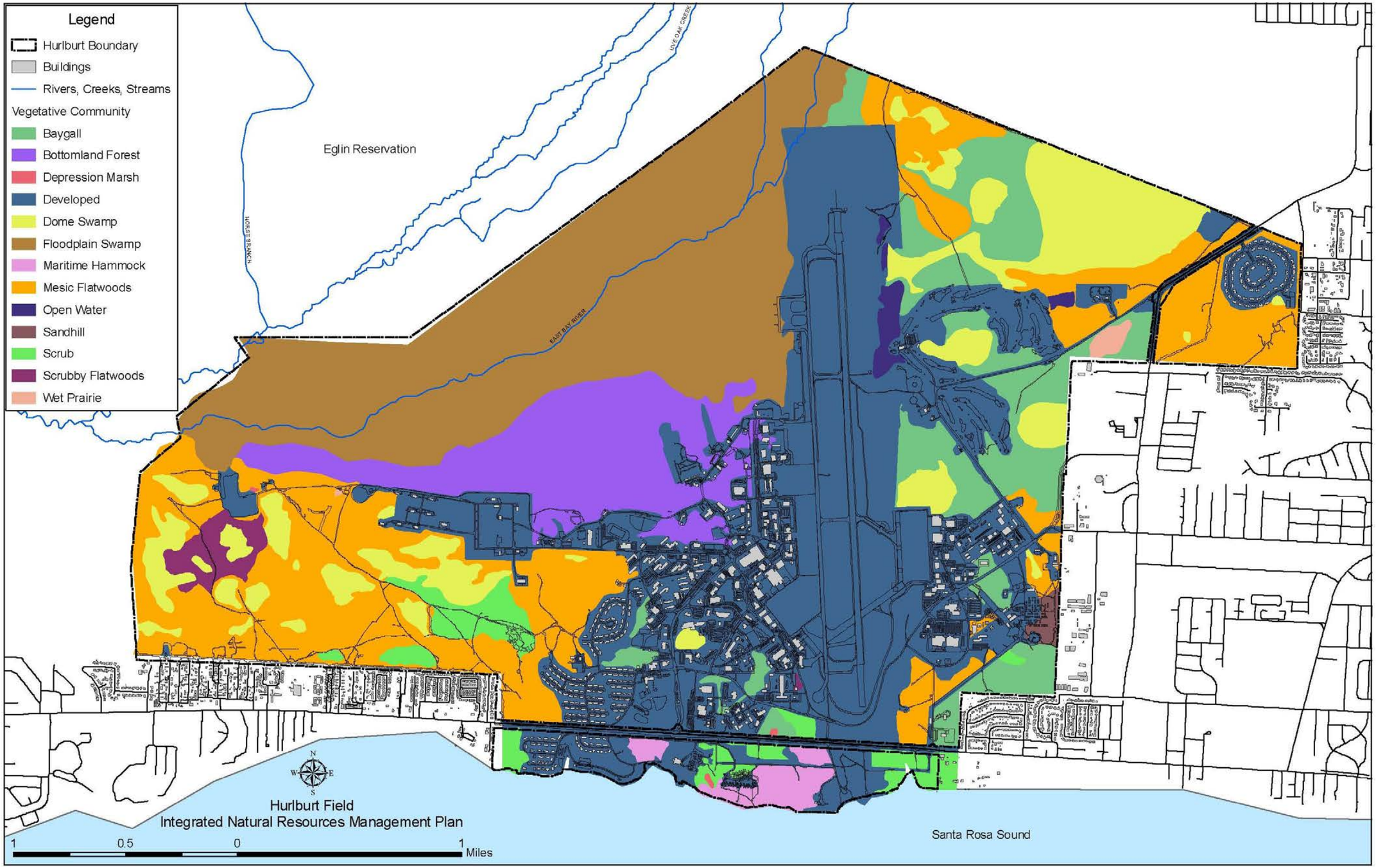

Figure 5-1. Vegetative Communities of Hurlburt Field

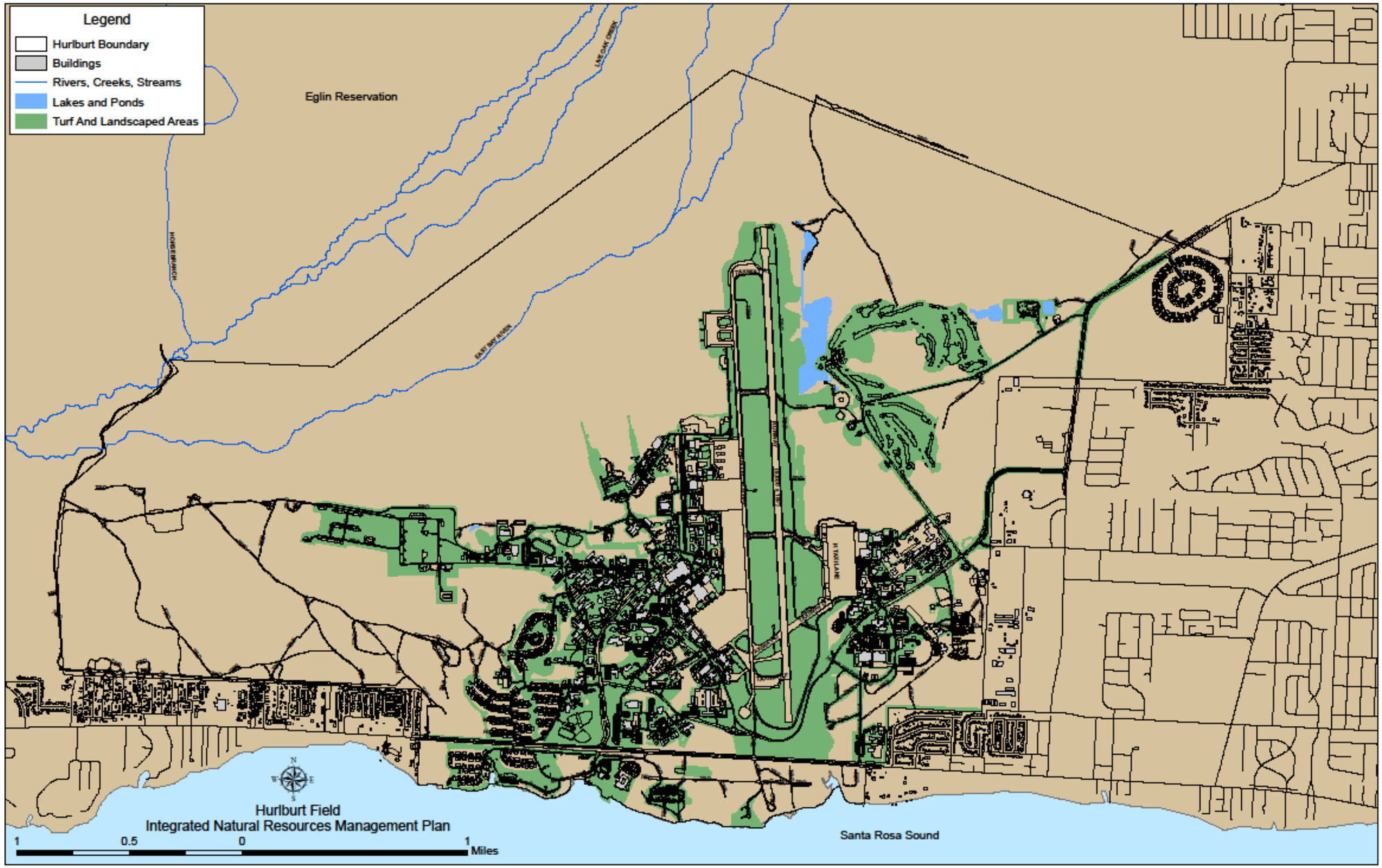

Figure 5-2. Turf And Landscaped Areas Of Hurlburt Field

According to Surdick (2009), 13 *rare* plants and 12 *rare* animals were documented during the 2008-9 survey at Hurlburt Field (Table 5-1). Of the thirteen species located during the survey by the above author, three species are new records.Two Florida rare species, the endangered Many-flowered Grass Pink (*Calopogon multiflorus*) and the endangered perforate reindeer lichen (*Cladonia perforata*) were not observed on Hurlburt. Ten of the rare plants found in previous surveys are no longer considered *rare* and were not included in this survey (1 SOCES 2013). A list of the rare plants and animals found during this survey is included in the following table along with rank and status for each species. Rank and status explanations are included in Appendix B (flora) and Appendix E (fauna).

Table 5-1. Rare Plants and Animals Documented at Hurlburt Field (2008-2009)

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Baptisia calycosa	Hairy wild indigo	G3T3	S3	MC	LT
Calamovilfa curtissii	Curtiss' sandgrass	G3	S3	MC	LT
Drosera intermedia	Spoon-leaf sundew	G5	S3	N	LT
Lilium catesbaei	Pine lily	G3	S4	N	LT
*Lilium iridollae**	Panhandle Lily	G2	S2	N	LE
*Lister australis**	Southern Twayblade	G4	S3S4	N	LT
Nuphar lutea ssp. *ulvacea*	West Florida cowlily	G5T2	S2	MC	N
*Pinguicula lutea**	Yellow butterwort	G4G5	S3	N	LT
Pinguicula planifolia	Chapman's butterwort	G3	S3	N	LT
Rhododendron sp	Azalea	G3G5	S3SNR	N	LT
Saracenia leucophylla	White top pitcher plant	G3	S3	MC	LE
Sarracenia psittacina	Parrot pitcher-plant	G4	S4	N	LT
Sarracenia rosea	Gulf Purple pitcher-plant	G5	S3	N	LT
Accipiter cooperi	Cooper's Hawk	G5	S3	N	N
Alligator mississippiensis	American Alligator	G5	S4	SAT	LS
Ambystoma bishopi	Flatwoods salamander	G2	S2	T	LS
Eumeces anthracinus	Coal skink	G5	S3	N	N
Aimophila aestivalis	Bachman's sparrow	G3	S3	N	N
Gopherus polyphemus	Gopher Tortoise	G3	S3	N	LT
Haliaeetus leucocephalus	Bald Eagle	G5	S3	N	N
Picoides borealis	Red-cockaded woodpecker	G3	S2	LE	LS
Ursus americanus floridanus	Florida black bear	G5T2	S2	N	LT

Sources: Surdick, J.S. (2009) Rare plant and animal inventory of Air Force Special Operations Command, Hurlburt Field, Florida: Final Report. Florida Natural Areas Inventory, Tallahassee, Florida.
*new record for Hurlburt Field

5.2.3 Turf & Landscaped Areas

Turf and/or landscaped areas encompass *Improved* and *Semi-Improved* grounds on Hurlburt Field. These areas are maintained by individual squadrons, contracted housing occupants, and golf course areas (maintained by Services). Maintenance of the remaining areas, depicted in Figure 5-2, is the responsibility of Grounds, 1 SOCES.

Turf grasses on Hurlburt Field include centipede, common Bermuda, St. Augustine, and Argentine Bahia. Annual rye is over seeded in high-visibility areas and on soil-disturbed sites during the winter. Bermuda Tifway 419 is used on golf course tees and fairways with Bermuda Tifdwarf 328 used on greens. Pensacola Bahia is the most prevalent grass cover on the Hurlburt

Field airfield but the base is attempting to move towards a non-seed producing Bermuda grass to provide continguous airfield ground cover.

The Hurlburt Field Landscape Development Plan provides strategies for landscape improvements based on AT/FP standards, LEED and sustainable design. A *Master Plant List of Trees and Shrubs* was also developed by the installation landscape architect (Appendix C). Emphasis on landscape plant selection is on the use of native species or cultivars that are well-adapted to Hurlburt Field's climate and soil conditions.

Executive Order 13514 of October 5, 2009; Federal Leadership in Environmental, Energy, and Economic Performance There is also a long-term landscape naturalizing goal of xeriscaping or using native trees, shrubs, and ground covers that will require little or no irrigation (Table 5-2). This objective directly supports UFC 3-201-02 on Landscape Architecture and E.O. 13514, Federal Leadership in Environmental, Energy and Economic Performance and the Hurlburt Field Energy Policy as it relates to water consumption.

Hurlburt Field has attained Tree City USA status since 1994 (1 SOCES, 2013) and most recently earned the distinction as a Sterling Tree City USA, a designation extended to those who have made substantial contributions to urban forestry programs as a Growth Award winner. Furthermore, an Urban Forestry Management Plan for the installation was completed in 1997 (Harland Bartholomew & Associates, Inc.) and a Land Management Plan was developed as a result of wetlands permitting/mitigation in the year 2000 (Section 5.5).

Table 5-2. Dominant Woody Plants Located Within Developed Areas of Hurlburt Field

Location	Plants
Administration Areas	Palm species, Eastern Red Cedar, oak species, pine species, and various ornamental shrubs
Airfield	No trees
Aircraft Operations and Maintenance	Pine species, red maple, crape myrtle, and flowering dogwood
Community (Commercial and Services)	Live oak, laurel oak, slash pine, longleaf pine, southern red cedar, and sabal palm
Housing (Accompanied and Unaccompanied)	Slash pine, longleaf pine, southern red cedar, live oak, laurel oak, sabal palm, butia palm, crape myrtle
Industrial	Red maple, southern red cedar, longleaf pine, slash pine, turkey oak, live oak, laurel oak, southern magnolia, and wax myrtle
Outdoor Recreation	Sabal palm, southern magnolia, live oak, laurel oak, longleaf pine, and southern red cedar
Open Space	Longleaf pine, slash pine, southern magnolia, southern red cedar, and live oak

5.3 FISH AND WILDLIFE

Due to the variety of habitats found on Hurlburt Field, the installation supports a rich diversity of wildlife. Table 5-3 provides a summary of some of the fish and wildlife species typically found within the installation. The table should only serve as a reference list and not a comprehensive inventory.

Table 5-3. Summary List of Fish and Wildlife Species Found on Hurlburt Field

Common Name	Scientific Name	Common Name	Scientific Name	Common Name	Scientific Name
Red-cockaded Woodpecker	*Picoides borealis*	Wood Duck	*Aix sponsa*	River Otter	*Lutra canadensis*
Bobwhite Quail	*Colinus virginianus*	Red-winged Blackbird	*Agelaius phoenicius*	American Alligator	*Alligator mississippiensis*
Great Horned Owl	*Bubo virginianus*	Cotton Mouth	*Agkistridon piscivorus*	Pine Barrens Tree Frog	*Hyla andersonii*
Gopher Tortoise	*Gopherus polyphemus*	Flatwoods Salamander	*Ambystoma cingulatum*	Five-lined Skink	*Eumeces fasciatus*
Diamondback Rattlesnake	*Crotalus adamanteus*	Gray Fox	*Urocyon cinereoargenteus*	Garter Snake	*Thamnophis sirtalis*
Six-lined Racerunner	*Cnemidophorus sexlineatus*	Green Anole	*Anolis carolinensis*	American Beaver	*Castor canadensis*
Florida Black Bear	*Ursus americanus floridanus*	Least Tern	*Sterna albifrons*	Parula Warbler	*Parula americana*
Fox Squirrel	*Sciurus niger*	Great Egret	*Egretta alba*	Periwinkles	*Littorina irrorata*
Least Shrew	*Cryptodus parva*	Shorebirds	Several genera & species	Oyster	*Crassostrea virginica*
Eastern Cottontail Rabbit	*Sylvilagus floridanus*	Red Fox	*Vulpes vulpes*	Coach whip	*Masticophis flagellum*
Southeastern Pocket Gopher	*Geomys pinetus*	Cotton Rat	*Sigmodon hispidus*	Long-nosed Killifish	*Fundulus similis*
White-tailed Deer	*Castor canadensis*	Opossum	*Didelphis virginiana*	Sheepshead Minnow	*Cyprinodon variegatus*
Eastern Box Turtle	*Terrapene carolina*	Eastern Mole	*Scalopus aquaticus*	Black Racer	*Coluber constrictor*
Bachman's Sparrow	*Aimophila aestivalis*	Cooper's Hawk	*Accipiter cooperii*	Great Blue Heron	*Ardea herodias*
Slender Glass Lizard	*Ophisaurus attenuatus*	Flycatchers	*Tyrannidae* spp.	Belted Kingfisher	*Megaceryle alcyon*
Raccoon	*Procyon lotor*	Cotton Mouse	*Peromyscus gossypinus*	Red-shouldered Hawk	*Buteo lineatus*
Pygmy Rattlesnake	*Sistrurus miliarius*	Southeastern American Kestrel	*Falco sparverius paulus*	Common Snapping Turtle	*Chelydra serpentina*

5.4 THREATENED AND ENDANGERED SPECIES

The ESA of 1973 (Public Law 93-205) requires military installations to protect and conserve federally listed T&E plants and animals and their habitats. In addition, the ESA requires that installations having listed species develop specific plans for preservation of these species and their habitats. AFI 32-7064 further requires that all installations must prepare and maintain a current inventory of T&E species and their habitats as part of the installation habitat inventory.

If listed species or their habitats are present, formal consultation (Section 7 under the ESA) must be undertaken with the USFWS or NMFS as appropriate. Consultation procedures are in 50 CFR Part 402. In 1991, the Air Force signed a Memorandum of Agreement to participate in the USFWS's Federal Neotropical Migratory Bird Conservation Program, which promotes and protects neotropical birds and their habitats. This two-year study (1994–5) conducted by the then Air Armament Center, Environmental Management, and Natural Resources Division (AAC/EMN), Eglin AFB Florida, surveyed neotropical migrants every other week during April/May and September/October migration seasons. An observation station was placed at

Hurlburt Field within the maritime hammock and former picnic area along Santa Rosa Sound as part of this study.

Surveys for rare species in recent years include those documented in Flowers (1997), FNAI (1992; 1994b), Labat-Anderson (1994), Printiss and Hipes (1997, 1999, 2000), U.S. Air Force (1996), and Hipes and Norden (2003), and Surdick (2009) as presented in Table 5-4a. Species historically reported as occurring on Hurlburt Field include the reticulated flatwoods salamander, RCW (historic), white-top pitcher plant, Curtiss' sand grass, and gopher tortoise. The primary habitats identified for these species are the wetlands near the new Family Campground and much of the western portion of the installation.

Table 5-4. Surveys for Rare Species Conducted at Hurlburt Field

Survey Type	Timeframe
Rare Plant Survey	1991, 1993, 2003, 2009
Flatwoods Salamander	1993-4, 1999-00, 2003
Gopher Frog Survey	1993-4
Invertebrate Survey	1996-7
Comprehensive Rare Species Survey	1996-7, 2003

A total of 13 rare plant species and 12 rare animal species (including invertebrates) were documented at Hurlburt Field during the 2009 FNAI survey (Surdick, 2009). Surdick (2009) surveyed Hurlburt Field for rare or listed terrestrial and fresh water species of plants and animals of conservation concern (Figure 5-4b). Detailed location information is available for most of these species in Figures 5-3 and 5-3a. Federally listed species having been noted to occur in the sound along Hurlburt's coastline but not included in the 2009 FNAI survey, include Gulf Sturgeon (*Acipenser oxyrinchus desotoi*) and West Indian Manatee (*Trichechus manatus*). Additionally, random sampling efforts since 2009 have been positive for 2 occurrences of *Abystoma bishopi (*Walsh, 2014*)*.

Table 5.4a 2009 FNAI Survey for Rare Plants and Animals

Scientific Name	Common Name	Federal Rank	State Status
Baptisia calycosa	hairy wild indigo	MC	LT
Calamovilfa curtissii	Curtiss sandgrass	MC	LT
Drosera intermedia	spoon-leaf sundew	N	LT
Lilium catesbaei	pine lily	N	LT
Lilium iridollae	panhandle lily	N	LE
Listera australis	southern twayblade	N	LT
Nuphar lutea ssp. Ulvacea	west Florida cowlily	MC	N
Pinguicula lutea	yellow butterwort	N	LT
Pinguicula planifolia	Chapman's butterwort	N	LT
Rhododendron sp.	azalea	N	N
Sarracenia luecophylla	white top pitcher plant	MC	LE
Sarracenia psittacina	parrot pitcher-plant	N	LT
Sarracenia rosea	gulf purple pitcher-plant	N	LT

Accipiter cooperi	Cooper's hawk	N	N
Aimophila aestivalis	Bachman's sparrow	N	N
Alligator mississippiensis	American alligator	SAT	LS
Gopherus polyphemus	gopher tortoise	N	LT
Haliaeetus leucocephalus	bald eagle	N	N
Pandion haliaetus	osprey	N	N
Picoides borealis	red-cockaded woodpecker	LE	LS
Ursus americanus floridanus	Florida Black Bear	N	LT

MC = Management Concern, N = Not Listed, SAT = Similar in Appearance, LT= Listed Threatened, LE = Listed Endangered

Gum swamp, cypress domes, baygall and flatwoods dominate Hurlburt's natural communities lending ecological support to a diverse, multitude of rare species identified in the aforementioned table. Hurlburt Field's *Land Management Plan* characterizes each natural area into habitat units based on current vegetative type, land use, species and management activity. This plan was developed in 2000 and in conjunction with the Memorandum of Agreement (MOA) between the base and the Florida Department of Environmental Protection (FDEP) to set aside 3200 acres of wetlands and 125 acres of uplands for compensatory mitigation. Together these guidelines provide overarching management strategies for the protection and preservation of rare species on Hurlburt.

Section 7.3.4, *Management of Threatened and Endangered Species and Habitats,* presents *a* summary of management practices, surveys and status of these species and are discussed in detail.

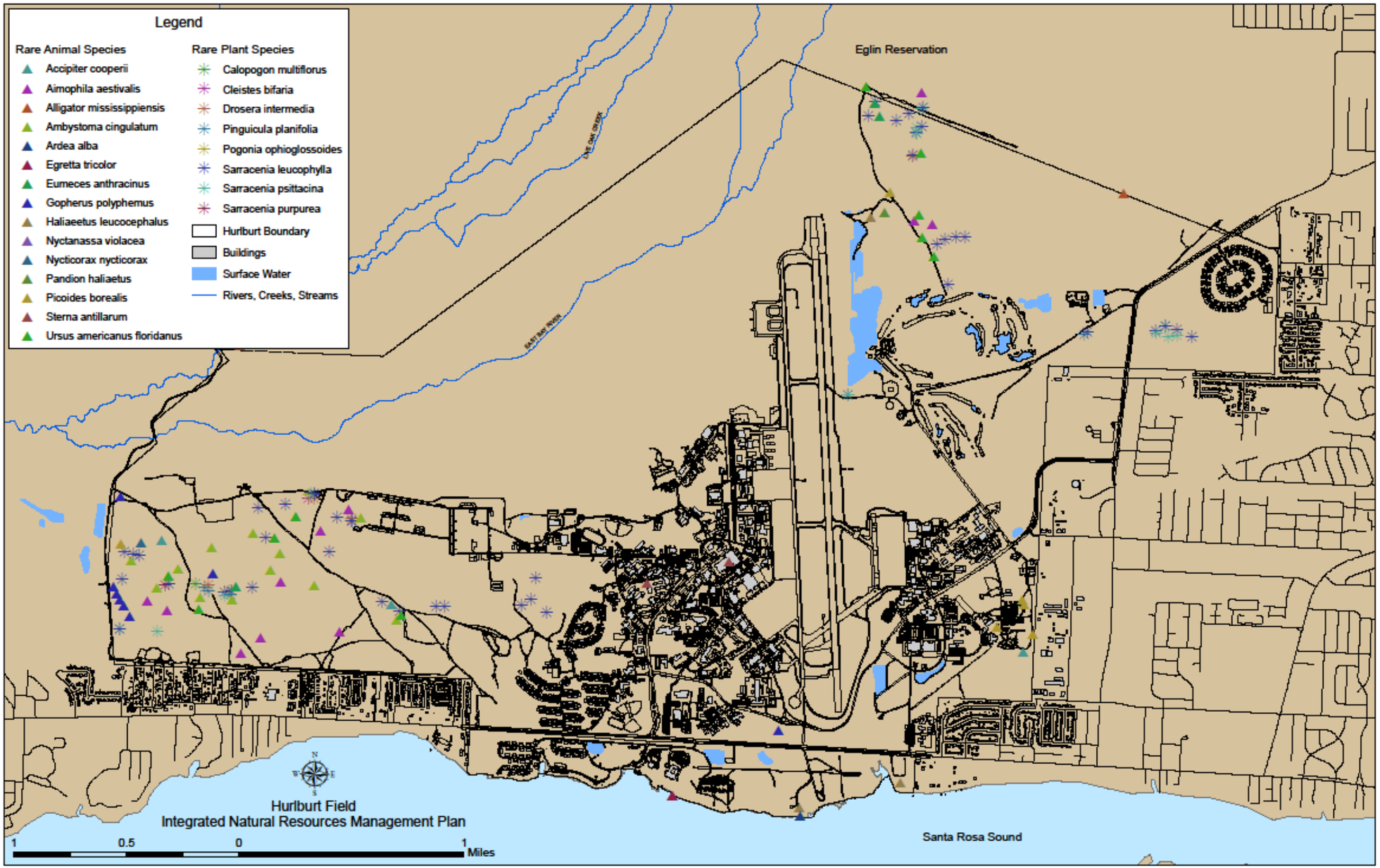

Figure 5-3. Terrestrial and Aquatic Species of Concern at Hurlburt Field

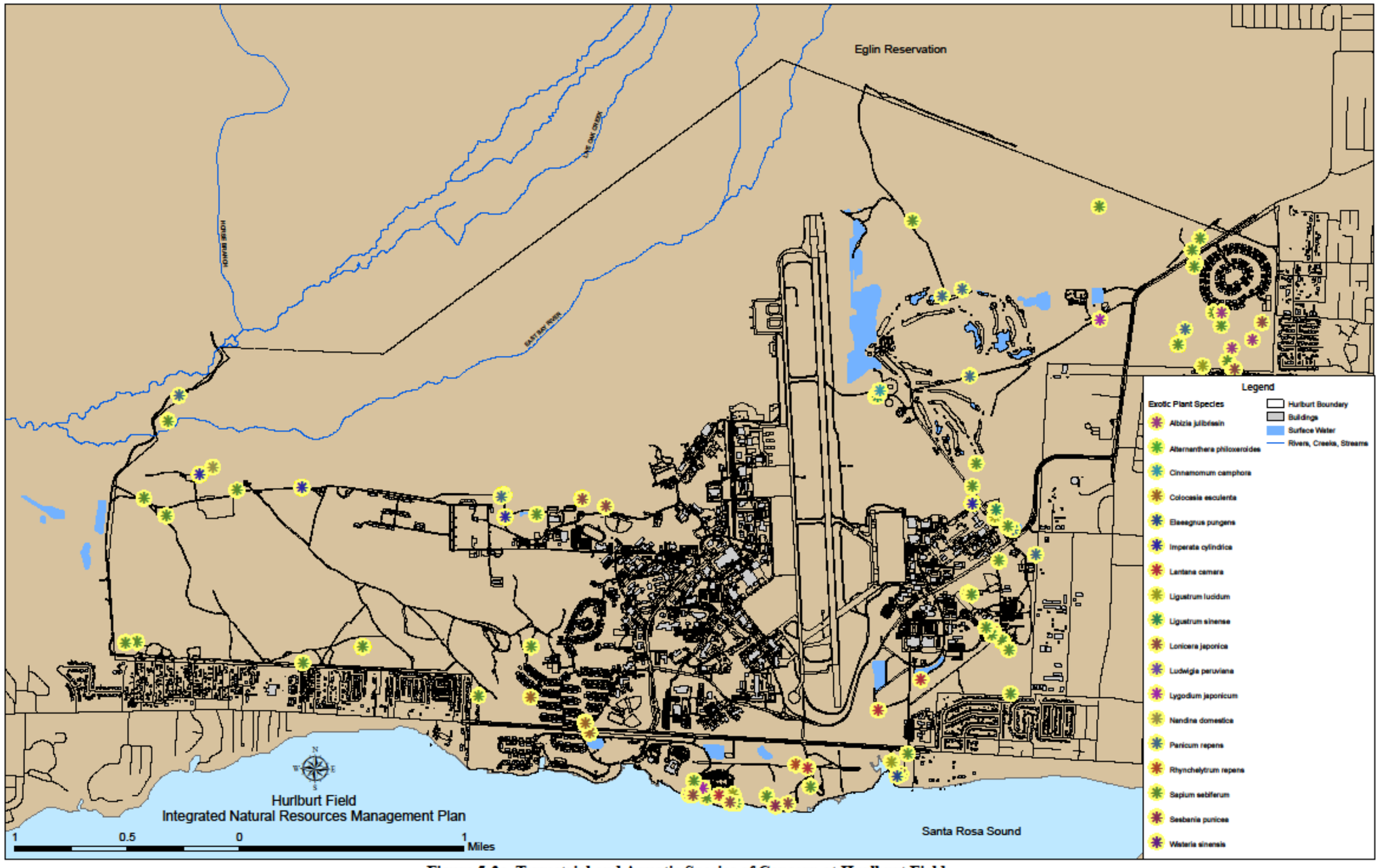

Figure 5-3a. Terrestrial and Aquatic Species of Concern at Hurlburt Field

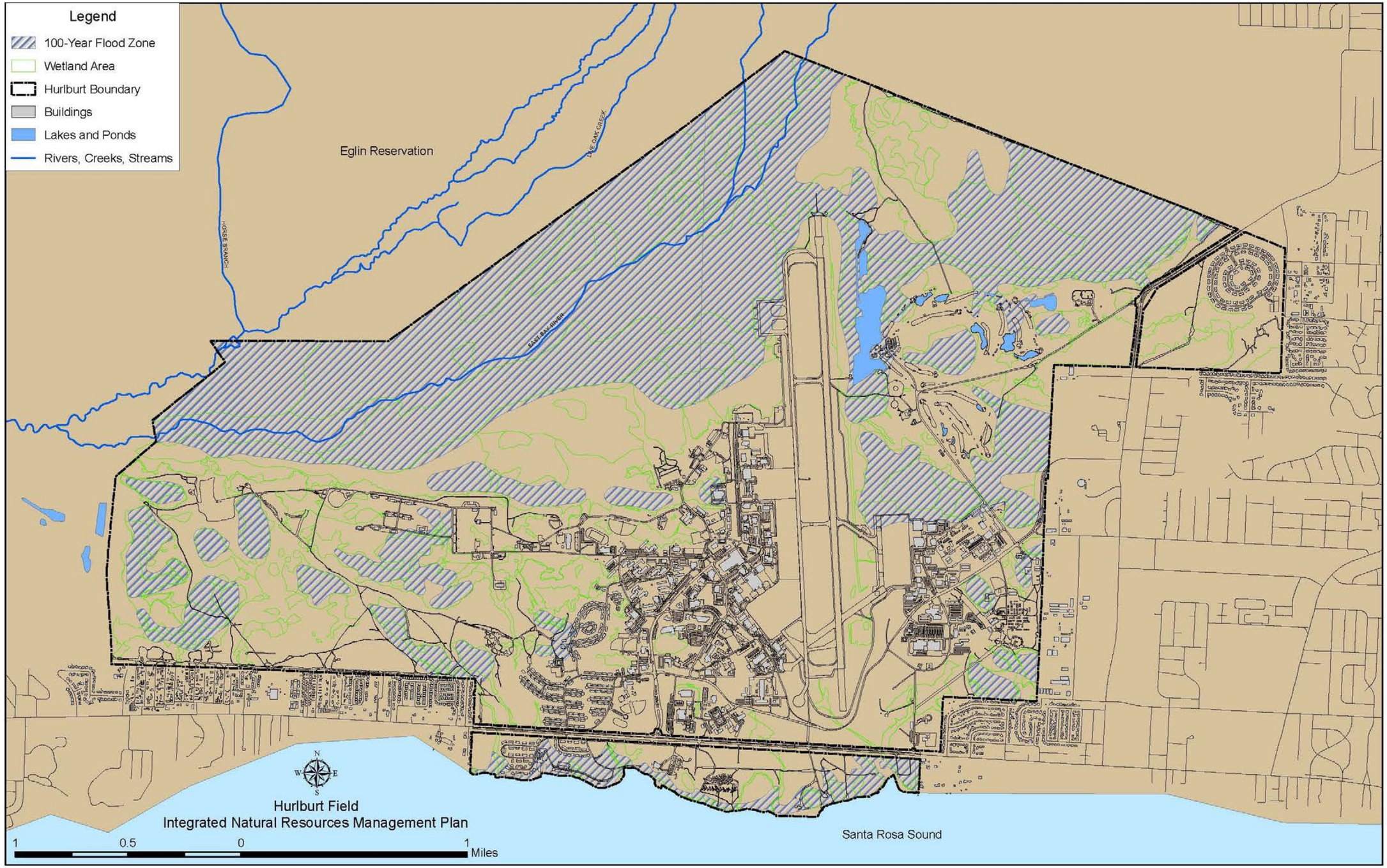

Figure 5-4. Wetlands and 100-Year Floodplain of Hurlburt Field

5.5 WETLANDS

Extensive swamps, marshes, ponds, and bayous occur in and around Hurlburt Field. Approximately 3,431 acres, or 52 percent of the installation, is comprised of state and federal jurisdictional wetlands (Figure 5-4).

The National Wetlands Inventory (NWI) Classification for Wetlands (Cowardin, 1979) describes wetland habitats according to a hierarchical classification system progressing from *System* and *Subsystem*, at the general level, to *Classes* and *Subclasses* (where applicable). A *System* refers to a complex of wetlands and deepwater habitats that share the influence of similar factors such as hydrologic and geomorphic features, and chemical and biological characteristics. This classification system describes ecological taxa and provides uniformed concepts and terms. There are five wetland categories in this classification system:

- ***Estuarine*** - Deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the ocean, with ocean water at least occasionally diluted by freshwater runoff from the land. The upstream and landward limit is where ocean derived salts measure less than 0.5 parts per thousand during the period of average annual low flow. The seaward limit is (1) an imaginary line closing the mouth of a river, bay, or sound, and (2) the seaward limit of wetland emergents, shrubs, or trees when not included in (1).
- ***Riverine*** - All wetlands and deepwater habitats contained within a channel except those wetlands (1) dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) which have habitats with ocean-derived salinities in excess of 0.5 parts per thousand.
- ***Lacustrine*** - Wetlands and deepwater habitats (1) situated in a topographic depression or dammed river channel, (2) lacking trees, shrubs, persistent emergents, emergent mosses, or lichens with greater than 30 percent aerial coverage, and (3) whose total area exceeds 8 hectares (20 acres), or area less than 8 hectares if the boundary is active wave-formed or bedrock or if water depth in the deepest part of the basin exceeds 2 meters (6.6 feet) at low water. Ocean-derived salinities are always less than 0.5 parts per thousand.
- ***Palustrine*** - All nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and all such tidal wetlands where ocean-derived salinities are below 0.5 parts per thousand. This category also includes wetlands lacking such vegetation but with all of the following characteristics: (1) area less than 8 hectares, (2) lacking an active wave-formed or bedrock boundary, (3) water depth in the deepest part of the basin less than 2 meters (6.6 feet) at low water, and (4) ocean-derived salinities less than 0.5 parts per thousand.
- ***Marine*** - Open ocean overlying the continental shelf and coastline exposed to waves and currents of the open ocean shoreward to (1) extreme high water of spring tides, (2) seaward limit of wetland emergents, trees, or shrubs, or (3) the seaward limit of the Estuarine System, other than vegetation. Salinities exceed 30 parts per thousand.

The most dominant wetland type on Hurlburt Field is *Palustrine* forested, with significant areas of *Palustrine* scrub/shrub habitat, and some *Palustrine* emergent marsh. Small *Estuarine* wetland

areas are mapped bordering Santa Rosa Sound. State and federal wetland boundaries throughout Hurlburt Field were most recently re-established during extensive jurisdictional wetlands delineation survey conducted from 2010 to 2012. In the absence of a current Mean High Water Survey, the 4-foot contour was established by the Florida Department of Environmental Protection as the state's southernmost jurisdictional boundary on the base. All future projects constructed water ward of this line would require a survey to establish wetland characteristics. This boundary does not apply to federal jurisdiction.

Two very successful salt marsh areas were established along the Santa Rosa Sound shoreline near the installation picnic area in 1995. The easternmost marsh is located on Hurlburt Field's southeast boundary in a cove at the mouth of a small freshwater tributary. The other marsh is a few hundred yards west, directly in front of Hurlburt Field's picnic area. Together the two marshes total 4.7 acres. Over time the marshes have evolved into systems that very closely mimic natural salt marsh communities with graduated vegetative zones governed by elevation and the whole suite of floral and faunal species normally found in these tidal environments. In the late 1990s, the Florida Department of Environmental Protection (FDEP) requested and was granted permission to harvest seeds and seedlings from these two marshes to grow in their nurseries for use with other similar projects around the northwest region. Personnel from FDEP have also brought individuals who were entertaining possible marsh projects in lieu of retaining walls to see an example of a successful marsh project first hand in Hurlburt Field's marshes.

In 2002, a 4.3-acre salt marsh was constructed along Santa Rosa Sound just east of Hurlburt Field's Soundside Club. This marsh was designed with more open water and deep water areas than the previous two marshes (referenced above). While it is a very different system from the previous two it is equally successful. Submerged sea grasses have pioneered the site and have become established in this marsh due to the protective rock outcropping around the perimeter that reduces wave energy and provides a favorable environment for growth (1 SOCES, 2013).

These man-made salt marshes served as partial mitigation credit for military construction projects. In addition to serving as mitigation credit, the projects helped check shoreline erosion, provided valuable fish and wildlife habitat and protected three sensitive archeological sites from further degradation from erosion.

One of the biggest environmental considerations Hurlburt Field has is wetlands. Hurlburt Field is 52 percent jurisdictional wetlands. Since most remaining uplands are built out, many of Hurlburt Field's construction projects have potential for impacting protected wetland areas. To emphasize good management and stewardship of the environment, the Air Force makes an effort to eliminate impacts. If impacts can't be completely eliminated they are minimized by reconfiguring or relocating. If impacts can't be completely eliminated, natural resource managers must engage regulators and initiate the permitting process. To help manage this issue, Environmental began working with multiple regulators in the mid-1990s to develop a 10 year/multi-project permit that included all projects scheduled to begin construction in the next ten years that would impact wetlands. This was a precedent setting move because it was the first permit of its kind ever issued in northwest Florida by FDEP. The permit includes an extensive mitigation package for the impacts incurred to wetlands and ultimately allows the mission much greater flexibility. Part of the mitigation package included the restoration of a 125-acre forested site that was clear cut and planted in sand pine (*Pinus clausa*) in 1988 for pulpwood production. The timing of this operation represents the tail-end of a different era when Air Force natural

resources managers placed more emphasis on generating revenue than on ecosystem management. The Air Force is currently removing the sand pine and converting it back to the longleaf/wiregrass ecosystem that naturally occurred there. (See also Wetlands, 7.6)

5.5.1 Impoundments

Hurlburt Field has no other impoundments.

5.6 OTHER NATURAL RESOURCE INFORMATION

Biological inventories and surveys conducted on the installation provide vital information to support various natural resources program management. The following studies have assisted Hurlburt Field's natural resources managers and land use planners in forecasting potential impacts to wildlife.

- Formal Determination of the Landward Extent of Wetlands and Other Surface Waters, 2012. FDEP, USACE
- Florida Natural Areas Inventory. 2009. Rare Plant and Animal Inventory of Air Force Special Operations Command, Hurlburt Field, Florida.
- U.S. Environmental Protection Agency. 2005. "A survey of Isolated Wetland Function and Condition on Hurlburt Field."
- Florida Natural Areas Inventory. 2003. "Rare Plant and Animal Inventory of Air Force Special Operations Command, Hurlburt Field, Florida."
- Florida Natural Areas Inventory. 2002. "Flatwoods Salamander Survey of Hurlburt Field, Florida."
- Florida Natural Areas Inventory. 2000. "Flatwoods Salamander Survey and Habitat Evaluation of Eglin Air Force Base, Hurlburt Field, and Tyndall Air Force Base."
- Florida Natural Areas Inventory. 1997. "Rare Plant, Rare Vertebrate, and Natural Community Survey of Air Force Special Operations Command, Hurlburt Field, Florida."
- Flowers, R. Wills. 1997. "An Invertebrate Survey of Hurlburt Field, Florida with Special Reference to Species of Special Concern."

5.7 ECOSYSTEM SERVICES

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

Healthy forest ecosystems are ecological life-support systems. Forests provide a full suite of goods and services that are vital to human health and livelihood, natural assets we call ecosystem services.

Many of these goods and services are traditionally viewed as free benefits to society, or "public goods" - wildlife habitat and diversity, watershed services, carbon storage, and scenic landscapes, for example. Lacking a formal market, these natural assets are traditionally absent from society's balance sheet; their critical contributions are often overlooked in public, corporate, and individual decision-making.

When our forests are undervalued they are increasingly susceptible to development pressures and conversion. Recognizing forest ecosystems as natural assets with economic and social value can help promote conservation and more responsible decision-making. – US Forest Service

The USAF promotes a mission focus stewardship of the Ecosystems it is entrusted with. As such, it is in the common interest to maintain the ecosystems in as natural a state as feasible. It is in the USAF interest to keep buffers around airfields, bombing ranges, test sites and other existing mission activities. These buffers are unmaintained natural areas. The "service " provided by these areas are: sound abatement by offering distance and absorbing materials; distance buffers for projectiles; safety zones under airport runway approaches; security buffers to highlight the approach of intruders; training grounds for anti-terrorism and infiltration. All of these activities require an unmaintained or minimally managed ecosystem to the benefit of the USAF mission and the natural ecosystems.

5.8 CLIMATE CHANGE

The earth has a dynamic climate, which is a nice way of stating that there is irrefutable evidence of change. (See attached **Timeline of glaciation**, Wikipedia) The climate "blame game" is a political argument not a sound scientific one. The science fact is there is a trend toward warming, glacial melt, and sea rise that has been going on for the last 10,000 years. The Environmental Protection Agency conducted a Sea Level Affecting Marshes Model, Aug 2011(SLAMM6) to look only at the projected effects on the marsh estuaries. The model projected a 30 to 200 cm rise by 2100ce and looked at the affect on critical wetlands and shore lines. Their conclusions are pertinent here (see attached SLAMM_ Florida_Final).

There are five identified process that are of primary concern: Inundation, Erosion, Over-wash, Saturation, and Accretion. Areas inundated will remain under salt water and are lost to dry land species. This loss will be significant along shorelines, bayside, and in existing marshes. New marsh land will be created in excess of the existing (net gain in marsh) as man has not had reason to fill these areas as of yet. The areas lost on Eglin, Hurlburt and Tyndall will be on the barrier islands showing up as a significant loss of beaches to the dunes. Thirty cm of additional sea rise will have a relatively mild impact with a gradual loss of the existing beach front. As this is a projection for 2100ce, the impact over the duration of the 5 year window of the INRMP is negligible at less than 0.3cm annually. In the longer term, the loss of beach front is better thought of as a moving of the beach front. So long as the annual change is gradual, the nesting of shorebirds, sea turtles and migration patterns are essentially unchanged. Erosion will create new beaches, new sandbars, and new dunes, just not in their current positions. Beach mice will move, but Perforate Lichen might not fare well. Over-wash is a storm event concern. The forces of over-wash are both erosional and accretional. What is taken will be deposited elsewhere.

The greatest threat to habitat and mission is the threat to inland marshes. This was not included in the SLAMM study. Eglin, Hurlburt, and Tyndall all have extensive marshes. These may become brackish and eventually completely flooded with 30 cm to 2 meters of sea level rise. The good news to species is the expected creation of new marsh is going to far outpace the loss. In general, this means more estuaries, more breeding grounds, more fish, and more life. This will mean loss of shore line facilities, recreation facilities, roads, utilities, and dry land to the mission, with some loss of facilities especially along the current shore line.

By the most dire prediction of sea-level rise; Eglin, Hurlburt, and Tyndall all still remain more or less in their current state – minus dry acreage. Immobile species may be lost. Perforate Lichen, cedars and fresh water plants may have a difficult time migrating in at a sufficiently quick rate to survive.

The other climate change predictions are more difficult to foresee. Meteorological evidence is most reliable when looked at as century long trends. In the short term, there will be drought, floods, and storms. In the longer term, the rising sea, rising mean temperature and rising pollution levels should give more energy to the ever warming atmosphere. This intuitively would yield greater intensity storms and more of them. The past 5 years has not followed this pattern. Obviously, other forces are at play and not accounted for. There is a good argument for a pending ice age!

Climate awareness has already had an impact. Building codes now require hurricane standards up to 100 miles inland. Flood insurance is mandatory for many citizens. The modest sea rise has taken beach front and just as often added it elsewhere, but this is an un-noted benefit. The mission at Hurlburt, Eglin, and Tyndall reflect most of the world population as they all are tied to the sea. As such, it is likely the military missions will continue in place.

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6. MISSION IMPACTS ON NATURAL RESOURCES

6.1 LAND USE

Hurlburt Field has over 6,634 acres of land within Okaloosa County (U.S. Air Force, 2005). The land distribution of Hurlburt Field is divided into a western and eastern section by the 9,600-foot runway and the associated airfields (Figure 6-1).

6.2 CURRENT MAJOR IMPACTS

Hurlburt Field is the home of the HQ AFSOC with the mission to organize, train, equip, and educate Air Force special operations forces for worldwide deployment. The current mission at Hurlburt Field may create pollution concerns that have the potential to adversely affect natural resources on the installation if left unchecked. Hurlburt Field's 1 SOCES has several programs in place to address permitted air and water pollution point sources, as well as Air Installation Compatible Use Zones (AICUZ) or other noise problems. The 1 SOCES manages a comprehensive hazardous waste program to proactively address any surface or ground water contamination.

Hurlburt Field operates a small arms range and an EOD area to maintain standard Air Force proficiency levels for its users (Figure 6-2). A planning team composed of MAJCOM and installation-level combat areas, civil engineering, environmental, and safety personnel jointly establish firing points, target distance, and the type of range necessary to meet training requirements. These facilities are designed and maintained in accordance with AFI 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*, and AFI 36-2226, *Combat Arms Programs*.

Additional training is satisfied by sharing existing facilities and capacity at Cannon AFB, New Mexico, Tyndall AFB, Florida and by the use of multiple facilities at Eglin AFB, Florida. These impacts are addressed in the host installation INRMPs.

6.3 POTENTIAL FUTURE IMPACTS

Natural resources face potential future impacts from conversion of habitat into new training areas. Habitat alteration is a major effecter with the potential to directly reduce habitat used by protected and sensitive species.

The establishment of new training areas does not typically occur within the boundaries of Hurlburt Field. Habitat alteration is more likely to occur as new facilities are constructed to enhance or support new and existing mission requirements. Table 6-1 lists some of the environmental studies at Hurlburt Field. One of the most valuable assets of Hurlburt and Eglin training areas is the undeveloped natural area to practice combat ground movement, operation and survival that leaves no traces. It is therefore in the best interests of the ground combat trainers to have an unspoiled and wild environment on the installation.

The role of Hurlburt Field as a focus for Air Force special operations education, planning, and training is expected to continue to grow. Projected growth is detailed in the *Hurlburt Field Long-Range Facilities Development Plan* updated in December 2007 as well as in the *Hurlburt Field General Plan Environmental Assessment* completed in October 2010 (USAF, 2010). Outward expansion at Hurlburt is tightly constrained by jurisdictional wetlands (Section 5.5) and associated T&E species habitat leaving approximately 33 buildable acres of uplands within installation boundaries; therefore, long-range planning objectives will organize related activities into functional core areas or subareas utilizing multi-story construction housing multiple agencies in an effort to maximize operational efficiency and minimize footprint. Hurlburt Field can expect to see a consolidation and collocation of land uses to maximize land area and improve transportation.

Table 6-1. Environmental Assessments and Mission Impacts On Hurlburt Field's Natural Resources

Project	Timeframe
SOF Construction Boat Storage Facility 1 SOSS	FY 2014
Expansion of Dorm Chiller Plant	FY 2014
SOF ADAL Operations Facility (11 IS)	FY 2014
Eglin/Hurlburt Military Housing Privatization Initiative	FY 2014
West Gate EA Study	FY 2014
Commercial Vehicle Inspection	FY 2014
SOF Construct Northeast Access Road	FY 2014
Operational Jet Fuel Storage & Fill stand	FY 2014
Temporary Lodging Facility 8 Units	FY 2014
SOF Construct Resiliency Ops Center	FY 2015
Construct Lt Aircraft Squadron Ops/Mx Hangar	FY 2015
SOF Fuel Cell MX Hangar	FY 2016
Professional Development & Education Center	FY 2017
SOF Indoor Small Arms Range 1 SOW	FY 2017
Independence Road Improvement	FY 2017
SOF Vehicle Shelter Facility	FY 2018
Construct Dormitory (144 pn-East Side)	FY 2019

Source: General Plan, Environmental Assessment (2010)
FY = fiscal year; JSOU = Joint Special Operations University;
STG = Special Tactics Group; SOF = Special Operations Forces;
UAV = unmanned aerial vehicle

The future relocation of training areas and construction of an access road to the undeveloped Northeast area will impact approximately 4 acres of wetlands. The potential for future base access from the west is being explored, but wetlands, preservation areas and sensitive species habitat present development challenges for this portion of the base. Immediately adjacent and east of this area, the Pine Shadows residential area is soon to add 46 new units as part of the Air Force Military Housing Privatization Initiative (MPHI) bringing the total to 252 newly constructed military family homes by FY15. To make room for new homes on the Soundside Parcel M, the 50-site Hurlburt Field Family Campground has relocated to a new 49-site location on Martin Luther King Boulevard. The paintball area is also being relocated to an area on the site developed as a portion of the Hurlburt Field Skeet Range. Buffers designated by the MHPI

EIS will ensure protection for pristine wetland areas, created marshes and archaeological sites will delineate the southern boundary of the housing area. Most all other project impacts are the result of the activity and land use consolidation objectives mentioned above and will follow subarea development plans as outlined in the Hurlburt Field General Plan. Long range objectives also include a new town center which will house an administrative core and are located on the west side of the base near the new main base housing area.

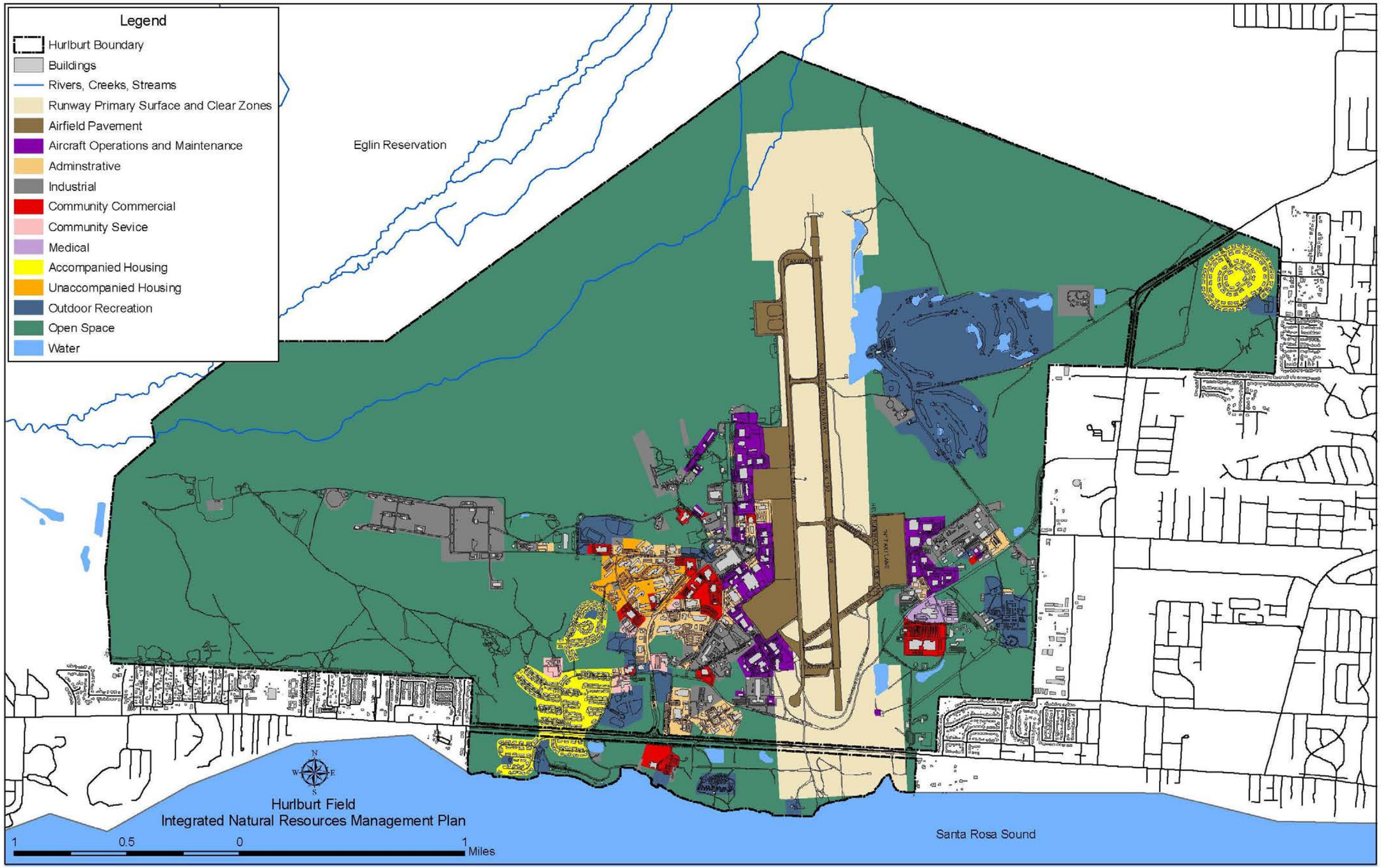

Figure 6-1. The Land Use Distribution at Hurlburt Field

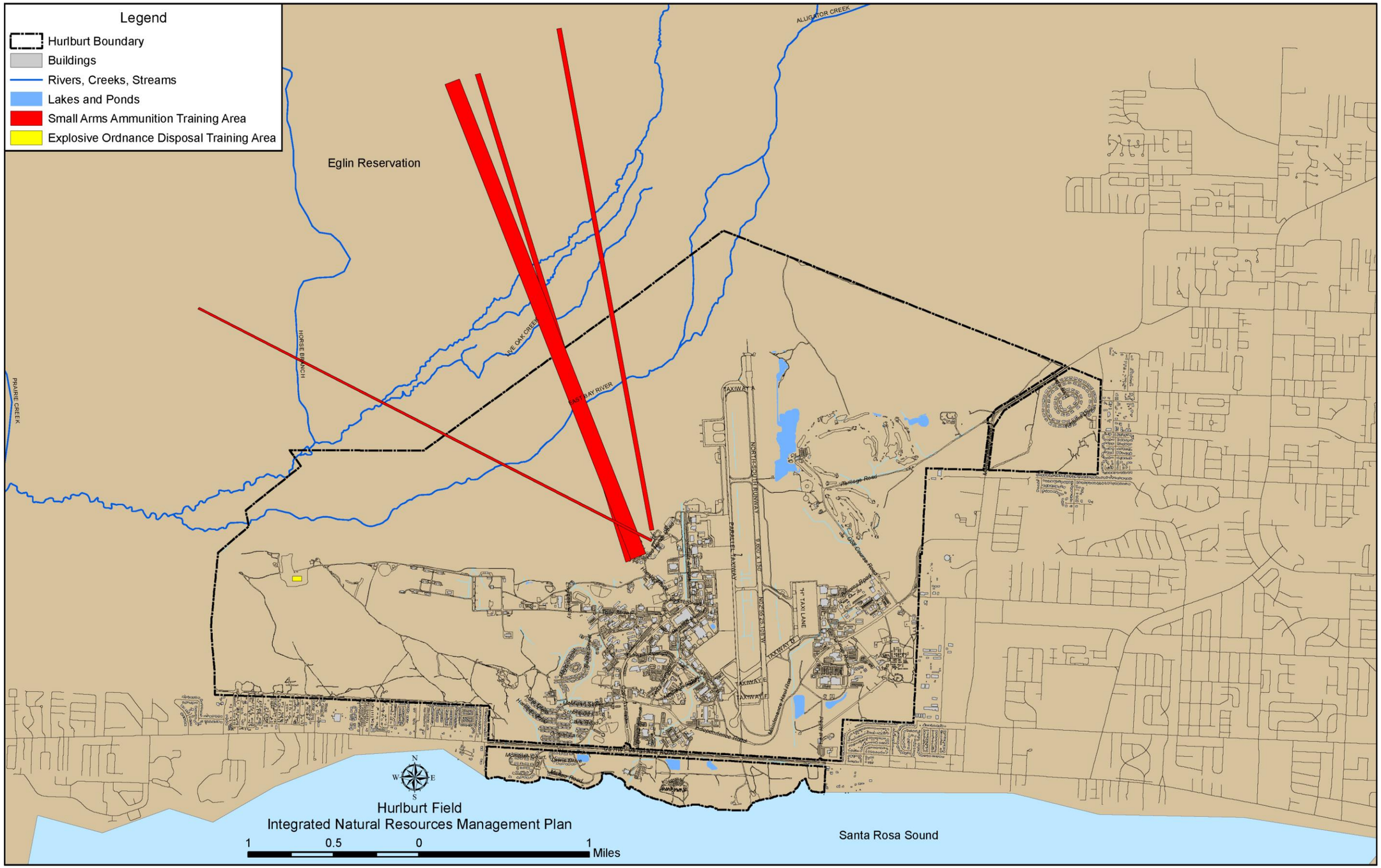

Figure 6-2. Existing Training Areas at Hurlburt Field

Other development within currently undeveloped areas of the cantonment area will undoubtedly impact natural resource assets. While impacts are expected to be minimal, all projects will be thoroughly reviewed under the Environmental Impact Analysis Process (EIAP).

Water may become a growth-limiting factor in the Florida Panhandle over the next decade. Concerns over the availability of water from the Floridan aquifer will increase as the regional population continues to grow. Hurlburt Field's joint initiative with the State and the City of Fort Walton Beach in reusing treated wastewater from the Hurlburt Field wastewater treatment plant, and Hurlburt Field's efforts at expanding the use of the Sand and Gravel aquifer for both irrigation and potable water will contribute to reducing reliance on the Floridan aquifer.

6.4 NATURAL RESOURCES NEEDED TO SUPPORT MILITARY MISSION

Hurlburt Field and the mission of the 1 SOW requires sufficient open and maintained grass areas to provide an adequate clear zone for flight line operations. A heavily forested buffer area that extends from this clear zone to the interface with private property is beneficial to both the Air Force and the adjacent property owners. Hurlburt Field strives to maintain air and water quality standards to allow for new growth without further degrading the natural environment.

The Explosive Ordnance Range, Small Arms Range and Dynamics of International Terrorism Range are the only range-type environments on Hurlburt Field where training takes place. Training involving the 1 SOW's aircraft/weapons is typically carried out on large land ranges on the adjoining Eglin AFB and the water ranges in the Gulf of Mexico. Low-level flying routes utilized by AFSOC extend over north Florida, Alabama, Georgia, Tennessee, South Carolina, and North Carolina.

The 800+ acre EOD range located on the westernmost part of the installation represents the greatest example of how T&E species management and habitat sustainment can be balanced to achieve realistic experiences for military training without delay to the Air Force mission. The EOD Flight controls perimeter access to the range in conjunction with Security Forces personnel. An approximate 8 acre grid has been cleared for authorized activities which includes intentional detonation, ATV training and range qualifications for explosives. Land navigation courses which occur throughout the range are conducted on foot. Close quarters training and mock set ups are performed in the modular building constructed for this purpose north of Range Road 666 only. While there is not free access to the range, scheduling around training days to perform land management activities in support of ecosystem sustainability is not a major concern. Future strategies and objectives include:

- Natural Resources staff working with EOD to ensure awareness of and compliance with environmental compliance by range users.
- Making certain that range users follow the proper procedures to receive approval through the EIAP process
- Guaranteeing adequate access for land management activities to support range sustainability (i.e., prescribed burning)
- Enhancing use by research groups for the purpose of monitoring, conservation and public awareness of T&E species

6.5 NATURAL RESOURCES CONSTRAINTS TO MISSIONS AND MISSION PLANNING

The presence of T&E species and sensitive or important habitats increasingly constrain military missions in the land and water areas. Sometimes the constraints are seasonal, as in a case where a mission must avoid the nesting seasons of a protected species. In this case, the mission may be scheduled to avoid nesting seasons of the species in question. In other circumstances, the constraints may involve comprehensive consultation periods before a mission can be conducted, or the added cost of observers to monitor the protected species (or its habitat) during the mission. Early consideration of these issues in planning typically results in solutions where the mission can proceed unimpeded, either through slight modifications in location or timing, by implementing requirements from an existing programmatic consultation, or by obtaining permits through the appropriate regulatory channels that allow the potential for negative impacts to the resource (i.e., ESA Section 7 consultation). On Hurlburt, all wetlands have been delineated through a formal process in order to save time and money on a project-by-project basis and to also minimize the risk for unauthorized impacts. All environmental layers are routinely updated and available on GeoBase and accessible to key decision-makers who understand that early planning is crucial in making natural resources a consideration rather than a constraint.

Even the loss of protected species or important habitats in the immediate vicinity of Hurlburt Field by non-military factors places constraints on the military mission by increasing the natural resource management responsibilities of the Air Force. As natural resources are depleted outside Hurlburt Field, the resources within the installation boundary become more valuable and must be managed more carefully. Natural resources staff has an excellent working relationship with all state and federal agencies which facilitates ease of coordination which typically result in informal consultations with typical best management practices for avoidance or minimization. There have yet to be any missions on Hurlburt Field with formal consultation requirements resulting in a “take” of a listed species.

Buffer zones have been also established for sensitive species that prohibit off road driving, digging, cutting of vegetation and other ground disturbing activities within these areas. These zones, primarily for the purpose of protecting target species, allow for 1500 feet from the center of known Flatwoods Salamander breeding ponds and 200 feet from Red-Cockaded Woodpecker trees. These data layers can also be found on the GeoBase.

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7. NATURAL RESOURCES PROGRAM MANAGEMENT

The Endangered Species Act (ESA) of 1973 (Public Law 93-205) requires military installations to protect and conserve federally listed threatened and endangered (T&E) plants and animals and their habitats. In addition, the ESA requires that installations having listed species develop specific plans for preservation of these species and their habitats. Air Force Instruction (AFI) 32-7064, *Integrated Natural Resources Management*, requires additionally that all installations must prepare and maintain a current inventory of threatened and endangered species and their habitats as part of the installation habitat inventory.

Extensive swamps, marshes, ponds, and bayous occur in and around Hurlburt Field. Approximately 3,431 acres, or 52 percent of the installation, is composed of state and federal jurisdictional wetlands. These sensitive and important habitats present challenges and, at times, may constrain the military mission at Hurlburt Field. Sometimes the constraints are seasonal, and mission activities are scheduled for specific times of the year to avoid or minimize potential impacts. Constraints may involve comprehensive consultation periods before a mission can be conducted, or measures to monitor the protected species (or its habitat) during the mission. For this reason, Hurlburt Field's Natural Resources staff plays a vital role in the planning stages for many mission activities.

7.1 NATURAL RESOURCE PROGRAM MANAGEMENT

Hurlburt Field resource managers and the Installation Support Team at the Air Force Civil Engineer Center are directly responsible for the development and the subsequent updates of Hurlburt Field's INRMP. However, several other agencies play a critical role in this process. This Plan represents a mutual agreement between Hurlburt Field, the USFWS, the FWC, and the NMFS in regards to the conservation, protection, and management of fish and wildlife resources and the listed T&E species on the installation. Throughout the INRMP update process, these agencies are encouraged to participate in the scoping, design, and preparation of the INRMP. The Final INRMP is then signed by the installation's Wing Commander, the Regional Director of the USFWS, the Regional Director of the FWC, and the Regional Director of the NMFS.

7.2 GEOGRAPHIC INFORMATION SYSTEMS

Historically, information from all natural resources surveys has been converted into digital format and incorporated into the installation geographic information system (GIS). The natural resources data layers (provided below) are maintained by personnel in the Environmental Flight, and are updated as new information becomes available. Hurlburt Field's GIS is the central location for various natural resources data layers; however, not all of the data layers are available to the entire installation public because of the requirement to protect certain vulnerable natural resources assets. AFCEC is re-evaluating the value of decentralized GIS as of the FY 14 budget year. Future GIS funding and execution will be on a reduced total budget with some loss of fidelity.

Hurlburt Field utilizes the data collected in GIS to ensure military readiness while protecting natural resources and effectively manage growth on the installation. Currently, Hurlburt Field's Environmental Flight manages and updates the following data layers:

- Asbestos Management Location Points
- Lead-Based Paint Location Points
- Hazardous Material Storage Location Points
- Air Emissions Source Points
- Installation Chemical Sectors (used by Readiness)
- Aboveground Storage Tank Points
- Environmental Restoration Areas
- Environmental Well Points
- Wetlands
- Floodplains
- Rare and Threatened Animal and Plant Species
- Installation Tree Species Points
- Archeological Sites

7.3 FISH AND WILDLIFE MANAGEMENT

7.3.1 Fish and Wildlife Management Background and Introduction

The USFWS, FWC, and NMFS all provide valuable insight to natural resource conservation programs at Hurlburt Field. When the agencies' officials sign the Final INRMP, it serves as a mutual agreement between these agencies and the U.S. Air Force. These agencies continue to interact with natural resources managers at Hurlburt Field to discuss priories, set goals, and coordinate the annual review of the INRMP.

State and Federal Jurisdiction of Fish and Wildlife

The State of Florida has jurisdiction over resident fish and wildlife throughout the state including Hurlburt Field. The USFWS has jurisdiction over migratory birds, federally listed T&E species, certain marine mammals, and freshwater and anadromous fish. Hurlburt Field is required to comply with federal fish and wildlife laws such as the ESA, which prohibits the unauthorized taking of a federally threatened or endangered species and requires federal agencies conserve those species and consult with the USFWS on actions that may affect them. The USFWS has been a strong conservation partner to Hurlburt Field and has worked closely with the natural resources managers on the installation. The USFWS's main role on the installation has been to assist the natural resources staff in the conservation and management of the many federally listed T&E species occurring on the installation in a manner which sustains and supports Hurlburt Field's diverse training military mission.

7.3.2 Hunting and Fishing Program Organization and Management

Deliberate management of wildlife populations is necessary to sustain and enhance biological diversity and the viability of wildlife populations and to maximize the compatibility of wildlife and human activities. To achieve these goals, it is vital that habitat management activities be coordinated with other land management and mission-related activities.

7.3.3 Hunting and Fishing Policy, Regulations and Fee Structure.

In accordance with AFI 32-7064, *Integrated Natural Resources Management*, the designated installation natural resources manager is responsible for management and oversight of all hunting and fishing programs. Currently, Hurlburt Field does not have a hunting program in place. Management of fish and wildlife resources is conducted throughout much of the adjacent Eglin reservation, which contains significant remote areas. There is no hunting on Hurlburt Field, and fishing opportunities are limited to Hurlburt Lake and Santa Rosa Sound. All persons fishing, or engaging, in outdoor recreational activities on Hurlburt Field are required to obtain a recreation permit through Eglin Natural Resources and comply with all applicable federal and state laws, rules and regulations.

The only pond open to fishing on Hurlburt Field is Hurlburt Lake (Figure 4-2, in Chapter 4). Specific regulations may be posted as needed at individual ponds. A fishing permit (issued by Eglin) is required to fish on Hurlburt Lake. State licenses for fishing in Santa Rosa Sound are available are the Okaloosa Tax Collector's office on Hurlburt Field. Other recreational fishing opportunities on the base have been researched but no other viable opportunities have been identified or developed.

The management of the fishing program on Hurlburt Field is coordinated through the FWC and the USFWS. The cost of this program and the funds generated by fees charged for fishing are handled by Eglin Natural Resources. Regulations and fee structures are the responsibility of Eglin AFB and are not handled by Hurlburt Field. Updated information can be found at http://jacksonguard.com/. Map updated daily of open areas at http://jg.eglinforcesupport.com/#

Wildlife Education and Interpretative Programs Wildlife education is disseminated throughout the base community via a variety of new airmen orientation briefs, facility manager training, Cross-Functional Team meetings and festivals such as Earth Day and First Friday. These events as well as multiple news articles, the Hurlburt Field website and social networking pages regularly provide information about wildlife or other natural resources topics to all military personnel and their families.

The Grace Brown Nature Trail extends approximately 1.4 miles in length through coastal and wetland ecosystems and includes boardwalks, bridges, and wildlife observation areas. Interpretative signage and educational kiosks along the way provide information about native plants, wildlife, birds, coastal processes, aquatic life and invasive species. An observation point provides visitors the opportunity to learn about barrier islands and view birds through non-coin operated binoculars. Black Bears are increasingly common on Hurlburt Field. The Florida Black

Bear has recently been delisted as a state threatened species but is still protected along with all other wildlife on the base. Over time, unsecured garbage and inconsistent practices for managing attractants have habituated bears to developed areas of the base creating issues periodically. While bear-proof containers and ongoing education have decreased the frequency of human/bear conflicts at Hurlburt, the Florida Fish and Wildlife Conservation Commission (FWC) regularly assists base natural resources personnel in control of the species.

Hurlburt Field staff uses various measures to handle nuisance bears. Education on good housekeeping practices remains the most effective technique for preventing such encounters. Articles in the installation newspaper, social media, brochures, and strategically placed signs are used to educate the public about alligators and bears and the laws that protect them. Hurlburt Field personnel consult and coordinate with FWC before any nuisance alligators and black bears are removed from the installation. Hurlburt Field maintains a Florida Black Bear aversive conditioning permit and regularly holds classes to train and certify bear response agents including Security Forces troops.

Pest Management personnel are part of the Civil Engineer Squadron and respond to all other nuisance wildlife calls including snakes and alligators. All wildlife is handled in accordance with FWC regulations. Pest Management regularly interacts with and supports base natural resources and BASH personnel on a case-by-case basis.

Offsite relocation of native captured wildlife is discouraged. There are well documented negative impacts of relocation on resident wildlife populations and relocated individuals. Any relocation of native species outside of Hurlburt Field should occur with appropriate coordination and in accordance with FWC regulations. Live traps are used to remove feral animals such as opossums, raccoons or other small nuisance pests. These animals are released to an onsite location so as the animal is not endangered and base personnel and property are not in jeopardy.

7.4 MANAGEMENT OF THREATENED AND ENDANGERED SPECIES AND HABITATS

7.4.1 Legal Requirement to Manage and Conserve T&E Species

The ESA of 1973 is the primary legal driver for the protection and management of federally listed T&E species. The **purposes** of the Act are: "…to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section."

The **policy** of the Act reads as follows: "It is further declared to be the policy of Congress that all Federal departments and agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."

The **consultation clause**, section 7(a)(1) of the Act further reads: "All Federal agencies shall, in consultation with and with the assistance of the Secretary (Interior and/or Commerce), utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act."

The Act defines the terms "conserve," "conserving," and "conservation" as meaning: "use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include the regulated taking."

To further stress and clarify the importance of conserving T&E species, the DoD along with the Departments of Agriculture, Commerce, Interior, Transportation, and the USEPA signed a Memorandum of Understanding (MOU) in 1994. This MOU reads as follows: "Each individual agency that is a party of this MOU will: Use its authority to further the purposes of the ESA by carrying out programs for the conservation of Federally listed species, including implementing appropriate recovery actions that are identified in recovery plans."

7.4.2 Direct Mission Support

Section 7(a)(2) of the ESA requires that each federal agency *consult with* the USFWS and/or the FWC (as appropriate) on *proposed actions* that the Air Force has determined *may affect* listed T&E species. This initial determination is made as part of the Environmental Impact Analysis Review Process (EIAP) more commonly referred to as NEPA, the National Environmental Policy Act of 1970. This process assesses potential impacts of proposed mission activities on natural resources with special emphasis on T&E species and wetlands. Clear project proposals with details of the proposed mission activity and recommended conditions help to streamline the

review process. Natural Resources staff act as the liaison between the proponent and the regulatory agencies (USFWS and NMFS) managing the ESA Section 7 and MMPA consultation process. Before beginning any consultations, the Natural Resources staff works with the proponent and other decision-makers including the community planner to determine if the mission fits under a pre-existing or programmatic consultation or if there are ways to adjust location, timing or types of activities to avoid or minimize impacts to t&E species and their protected habitats. Often, agreement to follow mission avoidance and minimization criteria has allowed the mission to eliminate the need for consultation or consult on an informal basis which greatly reduces the length of time required for regulatory response.

On the surface, many proposed actions have the potential to impact T&E species. Often times, however, it is the support activities associated with the mission, rather that the mission itself, that have the greatest potential to impact T&E species. The role of Hurlburt Field's staff is to understand the parameters in which the mission must occur and find solutions to avoid impacts to T&E species. If all impacts can be avoided, a formal Section 7 consultation (with USFWS) is not required. If it is not possible to avoid impacts to T&E species or sensitive habitat, then the Natural Resources staff initiates consultation on behalf of the proponent through the submission of a Biological Assessment (BA) to the USFWS or NMFS. The following table identifies consultations related to proposed actions with the potential to affect T&E species or their habitat.

Table 7-4. Mission Activities and Related T&E Related Consultations

PROJECT	DATE	AGENCY
Boat Storage Facility	2007/2009	USFWS/NMFS
Planned Growth EA	2009	USFWS
EOD/Close Quarters Addition	2010	USFWS
Northeast Area Development	2011	USFWS
Military Housing Privatization Initiative	2011	USFWS
West Gate EA Study	2013	USFWS
Timber Harvest BA (Eglin)	2014	USFWS
Range Road Maintenance	2014	USFWS
Hardwood Control in Flatwoods Salamander Ponds BA	2014	USFWS

7.4.3 Management of Federally Listed Threatened and Endangered Species

Specific management and monitoring activities for many of the species list below are addressed in the Hurlburt Field *Land Management Plan* (Appendix G). This Plan provides a basis for the various actions that Hurlburt's Natural Resources Manager is undertaking to effectively manage and monitor these species and their habitats.

Flatwoods Salamander

The Frosted Flatwoods salamander (*Ambystoma cingulatum*) was federally listed as a *Threatened* species in 1999. This salamander is a slender, small-headed salamander that rarely exceeds 13 centimeters in length when fully mature. Adult dorsal color ranges from black to chocolate-

black with highly variable, fine, light gray lines forming a netlike or cross-banded pattern across the back. The historical range of the flatwoods salamander included the lower Coastal Plain of Alabama, Florida, Georgia, and South Carolina. In 2008, two distinct species were identified. The new species occurring west of the Appalachicola River was identified as the Reticulated Flatwoods Salamander, *Ambystoma bishopi*, and its federal and state listing status elevated to *Endangered* in 2009.

Optimum habitat is an open, mesic (moderately wet) woodland of longleaf (*Pinus palustris*) or slash pine (*Pinus elliottii*) flatwoods maintained by frequent fires that also contain shallow, ephemeral wetland ponds. Males and females migrate to these ephemeral ponds during the cool, rainy months of October to December. The females lay their eggs in vegetation at the edges of the ponds. The timing and frequency of rainfall are critical to the successful reproduction and recruitment of Flatwoods salamanders. If ponds do not fill or they dry too early then young will be unable to metamorphose into adults.

Hurlburt's breeding ponds are ecologically connected to similar habitat on Eglin Air Force Base, located just west of the installation boundary. Together these areas constitute the most extensive habitat known for this species in its geographic range T&E species surveys conducted in 2002-2003 on Hurlburt confirmed the species in 11 ponds and noted potential breeding sites throughout the approximate 800 –acre Pine Flatwoods stand on the installation's west side. As a result of a wetland mitigation agreement in 2000, a MOA and *Land Management Plan* was established between Hurlburt and regulatory agencies to outline future appropriate land uses for this portion of the base, ongoing protection for jurisdictional wetlands, restoration for 125 acres and preservation for over 350 acres of uplands. Recommended best management practices for these sensitive areas and the salamander habitat are identical and this agreement ensures that this protection and activities like fire and invasive species control will continue into perpetuity. Mission critical objectives may at times threaten this ecological area however, Natural Resources staff work consistently with decision-makers to avoid and minimize and impacts to the species.

Based on the aforementioned surveys, Hurlburt Field assumes presence of the species and does not conduct routine monitoring and/or ongoing surveys. Prescribed fire is planned and conducted routinely with the support of the Air Force Wildland Fire Team at Eglin Air Force Base to control midstory hardwoods. Fire activities normally occur in the winter which have had long term overall effects on the breeding sites, i.e., increase in dominance of woody plants, decreased hydroperiods, increased shading and reduced herbaceous vegetation, etc. More aggressive management which includes midstory vegetative thinning, cut-stump herbicide application (FWC AHRES funding) and detailed growing season prescribed fires of individual ponds are scheduled in the near future to sustain healthy breeding conditions.

Eastern Indigo Snake

The eastern indigo snake (*Drymarchon corais couperi*) is a federally endangered and state-threatened species. It is one of eight subspecies of primarily tropical snakes. Six of the eight subspecies are distributed in South or Central America, only the eastern indigo and the Texas indigo occur within the United States. The eastern indigo is a very large, conspicuous, slow-moving and docile snake that can attain a body length of 8.5 feet. These characteristics make it

an easy target for those who indiscriminately kill snakes on sight. It is also a species that is highly sought after by collectors in the commercial pet industry. The eastern indigo often uses the burrows of the gopher tortoise as habitat which establishes an important linkage between the two species. While this species has been sighted on the Eglin reservation, there have been no sightings at Hurlburt Field.

Hurlburt Natural Resources maintains a passive management approach for this species in order to maintain the habitat with prescribed fire, restriction of use of forest roads and use of perimeter access controls where the species is most likely to inhabit. All construction personnel are briefed on this species and education including signage is provided. The management and recovery of the Eastern indigo snake is closely related to the gopher tortoise. Management of one species benefits the other. The next T&E species survey is tentatively scheduled for FY 16; however, the Natural Resources staff routinely inspects active and or inactive burrows which have been documented.

Gopher Tortoise

The gopher tortoise (*Gopherus polyphemus*) is a state threatened species and is a candidate for Federal listing in the eastern portion of its range. In December 2008, all DoD entities, including the Air Force, as well as state agencies and other non-governmental organizations (NGO), signed a Candidate Conservation Agreement with the USFWS. This agreement defines what each agency will voluntarily do to conserve the gopher tortoise and its habitat. The Federal Register Vol. 76, No. 144 / Wednesday, July 27, 2011 recently documented the 12-month finding on a petition to list the gopher tortoise as threatened in the eastern portion of its range. The review found that the listing of the gopher tortoise is warranted; however, listing is precluded by higher priority actions. The Federal Register notice also states that it will be added to the federal candidate list and a proposed rule to list the gopher tortoise will be developed as priorities allow.

The gopher tortoise is found primarily within the sandhills and open grassland ecological associations on the Eglin Range, where it excavates a tunnel-like burrow for shelter from climatic extremes and refuge from predators. The primary features of good tortoise habitat are sandy soils, open canopy with plenty of sunlight, and abundant food plants (forbs and grasses). Prescribed fire is often employed to maintain these conditions. Nesting occurs during May and June and hatching occurs from August through September. Gopher tortoise burrows serve as important habitat for many species, including the federally listed eastern indigo snake.

In the last T&E species survey there were 7 occurrences noted along the westernmost boundary of Hurlburt Field. Of these only 2 active burrows were confirmed supporting no more than a population of 5 gopher tortoises. Management activities including prescribed fire and sand pine removal are being conducted. Surveys are routinely conducted for specific projects and construction personnel are educated regarding the species. Translocation to this area may occur in coordination with USFWS and FWC if the species is identified in a potential project area.

Gulf Sturgeon

The Gulf sturgeon (*Acipenser oxyrinchus desotoi*) was designated a threatened subspecies in September 1991. The sturgeon is a member of the family *Acipenseridae* that inhabits the Atlantic, Gulf, and Pacific and certain freshwaters of the United States. The Gulf sturgeon is one

of two geographically disjunct (discontinuous range) subspecies of the Atlantic sturgeon. The other subspecies is referred to as the Atlantic coast subspecies (*Acipenser oxyrinchus oxyrinchus*). Gulf sturgeon is an anadromous fish with a sub-cylindrical body imbedded with bony plates or scutes. These fish rear in fresh water, mature in salt water, and then migrate back to fresh water to spawn and reproduce. The Gulf sturgeon occurred in most major river systems from the Mississippi River to the Suwannee River, Florida and in marine waters from the central and eastern Gulf of Mexico to Florida Bay. Comparison of historic information and current data indicate that Gulf sturgeon populations are reduced from historic levels. At present, Gulf sturgeon population estimates are unknown throughout its range.

Through the EIAP, Hurlburt Field analyzes potential impacts to Gulf sturgeon from proposed mission activity and recommends conservation measures to avoid these impacts. Currently, Hurlburt Field does not conduct any active management for Gulf sturgeon.

Red-cockaded Woodpecker

The RCW is a federally listed endangered species endemic to open, mature old growth pine ecosystems in the southeastern United States. RCWs are the only woodpecker species in the southeast to excavate cavities in live pine trees. They require old growth pines for cavity excavation due to the greater presence of heartwood in older trees and they prefer longleaf pines in particular, which have greater incidents of red heart disease and makes cavity construction easier.

During the last T&E species survey RCWs were observed foraging in the western portion of the Hurlburt EOD range near to the area where gopher tortoises were documented. However, no active cavities were noted. Previously known cavity trees had either been abandoned or died. Within the last two years, at least 3 new cavities have been identified and management practices such as buffer zones are being implemented to protect these trees during prescribed fire or any other forest restoration activities. Passive management for the species includes prescribed fire and removal of invasive species including sand pine, which is the greatest threat to the RCW habitat. Sand pine eradication in over 100 acres on the western portion of the base is planned for FY14-15 with subsequent reforestation with longleaf pine. Hurlburt works consistently with Jackson Guard and the Eglin AFB Wildland Fire Center to manage T&E species habitat under a burn prioritization process. For RCWs, the frequency recommended for restorative emphasis is a three to four year return interval (Heirs, 2003). Currently there is no monitoring or recovery plan in place for the species but in light of these new cavities, Hurlburt Field Natural Resources staff will work with USFWS to identify additional requirements.

7.4.4 Management of State-Listed Threatened and Endangered Species and Non-Listed Conservation Target Species

AFI 32-7064 encourages biodiversity management to include the conservation of state-listed and other rare species. However, biodiversity management is not an Air Force mandate and as such is not considered a “must fund” area in the Air Force budgetary system. The Air Force is currently not providing funding to installations for conservation of state-listed and rare species unless those species are also federally listed. Nonetheless, the conservation of state-listed species and other rare but unlisted species, is encouraged and in some cases is critical to ensuring continued mission flexibility. Any potential impacts to state-listed species shall be address

through consultation with FWC. The flora and fauna species documented during field surveys at Hurlburt Field are discussed in Chapter 5 of this document.

7.5 WATER RESOURCE PROTECTION

Water resources include groundwater, streams, lakes, bays, bayous, sounds, and wetlands. Multiple large water bodies are located on or adjacent to Hurlburt Field (Figure 4-2). Additionally, numerous small streams and wetlands are present across the installation. Primary threats to these water resources are excess sedimentation, bacterial contamination, and high water demand. Specific management issues and concerns at Hurlburt Field related to water resources and watersheds include water quality monitoring, erosion control, and wastewater and stormwater management.

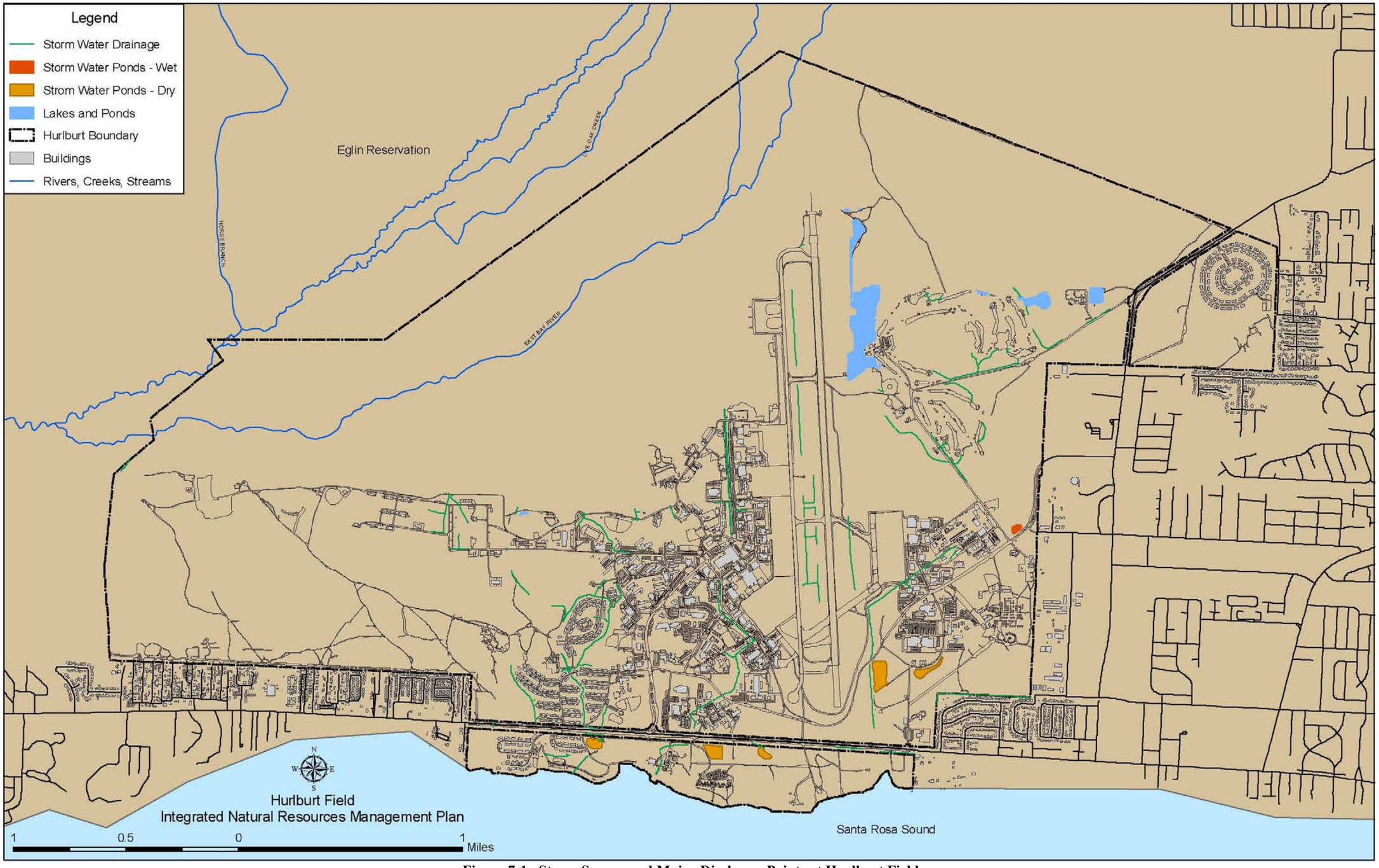

Figure 7-1. Storm Sewers and Major Discharge Points at Hurlburt Field

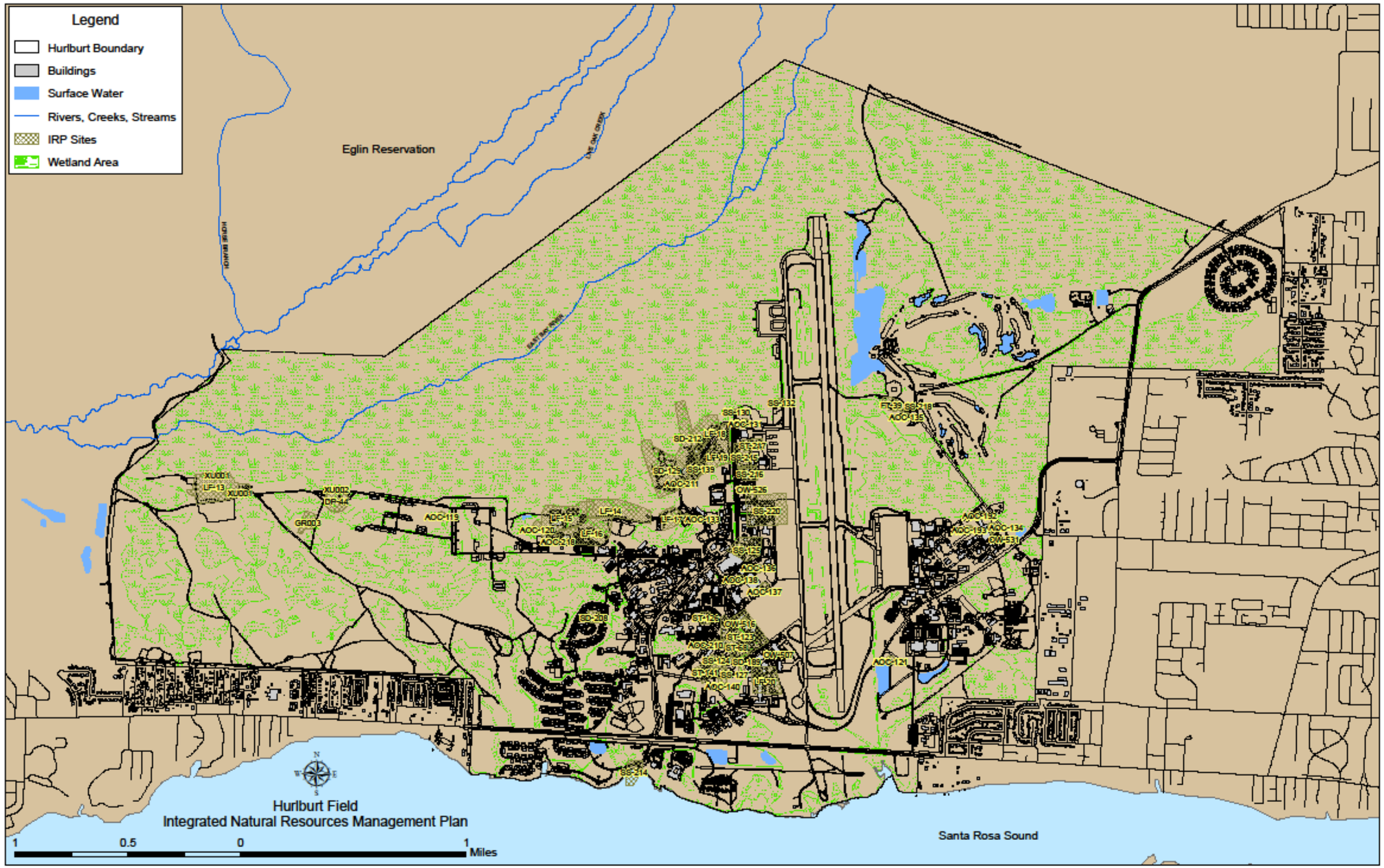

Figure 7-2. Installation Restoration Program Sites at Hurlburt Field

Water Supply

The Floridan and Surficial aquifers supply most of the water needs in Santa Rosa and Okaloosa counties. In the coastal areas of these counties, there has been an excessive decline in the potentiometric surface elevation of the Floridan aquifer due to heavy groundwater pumping. Therefore, Hurlburt Field lies within a water resource caution areas as identified by the Florida Department of Environmental Protection. For an unconfined aquifer the potentiometric surface is the water table; for a confined aquifer it is the static level of water in the wells. This decline causes an increased risk of saltwater intrusion and may potentially impact water levels in area water bodies. In 2013, a basewide wastewater reuse system projected to save approximately 93.4M gallons of potable water per year and an associated $402K per year in costs was implemented. Other water conservation efforts consist of small rain barrel projects at individual facilities, cisterns used for toilet flushing and native landscaping strategies which require less water.

Wastewater and Stormwater Management

Hurlburt Field has developed a Stormwater Program Management Plan updated annually that documents the requirements associated with the four required types of permits associated with stormwater discharges. The four types are: 1.) Florida Administrative Code (F.A.C.) Rule 62-624 Municipal Separate Storm Sewer (MS4) National Pollutant Discharge Elimination System (NPDES) Permit, 2.) F.A.C. Rule 62-621 Multi-Sector Generic NPDES Permit for Stormwater Associated with Industrial Activity, 3.) F.A.C. Rule 62-621 Generic NPDES Permit For Stormwater Discharge from Large and Small Construction Activities, and, 4.) F.A.C. Rule 62-330 Environmental Resource Permit.

The Stormwater Program Management Plan is implemented in accordance with AFI 32-7041. AFI 32- 7041 requires the establishment of a Pollution Prevention Team, which at Hurlburt is known as the Environmental Cross Functional Team. In line with the Environmental Management System (EMS) Program, much of the responsibility for ensuring the effectiveness of the stormwater program falls on industrial activities that support airfield operations and services to base population who must take direct actions to prevent stormwater pollution. These activity centers must comply with the many programs directed by Air Force Instruction that support stormwater pollution prevention. The following Best Management Practices (BMPs) are key facets in the implementation of the Stormwater Program Management Plan: 1.) good housekeeping; 2.) preventative maintenance; 3.) visual inspections; 4.) prevention and response to spills; 5.) sediment and erosion control; 6.) structural runoff controls; 7.) personnel training; 8.) hazardous material management; 9.) special and hazardous waste management; 10.) petroleum, oil, and lubricant management; 11.) pesticide management; 12.) industrial and domestic wastewater management; 13.) solid waste management and recycling; 14.) natural resources management; 15.) limiting exposure to rainfall; 16.) special containment; 17.) review of new construction plans, and 18.) illicit discharge prevention.

Historically, all stormwater drainage system features on the base are tracked and managed using the Hurlburt Field GeoBase geographic information system and are best depicted through direct use of that system. Up to date maps showing specific features are produced as needed. Features mapped include: outfalls, drainage basin boundaries, open ditches, piping, swales, retention basins, general surface flow direction based upon topography, and project areas falling under

general or individual permits. AFCEC will centrally manage GIS some time after FY 14. The system fidelity and attributes may not be mapped in the way they are described above.
The GeoBase shows that significant portion of the overall stormwater on base is transported by natural drainage features, underground concrete pipes, channels, and drainage swales to five regional dry retention ponds permitted under the FDEP F.A.C. 62-25 rule. Another large portion of the stormwater runoff receives treatment in approximately 150 other F.A.C. 62-25 and F.A.C 62-346 permitted dry retention ponds and approximately 100 swales deemed exempt from permitting. However, there are several portions of the base that were developed prior to stormwater permitting regulations and do not receive documented treatment.

Outfall locations are identified at points discharging to Santa Rosa Sound from much of the southern half of the base; however, wetlands north and west of the base receive some stormwater discharges also. Drainage and Clean Water Act compliance are made complex by the large percentage of the base that has been determined to be jurisdictional wetlands. Many of the drainage ditches that convey stormwater are also regulated as wetlands. Some of the wetland drainage features received permits under the wetland permitting programs and were included in FDEP issued older stormwater permits.

7.6 WETLAND PROTECTION

The extent of wetlands at Hurlburt Field raises specific management issues and concerns. Given the military mission, there is potential for non-point source pollution, in the form of sediment, nutrients, pesticides, oils, greases, and debris. These pollutants have the potential to enter the waters of Hurlburt Field as stormwater runoff (See *Wastewater and Stormwater Management)*. In an effort to protect these important resources, federal, state and Air Force regulations have been instituted. Some of the predominant regulations regarding wetlands conservation are provided below:

- Clean Water Act
- Rivers and Harbors Act 1899
- EO 11990, *Protection of Wetlands*
- EO 11988, *Floodplain Management*
- Safe Drinking Water Act
- Watershed Protection and Flood Protection Act
- North American Wetlands Conservation Act
- Coastal Wetlands Protection Act

In accordance with AFI 32-7020, *Environmental Restoration Program*, Hurlburt Field established an *Environmental Restoration Program Management Action Plan* (U.S. Air Force, 2006). There are several Installation Restoration Program (IRP) sites located in or near wetlands throughout the installation (Figure 7-2). Contamination on these sites is limited to groundwater, with minimal soil contamination. There is no known direct impact on the wetlands. However, remediation or site closure activities have the potential to impact wetlands by destroying or

filling existing wetland areas. The IRP Manager for Hurlburt Field remains in contact with base planners to ensure that the wetland areas adjacent to IRP sites are not disturbed.

Since the year 2000, the conditions of a comprehensive 10-year permit authorizing the construction of 7 projects in 29 acres of jurisdictional wetlands, have strongly influenced the base's decision-making process for wetlands and sensitive areas (See also Wetlands, Section 5.5). To mitigate for wetland impacts, Hurlburt Field set aside approximately 3200 acres of uplands and wetlands as wildlife preserve in addition to restoring 125 acres of uplands and creating 4.5 acres of salt marsh. The *Hurlburt Field Land Management Plan* established programs for fire and invasive species management in support of 10 natural vegetative communities and overall maintenance of the wildlife preserve. At this time, Hurlburt entered into a Memorandum of Agreement with the Florida Department of Environmental Protection confirming that all preservation areas would be protected from future development and/or activities which would degrade its ecological value. Future mission critical activities that would require impact to these areas would require additional mitigation to be determined.

While creation of wetlands has historically been a successful mitigation strategy for Hurlburt Field, few viable resources for creation or restoration still exist on the installation or within our service area in this portion of the watershed. Between 2010 and 2012, Hurlburt Field purchased 14.1 forested credits from a wetlands mitigation bank in the Pensacola Bay Watershed service area to secure compensatory options for future unavoidable mission critical projects. At an unspecified future date when an Environmental Resource Permit is sought by Hurlburt for authorization to construct in a wetland; credits proposed as mitigation will be subject to review and acceptance by the regulators. All activities occurring in wetlands are implemented in coordination with outside regulatory agencies to ensure that BMPs are included in construction proposals. Permits and approvals are obtained prior to taking any action in wetland areas.

Hurlburt Field maintains a binding jurisdictional determination of wetlands on the installation. This aids planning efforts, the effectiveness of protection measures and minimizes project costs. Additionally, signs are posted at various intervals along the wetland line to raise awareness to sensitive areas. State law requires the establishment of waterward extent and in the absence of a Mean High Water survey, the 4-foot contour was established by the FDEP as the southernmost jurisdictional boundary on the base. All future projects constructed waterward of this line would require a survey to establish wetland characteristics. This boundary does not apply for federal jurisdiction.

7.7 GROUNDS MAINTENANCE

Land Management and Grounds Maintenance

Routine land management and grounds maintenance activities conducted on Hurlburt Field include mowing, fertilization, pest management, urban landscape management, and related activities. These actions are accomplished under contract on both the main installation and the surrounding areas of the installation. The Natural Resources staff works with Grounds Maintenance and Contracting personnel to ensure that best management practices for work in wetlands are performed. General grounds maintenance is the responsibility of the Civil

Engineer, Maintenance Engineer Flight. Pest Management is discussed in more detail in Section 7.11, *Integrated Pest Management Program.*

Hurlburt maintains an aggressive urban forestry program which includes components on landscape development, education, community service, habitat enhancement and prescribed fire. As of 2013, the base had qualified as a Tree City USA for the last 19 years and as a Growth Award recipient for the last 11 years. These designations earned the base the Sterling Tree City Award in 2012. Hurlburt's Tree Board and Vegetation Management team meets at least annually and has assisted with proactively identifying low impact strategies to removing airfield obstructions.

7.8 FOREST MANAGEMENT

AFI 32-7064, *Integrated Natural Resources Management*, states, "The objectives of forest management are to maintain and enhance ecological integrity to support the military mission, maintain a biological balance in the forest community, protect watersheds and wildlife habitat, and plan and coordinate the multiple uses of forest lands." The previously referenced 10-year permit and mitigation plan resulting from it provides land management guidance for the preservation of 10 natural vegetative communities and associated wildlife habitat. Currently, all of Hurlburt Field's forested areas are closed to outdoor recreation. Any future changes to this program would be reflected in future revisions of this document.

Commercial Forest Management

Harvesting of forest products on Hurlburt Field consists primarily of salvage wood operations at new construction sites. All timber on the base remains property of Eglin AFB; therefore, Eglin Natural Resources' foresters evaluate felled trees for potential commercial use before traditional disposal methods are employed. Harvesting of merchantable timber in order to thin the installation's forested perimeters is also being considered as an ongoing wildfire mitigation method. The base will continue to work with foresters at Eglin Natural Resources to explore this option while maintaining compliance with Hurlburt's Land Management Plan and all other federal and state regulations.

In 2012, over 25 acres of *Pinus sp*. were identified as airfield obstructions which have breached the allowable height of the airfield's transitional surface. Hurlburt will work with Eglin Natural Resources to identify merchantable timber in these areas which can be harvested and in this manner remove violations without clear-cutting the entire area. In some instances, sandpine plantations have been removed (by hand) and in areas where there is no conflict with flight operations, replanted with long leaf pine. Other upland forests areas consists of either pine or mixed pine/hardwood and wetland forests, either pond pine, cypress, or black gum.

7.9 WILDLAND FIRE MANAGEMENT

Mission support, ecosystem management and protection of life and property all depend on a professionally managed wildland fire program. AFI 32-7064 states clearly that wildland fire management personnel *"must meet the applicable National Fire Protection Association (NFPA)*

Standards for wildland fire activities… [and] may use training criteria in the NWCG Wildland Fire Qualification Substem Guide (PMS 310-1/NFES 1414) to attain equivalent NFPA certifications."

Fire management plans discussed in the Hurlburt Field long-term wetland permit submitted to the U.S. Army Corps of Engineers (USACE) and the FDEP have the goal of maintaining and enhancing the fire-dependent ecosystems on Hurlburt Field, including healthy forests of longleaf and slash pine. Effective 2014, Hurlburt Field receives support from the newly established AFCEC Wildland Fire Center regionally based at Eglin AFB for all fire management activities on the installation. The Hurlburt Field fire department supports the installation during prescribed burns in the urban interface only. However, the installation fire department is neither funded nor trained to handle wildfire operations. Prescribed burns are performed on a 2-3 year cycle in accordance with sophisticated technical models which predict optimum fire frequency for T&E species. Currently prescribed fire is restricted to the approximate 1000 acre pine flatwoods preserve on the west side of the installation.

In May, 2012, a wildfire in East Bay swamp north of Hurlburt Field required multiple emergency response services to contain the fire which ultimately encompassed over 2700 acres. This wildfire, now known as the Runway Fire raised concern about the mounting availability of underlying fuels throughout much of the wildland-urban interface which has been predominantly fire-suppressed. Currently, Hurlburt Field is working with the AF Wildland Fire Center to develop a regional Wildland Fire Management Plan to address prescribed fire plans for the base, locations and maintenance of fire lines and strategies for mitigating wildfire risk which will also minimize management impacts.

7.10 AGRICULTURAL OUTLEASING

Currently, there are no such activities on the installation nor are any under consideration. Hurlburt has no suitable open ground, soil fertility or market opportunity to take advantage of this program at this time. Any future changes to this program would be reflected in future revisions of this document.

7.11 INTEGRATED PEST MANAGEMENT PROGRAM

Hurlburt Field has an active pest management program to control rodents, insects, weeds, and fungi on the installation property (Lindler, 2007). The installation is committed to reducing pesticide and fertilizer use through the development and implementation of an integrated pest management program in accordance with AFI 32-1053, *Pest Management Program*. The specifics of the program are outlined in the Hurlburt Field Pest Management Plan (Rosendale, 2007).

Hurlburt Field's Pest Management Shop is part of Civil Engineer Squadron and administers the program for the military portion of the installation. Civilian personnel with the Services Squadron oversee the pest management activities at the Hurlburt golf course. Both the on-site contractor and the Services Squadron have state-certified pesticide applicators. The chemicals are stored and mixed at the entomology facility and at the golf course pesticide storage facility in accordance with DoD policy.

Invasive Non-native Species Management Program

An invasive species can be defined as a species that is non-native to an ecosystem and who's intentional or accidental introduction causes or is likely to cause environmental or economic damage or harm to human health.

Once established, these species reduce biological diversity and disrupt the natural integrity and function of native ecosystems by altering habitat and out competing native species. Invasive animal species may significantly impact native species populations by actual consumption of flora or predation of fauna. The introduction and spread of non-native invasive species may also create significant, negative issues for military training or for other anthropogenic land uses.

Hurlburt Field is committed to the identification, control and eradication of invasives. Hurlburt uses the Exotic Plant Pest Council list of Florida's Most Invasive Species to identify species and prioritize invasive species control. Natural communities and urban interface areas where invasive exotic plants are established receive first priority for treatment as funding is made available. This is accomplished by an initial herbicidal treatment, maintenance treatments and monitoring. In 2000, a wetland mitigation plan for associated impacts on Hurlburt, established a land management plan whereby invasive species would be managed in perpetuity.

Natural Resources staff also participates with the Six Rivers Cooperative Invasive Species Management Area (CISMA) team whose objective is to develop regional strategies for education, identification, data collection, eradication and control of invasive species. The CISMA consists of multiple private and public agencies in this geographic region.

7.12 BIRD-AIRCRAFT STRIKE HAZARD

Bird and wildlife collisions with aircraft cause millions of dollars in damage and the loss of human life. The participation of Hurlburt Field Natural Resources in the BASH program is directed by AFI 32-7064*, Integrated Natural Resources Management*, and *AAC Plan 91-212, Bird Aircraft Strike Hazard Plan*. Hurlburt Field Natural Resources has taken a more active and

involved role in the development and implementation of the current BASH program on the installation as a result of increased awareness of BASH threats throughout the Air Force.

Hurlburt Field is located on the fringe of two major flyways; the Mississippi Flyway and the Atlantic Flyway. Fall migration into Northwest Florida is dispersed over several months and peaks in September and October as cold fronts pass through. A second, smaller peak occurs in March and April. Land birds, shore birds, geese, and raptors all migrate through this area at different altitudes. Bird strikes during these peak periods are inevitble.

The BASH Program has many cooperators, but the Flight Safety Office takes the lead for BASH Program management. This program is responsible for minimizing risks to pilots and aircraft from birds and other wildlife species on the airfield and surrounding operating areas. A BASH plan was developed by the Safety Office with inputs from other installation organizations. This fully-integrated plan utilizes habitat modification with BASH dispersal techniques to minimize the presence of wildlife species on the airfield.

In support of this program, the Bird Hazard Working Group offers oversight and implementation of the BASH Program at Hurlburt Field. The natural resources manager at Hurlburt Field provides valuable technical information and expertise to the Bird Hazard Working Group and the installation's BASH program on bird/wildlife biology, species identification and control options. An integrated pest management strategy (discussed earlier) is utilized to manage airfields for bird and wildlife control.

Passive control measures such as landscape design, elimination of food and roost sources, turf/water management and forest management are the most permanent ways of reducing the attractiveness of airfields for bird and wildlife utilization.

Active control measures may incorporate trained working dogs, pyrotechnics, bioacoustics, and depredation (lethal control) activities. Depredation activity is only implemented as a last resort when other scare tactics are proven unsuccessful.

Specific types of management strategies and actions incorporated into the BASH program include:

- Bird harassment techniques (using wildlife biologists and trained working dogs)
- Removal of dead animals (carrion) from airfields
- Auditory bird dispersal unit
- Propane cannons
- Sirens/horns/lights
- Pyrotechnics (shell crackers)
- Maintain drainage ditches in areas that have potential to hold water
- Grass heights are maintained at 10-14 inches
- Insect outbreaks may be sprayed with pesticides
- Tree and scrub vegetation management

- Maintain sanitary conditions around main installation dumpsters
- Lethal control measures, as necessary (depredation permits are acquired and annual reports are submitted to the USFWS by the installation natural resources manager)

In accordance with state regulations, Hurlburt Field base natural resources supports the BASH program in coordinating the removal of alligators, turtles, and other quadrupeds from the airfield.

7.13 OUTDOOR RECREATION

Non-consumptive outdoor recreation opportunities on Hurlburt Field encompass several opportunities including jogging/biking, camping, hiking, and birding. The Grace Brown Nature Trail and the picnic area along Santa Rosa Sound provide additional recreational opportunities for installation personnel, as well as members of the general public. Softball fields, basketball courts, a paintball area and a skeet range provide additional recreation opportunities.

The Grace Brown Nature Trail is a 1.5 mile loop trial that extends from the trail head alongside Santa Rosa Sound in front of the Soundside Club to the Hurlburt Field picnic area and back. The trail includes approximately 70 interpretive signs, benches, picnic tables and extensive elevated boardwalks that cross wetland marshes and other forested wetland areas. The trail was almost completely constructed through a partnership between the installation and the local scouting community. To date, a total of 18 scouts have obtained the Eagle Scout badge through projects related to Hurlburt Field's Grace Brown Nature Trail. In addition, the trail sets the stage for many environmentally-related activities such as Earth Day, Arbor Day, guided nature walks, bird watching activities and geocaching. In the Fall of 2013, over 100 volunteers participated in Hurlburt's first National Public Land's Day which focused its efforts on refurbishment of the recreation area and enhancing neotropical migratory bird habitat in the area of the nature trail. In anticipation of a new military family housing nearby, the trail was re-routed to ensure continuous access around the new homes. The project also installed additional signage, educational kiosks, planted 80 trees, mounted nesting boxes and constructed a new barrier island observation deck.

Hurlburt Field's Community Park features batting cages, an interactive fountain, skate board park, and soccer field. There are also numerous softball fields, a running track, tennis courts, a golf course and miles of jogging trail. Hurlburt Lake is the only lake on Hurlburt Field open to fishing. It is a 22-acre man-made impoundment located between the flightline and the Gator Lakes Golf Course. Because of its location there are restrictions on fishing the pond. These restrictions include fishing by boat only, fishing in daylight hours only and all fishing is catch and release.

Public Access Areas

Hurlburt Field has very limited public access. The largest and most utilized public access area is the portion of the installation south of US 98. With the exception of Soundside Housing Area, this area which includes the Grace Brown Nature Trail, Hurlburt Field Marina and the installation's Picnic Area is open to public access. Information on fishing licenses, regulations, various watercraft rentals, paintball, camping and other water sports can be obtained at the

Hurlburt Field Marina. Fishing licenses can be purchased at the Hurlburt Field Tax Collector's Office on main base.

In 2013, as a result of the Military Housing Privatization Initiative (MHPI), the 50-site Family Campground was moved to a new 32-site location north of Hwy 98 and west of the base along Martin Luther King Boulevard. The paintball area is also being relocated due to the MHPI and has been tentatively sited adjacent to the Hurlburt Field Skeet Range on a 14-acre parcel located off Lewis Turner Boulevard on 6th Ranger Road.

7.14 COASTAL ZONE MANAGEMENT ACT

In response to the federal CZMA, Florida enacted the Florida Coastal Management Act (Florida Statutes Title 26) to manage, protect, and maintain the coastal zone and its resources. In addition, the State may acquire coastal properties before they are developed, thereby reducing the risk of associated environmental and land use impacts. The coastal zone has been defined as all land and water within the state's 35 coastal counties, which puts Hurlburt Field within the coastal zone.

Under provisions of the federal CZMA of 1972, any federal activity that has the potential to impact Florida's coastal resources is reviewed for consistency with the 23 Florida statutes that comprise the Florida Coastal Management Plan (FCMP). The consistency process allows state agencies to review Proposed Actions. If a reviewing agency believes a project is not consistent with Florida's statutes, the FCMP requires the applicant (Hurlburt) to revise its plans. The Federal Consistency Unit coordinates with reviewing agencies and works with applicants to produce projects that are consistent with Florida's statutes and that protect critical coastal resources.

Hurlburt Natural Resources coordinates planned construction activities through the use of the CZMA as part of the NEPA review process (par 7.3). Projects do not proceed until all clearances and approvals are in place.

7.15 CULTURAL RESOURCES PROTECTION

Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, and any other physical evidence of human activity considered important to a culture or community for scientific, traditional, religious, or other reasons. Generally, any item 50 year old or older may be considered a historic cultural resource. To qualify as Prehistoric, an item or location must predate the European discovery of America (1500ce).

As a Federal agency, Hurlburt Field is required by law to consider the effects of its actions on historic properties. Mandating regulations include:

- Antiquities Act of 1906.
- Historic Sites Act of 1935.
- National Environmental Policy Act of 1969 (NEPA).

- National Historic Preservation Act (NHPA) of 1966 (as amended 36 CFR Part 800).
- Archaeological and Historic Preservation Act of 1974 (AHPA).
- Archaeological Resources Protection Act of 1979.
- Native American Graves and Repatriation Act of 1990.
- American Indian Religious Freedom Act of 1978.

National Historic Preservation Act (NHPA) section 106 requires that federal agencies analyze the impacts of their activities on historic properties, or cultural resources included in, or eligible for inclusion in, the National Register of Historic Places. Section 110 of the NHPA requires that federal agencies inventory any cultural resources that are located on their property or within their control and to nominate those found to be significant for inclusion into the National Register. Federal agencies are also required under Section 106 to consult with any Indian Tribe or Native Hawaiian organization that attaches religious and cultural significance to historic properties.

The USAF requires each installation to maintain an up to date Integrated Cultural Resources Plan (ICRMP). The ICRMP identifies the areas and structures on Hurlburt that are of historic interest. It also outlines the plan to survey Hurlburt's aging buildings to add culturally or historically significant ones as they warrant.

The entire land area of Hurlburt Field has been surveyed and designated as either high probability or low probability for the likelihood of cultural resources. These probability areas have been reviewed by and agreed upon by the Florid State Historic Preservation Officer (SHPO). Artifacts of interest are preserved under a programmatic agreement between Hurlburt and Eglin that establishes a process for all cultural items to be curated at Eglin.

There are recurring surveys conducted on Hurlburt Field for historic structures as buildings and other structures meet the minimum age requirement for listing. To date, no structures on Hurlburt Field are eligible or listed on the National Register.

7.16 ENFORCEMENT

The Sikes Act specifies that each installation's INRMP "shall, to the extent appropriate and applicable, provide for enforcement of applicable natural resources law including regulations." The Act further states that the Commanding Officer of the installation or persons designated by that officer are authorized to conducted natural resources enforcement. Section 670e-2 [Section 107] of the Act reads as follows. "To the extent practicable using available resources, the Secretary of each military department shall ensure that sufficient numbers of *professionally trained natural resources management personnel and natural resources law enforcement personnel are available and assigned responsible to perform tasks necessary to carry out this title…"* DODI 4715.3 states that *"professional natural and cultural resources staff shall oversee the enforcement of applicable laws as an integral part of the installation's conservation program."* AFI 32-7064 reads "To comply with the Sikes Act (16 USC 67 a-l [b]), United States military reservations *must use professionally trained fish and wildlife management personnel to develop, implement, and enforce their fish and wildlife management programs.*

Hurlburt Field has no consumptive use issues; FWC staff can provide assistance, if needed.

7.17 PUBLIC OUTREACH

Communication and cooperation with the public is a critical component of any natural resource management effort. Without the support of partner organizations and local citizens, it becomes very difficult to run effective management programs.

Authority

The authority to establish Volunteer and Partnership Cost-Share programs is provided by the National Defense Authorization Act, P.L. 101-189. Passed in November 1989, this legislation amended two acts and established volunteer and partnership programs for natural resource management on DoD lands.

The DoD Authorization Act of 1984 (10 USC 1588 a-c) was amended to expand existing authority to use volunteers to include acceptance of volunteer services for natural and cultural resources programs at military installations.

The Sikes Act (16 USC 670c-1) was amended to add the use of cooperative agreements with organizations and individuals for the maintenance and improvement of natural resources on, or to the benefit of natural and historic research at, DoD installations. The primary purpose of this legislation is to provide a vehicle through which DoD natural and cultural resources management programs can accept and utilize voluntary services in such a way that it is mutually beneficial to the program and the volunteer.

The goal of public outreach efforts is to encourage understanding of, support for, and involvement in the many management and monitoring programs at Hurlburt Field. Successful, outreach programs have been accomplished through various means, such as those provided in the following subsections. The Public Affairs office provides ongoing support to Hurlburt Environmental by disseminating information to the news media, military and outlying communities.

Research Partnerships and Internships

- Scouting - Hurlburt Field works with the local scouting community to provide projects for merit and other badges. Since 1997 Natural Resources has provided 20 scouts with Eagle projects toward earning the rank of Eagle with various projects on base. Several area Girl Scout troops have also contributed to projects and events like Arbor Day and the National Public Lands Day.
- Military Partners: Hurlburt Field partners with the Air Force Wildland Fire Center at Eglin AFB to accomplish prescribed burning and respond to wildfires.
- Research and Development
    - Hurlburt Field has worked closely with Three Rivers Resource Conservation & Development to conduct biological monitoring and habitat improvement projects on Hurlburt Field since 2002.

  - The base also worked with the University of Florida to conduct a 2-year grass study for the purpose of deterring a non-seed producing grass that would detract mourning dove on the airfield.
  - Since 1996, Hurlburt Field has worked with Florida's state heritage organization, the Florida Natural Areas Inventory (FNAI), to ensure up-to-date and accurate inventory on T&E species and their habitats of concern.
  - In 2011-2012, Hurlburt Field Natural Resources staff and the Hurlburt Field Youth Center partnered with the Audubon Society to restore a degraded wetland ditch and create a wetland stream for the purposes of creating an outdoor environmental education classroom for children of military families.
  - Hurlburt Field partners with local, state and federal agencies as part of a Cooperative Invasive Species Management Area team to address eradication and control of invasives within a 9-county area.
- Student Internships - University of West Florida refers student interns to Hurlburt Environmental to fulfill educational requirements. This arrangement is a win-win for both the base and the student.

Presentations and Guided Tours

Hurlburt Field's Environmental Flight provides tours to local school children frequently in conjunction with Earth Day, Arbor Day, and other family festivals. This includes guided tours of the Grace Brown Nature Trail as well as energy and water conservation presentations.

In addition, new airmen assigned to Hurlburt Field receive information on natural resources and conservation. Hurlburt Environmental gives presentations at the Airman Leadership School, Commando Connection, and Commando Pride Airmen Center (CPAC).

Volunteer Involvement

Currently, Hurlburt Field works with the Hurlburt Field Volunteer Coordinator at the Airman and Family Readiness program to provide natural resource volunteer opportunities. There are regular volunteer opportunities in place to maintain the Grace Brown Nature Trail, conduct beach clean-ups, and maintain wetland streams used for youth environmental education and assist with other environmental awareness events. In 2013, over 120 volunteers performed work in these areas.

8. MANAGEMENT GOALS AND OBJECTIVES

This chapter contains the Principle Goals, Supporting Goals, and specific Objectives that reflect the direction developed in this INRMP.

Principle Goals are the primary focal points for the implementation of the INRMP. Each Goal is supported by one or more Objectives that indicate a management initiative or strategy that will be used to achieve the stated Goal.

An Objective specifically states what will be done and how it will be done.

Principal Goal I Mission First:
Preserve, enhance, or expand current and future military air, ground, and water operations capacity through sound stewardship practices

Supporting Goal: I. A Responsive Planning:
Support military mission objectives through a responsive natural resources' analysis and consultation process (NEPA/EIAP).

Objectives: I.A.1.
Utilize the NEPA/EIAP AF form 813 review as an opportunity to avoid Endangered Species Act or Marine Manual Protection Act consultations. This is to be accomplished by rescheduling, relocation, or other avoidance strategy wherever practicable. Consultations should be accomplished rarely (target: fewer than 5 annually or 2% of 813s submitted)

Objectives: I.A.2.
Utilize the NEPA/EIAP as the starting point for 100% of all CZMA actions. Actions will not proceed until all clearances and coordinating agencies have had the opportunity to weigh in. Goal: 0 missed CZMA filings.

Objectives: I.A.3.
For any required Section 7 consultations, begin process within 1 business day.

Objectives: 1.A.4.
Monitor regional land use and development for critical habitat loss. Comment informally or on public record when practicable to convey the DoD desire to minimize habitat loss. Habitat loss near DoD facilities INCREASES the importance of DoD lands and DECREASES operations capacity.

Supporting Goal: I.B Internal Communication:
Informally consult internally with planners, commanders, and other actors to guide proposals, plans and actions before they have the opportunity to create an impact on natural resources. Preemptive strategy is difficult to quantify other than through attendance at key meetings.

Objectives: I.B.1.
Natural resources personnel will attend and actively contribute to all scheduled meetings in support of compliance and mission planning, i.e., Airfield Operations Board meeting, Vegetation Management meeting, BASH Working Group.

Objectives: I.B.2.
Establish and maintain regular communications with installation groups, community planner, range and training managers to identify early solutions to natural resources problems.

Objectives: I.B.3.
Conduct an annual plan review of NR program using Environmental Management System (EMS) tools to identify and correct deficiencies in a timely manner.

Supporting Goal: I.C Management Tools:
Provide up-to-date and accurate natural resources information to support informed decision-making and integration with other programs in the analysis and consultation process.

Objectives: I.C.1.
At least annually review and update environmental data layers to AFCEC's GeoBase system to provide the most up to date natural resources information.

Objectives: I.C.2
Record GIS field data for species' inventories, invasive species' controls, suspected or delineations of cultural sites or other field data points when discovered.

Objectives: I.C. 3.
Maintain up to date binding jurisdictional wetland survey in accordance with state and federal wetland delineation regulations. Significant changes which have occurred due to infrastructure, wetlands, or regulation are incorporated every 5 years in order to provide advance planning, avoid wetland impacts, maximize design efficiencies and minimize project costs. Review annually for the need to schedule with AFCEC.

Objective I.C.4
Survey and quantify species by defined area and habitat. Inventory of species is to be kept "current". Periodic verification is required. Establish spot inventory points for verifying species inventories. Establish method that can be accomplished by volunteers, non-biologist staff, and NR staff. Use to establish parameter to justify professional level inventory accomplishment.

Supporting Goal: 1.D Wildland and Prescribed Fire:
Provide sufficient wildland fire management support to Hurlburt's military mission through coordination with the Air Force Wildland Fire Center at Eglin, thereby reducing threats to life, property and natural resources

Objectives: 1.D.1.
Develop installation Wildland Fire Managment Plan in cooperation with the Air Force Wildland Fire Center at Eglin AFB. Outline burn blocks, prescribed fire frequency and strategies for reducing risk to mission.

Objectives: 1.D.2.
Reduce wildfire risk by implementing methods outlined in the Wildland Fire Management Plan by 2015 to 50% or more of uplands areas identified as high risk.

Objectives: 1.D.3
Utilize prescribed fire to maintain sensitive habitat. Salamander pond and other sensitive habitats respond favorably to appropriate use of fire. Treat 50% of high risk areas by 2017.

Supporting Goal 1.E. (7.12) Flight Safety and BASH:
Provide natural resources' expertise and field support to Flight Safety and BASH program

Objectives: 1.E.1.
Annually maintain all permits required for lethal control of migratory birds and coordinate removal of nuisance wildlife as needed to promote airfield safety. Verify permits are applied for and received annually.

Objectives: 1.E.2.
Work with BASH Working Group to identify effective, long-term solutions for the management of airfield wetlands that will minimize adverse effects to natural resources while reducing BASH. Monitor BASH statics for negative trends.

Principal Goal II Sikes Act & 32CFR Ch1 Part 190 Natural Resources Management Program:
Promote opportunities for sustainable use by the public while enhancing collaboration and stewardship consistent with the military mission.

Supporting Goal: II.A
Recreation: Develop outdoor recreational opportunities in response to identified needs and demands while maintain cost effective approaches that are within the constraints of the AF mission.

Objectives: II.A.1.
Promote fishing: awareness of shoreline fishing opportunities, kayak fishing, etc., and consider extending Eglin Fishing Rodeo to Hurlburt properties. Post seasonally to Hurlburt website, and cooperatively with Eglin. Request Public Affairs release/ publish news of fishing availability at Hurlburt Field.

Objectives: II.A.2.
Promote hiking trails: Enhance the management of special interest areas such as the Grace Brown Nature Trail to reflect the cultural and ecological importance of the area

while improving maintenance and utilization of these areas. Post seasonally to Hurlburt website, and cooperatively with Eglin. Request Public Affairs release/ publish news of volunteer efforts/cultural significance/leave no trace.

Objectives: II.A.3
Services Squadron Recreation Promotion: Services Squadron offers Paintball, Trap/Skeet, Pistol/Rifle range, boating, water sports, RV park, camping. All are open to military id holders and guests. Services Squadron advertises these opportunities independently on there website and in print. Coordinate and de-conflict efforts with Natural Resources seasonally.

Supporting Goal: II.B Informed Public:
Maintain current partnerships and create new partnerships with the base community and outside agencies to enhance conservation effectiveness and provide outreach opportunities.

Objectives: II.B.1.
Work with Hurlburt Field's Public Affairs Office and Force Support Squadron to help communicate future events and education information to the installation population. Publish two articles per year promoting recreation/stewardship/conservation/ volunteer support.

Objectives: II.B.2.
Participate in local events to increase awareness to natural resources and outdoor recreational areas. Attend appropriate event and promote conservation programs. Arbor Day/ Earth Day/ America Recycles Day/ or other public event.

Objectives: II.B.3.
Maintain compliance with the Hurlburt Field Clean Marina Designation and work with Florida Department of Environmental Protection to recertify as needed. Monitor completion of best management practices in cooperation with Force Support Squadron annually.

Objectives: II.B.4.
Maintain continuity of conservation efforts, public education, ecosystem management and wildlife control with housing 50 year lease holder. Attend coordination meeting at least annually.

Supporting Goal: II.C. Volunteers:
Utilize volunteers to enhance conservation effectiveness

Objectives: II.C.1.
Tap into community volunteer organizations to accomplish natural resources objectives and to raise awareness and encourage participation in recreational activities. Investigate outreach relationships with local service organizations such as Sierra Club, Scouting, 4-H, Ducks Unlimited, Archers, Florida Trail Association, Equestrian Society or other appropriate groups. Coordinate, assign and monitor areas of responsibility to the

volunteer group. Update future INRMP to reflect what service organization took what responsibility and their relative success.

Objectives: II.C.2.
Collaborate with and support organizations like the Hurlburt Field Youth Center, Library and local scouting projects for the purpose of environmental education and outreach for at least one project annually.

Objectives: II.C.3.
Utilize free volunteer tracking websites to give credit to volunteers needing service hours (school honors). Track volunteer hours annually. Reflect in future INRMP.

Principal Goal III ESA:

Conserve and protect natural biodiversity by restoring and maintaining Hurlburt's ecosystems in support of the military mission.

Supporting Goal: III.A.
Protect, restore and maintain endangered, threatened, rare and sensitive species and their habitats in accordance with all state and federal laws.

Objectives: III.A.1
Re-establish periodic fire regimes through wetland areas that are habitat suited to Flatwoods Salamander breeding ponds. Methods may include mechanical vegetation thinning, herbicide and growing season prescribed fire in individual ponds. (also goal I.E) Coordinate and cooperate with Eglin Wild Fire Center.

Objectives: III.A.2
Relocate gopher tortoise as needed, primarily in the preservation area. NEPA/EIAP follow up action as required.

Objectives: III.A.3
Maintain effective Black Bear Management program through base community education, removal of attractants and annual training in aversive conditioning for bear response agents. Monitor success through Hurlburt Law Enforcement complaint statics.

Objectives: III.A.4
Manage erosion sites: Identify for rehabilitation soil erosion sites in or adjacent to wetland riparian areas subject to Clean Water Act notice of violation. Recommend sites for programming to AFCEC for inclusion in the 5 year plan.

Supporting Goal: III.B Monitoring:
Maintain an integrated adaptive management and long-term trends monitoring program to evaluate potential impacts and to provide scientific information to decision makers for future projects and missions.

Objectives: III.B.1.
Update and maintain current base-wide natural resources rare plant and animal data. Volunteers and staff may be utilized for inventory verification seasonally. Request a funded formal inventory from AFCEC when driven by mission needs or a significant change in seasonal inventories.

Objectives: III.B.2.
Survey salamander population; Conduct an in-house effort to dip net sample the flatwoods salamander (*Ambystoma bishopi*) known breeding ponds.

Objectives: III.B.3.
Check established gopher tortoise burrows annually for indigo snakes and track/report incidental sightings of gopher tortoises. Volunteer reports, staff, or formal contract survey.

Objectives: III.B.4
Annually report black bear incidental sightings, nuisance bear conflicts and associated occurrences to Florida Fish and Wildlife Conservation Commission. Utilize report data from NR records and Law Enforcement desk.

Supporting Goal: III.C Invasives:
Reduce and control the spread of invasive, exotic plant and animal species.

Objectives: III.C.1.

Identify the threat of invasive, exotic plant species that compromise the biodiversity of high quality natural areas in close proximity to the urban interface. Annually treat the high threat/density sites located during the previous year's survey. Opportunistically treat single plants and clusters. Direct Housing Contractor to preform treatment where applicable.

Objectives: III. C.2.
Actively participate with the Comprehensive Invasive Species Management Area working group to develop standardized tracking and monitoring methods, and improve best management practices for the control and eradication of invasives.

Objectives: III.C.3.
Annually survey a minimum of 20 percent of high quality natural areas in close proximity to the urban interface for invasive, exotic species.

Objectives: III.C.4.
Cooperatively work with Housing Contractor to educate base community about the negative impacts of invasive species on native species through activities, community events, newspaper articles, or email blasts.

Objectives: III.C.5.
Update Hurlburt Field Landscape Development Guide in order to improve native landscaping practices; obtain Wing approval for implementation as base standard.

9. IMPLEMENTATION

The individual programs and their associated budgets implement the INRMP at Hurlburt Field. This chapter provides specific information on the procedures necessary to implement the Goals, Objectives and projects listed in Chapter 8, *Management Goals and Objectives*.

9.1 WORK PLANS

Chapter 8 listed goals and objectives are primarily carried out as duties and responsibilities of the Environmental flight chief, as relayed to the Natural Recourses staff. Where possible, other organizations, contractors, and volunteers are utilized to supplement the Natural Resources staff efforts. Efforts beyond the capabilities of the installation are carried forward as projects to AFCEC for inclusion in the 5 year budget review.

The Goals and Objectives are carefully stated as to not over reach the ability of installation personnel to complete them with staff as assigned.

To fully implement the Goals and Objectives of this INRMP, as outlined in Chapter 8, resources are needed as outlined in the following table. The availability of these resources and the precise time of availability will depend on the availability of on base "borrowed" resources, shared Eglin AFB resources, AFCEC loan of resources/expertise, funding, or civilian volunteers as noted.

Table 9.1 Funding sources and requests for implementation of the INRMP

INRMP reference	Project Title	Justification standard for AFCEC funding	Hurlburt application	AFCEC funding requested
I.A.3 I.C.1 I.C.2 I.C.3 I.C.4 I.E.1 I.E.2 I.E.3 III.B.1 III.B.2 III.B.3 III.B.4	MGT, SPECIES, FLATWOODS SALAMANDER	Species-specific management activities required to either: 1) achieve the goals and objectives of an INRMP approved in accordance with the Sikes Act; or 2) achieve Endangered Species Act requirements within a Biological Opinion, Species Recovery Plan, installation Endangered Species Management Plan, management of species-at-risk and species of concern in accordance with a Candidate Conservation Agreement. Includes requirements to inventory, survey, and monitor or otherwise manage species. Narrative will be specific to species.	Restoration of ponds and surrounding critical habitat, signs and fencing to exclude unauthorized access, As of 2014, funds are not required to reimburse AF Wildland Fire Center labor and materials. FY15 and future funding is under review.	Request funding

I.A.3 I.C.1 I.C.2 I.C.3 I.C.4 I.E.1 I.E.2 I.E.3 III.A.4 III.B.1 III.B.2 III.B.3 III.B.4	MGT, HABITAT, LONGLEAF PINE	Habitat management activities required to either: 1) achieve the goals and objectives of an approved INRMP; or 2) achieve Endangered Species Act requirements within a Biological Opinion, Species Recovery Plan, installation Endangered Species Management Plan, or management of species-at-risk and species of concern in accordance with a Candidate Conservation Agreement. Includes requirements to inventory, survey, and monitor or otherwise manage habitats that support endangered, threatened, rare, sensitive or keystone flora or fauna species. Narrative will be specific to habitat.	Eglin AFB forestry manages harvest only, replanting LL pine, sand pine eradication for 111 acresin accordance withFDEP permit 46-151212-011DF and USACE permit 199900679 base responsibility; monitoring, marking, forestry vehicles, thinning equipment, manpower	Funding requested every 5 years
I.A.3 I.C.1 I.C.2 I.C.3 I.C.4 I.E.1 I.E.2 I.E.3 1.F.1 1.F.2 III.A.1 III.A.2 III.A.3 III.A.4 III.B.1 III.B.2 III.B.3 III.B.4	NONE	Supports maintenance and minor updates of Environmental Mission Data Layers (MDL) and the overall Environmental Mission Data Set (MDS) in accordance with AFI 32-10112, Installation Geospatial Information and Services (Installation GI&S), and Spatial Data Standards for Facilities, Installations, and Environment (SDSFIE) versions as they are released.	As of FY 15, AFCEC plans to maintain all data layers centrally.	No funding allotted to base level by AFCEC
I.A.3 I.C.1 I.C.2 I.C.3 I.C.4 I.E.1 I.E.2 I.E.3 1.F.1 1.F.2 III.C.1 III.C.2 III.C.3	MONITOR, WETLANDS	Monitoring wetlands IAW regulatory requirements. Includes monitoring wetlands restoration and enhancement as required to achieve compliance with the conditions of a permit (referenced in Habitat Management Section) action under Section 404 of the Clean Water Act; or supports the goals/objectives of an INRMP approved in accordance with the Sikes Act or applicable host nation environmental governing standards.	Wetland erosion repair. Identify and repair of damage to wetlands crossings and other wetlands restoration. Install signs and define exclusion areas. Restore and maintain wetland and riparian habitat. Areas of primary interest are in jurisdictional wetlands, around identified salamander ponds, and in preserve.	fy 16-20
I.A.3 I.C.1 I.C.2 I.C.3 I.C.4 I.E.1 I.E.2 I.E.3 1.F.1 1.F.2 III.A.1 III.A.2 III.A.3 III.A.4 III.B.1	MGT SPECIES, WILDLIFE	Species-specific management activities required to either: 1) achieve the goals and objectives of an INRMP approved in accordance with the Sikes Act; 2) achieve Endangered Species Act requirements within a Biological Opinion, Species Recovery Plan, installation Endangered Species Management Plan, management of species-at-risk and species of concern in accordance with a Candidate Conservation Agreement; or 3) applicable host nation environmental governing standards. Includes requirements to inventory, survey,	Professional Biologist (USFWS) to preform multi-season biological inventories to verify presence of potential T&E and indigenous species. Habitat restoration.	FY14-16

III.B.2 III.B.3 III.B.4		monitor or otherwise manage species. Narrative will be specific to species.		
I.C.1 I.C.2 I.C.3 I.C.4 I.E.1 I.E.2 I.E.3 1.F.1 1.F.2 II.A.1 II.A.2 II.A.3 II.A.4 III.C.1 III.C.2 III.C.3 III.C.4 III.C.5	MGT INVASIVE SPECIES, CHINESE TALLOW	Requirements to control the presence and spread of invasive species as required by either: 1) the goals and objectives of an INRMP approved in accordance with the Sikes Act; 2) a Biological Opinion, Species Recovery Plan, installation Endangered Species Management Plan, or Candidate Conservation Agreement in compliance with the Endangered Species Act; or 3) mitigation requirements of a permit issued under Section 404 of the Clean Water Act.	Contracted removal/spraying of invasive species annually. Does not include sand pine.	requested annually
ALL	ENVIRONMENTAL SERVICES,CN, NATURAL CULTURAL, HURLBURT	Funds contract, interagency/intra-agency agreement, cooperative agreement, or other similar support required to assistance the base's normal day-to-day management functions & operations of the Conservation Program.	Contract Biologist to run Natural Resources Program. GS 11/12 position filled by contract since 2009.	requested annually starting in FY 14 authorized fy 14
I.C.3 1.F.1 1.F.2 II.A.1 II.A.2 II.A.3 II.A.4 III.A.1 III.A.2 III.A.3 III.A.4 III.B.1 III.B.2 III.B.3 III.B.4	SUPPLIES, CN	Includes expendable supplies, not equipment, unique to conservation, including, e.g., red-cockaded woodpecker artificial cavity boxes, special photographic film and paper for historic facility documentation, specialized marking flags / tape for feature marking and documentation, fencing, lumber, signage, and wildlife tranquilizers.	Bear, tortoise, non-game animal relocation and management. Education and communication of the public. Bear proofing efforts.	requested annually
I.C.2 I.C. 3 II.A.1 II.A.2 II.A.3 II.A.4 III.A.1 III.A.2 III.A.3 III.A.4 III.B.1 III.B.2 III.B.3 III.B.4 III.C.1 III.C.2 III.C.3	EQUIPMENT, CN ACTIVITIES	Equipment required in support of natural & cultural resource activities prescribed in the approved INRMP and ICRMP. Includes purchase or lease of equipment for wildfire and conservation management, including conservation law enforcement <i.e., cameras, memory cards, telescopes, binoculars, botanical sampling equipment, chainsaws, etc.>	Equipment is provided by contractors preforming specified tasks such as species inventories, wildfire, thinning, harvest, or wetlands maintenance. Civil Engineering at Hurlburt can supplement with on hand resources if they are not otherwise in use.	N/A
I.C.2 I.E.1 I.E.2	EQUIPMENT MAINT, CN SUPPORT,	Funds maintenance, repair, and calibration of equipment supporting authorized conservation activities.	Equipment is provided by contractors preforming specified tasks such as species	N/A

I.E.3 II.A.1 II.A.2 II.A.3 II.A.4 III.A.1 III.A.2 III.A.3 III.A.4 III.B.1 III.B.2 III.B.3 III.B.4	<specify>	Includes maintenance of cameras, telescopes, binoculars, botanical sampling equipment, chainsaws, and wildfire & conservation law enforcement equipment. Narrative will be specific for the type of equipment maintenance necessary.	inventories, wildfire, thinning, harvest, or wetlands maintenance. Civil Engineering at Hurlburt can supplement with on hand resources if they are not otherwise in use.	
I.C.2 I.C.3 I.C.4 II.A.1 II.A.2 II.A.3 II.A.4 III.A.1 III.A.2 III.A.3 III.A.4 III.B.1 III.B.2 III.B.3 III.B.4	VEHICLE LEASING, EXCESS OF TOA, CN	Funds vehicle lease to support conservation activities (vehicles in excess of table of allowances). Required to achieve goals and objectives of an approved INRMP/ICRMP for activities such as wildland fire management, endangered species management, & cultural resources protection conservation law enforcement.	None requested	N/A
I.C.2 I.C.3 I.C.4 II.A.1 II.A.2 II.A.3 II.A.4 III.A.1 III.A.2 III.A.3 III.A.4 III.B.1 III.B.2 III.B.3 III.B.4	VEHICLE FUEL & MAINTENANCE, IN EXCESS OF TOA, <CN, CP, P2>	Funds fuel, maintenance, and parts for EQ leased/owned vehicles in excess of TOA. List each vehicle in inventory, # gallons of fuel consumed per year, and annual regular maintenance costs (oil change, tune-up, tires). Covers vehicles when in use for fighting wildland fires on AF properties. Does not cover vehicles used primarily for executing programs funded by reimbursable budgets, i.e. agricultural leases, forestry products sales, hunting and fishing permits and fees. Use "EQUIPMENT PURCHASE/ MAINTAIN, EC, SAM" for OGMVCs.	Hurlburt has not identified any EQ owned vehicles that qualify for this funding.	N/A
	VEHICLE FUEL, ON TOA, <CN, CP, P2>	Funds EQ Vehicle fuel for each vehicle on TOA. List each vehicle in inventory, # gallons of fuel consumed per year. Covers vehicles when in use for fighting wildland fires on AF properties. Does not cover vehicles used primarily for executing programs funded by reimbursable budgets, i.e. agricultural leases, forestry products sales, hunting and fishing permits and fees	Hurlburt has not identified any EQ owned vehicles that qualify for this funding.	N/A
	PLAN UPDATE, WFMP	Funds the initial installation Wildland Fire Management Plan (WFMP) as required by DODI 6055.06 and AFI 32-7064. Recurring annual review with minor update is generally performed in-house but may include incidental costs associated with physical update of the plan documentation. Major WFMP revisions, if required, are a Level 1 requirement.	Wildland fire center to absorb this task/expense.	N/A
I.C.1 I.C.3	MGT WILDLAND	Goods and services required to support implementation of the wildland fire	Wildland Fire Center is developing a regional fire plan	N/A

I.E.1 I.E.2 I.E.3 III.A.1 III.A.2 III.A.3 III.A.4	FIRE	management plan. Includes activities required for pre-suppression (such as fire break establishment, fuels reduction projects, prescribed fire, etc); wildfire suppression activities required to provide intial response and/or extended attack on wildland fires; post-suppression activities (such as burned area assessments, recovery actions, etc); and any specialized equipment or qualified personnel necessary to accomplish. Include pertinent information about number of acres supported under each specific activity; number of FTE equivalents; number and types of specialized equipment/vehicles required of the service provider to accomplish the objectives; and for how long (months) assets would be required.	(FY14). This funding title may be incorporated in future budget requests if Wildland fire services become a reimbursable expense.	
I.A.3 I.C.2 I.C.3 I.C.4 I.E.1 I.E.2 I.E.3	MGT, WETLANDS/ FLOODPLAIN	Management, restoration, or enhancement of wetland habitats IAW either: 1) the terms and conditions of a permit issued under Section 404 of the Clean Water Act, or 2) the goals and objectives of an INRMP approved in accordance with the Sikes Act.	None requested	N/A
ALL	PLAN UPDATE, INRMP	Funds the "Five Year Update" of INRMP as required by Sikes Act (16 USC 670a) and DODI 4715.03. Recurring annual review with minor update and tripartite coordination is generally performed in-house or by the IST, but may include incidental costs associated with physical update of the plan documentation. Major INRMP revisions, if required, are a Level 1 requirement. Major revisions to an INRMP are not required unless (1) changes in the installation military mission significantly change land uses, or (2) new natural resources issues (e.g. new listed species) require changes to INRMP goals and objectives. In many cases, the annual INRMP review and update will keep the Plan current and negate the requirement for a costly major revision.	Service provided by AFCEC in cooperation with installation.	Not funded annually
	PLAN UPDATE, OTHER	Title & narrative will be specific to the plan update requirement. Contracted services required to review/revise plan/documentation including inventories. Include the specific legal driver.	Task specific service.	N/A
I.C.1 I.C.2 I.C.4 1.F.1 1.F.2 III.B.1 III.B.2 III.B.3 III.B.4	NIA UPDATE	Contracted service to conduct a Natural Infrastructure Assessment to include data gathering and database entry.	Funds are low priority with no legislative driver. Inventories and database are assumed to be similar to Eglin AFB. Species lists are generic to the region not confirmed for Hurlburt. Surveys needed in wetland/upland/shoreline/urban areas for bats/invertebrates/ flora/T&E/rare – seasonal and area specific efforts planned as funding is available.	requested 2016-20

II.A.1 II.A.2 II.A.3 II.A.4 II.B.1 II.B.2 II.B.3 II.B.4 II.C.1 II.C.2 II.C.3 II.C.4 III.C.4	OUTREACH	Funds purchase of current publications and regulatory guidance distributed at community outreach activities such as Earth Day, P2 Awareness Week, air shows and partnering efforts.	Funds are low priority with no legislative driver. Efforts for outreach are coordinated with other organized events and with volunteers.	requested
II.A.1 II.A.2 II.A.3 II.A.4 II.B.1 II.B.2 II.B.3 II.B.4 II.C.1 II.C.2 II.C.3 II.C.4 III.C.4	COMPLIANCE PUBLIC NOTIFICATION	Supports public awareness projects to educate base personnel / public about base cultural resources, natural resources, historical preservation, and conservation activities as required by AFI 32-7065 and AFI 32-7064 (Ultimate authority comes from NHPA and ARPA). Funds activities to inform base personnel of storm water outreach, local solid waste diversion practices, etc.	Not specific to NR.	Shared
I.A.3 I.C.1 I.C.2 I.C.3 I.C.4 I.E.1 I.E.2 I.E.3 1.F.1 1.F.2 III.A.1 III.A.2 III.A.3 III.A.4 III.B.1 III.B.2 III.B.3 III.B.4	RECORDKEEPING, OTHER, <List Type>	Title & narrative will be specific to the recordkeeping requirement. Include the specific legal driver. Includes requirement to prepare/submit reports, monitoring, recordkeeping, and data management	maintenance and minor updates of Hurlburt's Natural Resources Data Layers of the AFCEC Environmental Mission Data Set (MDS)	N/A
CW	P&F, NPDES / PESTICIDE PERMIT	Funds annual fees to regulators for Pesticide General Permits	May not be managed by NR.	Clean Water Pgm
	PERMIT RENEWAL, <OTHER>	Funds requirements not specified in other Standard Titles	N/A	N/A
III.A.3 III.A.4	P&F, CN	Funds the cost of preparing and procuring permit for the Conservation Program related activities required by law, regulation, compliance agreement, and supported by approved INRMP or ICRMP.	State and federal permits are issued at no cost.	N/A
	IT, EQUIPMENT <Insert Equipment Name>	Approved small computer replacement and automated information technology (AIT) such as bar-coding equipment, printers, hand-held devices, etc. This does not include local area network	May apply to RF tag & species GIS associated replacement.	N/A

		software and licensing, cabling and hubs, servers, routers and systems administration)		

Table 9-2 Basic Conservation Equipment Requirement

Type	Justification	Current source	Provided by	Comment
All terrain vehicle (ATV) small	Field inspection in off-road/wet areas.	Borrowed	EOD or Readiness (both Civil Engineer functions at Hurlburt)	Scratching or denting of vehicles is considered abuse.
Fire Rx/ suppression Services/ Equipment	Rx fire, clearing of fire breaks, wildfire suppression, wetlands maintenance, restoration of uplands.	Contract – not possessed by Hurlburt	Eglin Wildland Fire Center	Includes use of forestry tracked heavy equipment, tractors, water truck, hand tools, training and certification
Forestry EQ Truck, 4wd	Forest Inspection for inventory, road conditions, clearing work,	Contract – not possessed by Hurlburt	Eglin Forestry.	Eglin provides 100% of forestry maintenance and keeps 100% of forestry sales
Spray vehicle & hand removal tools, PPE	Invasive Plant Spraying	Contract – not possessed by Hurlburt	AFCEC contractor supplied	All chemicals, training, certifications are provided by contractor
Recording equipment	Hand held GPS, GIS compatible. Field camera, digital. Game camera (4).	In house (or borrowed)	Engineering, Eglin NR/CR or contract.	Replacement and upgrade of in house equipment needed
Grader/ loader/ dump truck	Forest road maintenance and repair	Contract – not possessed by Hurlburt	Borrowed from Engineering, Eglin NR or contract.	Eglin Forestry or Hurlburt CE repair all forestry roads
Traps	Relocation of bears/tortoise and non-game animals.	Borrowed (some in house capacity)	Entomology USFWS (Eglin), FWCC or contract	Replacement and upgrade of in house equipment needed

9.2 NATURAL RESOURCES MANAGEMENT STAFFING

The INRMP provides the basis for developing multi-year program budget proposals to execute the Goals and Objectives outlined in Chapter 8. Adequate funding is a critical component to ensure full implementation of these Goals that are beyond the ability of the assigned staff to complete such as effective invasive species control and prescribed fire on all 5000acres. These requirements are carried to AFCEC for inclusion in the 5 year budget.

The staffing requirements (internal and external) that are necessary for oversight of the natural resources management program and implementation of the INRMP are provided in the table below. Table 9-1 identifies the current staff by job series, labor categories, and program functions.

Table 9-3. Current Staff of the 1 SOCES/CEAN at Hurlburt Field **(as of June 2013)**

Flight Directory/Major Programs		
GS-13/0819	Environmental Engineer	Chief, Environmental Flight
Environmental Compliance		
GS-12 /0819	Environmental Engineer	Lead Engineer Environmental Compliance Air Quality Drinking Water Wastewater Budget
GS-12/1301	Physical Scientist (effective 23 Jul 2007)	Asbestos Lead-Based Paint PCBs Tanks
GS-11/0028	Environmental Protection Specialist	Hazardous, Special, & Universal Waste Spill Response
GS-12/032E36	Environmental Engineer	Hazardous Materials ESOHCAMP Coordinator
Environmental Conservation		
GS-12/1301	Physical Scientist	Stormwater Environmental Impact Analysis Program
Pollution Prevention (P2) Program		
GS-12/1301	Physical Scientist	Lead Scientist Pollution Prevention (P2) Program Green Procurement Solid Waste Recycling
Contract Support (non-UMD)		
ENVIRONMENTAL SERVICES,CN, NATURAL RESOURCES	Biological/Environmental/Archaeological Scientist	Lead Scientist Environmental Conservation Natural, Cultural, Archeological & Resources Wetlands Management

Funded positions on Unit Manning Document (UMD): 7

9.3 ANNUAL COORDINATION REQUIREMENTS

Management of Hurlburt Field's natural resources is a dynamic process with various plans and programs that require frequent review and continuous updates. Hurlburt's Natural Resources Manager will conduct periodic reviews and updates to account for changes in the military mission, condition of natural resources, the ecosystem and regulatory requirements. These periodic reviews will assess the effectiveness of integration linkages and bring in partners for guidance and knowledge. The INRMP serves as a continuous cycle of improvement to ensure that the most up-to-date methods are being implemented. Annual meetings with the USFWS and FWC will help foster a positive dialogue to benefit the INRMP and the conservation efforts on Base. Hurlburt will provide the most current version of its INRMP on its public website in an effort to effectively communicate the direction of the natural resources program.

9.4 MONITORING INRMP IMPLEMENTATION

The INRMP Annual Review Cycle will also be maintained as a tabular check sheet for tracking purposes. Manual updates will also be reflected in the web-based INRMP. Additionally, completion and status of the objectives identified in Chapter 8 will be tracked. Hurlburt's Natural Resources Manager will review these documents at each INRMP Review Cycle and the Chief of Environmental will enforce compliance with the INRMP.

10. REFERENCES

1st Special Operations Command Civil Engineer (1 SOCES), 2007. Natural Resources. Personal communication with Philip Pruitt. April 2007.

Air Armament Center Plan 91-212, Bird Aircraft Strike Hazard Plan.

Air Force Instruction 32-1023, Design and Construction Standards and Execution of Facility Construction Projects.

Air Force Instruction 32-1053, Pest Management Program.

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APPENDIX A

PARTIAL LIST OF FLORAL SPECIES POSSIBLE WITHIN HURLBURT FIELD

PARTIAL LIST OF FLORAL SPECIES POSSIBLE WITHIN HURLBURT FIELD

Common Name	Scientific Name
Red Maple[2]	*Acer rubrum*
Beardgrass[2]	*Andropogon* sp.
Jack-in-the-pulpit	*Arisaema triphylla*
Three-awn grass	*Aristida arbutifolia*
Three-awn grass	*Aristida palustris*
Southern three-awn grass	*Aristida simpliciflora*
Wiregrass[2]	*Aristida stricta*
Red chokeberry	*Aronia arbutifolia*
Large-flower milkweed[2]	*Asclepias connivens*
Pedicellate milkweed[2]	*Asclepias pedicellata*
Coyote-thistle aster	*Aster eryngiifolius*
Saltbush	*Atriplex pentandra*
Groundsel tree[2]	*Baccharis halimifolia*
Yellow buttons	*Balduina angustifolia*
Pineland baptisia[2]	*Baptisia lanceolata*
Green eyes[2]	*Berlandiera pumila*
Gum bumelia	*Bumelia lanuginosa*
Sea rocket	*Cakile constricta*
Toothed savory[2]	*Calamintha dentata*
Curtiss' sandgrass[2]	*Calamovilfa curtissii*
French mulberry[2]	*Callicarpa americana*
Tuberous grass-pink[2]	*Calopogon tuberosus*
Deer tongue[2]	*Carphephorus pseudoliatris*
Pignut hickory	*Carya glabra*
Mockernut hickory	*Carya tomentosa*
New Jersey tea[2]	*Ceanothus americanus*
Sugarberry	*Celtis laevigata*
Ovate-leaved marsh-pennywort[2]	*Centella asiatica*
Butterfly pea	*Centrosema virginianum*
Rosemary[2]	*Ceratiola ericoides*
Fringe tree	*Chionanthus virginicus*
Woody goldenrod	*Chrysoma pauciflosculosa*
Godfrey's golden aster	*Chrysopsis godfreyi*
Cruise's golden aster	*Chrysopsis gossypina* ssp. *cruiseana*
Saw grass	*Cladium jamaicense*
Gray puff lichen	*Cladonia evansii*
Ground lichen	*Cladonia leporina*
Florida perforate cladonia	*Cladonia perforata*
Rosebud orchid[2]	*Cleistes divaricata*
Coast pepperbush[2]	*Clethra alnifolia*
Black titi[2]	*Cliftonia monophylla*
Stinging nettle[2]	*Cnidoscolus stimulosus*
Wild Rosemary[2]	*Conradina canescens*
Swamp coreopsis[2]	*Coreopsis nudata*
Flowering dogwood	*Cornus florida*
Toothache grass[2]	*Ctenium aromaticum*
Love vine[2]	*Cuscuta* sp.
Nut rush[2]	*Cyperus lecontei*

Common Name	Scientific Name
Flat-sedge[2]	*Cyperus* sp.
Cyrilla[2]	*Cyrilla racemiflora*
Panic grass	*Dichanthelium aciculare*
White-top sedge[2]	*Dichromena latifolia*
Persimmon[2]	*Diospyros virginiana*
Pink sundew[2]	*Drosera capillaris*
Water sundew[2]	*Drosera intermedia*
Dew-threads[2]	*Drosera tracyi*
Trailing arbutus	*Epigaea repens*
Hat pins[2]	*Eriocaulon compressum*
Hairy buckwheat[2]	*Eriogonum tomentosum*
Rattlesnake-master[2]	*Eryngium yuccifolium*
Coral bean[2]	*Erythrina herbacea*
Dog fennel[2]	*Eupatorium capillifolium*
Painted Leaf[2]	*Euphorbia cyathophora*
Spurge[2]	*Euphorbia* spp.
Umbrella grass[2]	*Fuirena breviseta*
Milkpeas	*Galactia microphylla*
Bedstraw	*Galium* spp.
Woolly-berry[2]	*Gaylussacia mosierii*
Loblolly bay[2]	*Gordonia lasianthus*
Silverbells	*Halesia* spp.
Bitterweed[2]	*Helenium amarum*
Gulf rockrose	*Helianthemum arenicola*
Rockrose	*Helianthemum arenicola*
Telegraph weed	*Heterotheca subaxillaris*
Heart leaf	*Hexastylis arifolia*
Pennywort[2]	*Hydrocotyle bonariensis*
Pineweed[2]	*Hypericum gentianoides*
Smooth-barked St. John's wort	*Hypericum lissophloeus*
Hypericum	*Hypericum reductum*
St. John's wort[2]	*Hypericum* sp.
Gallberry[2]	*Ilex glabra*
Myrtle holly[2]	*Ilex myrtifolia*
American holly	*Ilex opaca*
Yaupon[2]	*Ilex vomitoria*
Florida anise	*Illicium floridanum*
Cogon grass[2]	*Imperata cylindrica*
Beach morning glory[2]	*Ipomoea stolonifera*
Iris	*Iris* sp.
Virginia willow[2]	*Itea virginica*
Beach elder[2]	*Iva imbricata*
Rush	*Juncus abortivus*
Black needle rush[2]	*Juncus roemerianus*
Southern red cedar[2]	*Juniperus silicicola*
Hairy laurel[2]	*Kalmia hirsuta*
Mountain laurel	*Kalmia latifolia*
Redroot[2]	*Lachnanthes caroliniana*
Whitehead bog buttons[2]	*Lachnocaulon anceps*
Bog-buttons	*Lachnocaulon digynum*
Engler's bog buttons[2]	*Lachnocaulon engleri*
Duckweed[2]	*Lemna* sp.

Common Name	Scientific Name
Fetterbush[2]	*Leucothoe axillaris*
Grass-leaved blazing-star[2]	*Liatris graminifolia*
Pine lily	*Lilium catesbaei*
Panhandle lily	*Lilium iridollae*
Bog spicebush	*Lindera subcoriacea*
West's flax	*Linum westii*
Sweet-gum	*Liquidambar styraciflua*
Tulip tree	*Liriodendron tulipifera*
Pondspice	*Litsea aestivalis*
Gulf coast lupine	*Lupinus westianus*
Southern club-moss[2]	*Lycopodium appressum*
Club moss[2]	*Lycopodium* sp.
Rusty lyonia[2]	*Lyonia ferruginea*
Fetterbush[2]	*Lyonia lucida*
Ashe's magnolia	*Magnolia ashei*
Southern magnolia[2]	*Magnolia grandiflora*
Pyramid magnolia	*Magnolia pyramidata*
Sweet bay[2]	*Magnolia virginiana*
Slim-leaf Barbara's-button[2]	*Marshallia tenuifolia*
Chinaberry[2]	*Melia azedarach*
Swamp hornpod[2]	*Mitreola sessilifolia*
Red mulberry	*Morus rubra*
Wax myrtle[2]	*Myrica cerifera*
West Florida cowlily	*Nuphar luteum* spp. *ulvaceum*
White water-lily[2]	*Nymphaea odorata*
Black gum[2]	*Nyssa sylvatica*
Evening primrose	*Oenothera humifusa*
Prickly pear cactus[2]	*Opuntia humifusa*
Wild olive	*Osmanthus americanus*
Royal fern[2]	*Osmunda regalis*
Sourwood	*Oxydendrum arboreum*
Dune panic grass	*Panicum amarum*
Naked-stemmed panic grass	*Panicum nudicaule*
Torpedo grass	*Panicum repens*
Bluejoint panic grass	*Panicum tenerum*
Sand squares	*Paronychia erecta*
Virginia creeper[2]	*Parthenocissus quinquefolia*
Spoon-flower	*Peltandra sagittifolia*
Red bay[2]	*Persea borbonia*
Capeweed[2]	*Phyla nodifora*
Groundcherry	*Physalis angustifolia*
Violet-flowered butterwort	*Pinguicula ionantha*
Yellow butterwort[2]	*Pinguicula lutea*
Chapman's butterwort[2]	*Pinguicula planifolia*
Sand pine[2]	*Pinus clausa*
Slash pine[2]	*Pinus elliottii*
Spruce pine	*Pinus glabra*
Longleaf pine[2]	*Pinus palustris*
Loblolly pine[2]	*Pinus taeda*
White fringed orchid	*Platanthera blephariglottis*
Yellow fringeless orchid	*Platanthera integra*
Rosy camphor-weed[2]	*Pluchea rosea*

Common Name	Scientific Name
Rose pogonia[2]	*Pogonia ophioglossoides*
Little-leaf milkwort[2]	*Polygala brevifolia*
Tall milkwort[2]	*Polygala cymosa*
Bog bachelor's button[2]	*Polygala lutea*
Slender jointweed	*Polygonella gracilis*
Large-leaved jointweed	*Polygonella macrophylla*
Jointweed	*Polygonella polygama*
Cherry sp.[2]	*Prunus* sp.
Bracken fern[2]	*Pteridium aquilinum*
Arkansas oak	*Quercus arkansana*
Sand live oak[2]	*Quercus gemminata*
Turkey oak[2]	*Quercus laevis*
Laurel oak	*Quercus laurifolia*
Myrtle oak[2]	*Quercus myrtifolia*
Water oak[2]	*Quercus nigra*
Needle palm	*Rhapidophyllum hystrix*
Rose meadow-beauty[2]	*Rhexia alifanus*
Maryland meadow-beauty[2]	*Rhexia mariana*
Panhandle meadow-beauty	*Rhexia salicifolia*
Virginia meadow-beauty[2]	*Rhexia virginica*
Orange azalea	*Rhododendron austrinum*
Winged sumac[2]	*Rhus copallina*
Clustered beak rush[2]	*Rhynchospora cephalantha*
Beak rush	*Rhynchospora pusilla*
Bear rush	*Rhynchospora tracyi*
Blackberry[2]	*Rubus* sp.
Bluestem palmetto	*Sabal minor*
Cabbage palm[2]	*Sabal palmetto*
Bartram's rose-gentian[2]	*Sabatia bartramii*
Ten-petal sabatia[2]	*Sabatia dodecandra*
Large-leaf rose-gentian[2]	*Sabatia macrophylla*
Bull-tongue arrowhead[2]	*Sagittaria lancifolia*
Chinese tallow tree[2]	*Sapium sebiferum*
Trumpets[2]	*Sarracenia flava*
White-top pitcherplant[2]	*Sarracenia leucophylla*
Parrot pitcherplant[2]	*Sarracenia psittacina*
Purple pitcher plant[2]	*Sarracenia purpurea*
Sweet pitcher plant	*Sarracenia rubra*
Red basil[2]	*Satureja coccinea*
Gulf bluestem	*Schizachyrium maritimum*
Low nutrush[2]	*Scleria verticillata*
Sebastian bush	*Sebastiana fruiticosa*
Sand spikemoss	*Selaginella arenicola*
Gulf spikemoss	*Selaginella ludoviciana*
Saw palmetto[2]	*Serenoa repens*
Wild bamboo[2]	*Smilax auriculata*
Bullbrier[2]	*Smilax bona-nox*
Sawbrier[2]	*Smilax glauca*
Bamboo-vine[2]	*Smilax laurifolia*
Seaside goldenrod[2]	*Solidago sempervirens*
Goldenrod[2]	*Solidago* spp.
Salt marsh Cordgrass[2]	*Spartina alterniflora*

Common Name	Scientific Name
Beach cordgrass[2]	*Spartina patens*
Sphagnum moss[2]	*Sphagnum* spp.
Grass-leaf ladies' tresses[2]	*Spirauthes praecox*
Silky camellia	*Stewartia malacodendron*
Wild bean	*Strophostyles* sp.
Yellow pipewort	*Syngonanthus flavidulus*
Pond cypress[2]	*Taxodium ascendens*
Bald cypress	*Taxodium distichum*
Pineland hoary-pea	*Tephrosia mohrii*
Cooley's meadowrue	*Thalictrum cooleyi*
Southern shield fern[2]	*Thelypteris kunthii*
Basswood	*Tilia americana*
Coastal false-asphodel[2]	*Tofieldia racemosa*
Poison ivy[2]	*Toxicodendron radicans*
Sea oats	*Uniola paniculata*
Horned blatterwort	*Utricularia cornuta*
Farkleberry	*Vaccinium arboreum*
Blueberry	*Vaccinium* sp.
Muscadine[2]	*Vitis rotundifolia*
Netted chain-fern[2]	*Woodwardia areolata*
Yellow-eyed grass[2]	*Xyris brevifolia*
Elliott's yellow-eyed grass	*Xyris elliottii*
Yellow-eyed grass	*Xyris fimbriata*
Harper's yellow-eyed grass	*Xyris scabrifolia*
Small yellow-eyed grass	*Xyris smalliana*
Lawn orchid[2]	*Zeuxine strateumatica*

[1]Adapted from Earth Tech, 1994.
[2]Observed by Woolpert in November 1994, April 1995, and July 1995.

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APPENDIX B

ENDANGERED FLORA POTENTIALLY OCCURRING ON HURLBURT FIELD

ENDANGERED FLORA POTENTIALLY OCCURRING ON HURLBURT

RARE PLANT SURVEY

Hurlburt Field is within or approached by the range of at least 60 rare, Threatened, Endangered, or declining plant taxa; Table 1 lists the legal status and FNAI rank of each.

Table 1. Rare plant search list for Hurlburt Field

Scientific Name	Common Name	Global Rank	State Rank	Fed. Status	State Status
Andropogon arctatus	pine-woods bluestem	G3	S3	3C[1]	N
Aristida simpliciflora	southern tree-awned grass	G2	S2	C2[1]	N
Aster chapmanii	Shinner's aster	G2G3	S2S3	C2[1]	N
Aster eryngiifolius	snakeroot aster	G3?	S2S3	C2[1]	N
Baptisia calycosa var. *villosa*	hairy wild indigo	G2T3	S3	C2[1]	LT
Calamovilfa curtissii	Curtiss' sandgrass	G3	S3	C2[1]	LT
Calopogon multiflorus	many-flowered grass pink	G3G4	S?	N	LE
Chrysopsis godfreyi	Godfrey's golden aster	G2	S2	C2[1]	N
Chrysopsis gossypina ssp. *cruiseana*	Cruise's golden aster	G5T2	S2	C2[1]	LE
Cladium mariscoides	pond rush	G5	S1	N	N
Cladonia perforata	perforate reindeer lichen	G1	S1	LE	LE
Cleistes divaricata	rosebud orchid	G4	S?	N	N
Coelorachis tuberculosa	piedmont jointgrass	G3	S3	C2[1]	N
Drosera intermedia	spoon-leaved sundew	G5	S3	N	LT
Eleocharis rostellata	beaked spikerush	G5	S1	N	N
Helianthemum arenicola	gulf rockrose	G3	S3	N	N
Hymenocallis henryae	panhandle spiderlily	G1Q	S1	C2[1]	LE
Ilex amelanchier	serviceberry holly	G4	S2	3C[1]	N
Illicium floridanum	Florida anise	G5	S3	N	LT
Juncus gymnocarpus	Coville's rush	G4	S1	3C[1]	N
Lachnocaulon digynum	bog button	G3	S2?	C2[1]	N
Lilaeopsis carolinensis	Carolina lilaeopsis	G3	S2?	3C[1]	N
Lilium catesbaei	southern red lily	G4	S3	N	LT
Lilium iridollae	panhandle lily	G1G2	S1S2	C2[1]	LE
Lindera subcoriacea	bog spicebush	G2	S1	C2[1]	LE
Linum westii	West's flax	G2	S2	C2[1]	LE
Litsea aestivalis	pondspice	G3	S2	C2[1]	LE
Lupinus westianus	gulf coast lupine	G2	S2	C2[1]	LT
Macranthera flammea	hummingbird flower	G3	S2	N	LE
Myriophyllum laxum	Piedmont water-milfoil	G3	S2S3	C2[1]	N
Nuphar lutea ssp. *ulvacea*	west Florida cowlily	G5T2	S2	C2[1]	N

Panicum nudicaule	naked-stemmed panic grass	G3?	S2?	C2[1]	N
Peltandra sagittifolia	spoon-flower	G3G4	S3	N	N
Pinguicula planifolia	Chapman's butterwort	G3?	S2	C2[1]	LT
Pinguicula primuliflora	primrose-flowered butterwort	G3G4	S3	N	N
Platanthera blephariglottis	white-fringed orchid	G4G5	S?	N	N
Platanthera ciliaris	yellow-fringed orchid	G5	S?	N	N
Platanthera cristata	crested fringed orchid	G5	S?	N	N
Platanthera integra	yellow fringeless orchid	G4	S3S4	3C[1]	LE
Platanthera nivea	snowy orchid	G5	S?	N	LT
Pogonia ophioglossoides	rose pogonia	G5	S?	N	N
Polygonella macrophylla	large-leaved jointweed	G2	S2	C2[1]	LT
Quercus arkansana	Arkansas oak	G3	S3	3C[1]	N
Rhexia parviflora	small-flowered meadowbeauty	G2	S2	C2[1]	LE
Rhexia salicifolia	panhandle meadowbeauty	G2	S2	C2[1]	N
Rhododendron austrinum	orange azalea	G3G4	S3	3C[1]	LE
Rhynchospora crinipes	hairy-peduncled beakrush	G1	S1	C2[1]	N
Rhynchospora decurrens	decurrent beakrush	G3G4	S2	C2[1]	N
Rhynchospora stenophylla	narrow-leaved beakrush	G4	S2S3	N	N
Sarracenia leucophylla	white-top pitcherplant	G3	S3	C2[1]	LE
Sarracenia psittacina	parrot pitcherplant	G4	S3	N	LT
Sarracenia purpurea	purple pitcher-plant	G5	S?	N	N
Sarracenia rubra	sweet pitcherplant	G3	S2	N	LT
Sideroxylon lycioides	gopherwood buckthorn	G5	S2	N	LE
Spiranthes laciniata	lace-lip ladies'-tresses	G4G5	S?	N	LT
Spiranthes ovalis	lesser ladies'-tresses	G5	S?	N	LE
Tephrosia mohrii	pineland hoary-pea	G2?Q	S1	C2[1]	N
Xyris drummondii	Drummond's yellow-eyed grass	G3	S2	C2[1]	N
Xyris longisepala	karst pond Xyris	G2	S2	C2[1]	LE
Xyris scabrifolia	Harper's yellow-eyed grass	G3	S1	C2[1]	LT

[1]The Federal Candidate ranking levels C2 and 3C were removed from federal listing in the spring of 1996.

Excerpted from Printiss and Hipes, 1997

Florida Natural Areas Inventory element rank and status explanations

An element is any exemplary or rare component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature. An element occurrence (EO) is a single extant habitat that sustains or otherwise contributes to the survival of a population or a distinct, self-sustaining example of a particular element. The major function of the Florida Natural Areas Inventory is to define the state's elements of natural diversity, then collect information about each element occurrence.

Using a ranking system developed by The Nature Conservancy and the Natural Heritage Program Network the Florida Natural Areas Inventory assigns two ranks to each element. The global element rank is based on an element's worldwide status; the state element rank is based on the status of the element in Florida. Element ranks are based on many factors, the most important ones being estimated number of Element occurrences, estimated abundance (number of individuals for species; area for natural communities), range, estimated adequately protected EOs, relative threat of destruction, and ecological fragility.

FNAI GLOBAL ELEMENT RANK (priority)

G1	=	Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or artificial factor.
G2	=	Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or artificial factor.
G3	=	Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.
G4	=	apparently secure globally (may be rare in parts of range)
G5	=	demonstrably secure globally
GH	=	of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker)
GX	=	believed to be extinct throughout range
GXC	=	extirpated from the wild but still known from captivity or cultivation
G#?	=	tentative rank (e.g., G2?)
G#G#	=	range of rank; insufficient data to assign specific global rank (e.g., G2G3)
G#T#	=	rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1)
G#Q	=	rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q)
G#T#Q	=	same as above, but validity as subspecies or variety is questioned.
GU	=	due to lack of information, no rank or range can be assigned (e.g., GUT2).
G?	=	not yet ranked (temporary)

FNAI STATE ELEMENT RANK (priority)

Definition parallels global element rank: substitute "S" for "G" in above global ranks, and "in Florida" for "globally" in above global rank definitions.

Additional state element ranks:

SA	=	accidental in Florida, i.e., not part of the established biota
SE	=	an exotic species established in Florida may be native elsewhere in North America
SN	=	regularly occurring, but widely and unreliably distributed; sites for conservation hard to determine

FEDERAL LEGAL STATUS (U. S. Fish and Wildlife Service- USFWS)

LE	=	Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species which is in danger of extinction throughout all or a significant portion of its range.
PE	=	Proposed for addition to the List of Endangered and Threatened Wildlife and Plants as Endangered Species.
LT	=	Listed as Threatened Species. Defined as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
PT	=	Proposed for listing as Threatened Species.
C1	=	Candidate Species for addition to the list of Endangered and Threatened Wildlife and Plants, Category 1. Taxa for which the USFWS currently has substantial information on hand to support the biological appropriateness of proposing to list the species as endangered or threatened.
C2	=	Candidate Species, Category 2. Taxa for which information now in possession of the USFWS indicates that proposing to list the species as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat(s) are not currently available to support proposed rules at this time.
3A	=	Category 3A. Taxa which are no longer being considered for listing as endangered or threatened because of persuasive evidence of extinction.
3B	=	Category 3B. Taxa which are no longer being considered for listing as endangered or threatened because the names do not represent taxa meeting the Endangered Species Act's definition of "species."
3C	=	Category 3C. Taxa that have proven to be more abundant or widespread than was previously believed and/or those that are not subject to any identifiable threat.
AC	=	Agency Concern. Species which are not currently listed or candidates, but which are a matter of concern to the USFWS.
LTSA	=	Threatened due to similarity of appearance.
N	=	Not currently listed, nor currently being considered for listing.

STATE LEGAL STATUS

Animals
(Florida Game and Fresh Water Fish Commission- FGFWFC)

LE = Listed as Endangered Species by the FGFWFC. Defined as a species, subspecies, or isolated population which is so rare or depleted in number or so restricted in range of habitat due to any artificial or natural factors that it is in immediate danger of extinction or extirpation from the state, or which may attain such a status within the immediate future.

LT = Listed as Threatened Species by the FGFWFC. Defined as a species, subspecies, or isolated population which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate and as a consequence is destined or very likely to become an endangered species within the foreseeable future.

LS = Listed as Species of Special Concern by the FGFWFC. Defined as a population which warrants special protection, recognition, or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance, or substantial human exploitation which, in the foreseeable future, may result in its becoming a threatened species.

N = Not currently listed, nor currently being considered for listing.

Plants (Florida Department of Agriculture and Consumer Services- FDACS)

LE = Listed as Endangered Plants in the Preservation of Native Flora of Florida Act. Defined as species of plants native to the state that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened pursuant to the Federal Endangered Species Act of 1973, as amended.

PE = Proposed by the FDACS for listing as Endangered Plants.

LT = Listed as Threatened Plants in the Preservation of Native Flora of Florida Act. Defined as species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in such number as to cause them to be endangered.

PT = Proposed by the FDACS for listing as Threatened Plants.

CE = Listed as a Commercially Exploited Plant in the Preservation of Native Flora of Florida Act. Defined as species native to state which are subject to being removed in significant numbers from native habitats in the state and sold or transported for sale.

PC = Proposed by the FDACS for listing as Commercially Exploited Plants.

(LT) = Listed threatened as a member of a larger group but not specifically listed by species name.

N = Not currently listed, nor currently being considered for listing.

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APPENDIX C

MASTER LIST OF TREES, SHRUBS, AND ACCENT FLOWERS FOR LANDSCAPE USE IN THE DEVELOPED AREAS OF HURLBURT FIELD

MASTER LIST OF TREES, SHRUBS, AND ACCENT FLOWERS FOR LANDSCAPE USE IN THE DEVELOPED AREAS OF HURLBURT FIELD

Botanical Name	Common Name	Remarks
Trees—Large (50 feet to 100 feet)		
Acer rubrum 'Coldwater'	Red Maple	Good wetlands species, brilliant fall color.
Carya species	Hickory	Tough wood, superior fall color.
Fraxinus americana	White Ash	Fast growing shade tree, good fall color.
Juglans nigra	Black Walnut	Large shade tree, superior wood.
Liquidambar styraciflua	Sweetgum	Fast grower, good fall color.
Magnolia grandiflora 'Claudia W.'	Southern Magnolia	Magnificent tree, fragrant flowers.
Magnolia grandiflora 'D. D. Blanchard'	Southern Magnolia	Compact dark green foliage, brown bark.
Magnolia grandiflora 'Green Giant'	Southern Magnolia	Large green leaves, green bark.
Magnolia grandiflora 'Little Gem'	Southern Magnolia	Dwarf to 25', long bloomer.
Magnolia grandiflora 'Smith Fogle'	Southern Magnolia	Like a rubber tree, shiny leaves.
Magnolia grandiflora 'St. Mary'	Southern Magnolia	Old standard, fragrant flowers.
Magnolia virginiana	Sweetbay Magnolia	Wetlands species, silver backed leaves.
Pinus elliottii	Slash Pine	Fast grower.
Pinus palustris	Longleaf pine	Fire tolerant, strong, long lived.
Quercus falcata	Southern Red Oak	Attractive large tree.
Quercus laurifolia 'Darlington'	Darlington Oak	Fast growing oak.
Quercus lyrata	Overcup Oak	Transplants well, good crown.
Quercus michauxii	Swamp Chestnut Oak	Deer eat acorns.
Quercus nuttallii	Nuttall Oak	Intense fall color.
Quercus phellos	Willow Oak	Fast grower, fine texture.
Quercus shumardii	Shumard Red Oak	Good shade tree, good fall color.
Quercus virginiana	Live Oak	Tough, stately evergreen tree.
Taxodium distichum	Bald Cypress	Good wetlands species.
Trees—Medium (20 feet to 50 feet)		
Betula nigra	River Birch	Good wetlands species.
Diospyros virginiana	Persimmon	Tough, drought tolerant, good fall color.
Gleditsia triacanthos 'Skyline'	Honeylocust	Nice form, light shade, drought tolerant.
Gordonia lasianthus	Loblolly Bay	Good wetlands species, evergreen.
Ilex latifolia	Lusterleaf Holly	Beautiful, resembles Magnolia.
Ilex opaca	American Holly	Good multi-trunk evergreen tree.
Ilex x attenuata 'Eagleston'	Eagleston Holly	Good fast growing screen.
Ilex x attenuata 'East Palatka'	East Palatka Holly	Good multi-trunk evergreen tree.
Ilex x attenuata 'Hume'	Hume Holly	Good standard or multi-trunk evergreen.
Juniperus virginiana/silicicola	Eastern Red Cedar	Drought tolerant, wood tough and fragrant.
Nyssa spp.	Tupelo	Good wetlands species, good fall color.
Oxydendron arboreum	Sourwood	Good fall color and flowers.
Pinus thunbergiana	Japanese Black Pine	Salt tolerant, handsome, good screen.
Pistache chinensis	Chinese Pistache	Good form, tough, superior fall color.
Pyrus calleryana 'Bradford'	Bradford Pear	Good form, flowers, and fall color.

Botanical Name	Common Name	Remarks
Quercus stellata	Post Oak	Drought tolerant, nice shape.
Ulmus parvifolia	Chinese Elm	Very graceful tree with beautiful bark.
Trees—Small (10 feet to 20 feet)		
Acer barbatum	Florida Maple	Good fall color.
Aesculus pavia	Red Buckeye	Good understory tree.
Chionanthus virginicus	Fringe Tree	Handsome specimen plant.
Cornus florida	Flowering Dogwood	Spectacular white flowers, red fall color.
Crataegus lacrimata	Pensacola Hawthorne	Beautiful weeping habit.
Cyrilla racemiflora	Titi	Good for wetlands, nice flowers.
Ilex cassine	Dahoon Holly	Good screen or for wetlands.
Ilex vomitoria 'Pendula'	Weeping Yaupon	Graceful weeping habit.
Ilex vomitoria 'Roundleaf'	Tree Form Yaupon	Nice bark and berries.
Lagerstroemia 'Basham's Party Pink'	Crape Myrtle	Lt. pink flowers in summer.
Lagerstroemia 'Biloxi'	Crape Myrtle	Pale pink flowers in summer.
Lagerstroemia 'Miami'	Crape Myrtle	Dark pink flowers in summer.
Lagerstroemia 'Muskogee'	Crape Myrtle	Lt. lavender flowers in summer.
Lagerstroemia 'Natchez'	Crape Myrtle	White flowers in summer.
Lagerstroemia 'Potomac'	Crape Myrtle	Large clear pink flowers.
Lagerstroemia 'Regal Red'	Crape Myrtle	Dark red flowers in summer.
Lagerstroemia 'Tuscarora'	Crape Myrtle	Coral red flowers in summer.
Ligustrum japonicum	Tree Form Ligustrum	Small, evergreen multi-trunk tree.
Magnolia soulangiana	Saucer Magnolia	Spectacular blooms in early spring.
Magnolia stellata 'Royal Star'	Star Magnolia	Spectacular blooms in early spring.
Myrica cerifera	Wax Myrtle	Good for wetlands, fast grower.
Quercus incana	Bluejack Oak	Distinctive winter outline.
Shrubs—Large (8 feet to 15 feet)		
Aesculus parviflora	Bottlebrush Buckeye	Showy flowers in May.
Camellia japonica	Japonica Camellia	Beautiful flowers in winter.
Cleyera japonica	Japanese Cleyera	Good hedge.
Feijoa sellowiana	Pineapple Guava	Grey-green color, edible fruit.
Hibiscus syriacus	Shrub Althea	Blue, violet, or white blooms in summer.
Ilex cornuta 'Burfordii'	Burford Holly	Good screen.
Ilex cornuta 'Nellie R. Stevens'	Nellie R. Stevens Holly	Good large screen.
Illicium parviflorum	Anise	Fragrant leaves, good informal hedge.
Juniperus chinensis 'Pfitzeriana'	Pfitzer's Juniper	Very drought tolerant.
Michellia figo	Banana Shrub	Fragrant flowers.
Nerium oleander	Oleander	Tough evergreen, blooms all summer.
Osmanthus fragrans	Tea Olive	Very fragrant blooms in winter.
Philadelphus coronarius	Mockorange	Showy white flowers in spring.
Punica granatum	Pomegranate	Red-orange flowers in summer.
Raphiolepis 'Majestic Beauty'	Majestic Beauty Hawthorn	Nice texture.
Viburnum odoratissum	Sweet Viburnum	Good screen, evergreen.
Vitex agnus-castus	Lilac Chaste Tree	Fragrant flowers in long clusters.
Shrubs—Medium (4 feet to 8 feet)		
Aucuba japonica	Japanese Aucuba	Good for shady places.
Buddleia davidii	Butterfly Bush	Blooms summer to fall.
Callicarpa americana	Beauty Berry	Magenta berries in fall.
Calycanthus floridus	Carolina Allspice	Richly fragrant flowers in spring.
Camellia sasanqua	Sasanqua Camellia	Beautiful flowers in winter.

Botanical Name	Common Name	Remarks
Fatsia japonica	Fatsia	Interesting tropical texture.
Hydrangea macrophylla	French Hydrangea	Profile blue blooms.
Hydrangea quercifolia	Oakleaf Hydrangea	All season plant, flowers, and fall color.
Ilex cornuta 'Burfordii Nana'	Dwarf Burford Holly	Good foundation plant.
Ilex cornuta 'Needlepoint'	Needlepoint Holly	Good foundation plant.
Ligustrum lucidum 'Recurvifolium'	Waxed Leaf Ligustrum	Excellent screen or driver hedge.
Lonicera fragrantissima	Winter Honeysuckle	Very fragrant blooms in early spring.
Mahonia bealei	Leatherleaf Mahonia	Very shade tolerant.
Pittosporum tobira	Pittosporum	Good evergreen shrub.
Pittosporum tobira 'Compact Green'	Compact Pittosporum	Tighter, more compact.
Pittosporum tobira 'Variegata'	Variegated Pittosporum	Light green color.
Rhododendron canescens	Piedmont Azalea	Fragrant flowers in spring.
Rhododendron species	Southern Indica Azaleas	Prolific blooms in spring.
Rosa laevigata	Cherokee Rose	State flower of Georgia.
Spirea species	Bridal Wreath	Prolific blooms in spring.
Weigela florida	Weigela	Pink blooms in spring.
Yucca filamentosa	Adams' Needle	Interesting texture and flowers.
Yucca pendula	Soft-Tipped Yucca	Nice gray-green foliage.
Shrubs—Small (1 foot to 4 feet)		
Buxus microphylla japonica	Japanese Boxwood	Good low hedge, bright green color.
Cycas revoluta	King Sago	Interesting texture.
Deutzia gracilis 'Nikko'	Dwarf Slender Deutzia	Graceful white flowers in spring.
Ilex cornuta 'Carissa'	Carissa Holly	Good evergreen border.
Ilex crenata 'Compacta'	Japanese Holly	Good foundation plant.
Ilex crenata 'Helleri'	Helleri Holly	Good foundation plant.
Ilex vomitoria 'Schilling's'	Stoke's Dwarf Yaupon	Good foundation plant.
Juniperus chinensis 'Nick's'	Nick's Compact Juniper	Good for screening parking lots.
Juniperus davurica 'Expansa'	Parson's Juniper	Nice horizontal branching.
Juniperus procumbens	Japgarden Juniper	Nice texture and gray-green foliage.
Nandina domestica 'Gulf Stream'	Dwarf Nandina	Compact, tight growth.
Nandina domestica 'Harbor Dwarf'	Dwarf Nandina	Compact, tight growth.
Nandina domestica 'Moon Bay'	Dwarf Nandina	Good foundation plant.
Philodendron selloum	Split-Leaf Philodendron	Interesting texture.
Pittosporum tobira 'Wheeleri'	Wheeler's Dwarf Pittosporum	Good evergreen border.
Pyracantha species	Scarlet Fire Thorn	Red-orange berries in fall.
Raphiolepis indica 'Alba' or 'Clara'	Indian Hawthorne	Good evergreen, white flowers.
Rhododendron 'Red Ruffle'	Red Ruffle Azalea	Prolific red blooms in spring.
Serenoa repens	Palmetto	Interesting texture.
Groundcovers (6 inches to 18 inches)		
Ajuga repens	Buleweed	Purple-green mat.
Cyrtomium falcatum	Holly Fern	Nice evergreen fern texture.
Hedera helix 'Hahn's'	Hahn's Ivy	Will tolerate part sun.
Juniperus chinensis 'Sargeantii'	Sergeant's Juniper	Good groundcover.
Juniperus conferta 'Blue Pacific'	Blue Pacific Juniper	Lush evergreen.
Juniperus hor. 'Plumosa Compacta'	Andorra Compacta Jun.	Reddish-purple in winter.
Juniperus horizontalis 'Wiltonii'	Blue Rug Juniper	Green mat, will trail over walls.
Juniperus procumbens 'Nana'	Dwarf Japgarden Juniper	Low growing juniper.
Liriope muscari 'Aztec Grass'	Aztec Grass	Nice accent plant.

Botanical Name	Common Name	Remarks
Liriope muscari 'Evergreen Giant'	Evergreen Giant Liriope	Stays evergreen in winter.
Ophiopogon japonicus	Mondo Grass	Good for rock gardens.
Pennisetum alopecuroides 'Hameln'	Dwarf Fountain Grass	Soft texture.
Trachelospermum asiaticum	Asiatic Jasmine	Forms low green mat.
Vinca minor	Periwinkle	Blue flowers.
Accents		
Aster spp.	Aster	Blooms summer to frost.
Canna x generalis	Canna Lilly	Prolific bloomer.
Chrysanthemum spp.	Mums and Daisies	Good late summer and fall color.
Coreopsis spp.	Coreopsis	Prolific yellow and pink blooms.
Echinacea purpurea	Purple Coneflower	Purple flowers on 24" stems.
Evolvulus glomeratus 'Blue Daze'	Blue Daze	Grey-green foliage, blue flowers.
Forsythia intermedia	Golden Bells	Prolific yellow blooms in March.
Gaillardia x gandiflora	Blanket Flower	Bright red flowers with yellow edges.
Gomphrena spp.	Globe Amaranth	Long blooming purple, pink, and white.
Hemerocallis spp.	Daylily	Yellow, red, orange, and peach blooms.
Iris species	Iris	Interesting texture.
Kerria japonica	Japanese Kerria	Yellow blooms in spring.
Lantana spp.	Lantana	Prolific and long-lived blooms.
Lavandula spp.	Lavender	Purple herb, takes heat and drought.
Lilium candidum	Madonna or Easter Lily	Oldest garden flower.
Lycoris radiata	Red Spider Lily	Red flowers on 18" stalks.
Malvaviscus arboreus	Turk's Cap	Bright red blooms.
Melampodium spp.	Melampodium	Prolific orange flowers all summer.
Miscanthus sinensis 'Gracillimus'	Miscanthus	Silver-green grass to 6'.
Monarda spp.	Bee Balm	Red, pink, or white flowers draw bees.
Osmunda cinnamomea	Cinnamon Fern	Lacy texture.
Pentas lanceolata	Pentas	Prolific and long-lived blooms.
Phlox paniculata	Garden Phlox	Coral, lavender, pink, and white blooms.
Platycodon grandiflorus	Balloon Flower	White and blue flowers.
Plumbago auriculata	Cape Plumbago	Sky-blue flowers.
Rosa spp.	Old Roses	Care-free, long bloom time.
Rosemerinus officinalis	Rosemary	Aromatic foliage.
Rudbeckia fulgida 'Goldstrum'	Black-Eyed Susan	Golden-yellow flowers, black center.
Salvia spp.	Salvia	Red, white, and purple blooms.
Santolina chamaecyparissus	Grey Santolina	Grey foliage.
Santolina virens	Green Santolina	Yellow flowers.
Stokesia laevis	Stoke's Aster	Prolific blue blooms.
Thelypteris normalis	Southern Wood Fern	Attractive native fern.
Verbena spp.	Verbena	Prolific bloomer.
Veronica spp.	Veronica	Light purple herb.
Zinnia linneraris	Zinnia	Hot red, pink flowers in summer.

APPENDIX D

VERTEBRATE FAUNAL SPECIES POSSIBLE ON HURLBURT FIELD

VERTEBRATE FAUNAL SPECIES POSSIBLE ON HURLBURT FIELD

Common Name	Scientific Name
Fish (Excludes Brackish and Saltwater Species)	
Rock bass	*Ambloplites rupestris*
Pirate perch	*Aphredoderus sayanus*
Lake chubsucker	*Erimyzon sucetta*
Redfin pickerel[1]	*Esox americanus*
Chain pickerel	*Esox niger*
Orangestripe shiner	*Etheostoma* sp.
Starhead topminnow[1]	*Fundulus notti*
Mosquitofish[1]	*Gambusia affinis*
Yellow-bullhead[1]	*Ictalurus natalis*
Channel catfish[1]	*Ictalurus punctatus*
Bluegill[1]	*Lepomis macrochirus*
Longear sunfish	*Lepomis megalotis*
Redear sunfish[1]	*Lepomis microlophus*
Spotted sunfish	*Lepomis punctatus*
Spotted bass	*Micropterus punctulatus*
Largemouth bass[1]	*Micropterus salmoides*
White crappie	*Pomoxis annularis*
Mammals	
Virginia short-tailed shrew	*Blarina brevicauda*
Feral dog[1]	*Canis familiaris*
Coyote[1]	*Canis latrans*
American beaver	*Castor canadensis*
Least shrew	*Cryptotis parva*
Nine-banded armadillo[1]	*Dasypus novemcinctus*
Opossum[1]	*Didelphis virginiana*
Southeastern pocket gopher	*Geomys pinetis*
Southern flying squirrel	*Glaucomys volans*
Eastern red bat	*Lasiurus borealis*
Hoary bat	*Lasiurus cinereus*
Northern yellow bat	*Lasiurus intermedius*
Seminole bat	*Lasiurus seminolus*
Northern river otter[1]	*Lutra canadensis*
Bobcat	*Lynx rufus*
Striped skunk[1]	*Mephitis mephitis*
House mouse[1]	*Mus musculus*
Woodland vole	*Microtus pinetorum*
Longtail weasel	*Mustela frenata*
Mink	*Mustela vison*
Southeastern myotis	*Myotis austroriparius*

Common Name	Scientific Name
Gray myotis	*Myotis grisescens*
Eastern woodrat	*Neotoma floridana*
Evening bat	*Nycticeius humeralis*
Golden mouse	*Ochrotomys nuttalli*
White-tailed deer[1]	*Odocoileus virginianus*
Marsh rice rat[1]	*Oryzomys palustris*
Cotton mouse	*Peromyscus gossypinus*
Santa Rosa beach mouse	*Peromyscus polionotus leucocephalus*
Eastern pipistrel	*Pipistrellus subflavus*
Rafinesque's big-eared bat	*Plecotus rafinesquii*
Common raccoon[1]	*Procyon lotor*
Eastern harvest mouse	*Reithrodontomys humulis*
Eastern mole[1]	*Scalopus aquaticus*
Eastern gray squirrel[1]	*Sciurus carolinensis*
Eastern fox squirrel	*Sciurus niger*
Hispid cotton rat[1]	*Sigmodon hispidus*
Eastern spotted skunk	*Spilogale putorius*
Eastern cottontail[1]	*Sylvilagus floridanus*
Marsh rabbit	*Sylvilagus palustris*
Brazilian free-tailed bat	*Tadarida brasiliensis*
Gray fox[1]	*Urocyon cinereoargenteus*
Florida black bear[1]	*Ursus americanus floridanus*
Red fox	*Vulpes vulpes*
Reptiles and Amphibians	
Northern cricket frog	*Acris crepitans*
Southern cricket frog[1]	*Acris gryllus*
Florida cottonmouth[1]	*Agkistridon piscivorus conanti*
American alligator[1]	*Alligator mississippiensis*
Flatwoods salamander[2]	*Ambystoma cingulatum*
Marbled salamander	*Ambystoma opacum*
Mole salamander	*Ambystoma talpoideum*
Tiger salamander	*Ambystoma tigrinum*
Two-toed amphiuma	*Amphiuma means*
Green anole[1]	*Anolis carolinensis*
Florida softshell turtle[1]	*Apalone ferox*
Gulf Coast spiny softshell	*Apalone spinifera aspera*
Oak toad[1]	*Bufo quercicus*
Southern toad[1]	*Bufo terrestris*
Fowler's toad	*Bufo woodhousii fowleri*
Northern scarlet snake[1]	*Cemophora coccinea copei*
Snapping turtle[1]	*Chelydra serpentina*
Six-lined racerunner[1]	*Cnemidophorus sexlineatus*

Common Name	Scientific Name
Southern black racer[1]	*Coluber constrictor priapus*
Eastern diamondback rattlesnake[1]	*Crotalus adamanteus*
Eastern chicken turtle	*Deirochelys reticularia*
Southern dusky salamander	*Desmognathus auriculatus*
Northern dusky salamander	*Desmognathus fuscus*
Southern ringneck snake[1]	*Diadophis punctatus*
Eastern indigo snake	*Drymarchon corais couperi*
Corn snake[1]	*Elaphe guttata*
Gray rat snake[1]	*Elaphe obsoleta spiloides*
Coal skink	*Eumeces anthracinus*
Northern mole skink	*Eumeces egregius similis*
Five-lined skink[1]	*Eumeces fasciatus*
Southeastern five-lined skink	*Eumeces inexpectatus*
Broadhead skink[1]	*Eumeces laticeps*
Southern two-lined salamander	*Eurycea cirrigera*
Three-lined salamander	*Eurycea longicauda guttolineata*
Dwarf salamander[1]	*Eurycea quadridigitata*
Eastern mud snake[1]	*Farancia abacura*
Rainbow snake	*Farancia erytrogramma*
Eastern narrowmouth toad[1]	*Gastrophryne carolinensis*
Gopher tortoise	*Gopherus polyphemus*
Alabama map turtle	*Graptemys pulchra*
Four-toed salamander	*Hemidactylium scutatum*
Eastern hognose snake[1]	*Heterodon platirhinos*
Southern hognose snake[1]	*Heterodon simus*
Pine barrens treefrog	*Hyla andersonii*
Bird-voiced treefrog	*Hyla avivoca*
Gray treefrog	*Hyla chrysoscelis*
Green treefrog[1]	*Hyla cinerea*
Pine woods treefrog[1]	*Hyla femoralis*
Barking treefrog[1]	*Hyla gratiosa*
Squirrel treefrog[1]	*Hyla squirella*
Eastern mud turtle[1]	*Kinosternon subrubrum*
Mole king snake	*Lampropeltis calligaster rhombomaculata*
Eastern king snake[1]	*Lampropeltis getula*
Scarlet king snake[1]	*Lampropeltis triangulum elapsoides*
Alligator snapping turtle	*Macroclemys temminckii*
Diamondback terrapin	*Malaclemys terrapin*
Coachwhip snake[1]	*Masticophis flagellum*
Eastern coral snake	*Micrurus fulvius*
Alabama waterdog	*Necturus alabamensis*
Yellowbelly water snake[1]	*Nerodia erythrogaster flavigaster*

Common Name	Scientific Name
Banded water snake[1]	*Nerodia fasciata*
Florida green water snake	*Nerodia floridana*
Midland water snake	*Nerodia sipedon pleuralis*
Brown water snake	*Nerodia taxispilota*
Newt	*Notophthalmus viridescens*
Rough green snake[1]	*Opheodrys aestivus*
Eastern slender glass lizard[1]	*Ophisaurus a. attenuatus*
Eastern glass lizard[1]	*Ophisaurus ventralis*
Florida pine snake	*Pituophis melanoleucus mugitus*
Slimy salamander	*Plethodon glutinosus*
Spring peeper	*Pseudacris crucifer*
Southern chorus frog[1]	*Pseudacris nigrita*
Little grass frog	*Pseudacris ocularis*
Ornate chorus frog[1]	*Pseudacris ornata*
Upland chorus frog	*Pseudacris feriarum*
River cooter	*Pseudemys concinna*
Florida cooter[1]	*Pseudemys floridana*
Mud salamander	*Pseudotriton montanus*
Northern red salamander	*Pseudotriton ruber*
Gopher frog	*Rana capito*
Bullfrog[1]	*Rana catesbeiana*
Bronze frog	*Rana clamitans clamitans*
Pig frog[1]	*Rana grylio*
River frog[1]	*Rana heckscheri*
Florida bog frog	*Rana okaloosae*
Southern leopard frog[1]	*Rana utricularia*
Gulf crayfish snake[1]	*Regina rigida sinicola*
Queen snake	*Regina septemvittata*
Pine woods snake	*Rhadinaea flavilata*
Eastern spadefoot	*Scaphiopus holbrooki*
Southern fence lizard[1]	*Sceloporus undulatus*
Ground skink[1]	*Scincella lateralis*
Black swamp snake	*Seminatrix pygaea*
Lesser siren[1]	*Siren intermedia*
Greater siren	*Siren lacertina*
Dusky pygmy rattlesnake[1]	*Sistrurus miliarius barbouri*
Loggerhead musk turtle	*Sternotherus minor*
Common musk turtle	*Sternotherus odoratus*
Red-bellied snake[1]	*Storeria occipitomaculata obscura*
Southeastern crowned snake	*Tantilla coronata*
Gulf coast box turtle[1]	*Terrapene carolina major*
Eastern ribbon snake[1]	*Thamnophis sauritus*

Common Name	Scientific Name
Eastern garter snake[1]	*Thamnophis sirtalis*
Yellow-belly slider	*Trachemys scripta*
Rough earth snake	*Virginia striatula*
Smooth earth snake	*Virginia valeriae*
Birds	
Cooper's hawk[1]	*Accipiter coopeerii*
Sharp-shinned hawk	*Accipiter striatus velox*
Spotted sandpiper[1]	*Actitis macularia*
Red-winged blackbird	*Agelaius phoenicius*
Bachmann's sparrow[1]	*Aimophila aestivalis*
Wood duck	*Aix sponsa*
Sharp-tailed sparrow	*Ammodramus caudacutus*
Henslow's sparrow	*Ammodramus henslowii*
LeConte's sparrow	*Ammodramus leconteii*
Seaside sparrow	*Ammodramus maritimus*
Grasshopper sparrow	*Ammodramus savannarum*
Northern pintail	*Anas acuta*
American widgeon	*Anas americana*
Northern shoveler	*Anas clypeata*
Green-winged teal	*Anas crecca*
Blue-winged teal	*Anas discors*
Mallard[1]	*Anas platyrhynchos*
American black duck	*Anas rubripes*
Gadwall	*Anas strepera*
Great blue heron[1]	*Andea herodias*
Anhinga	*Anhinga anhinga leucogaster*
American pipit	*Anthus spinoletta*
Ruby-throated hummingbird	*Archilochus colubris*
Ruddy turnstone	*Arenaria interpres*
Short-eared owl	*Asio flammeus*
Lesser scaup	*Aythya affinis*
Redhead	*Aythya americana*
Ring-necked duck[1]	*Aythya collaris*
Greater scaup	*Aythya marila*
Canvasback	*Aythya valisineria*
Upland sandpiper	*Bartramia longicauda*
Cedar waxwing[1]	*Bombycilla cedrorum*
American bittern	*Botaurus lentiginosus*
Canada goose	*Branta canadensis*
Great horned owl[1]	*Bubo virginianus*
Cattle egret[1]	*Bubulcus ibis*
Common goldeneye	*Bucephala clangula*

Common Name	Scientific Name
Red-tailed hawk	*Buteo jamaicensis*
Red-shouldered hawk[1]	*Buteo lineatus*
Broad-winged hawk[1]	*Buteo platypterus*
Green heron[1]	*Butorides striatus*
Sanderling[1]	*Calidris alba*
Red knot	*Calidris canutus*
Pectoral sandpiper	*Calidris melanotos*
Wilson's snipe	*Capella gallinago delicata*
Chuck-will's widow[1]	*Caprimulgus carolinensis*
Whip-poor-will	*Caprimulgus vociferus*
Northern cardinal[1]	*Cardinalis cardinalis*
Pine siskin	*Carduelis pinus*
American goldfinch	*Carduelis tristis*
Purple finch	*Carpodacus purpureus*
Great egret[1]	*Casmerodius albus*
Turkey vulture[1]	*Cathartes aura*
Veery	*Catharus fuscescens*
Hermit thrush	*Catharus guttatus*
Gray-cheeked thrush	*Catharus minimus*
Swainson's thrush	*Catharus ustulatus*
Willet[1]	*Catoptrophorus semipalmatus*
Brown creeper	*Certhia familiaris*
Chimney swift[1]	*Chaetura pelagica*
Snowy plover	*Charadrius alexandrinus*
Piping plover	*Charadrius melodus*
Semipalmated plover[1]	*Charadrius semipalmatus*
Killdeer[1]	*Charadrius vociferus*
Wilson's plover	*Charadrius wilsonia*
Snow goose	*Chen caerulescens*
Black tern	*Chlidonias niger*
Common nighthawk[1]	*Chordeiles minor*
Northern harrier	*Circus cyaneus*
Marsh wren	*Cistothorus palustris*
Sedge wren	*Cistothorus platensis*
Oldsquaw	*Clangula hyemalis*
Yellow-billed cuckoo[1]	*Coccyzus americanus*
Black-billed cuckoo	*Coccyzus erythrophthalmus*
Northern flicker[1]	*Colaptes auratus*
Northern bobwhite[1]	*Colinus virginianus*
Rock dove[1]	*Columbia livia*
Ground dove	*Columbiana passerina*
Olive-sided flycatcher	*Contopus borealis*

Common Name	Scientific Name
Eastern pewee	*Contopus virens*
Black vulture[1]	*Coragyps atratus*
American crow	*Corvus brachyrhynchos*
Fish crow[1]	*Corvus ossifragus*
Yellow rail	*Coturnicops noveboracensis*
Blue jay[1]	*Cyanocitta cristata*
Mute swan	*Cygnus olor*
Black-throated blue warbler	*Dendroica caerulescens*
Bay-breasted warbler	*Dendroica castanea*
Cerulean warbler	*Dendroica cerulea*
Yellow-rumped warbler	*Dendroica coronata*
Prairie warbler	*Dendroica discolor*
Yellow-throated warbler	*Dendroica dominica*
Blackburnian warbler	*Dendroica fusca*
Magnolia warbler	*Dendroica magnolia*
Palm warbler	*Dendroica palmarum*
Chestnut-sided warbler	*Dendroica pensylvanica*
Yellow warbler	*Dendroica petechia*
Pine warbler[1]	*Dendroica pinus*
Blackpoll warbler	*Dendroica striata*
Cape May warbler	*Dendroica tigrina*
Black-throated green warbler	*Dendroica virens*
Reddish egret	*Dichromanassa rufescens*
Bobolink	*Dolichonyx oryzivorus*
Pileated woodpecker[1]	*Dryocopus pileatus*
Gray catbird[1]	*Dumetella carolinensis*
Snowy egret	*Egretta thula*
Tricolored heron	*Egretta tricolor*
Swallow-tailed kite	*Elanoides forficatus*
Alder flycatcher	*Empidonax alnorum*
Yellow-bellied flycatcher	*Empidonax flaviventris*
Least flycatcher	*Empidonax minimus*
Willow flycatcher	*Empidonax traillii*
Arcadian flycatcher	*Empidonax virescens*
Horned lark	*Eremophila alpestris*
White ibis[1]	*Eudocimus albus*
Rusty blackbird	*Euphagus carolinus*
Brewer's blackbird	*Euphagus cyanocephalus*
Merlin	*Falco columbarius*
Arctic peregrine falcon	*Falco peregrinus tundrius*
American kestrel[1]	*Falco sparverius*
Little blue heron[1]	*Florida caerulea*

Common Name	Scientific Name
Magnificent frigatebird	*Fregata magnificens rothschildi*
American coot	*Fulica americana*
Common moorhen	*Gallinula chloropus*
Common loon[1]	*Gavia immer*
Red-throated loon	*Gavia stellata*
Common yellowthroat[1]	*Geothlypis trichas*
Sandhill crane	*Grus canadensis*
Blue grosbeak	*Guiraca caerulea*
American oystercatcher	*Haematopus palliatus*
Bald eagle	*Haliaeetus leucocephalus*
Worm-eating warbler	*Helmitheros vermivorus*
Cliff swallow	*Hirundo pyrrhonota*
Barn swallow	*Hirundo rustica*
Wood thrush	*Hylocichla mustelina*
Yellow-breasted chat[1]	*Icteria virens*
Northern oriole	*Icterus galbula*
Orchard oriole	*Icterus spurius*
Mississippi kite	*Ictinia mississippiensis*
Tree swallow	*Iridoprocne bicolor*
Least bittern	*Ixobrychus exilis*
Dark-eyed junco	*Junco hyemalis*
Loggerhead shrike	*Lanius ludovicianus*
Herring gull[1]	*Larus argentatus*
Laughing gull[1]	*Larus atricilla*
Ring-billed gull	*Larus delawarensis*
Bonaparte's gull[1]	*Larus philadelphia*
Black rail	*Laterallus jamaicensis*
Swainson's warbler	*Limnothlypis swainsonii*
Hooded merganser	*Lophodytes cucullatus*
Belted kingfisher[1]	*Megaceryle alcyon*
Red-bellied woodpecker[1]	*Melanerpes carolinus*
Red-headed woodpecker[1]	*Melanerpes erythrocephalus*
White-winged scoter	*Melanitta fusca*
Surf scoter	*Melanitta perspicillata*
Wild turkey	*Meleagris gallopavo*
Swamp sparrow	*Melospiza georgiana*
Lincoln's sparrow	*Melospiza lincolnii*
Song sparrow	*Melospiza melodia*
Red-breasted merganser	*Mergus serrator*
Northern mockingbird[1]	*Mimus polyglottos*
Black-and-white warbler	*Minotilta varia*
Brown-headed cowbird[1]	*Molothrus ater*

Common Name	Scientific Name
Great-crested flycatcher[1]	*Myiarchus crinitus*
Whimbrel	*Numenius phaeopus*
Yellow-crowned night-heron	*Nyctanassa violacea*
Black-crowned night-heron	*Nycticorax nycticorax hoactli*
Kentucky warbler	*Oporornis formosus*
E. screech-owl[1]	*Otus asio*
Ruddy duck	*Oxyura jamaicensis*
Osprey[1]	*Pandion haliaetus*
Northern parula[1]	*Parula americana*
Tufted titmouse[1]	*Parus bicolor*
Carolina chickadee[1]	*Parus carolinensis*
House sparrow[1]	*Passer domesticus*
Savannah sparrow	*Passerculus sandwichensis*
Fox sparrow	*Passerella iliaca*
Indigo bunting	*Passerina cyanea*
White pelican[1]	*Pelecanus erythrorhynchos*
Brown pelican[1]	*Pelecanus occidentalis*
Double-crested cormorant[1]	*Phalacrocorax auritus*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
American woodcock[1]	*Philohela minor*
Red-cockaded woodpecker	*Picoides borealis*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
Rufous-sided towhee[1]	*Pipilo erythrophthalmus*
Scarlet tanager	*Piranga olivacea*
Summer tanager[1]	*Piranga rubra*
American golden plover	*Pluvialis dominica*
Black-bellied plover[1]	*Pluvialis squatarola*
Horned grebe	*Podiceps auritus*
Eared grebe	*Podiceps nigricollis californicus*
Pied-billed grebe	*Podylimbus podiceps*
Blue-gray gnatcatcher[1]	*Polioptila caerulea*
Vesper sparrow	*Poocetes gramineus*
Purple gallinule	*Porphyrula martinica*
Sora	*Porzana carolina*
Purple martin[1]	*Progne subis*
Prothonotary warbler[1]	*Protonotaria citrea*
Boat-tailed grackle	*Quiscalus major*
Common grackle[1]	*Quiscalus quiscula*
King rail	*Rallus elegans*
Virginia rail	*Rallus limicola*
Clapper rail	*Rallus longirostris*

Common Name	Scientific Name
Ruby-crowned kinglet	*Regulus calendula*
Golden-crowned kinglet	*Regulus satrapa*
Black skimmer	*Rhynchops nigra*
Bank swallow	*Riparia riparia*
Eastern phoebe[1]	*Sayornis phoebe*
Ovenbird	*Seiurus aurocapillus*
Louisiana waterthrush	*Seiurus motacilla*
Northern waterthrush	*Seiurus noveboracensis*
American redstart	*Setophaga ruticilla*
Eastern bluebird[1]	*Sialia sialis*
Red-breasted nuthatch	*Sitta canadensis*
White-breasted nuthatch	*Sitta carolinensis*
Brown-headed nuthatch[1]	*Sitta pusilla*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Dickcissel	*Spiza americana*
Chipping sparrow	*Spizella passerina*
Field sparrow	*Spizella pusilla*
Rough-winged swallow	*Stelgidopteryx serripennis*
Least tern[1]	*Sterna antillarum*
Caspian tern	*Sterna caspia*
Forster's tern	*Sterna forsteri*
Common tern	*Sterna hirundo*
Royal tern	*Sterna maxima*
Gull-billed tern[1]	*Sterna nilotica*
Sandwich tern	*Sterna sandvicensis*
Barred owl	*Strix varia*
Eastern meadowlark	*Sturnella magna*
Western meadowlark	*Sturnella neglecta*
European starling[1]	*Sturnus vulgaris*
Bewick's wren	*Thryomanes bewickii*
Carolina wren[1]	*Thryothoruus ludovicianus*
Brown thrasher[1]	*Toxostoma rufum*
Lesser yellowlegs	*Tringa flavipes*
Greater yellowlegs	*Tringa melanoleuca*
Solitary sandpiper[1]	*Tringa solitaria*
House wren	*Troglodytes aedon*
Winter wren	*Troglodytes troglodytes*
American robin	*Turdus migratorius*
Gray kingbird	*Tyrannus dominicensis*
Eastern kingbird[1]	*Tyrannus tyrannus*
Barn owl	*Tyto alba*
Orange-crowned warbler	*Vermivora celata*

Common Name	Scientific Name
Golden-winged warbler	*Vermivora chrysoptera*
Tennessee warbler	*Vermivora peregrina*
Blue-winged warbler	*Vermivora pinus*
Nashville warbler	*Vermivora ruficapilla*
Yellow-throated vireo	*Vireo flavifrons*
Warbling vireo[1]	*Vireo gilvus*
White-eyed vireo[1]	*Vireo griseus*
Red-eyed vireo[1]	*Vireo olivaceus*
Philadelphia vireo	*Vireo philadelphicus*
Solitary vireo	*Vireo solitarius*
Canada warbler	*Wilsonia canadensis*
Hooded warbler	*Wilsonia citrina*
Wilson's warbler	*Wilsonia pusilla*
Mourning dove[1]	*Zenaida macroura*
White-throated sparrow	*Zonotrichia albicollis*
White-crowned sparrow	*Zonotrichia leucophrys*

[1]Observed by Woolpert (November 1994, April 1995, July 1995, and January 1996) or by CEOHE (1986 through 1995).
[2]Observed by Florida Natural Areas Inventory (1993 and 1994).
Source: Adapted from Earth Tech, 1994.

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APPENDIX E

ENDANGERED FAUNA POTENTIALLY OCCURRING ON HURLBURT FIELD

METHODS

From October 2008 through August of 2009 a comprehensive inventory for rare animal species was conducted on Hurlburt Field covering all seasons and appropriate habitats. A list of rare animals that may occur on Hurlburt Field was created (Table 9) using habitat information from a landcover map, published literature, the Florida Natural Areas Inventory (FNAI) database, and two previous surveys (1996-97 and 2002-03) conducted by FNAI. An initial reconnaissance of the survey area was conducted to confirm the potential habitats and their condition, and thus the site's potential for rare animal species. These procedures directed the site visits and allowed focus at the appropriate time on the rare species most likely to occur on Hurlburt Field. All sampling was conducted in accordance with sampling protocol # 0130 reviewed by the FSU Animal Care and Use Committee.

There were no specific surveys conducted for many of the target species (e.g., *Alligator mississippiensis* (alligator), *Corynorhinus rafinesquii* (Rafinesque's big-eared bat), *Crotalus adamanteus* (eastern diamondback rattlesnake), *Drymarchon couperi* (eastern indigo snake), *Elanoides forficatus* (swallow-tailed kite), *Falco sparverius paulus* (southeastern American kestrel), *Heterodon simus* (southern hognose snake) *Picoides villosus* (hairy woodpecker), and *Ursus americanus floridanus* (Florida black bear)). Observation of these species, or their sign, on Hurlburt Field was recorded opportunistically during other surveys.

Dip-nets with 4 mm mesh were used to sample wetlands where reticulated flatwoods salamander larvae or one-toed amphiumas were suspected. A total of 22 cover boards (approximately 1.5x1.5m) were distributed within the ecotone of four separate dome swamps and checked for reticulated flatwoods salamanders twice during the breeding season. Evening aural surveys were conducted near wetlands that had the potential to support gopher frogs or Florida bog frogs. Suitable gopher tortoise habitat was identified using DOQQs and experience from previous surveys. Meandering transects were walked through all potentially suitable habitat. Locations of all burrows observed were recorded using a Trimble GPS datalogger. Data describing size and status of burrows were recorded. The four known red-cockaded woodpecker (RCW) cavity trees were visited and inspected for signs of activity. Roosting surveys were conducted in areas where RCWs were encountered during daytime field surveys in an effort to detect onsite active cavities. Surveys for Henslow's Sparrows were conducted in mid-February by walking transects through wet prairie and the herbaceous fringe of dome swamps in attempt to flush residing birds. Surveys for Bachman's sparrows were conducted in mid June by driving and walking through mesic flatwoods, wet flatwoods, and sandhill and stopping approximately every 200m and listening for singing males. Rare shorebirds were sought throughout the year by visually scanning the small amount of sand beach shoreline and mud-flats found on the Hurlburt Field property.

On April 22 and June 16 of 2009 a military uh-1 "Huey" helicopter was used to conduct aerial surveys for bald eagle, osprey, and wading bird nest sites. Transects were flown at an elevation of approximately 46m at 150 knots/hour and spaced 200 to 400m apart depending on visibility. All of the Hurlburt Field property was surveyed, excluding the runway, and adjacent portions of Eglin Air Force Base. One to three observers were located on each side of the helicopter with the doors removed and all observers scanned for signs of nesting. All suspected nests were circled at slow speed, species identification was confirmed and a GPS point was recorded.

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Table 9. Rare vertebrate search list for 2008-09 survey at Hurlburt Field (Global and state ranks and legal status explanations are provided in Appendix 1).

Scientific Name	Common Name Rank	Global Rank	State Status	Fed. Status	State
AMPHIBIANS					
Ambystoma bishopi	reticulated flatwoods salamander	G2	S2	T	LS
Amphiuma pholeter	one-toed amphiuma	G3	S3	N	N
Rana capito	gopher frog	G3	S3	N	LS
Rana okaloosae	Florida bog frog	G2	S2	N	LS
REPTILES					
Alligator mississippiensis	American alligator	G5	S4	T(S/A)	LS
Crotalus adamanteus	eastern diamondback rattlesnake	G5	S?	N	N
Drymarchon couperi	eastern indigo snake	G4T3	S3	LT	LT
Eumeces anthracinus	coal skink	G5	S3	N	N
Gopherus polyphemus	gopher tortoise	G3	S3	N	LS
Heterodon simus	southern hognose snake	G2	S2	N	N
Lampropeltis getula	common kingsnake	G5	S2S3	N	N
Macrochelys temminckii	alligator snapping turtle	G3G4	S3	N	LS
Pituophis melanoleucus	Florida pine snake	G4T3	S3	N	LS
BIRDS					
Aimophila aestivalis	Bachman's sparrow	G3	S3	N	N
Ammodramus henslowii	Henslow's sparrow	G3G4	S?	N	N
Ardea alba	great egret	G5	S4	N	N
Charadrius alexandrinus	snowy plover	G4	S1	N	LT
Charadrius melodus	piping plover	G3	S2	LT	LT
Charadrius wilsonia	Wilson's plover	G5	S2	N	N
Egretta caerulea	little blue heron	G5	S4	N	LS
Egretta thula	snowy egret	G5	S4	N	LS
Egretta tricolor	tricolored heron	G5	S4	N	LS
Elanoides forficatus	swallow-tailed kite	G4	S2S3	N	N
Eudocimus albus	white ibis	G5	S4	N	LS
Falco sparverius paulus	southeastern American kestrel	G5T3T4	S3?	N	LT
Haliaeetus leucocephalus	bald eagle	G4	S3	LT	LT
Mycteria americana	wood stork	G4	S2	LE	LE
Nyctanassa violacea	yellow-crowned night-heron	G5	S3?	N	N
Nycticorax nycticorax	black-crowned night-heron	G5	S3?	N	N
Pandion haliaetus	osprey	G5	S3S4	N	LS
Picoides borealis	red-cockaded woodpecker	G3	S2	LE	LT
Picoides villosus	hairy woodpecker	G5	S3?	N	N
Sterna antillarum	least tern	G4	S3	N	LT
MAMMALS					
Corynorhinus rafinesquii	Rafinesque's big-eared bat	G3	S3?	N	N
Eptesicus fuscus	big brown bat	G5	S3	N	N
Myotis austroriparius	southeastern bat	G3	S3	N	N
Sciurus niger niger	southeastern fox squirrel	G5T5	S3	N	N
Ursus americanus floridanus	Florida black bear	G5T2	S2	N	LT

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RESULTS AND DISCUSSION

Twelve rare animal species or subspecies were documented from Hurlburt Field during this survey (2008-09). Five of these species were recorded during the 1996-97 and two of the species were documented during the 2002-03 surveys. The species observed during the 2008-09 survey, along with their global and state rank and legal status, are listed in Table 1. The natural communities in which they were found and the number of documented occurrences are provided in Table 10. The locations of observed rare animals are shown in Figure 3. The locations of the observed raptor and wading bird nests are shown in Figure 4. All locations are also provided in the ArcView shapefiles in Appendix 3.

Table 10. Rare vertebrates observed at Hurlburt Field during 2008-09 survey.

Scientific Name	Common Name	Community	Occurrences
Accipiter cooperii	Cooper's hawk	mesic flatwoods	3
Aimophila aestivalis	Bachman's sparrow	mesic flatwoods	2
Alligator mississippiensis	American alligator	basin swamp, blackwater stream	2
Ardea alba	great egret	shoreline	1
Egretta tricolor	tricolored heron	shoreline	1
Gopherus polyphemus	gopher tortoise	sandhill, mesic flatwoods	7
Haliaeetus luecocephalus	bald eagle	maritime hammock, mesic flatwoods, saltmarsh	4
Nyctanassa violacea	yellow-crowned night-heron	shoreline	1
Nycticorax nycticorax	black-crowned night-heron	dome swamp	1
Pandion haliaetus	osprey	wet flatwoods	8
Picoides borealis	red-cockaded woodpecker	mesic flatwoods, sandhill	2
Ursus americanus floridanus	Florida black bear	mesic flatwoods, wet flatwoods, basin swamp	8

APPENDIX F

DESIGNATION OF ENVIRONMENTAL RESPONSIBILITIES AT HURLBURT FIELD

30 DEC 1993

FROM: AFDTC/EM
501 DeLeon Street Suite 100
Eglin AFB FL 32542-5133

SUBJ: Clarification of Environmental Responsibilities

TO: 16 SPTG/CE

1. While reviewing my notes, I realized we had never formalized the agreements we made on 6 Oct when we discussed the responsibilities of our environmental offices. Our discussions were meant to clarify the broad statements used in the past Host-Tenant Agreement. They were not meant to negate or change that agreement.

2. In general, you accepted full responsibility for the environmental programs which we discussed that day: natural resources, cultural resources, and environmental planning. You are responsible for the environmental analysis of proposed actions on Hurlburt. If the proposed action might impact Eglin (mission or environment), I would expect you to coordinate the environmental assessment with us. AFDTC/EM will provide assistance (as a consultant, not as an office of primary responsibility) when requested. Examples would be consultations with US Fish and Wildlife Service or State Historic Preservation Officer. For specific areas in which you have no expertise, my office will take full responsibility, such as, timber sales and forest fire (or wildfire) fighting.

3. My notes indicate you had not yet made a decision whether you wanted Hurlburt to be included in the Eglin Historic Preservation Plan. If you do (and the Plan is approved by all parties), you must be willing to accept the determinations made by Dr. Newell Wright, AFDTC/EMPH, concerning the historical significance of a property. Such a decision would also require more discussions to ensure everyone understands who has what authority and responsibility.

4. We discussed the boundary lines for Hurlburt. Although neither of us has the authority to establish the actual boundaries, we did agree that the power line is a good indicator of the limits of Hurlburt.

5. We did not address environmental compliance or installation restoration (IRP) programs. The following is my understanding of the responsibilities in these areas. My office still has responsibility (and accountability to both EPA and Air Staff) for the cleanup and closure of the IRP sites which have already been identified. Future sites and their investigation could possibly be handled differently; this needs to be discussed. Your office has responsibility for any compliance issue resulting from Hurlburt activities (for example, air and water permits, hazardous waste disposal, underground storage tank monitoring).

6. If you disagree with my summary of our meeting, I would appreciate a reply. Hopefully in February we will be able to meet again to discuss the other environmental areas.

ORIGINAL SIGNED
F. THOMAS LUBOZYNSKI
Lt Col, USAF, BSC
Director, Environmental Management

TOTAL P.03

APPENDIX G

LAND MANAGEMENT PLAN

Land Management Plan

The proposed mitigation for Hurlburt Field will provide protection, enhancement, and preservation of existing ecological benefits provided by wetland systems on the base. In addition, the mitigation will enhance wetland benefits by re-creating an upland habitat that has been lost due to man's activities. Mitigation will preserve a total of approximately 3,200 acres of the base, or 52% of the total land area. Preservation areas include uplands that enhance the habitat value and long-term viability of the adjacent wetlands. Wetland creation will be accomplished by constructing a 4.3-acre saltmarsh to provide additional compensation for loss of wetland habitat. Further, a land management plan will be implemented to ensure success of the mitigation plan.

In addition to the specific details discussed below, Hurlburt Field will continue to implement an exotic species management plan on all property subject to the mitigation plan. This involves the control of exotic species as its long-term goal.

The mitigation area consists of the following habitat units:

Blackwater Stream

Consists primarily of emergent and floating vegetation along shallower and slower moving sections. Enhancement options are not available for this community. The most beneficial action Hurlburt Field could take to improve this habitat is to continue to implement and enhance an existing stormwater pollution prevention plan in cooperation with the Florida Department of Environmental Protection. No changes are anticipated from the current condition of the community.

Baygall (Enhancement)

Baygall communities have greater variation between units than other communities addressed in this plan. Baygall is used by Florida Natural Areas Inventory (FNAI) as a "catch-all" classification. Baygall communities range from bayhead drainage areas to transitional areas between other communities and flood plain swamp. Most baygall planned for enhancement are drainage areas located between mesic or wet flatwoods and consist of various bay trees, titi, ferns, greenbrair, Ilex spp., poison ivy and wax myrtle. As previously stated, these areas are primarily located between flatwoods communities targeted for a three-year burn cycle. True baygall communities have a 50-100 year fire cycle. We anticipate prescribed fire in these flatwoods areas will stop when reaching the wetter limits of the traditional baygall communities. However, if baygall areas between flatwoods communities have historically been wet flatwoods that have converted to baygall communities due to insufficient fire frequency, the fire will continue through the area. With proper fire frequency restored, the communities will revert to more closely resemble their natural species composition.

With restoration of traditional fire frequencies to adjacent areas, it is anticipated that baygall communities will stabilize to their traditional boundaries. The areas that have traditionally been baygall will change very little and will maintain the same species composition with only a sparser understory. However, the areas that were traditionally wet flatwoods will begin to revert to those communities with a species composition consistent with that community.

Baygall (Presevation)

As previously stated, baygall communities have far more variation between units than other communities addressed in this plan. Baygall is used by FNAI as a "catch-all" classification. The communities range from bayhead drainage areas to transitional areas between other communities and flood plain swamps. The majority of the baygall area to be preserved serves as a transitional zone into a cypress-gum swamp. The area is not conducive to active enhancement measures, and will therefore remain relatively static as far as function and species composition (consists primarily of various bay trees, titi, ferns, greenbrair, Ilex spp., poison ivy and wax myrtle). Primary management activities for these areas are control of exotic/invasive species. Most invasive species located on base can be found within these communities.

The proposed condition of these areas will remain virtually unchanged with the exception of the control of invasive species.

Sand pine (Restoration)

Community consists of sand pine plantation that was planted in 1990. Other species present include bluestem, wiregrass, Ilex spp., goldenrod, and various Quercus spp. Hurlburt Field has established baseline survey data along transects within this area which contain more species-specific information (see attached).

The sandhill restoration area will be considered successful when at least 85 % of the planted trees within the sample area have survived and are providing at least 20% cover, and the percent cover of forbs and shrub species exhibit a dominance of sandhill-indigenous species, and the ground cover exceeds 85%. The fire program within this community will be considered successful when ground cover species diversity increases over baseline conditions and when it is evident that longleaf pine are regenerating. The exotic species eradication program will be ongoing as long as exotics are present. Long term monitoring for this community will insure the area maintains success criteria. Details of this monitoring will be submitted in annual reports to the USACE until expiration of the permit in approximately 10 years. Thereafter, the reports shall be provided to the USACE every three years.

Wet Flatwoods (Enhancement)

Community consists primarily of slash pine overstory with other dominant species present, including sweetbay, sedges, titi, spikerush, gallberry, greenbrair and saw palmetto. Wet flatwoods and mesic flatwoods are closely related in appearance. However, wet flatwoods contain species more adapted to life in hydric soils. Wet flatwoods within the enhancement area have been subjected to various wild and controlled fires in the last five years. Therefore, the areas are not seriously degraded and are currently functioning as viable wet flatwoods. Without the continued assurance of required management provided by the mitigation plan, the area could degrade and become overgrown with a woody understory. Management in this area will include implementation of a burn management plan based on a 3-5 year fire cycle.

With implementation of a burn management plan, the area will continue to function as a viable wet flatwood. Further, many areas will show improvement as fire frequencies approach historic levels. More frequent, periodic fires in the community will result in a reduction of understory (including saw palmetto) and an increase of species in the herbaceous layer.

Wet Flatwoods (Preservation)

Community consists primarily of slash pine overstory with other dominant species present including sweetbay, titi, spikerush, gallberry, greenbrair and saw palmetto. However, wet flatwoods contain species more adapted to life in hydric soils. Due to lack of fire within these areas, a significant understory has developed. Burn management utilizing current methodologies is not a viable option in these areas due to safety concerns. Without a burn management plan for these areas, it is anticipated conditions will remain unchanged. Primary management activities for these areas include control of exotic/invasive species.

The proposed condition of these areas will remain virtually unchanged with the exception of the control of invasive species.

Mesic Flatwoods (Enhancement)

Community consists primarily of longleaf pine overstory with other species present including bluestem, wiregrass, Ilex spp. and various Quercus spp. Hurlburt Field has accomplished a baseline survey along transects within this area which contains more species-specific information. Mesic flatwoods within the enhancement area have been subject to various wild and controlled fires in the past. Therefore, the areas are not significantly degraded and are currently functioning as viable mesic flatwoods. Without the continued assurance of the required management provided by the mitigation plan, the area could degrade and become overgrown with a woody understory. Management in

this area will include implementation of a burn management plan based on a 3-5 year fire cycle.

With implementation of a burn management plan, the area will continue to function as a viable mesic flatwood. Further, many areas will show improvement as ideal fire frequencies are achieved. More frequent, periodic fires in the community will result in a reduction of understory (including saw palmetto) and an increase of species in the herbaceous layer.

Mesic Flatwoods (Preservation)

Community consists primarily of longleaf pine overstory with other species present including bluestem, wiregrass, Ilex spp., goldenrod, and Quercus spp. Due to lack of fire within this area, a significant understory has developed. Burn management, utilizing current methodologies is not a viable option in this area due to safety concerns.

Without the introduction of fire in these areas, it is anticipated conditions will remain unchanged. Primary management activities for these areas consist of control of exotic/invasive species.

Cypress-Gum Swamp

Community consists primarily of pond cypress, tupelo gum, slash pine, titi, and red maple. This community will be managed through preservation and control of exotic species. The area is currently a functional productive community with little improvement needed. Hurlburt Field personnel have identified sparse Chinese tallow along the fringe of the community and are working to insure the tallow does not spread further into the community.

The proposed condition of these areas will remain virtually unchanged with the exception of the control of invasive species.

Cypress Dome Swamp

Community consists primarily of pond cypress, slash pine, St. John's wort, myrtle holly, wiregrass, hatpins, and white-topped pitcher plants. The dominant species within the community is pond cypress with a herbaceous layer of wiregrass. Fire is essential for maintenance of a cypress dome community. Without frequent fire, hardwood invasion and peat accumulation would likely result in an eventual conversion to bottomland forest or bog.

Fire frequency and intensity varies greatly from the periphery of the dome to the center. Frequency near the periphery is similar to adjacent flatwoods at 3-5 years. Near the

center of some of the larger ponds, the fire cycle may approach 100 years. Management of these areas will be integrated with the adjacent flatwoods areas and incorporated into the burn management of those areas. Fire will be allowed to enter dome swamps when the adjacent flatwoods areas are burned. Fire will be allowed to naturally extinguish upon reaching the more moist areas of the community. After several burn events, monitoring should indicate a reduction in hardwoods around dome perimeters and increased herbaceous vegetation on pond bottoms.

General Habitat Types

General Habitat Type	Management Activity	Approx. Acres	Existing Dominant Species by Vegetative Layer	Target Dominant Species by Vegetative Layer
Mesic Flatwoods Enhancement	Burn on 3-5 year cycle; control invasive species	101	Canopy—Longleaf Pine Understory—Gallberry, Oaks Groundcover—Saw Palmetto, Gallberry, Blueberry sp., Bluestem, Wiregrass, Bluestem,	Canopy—Longleaf Pine Understory—Sparse Oak Groundcover—Saw Palmetto, Gallberry, Blueberry sp., and Wiregrass
Mesic Flatwoods Preservation	Preserve area; control invasive species	405	Canopy—Longleaf Pine Understory—Gallberry, Oaks Groundcover—Saw Palmetto, Gallberry, Blueberry sp., and Wiregrass, Bluestem,	Canopy—Longleaf Pine Understory—Gallberry, Oaks Groundcover—Saw Palmetto, Gallberry, Blueberry sp., and Wiregrass, Bluestem,
Sand Pine Hill	Handcut sandpine; repant longleaf; Burn on 2-5 year cycle; control invasive species	111	Canopy—Sand Pine Understory—Sand/Longleaf Pine, Ilex spp. and Quercus spp. Groundcover—Bluestem, Wiregrass, Beardgrass sp., Goldenrod and Wild Rosemary	Canopy—Longleaf Pine Understory—Longleaf Pine and Quercus spp. Groundcover— Bluestem, Wiregrass, Bracken Fern, Beardgrass sp., Goldenrod and Wild Rosemary
Domc Swamp	Allow fire to burn into areas if possible when burning surrounding flatwoods on 3-5 year cycle; control invasive Species	132	Canopy - Pond Cypress and Slash Pine Understory—Slash Pine, Myrtle Holly, and St. John's Wort Groundcover—Wiregrass, Hat Pins, and White-top Pitcherplant	Canopy—Pond Cypress and Slash Pine Understory—Slash Pine, Myrtle Holly, and St. John's Wort Groundcover—Wiregrass, Hat Pins, and White-top Pitcher Plant

Cypress-Gum Swamp	Preserve area; control invasive species	1,727	Canopy—Pond Cypress, Tupelo sp., Gum and Slash Pine Understory—Black Titi, Red Maple, Sweetbay, and Miscellaneous Shrubs Groundcover—None (Flooded)	Canopy—Pond Cypress, Tupelo sp., Gum and Slash Pine Understory— Black Titi, Red Maple, Sweetbay, and Miscellaneous Shrubs Groundcover—None (Flooded)
Wet Flatwoods Enhanccmcnt	Burn on 3-5 year cycle; control invasive species	101	Canopy—Slash Pine, Longleaf Pine Understory—Myrtle Holly, Fetter-bush, Slash Pine, Bamboo-Vine, and Black Titi Groundcover—Hat Pins, St. John's Wort sp., Greenbrier spp., Fern sp., Clubmoss, Ilex spp. and Wiregrass	Canopy—Slash Pine, Longleaf Pine Understory— (sparse) Fetter-bush, Slash Pine, Bamboo-Vine, and Black Titi Groundcover—Hat Pins, St. John's Wort sp., Greenbrier spp., Fern sp., Clubmoss, Ilex spp. and Wiregrass
Wet Flatwoods Preservation	Preserve area; control invasive species	405	Canopy—Slash Pine, Longleaf Pine Understory—Myrtle Holly, Fetter-bush, Slash Pine, Bamboo-Vine, and Black Titi Groundcover—Hat Pins, St John's Wort, Greenbrier spp., Wiregrass, Fern sp., Ilex spp., Clubmoss and St. John's Wort	Canopy—Slash Pine, Longleaf Pine Understory—Myrtle Holly, Fetter-bush, Slash Pine, Bamboo-Vine, and Black Titi Groundcover—Hat Pins, St. John's Wort, Wiregrass, Greenbrier spp., Fern sp., Ilex spp., and Clubmoss
Scrubby Flatwoods Scrubby	Burn on 8-25 year cycle; control invasive species	20	Canopy—Longleaf Pinc Understory—Ilex sp., Oak Groundcover—Saw Palmetto, Gopher Apple, Lichens, Frostweed, Blueberry sp., and Wiregrass	Canopy—Longleaf Pine Understory— Ilex sp., oak Groundcover—Saw Palmetto, Gallberry, Blueberry sp., and Wiregrass

Flatwoods Cont.					
Wet Prairie	Burn on 3-5 year cycle; control invasive species	12	Canopy—none Understory—Wax Myrtle, St. John's Wort Groundcover—Wiregrass, Toothache Grass, Sundews, Picture Plants, Spikerush and Beakrush	Canopy—none Understory— (sparse) Wax Myrtle, St. John's Wort Groundcover—Wiregrass, Toothache Grass, Spikerush and Beakrush
Baygall Preservation	Preserve area; control invasive species	466	Canopy—Tupelo sp., Gum Understory—Black Titi, Red Maple, Sweetbay, and Miscellaneous Shrubs Groundcover— Bullbrier, Fern, Beardgrass, and Sedge sp.	Canopy—Tupelo sp., Gum Understory—Black Titi, Red Maple, Sweetbay, and Miscellaneous Shrubs Groundcover— Bullbrier, Fern, Beardgrass, and Sedge sp.
Baygall Enhancement	Burn on 3-5 year cycle; control invasive species	97	Canopy—Tupelo sp., Gum, Bay Understory—Black Titi, Red Maple, Sweetbay, and Miscellaneous Shrubs Groundcover— Bullbrier, Fern, Beardgrass, and Sedge sp.	Canopy—Tupelo sp., Gum, bay Understory—Black Titi, Red Maple, Sweetbay, and Miscellaneous Shrubs Groundcover— Bullbrier, Fern, Beardgrass, and Sedge sp.

Land Management Unit (LMU) Descriptions

(Reference With Attached LMU Map)

Land Management Unit	Current Dominant Use/ Vegetative Cover	Projected Dominant Use	Planned Management Activities
AF-1	Airfield • Mowed turf primarily composed of Pensacola bahia grass with mixed weeds/forbes.	Airfield • Mowed turf primarily composed of Pensacola bahia grass with mixed weeds/forbes.	Evaluate feasibility of irrigating bahiagrass cover near runways with treated wastewater to reduce "blowouts" and airborne sand/soil that could impact aircraft operations. Evaluate mowing practices to reduce bahiagrass seedhead formation and grasshopper proliferation while maintaining overall height to discourage foraging birds. Test the use of *Nosema locustae* as a long-term grasshopper control agent on the airfield. Naturalize areas adjacent to Independence Road with native wildflower mixes.
BG-1	Baygall/Pine Flatwoods • Canopy—Longleaf Pine • Understory—Gallberry, Bamboo-Vine, Black Titi, Chinese Tallow Tree • Groundcover—Wiregrass, Saw Palmetto, Gallberry, Cogon Grass	Baygall/Pine Flatwoods	Maintain as buffer area. Continue control of exotic invasive plant species such as Chinese tallow tree, and cogon grass.
BG-2	Baygall/Pine Flatwoods • Southern Magnolia, Pine, and Sweetbay	Baygall/Pine Flatwoods	Maintain as a natural buffer zone; preserve wetlands. Continue invasive plant control efforts. No prescribed burning or clearing.
BG-3	Baygall/Wet Flatwoods • Longleaf Pine, Wax Myrtle, Sweetbay, Southern Magnolia, Chinese Tallow Tree, Pond Cypress, and Laurel Oak	Baygall/Wet Flatwoods	Maintain as natural wetland area. Naturalize areas along Cody Avenue with native wildflower mixes. No prescribed burning. Physical and herbicidal control of Chinese tallow.

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Land Management Unit	Current Dominant Use/ Vegetative Cover	Projected Dominant Use	Planned Management Activities
BG-4	Baygall/Wet Flatwoods • Canopy—Slash Pine • Subcanopy—Southern Magnolia, Southern Red Cedar, and Live Oak • Understory—Sweetbay • Groundcover—Chain Fern and Rushes	Baygall/Wet Flatwoods	Maintain most of unit as unique natural area; interpretive nature trail through this unit may be expanded. Shoreline stabilization through installation of a cordgrass salt marsh along a portion of Santa Rosa Sound. Naturalize areas along Independence Road, O'Neil Street, and U.S. 98 with native wildflower mixes. No prescribed burning or clearing.
BG-5	Bay gall/Wet Flatwoods • Canopy—Longleaf Pine • Understory—Gallberry • Groundcover—Wild Rosemary and Bracken Fern	Baygall/Wet Flatwoods	Maintain most of unit as natural area and buffer along east side of installation; scattered populations of Curtiss' sand grass and netted chain fern present. No prescribed burning or clearing.
CD-1	Cypress Dome • Canopy—Slash Pine • Understory—Pond Cypress, Myrtle Holly, St. John's Wort, Black Titi • Groundcover—Sparse (Fern)	Cypress Dome	Maintain wetland habitat for wildlife; Curtiss sand grass surrounds eastern half of wetland. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.
CD-2	Cypress Dome • Canopy—Slash Pine and Pond Cypress • Understory—St. John's Wort and Pond Cypress • Groundcover—White-Top Pitcherplant and Hat Pins	Cypress Dome	Maintain cypress dome wetland; Curtiss' sand grass occurs along western perimeter; white-top pitcherplant occurs throughout central portion of wetland. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.
CD-3	Cypress Dome • Canopy—None • Understory—St. John's Wort, Myrtle Holly, and Bamboo-Vine • Groundcover—Hat Pins and St. John's Wort	Cypress Dome	Maintain shrub wetland; suitable habitat for flatwoods salamander; Curtiss' sand grass encircles entire wetland. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.
CD-4	Cypress Dome • Canopy—Slash Pine • Understory—St. John's Wort, Black Titi, and Bamboo-Vine • Groundcover—None (Flooded)	Cypress Dome	Maintain cypress dome wetland; Curtiss' sand grass and white-top pitcherplant occur along northwest perimeter. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.

Land Management Unit	Current Dominant Use/ Vegetative Cover	Projected Dominant Use	Planned Management Activities
CD-5	Cypress Dome • Canopy—Slash Pine and Pond Cypress • Understory—Myrtle Holly, St. John's Wort, and Pond Cypress • Groundcover—Hat Pins and Miscellaneous Herbs	Cypress Dome	Maintain cypress dome wetland; Curtiss' sand grass occurs along northeast and south perimeter; flatwoods salamander habitat. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.
CD-6	Cypress Dome • Canopy—Slash Pine • Subcanopy—Pond Cypress • Understory—St. John's Wort and Myrtle Holly • Groundcover—Wiregrass	Cypress Dome	Maintain cypress dome wetland; white-top pitcherplant and Curtiss' sand grass occur along most of eastern perimeter, Chapman's butterwort present. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.
CD-7	Cypress Dome • Canopy—Pond Cypress • Understory—Pond Cypress, Myrtle Holly, and St. John's Wort • Groundcover—Hat Pins	Cypress Dome	Maintain cypress wetland; Curtiss' sand grass occurs around most of wetland perimeter; flatwoods salamanders have bred here. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.
CD-8	Cypress Dome • Canopy—Slash Pine • Understory—St. John's Wort • Groundcover—Wiregrass and White-Top Pitcherplant	Cypress Dome	Maintain shrub wetland; white-top pitcherplant occurs nearly throughout entire wetland. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.
CD-9	Cypress Dome • Canopy—Slash Pine • Subcanopy—Pond Cypress • Understory—St. John's Wort and Myrtle Holly • Groundcover—Wiregrass	Cypress Dome	Maintain cypress dome wetland; white-top pitcherplant and Curtiss' sand grass occur along most of eastern perimeter, Chapman's butterwort present. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.
CD-10	Cypress Dome • Canopy—Slash Pine • Understory—St. John's Wort, Myrtle Holly, and Bamboo-Vine • Groundcover—Wiregrass and Hat Pins	Cypress Dome	Maintain shrub wetland; suitable habitat for flatwoods salamander; grass pink; Curtiss' sand grass and Chapman's butterwort surround wetland. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.

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Land Management Unit	Current Dominant Use/ Vegetative Cover	Projected Dominant Use	Planned Management Activities
CD-11	Cypress Dome • Canopy—Slash Pine • Subcanopy—Pond Cypress • Understory—St. John's Wort and Myrtle Holly • Groundcover—Hat Pins and Wiregrass	Cypress Dome	Maintain cypress/shrub wetland; Chapman's butterwort occurs along the northwest perimeter of wetland; Curtiss' sand grass surrounds most of wetland; flatwoods salamander habitat. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.
CD-12	Cypress Dome • Canopy—Pond Cypress and Slash Pine • Understory—Myrtle Holly, St. John's Wort, and Bamboo-Vine • Groundcover (Sparse)—Flooded	Cypress Dome	Maintain cypress wetland; Curtiss' sand grass occurs along north and southeast edges of wetland; parrot pitcherplant, white-top pitcherplant and Chapman's butterwort occur along western edge of wetland. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.
CD-13	Cypress Dome • Canopy—Pond Cypress and Slash Pine • Understory—Pond Cypress and St. John's Wort • Groundcover (Sparse/Flooded)—Grass sp.	Cypress Dome	Maintain cypress wetland; Curtiss' sand grass and white-top pitcherplant occur around most of wetland perimeter; parrot pitcherplant occurs along north and west wetland edges; Chapman's butterwort occurs throughout most of wetland. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.
CD-14	Cypress Dome/Swamp/Mesic Flatwoods • Canopy—Slash Pine and Pond Cypress • Understory—St. John's Wort and Myrtle Holly • Groundcover—Sedges, Hatpins, Wiregrass, White-top Pitcherplant, and Beakrush	Cypress Dome/Swamp/Mesic Flatwoods	Maintain cypress dome, swamp, and mesic flatwoods complex. Suitable habitat for flatwoods salamander, white-top pitcherplant, and Chapman's butterwort. Area will be subject to prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.
CS-1	Cypress-Gum Swamp • Canopy—Pond Cypress and Tupelo sp. • Understory—Fetter-Bush and Miscellaneous Shrubs • Groundcover—Poison Ivy and Sedge sp.	Cypress-Gum Swamp	Maintain cypress-gum swamp as wildlife habitat, floodwater reservoir, and aquifer recharge area; netted chain-fern occurs along southern edge of unit. Permit natural fire regime except to protect installation assets.

Land Management Unit	Current Dominant Use/ Vegetative Cover	Projected Dominant Use	Planned Management Activities
CS-2	Cypress-Gum Swamp • Canopy—Pond Cypress and Slash Pine • Understory—Slash Pine, Myrtle Holly, and St. John's Wort • Groundcover—Wiregrass, Hat Pins, and White-Top Pitcherplant	Cypress-Gum Swamp	Maintain as natural area for populations of white-top pitcherplant, rose pogonia, and rosebud orchid. No prescribed burning or clearing.
CS-3	Cypress-Gum Swamp • Canopy—Pond Cypress and Slash Pine • Understory—Myrtle Holly and St. John's Wort	Cypress-Gum Swamp	Maintain as natural buffer area and functioning wetland in the airfield area. No prescribed burning or clearing.
FW-1	Flatwoods • Canopy—Longleaf Pine • Understory—Gallberry • Groundcover—Saw Palmetto, Wild Rosemary, Wiregrass, and Wicky	Flatwoods	Maintain most of unit as natural habitat areas for rare species; grass pink, grass-leaf ladies tresses occurs south of CD-10; rosebud orchid occurs east of CD-11 and west of SI-1; Curtiss' sand grass and white-top pitcherplant occur northeast of CD-10; Bachman's sparrow occurs west of CD-2 and southwest of west of SI-1; upland areas bordering the installation's southern boundary may be developed. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions. The lowest impact firebreaks will be used for fire suppression. Plow lines will be avoided. Monitor species compositions along transects A and E as described in the Sandhill Restoration Monitoring Project.
FW-2	Flatwoods • Canopy—Slash Pine and Pond Cypress • Subcanopy—Pond Cypress • Understory—Black Titi and St. John's Wort • Groundcover—Hat Pins and Yellow-Eyed Grass sp.	Flatwoods	Maintain much of unit in natural state; Curtiss' sand grass occurs along wetland edges; white-top pitcherplant, parrot pitcherplant, and Chapman's butterwort occur throughout wetland; wetlands may be a constraint to development. Area will be subject to periodic prescribed burns under conditions described for FW-1
FW-3	Flatwoods • See FW-2 above.	Flatwoods	Maintain similarly to FW-2. Prescribed burns may be used in this LMU.

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Land Management Unit	Current Dominant Use/ Vegetative Cover	Projected Dominant Use	Planned Management Activities
FW-4	Flatwoods • Southern Magnolia, Longleaf Pine, Chinese Tallow, Yaupon, and Wax Myrtle	Flatwoods	Maintain natural areas as buffer zones around recreation areas; preserve wetlands. Control Chinese tallow trees and other invasives with mechanical removal and herbicidal treatments. No prescribed burning in this LMU.
FW-5	Flatwoods/Cypress Domes • Canopy—Longleaf Pine and Slash Pine • Understory—Gallberry, Black Titi, Fetter-Bush, and Wild Rosemary • Groundcover—Saw Palmetto, Wiregrass, Huckleberry sp., and Bracken Ferns • Scattered Small Cypress Domes • Canopy—Pond Cypress, Tupelo sp., and Slash Pine • Understory—Black Titi, Red Maple, Sweetbay Myrtle Holly, Fetter-bush, Bamboo-Vine and Greenbrier spp. • Groundcover—Hat Pins and Wiregrass Fern sp., Clubmoss, White-Top Pitcherplant, Bamboo-Vine, and St. John's Wort sp.	Flatwoods/Cypress Domes	Maintain as natural buffer zone around cypress domes as wildlife habitat and natural area; white-top pitcherplant occurs throughout wetland; parrot pitcherplant is occasional in wetland, flatwoods salamander habitat. Maintain cypress dome wetland as wildlife habitat and natural area. White-top pitcherplant occurs throughout wetland. Area will be subject to periodic prescribed burns. Fire intensity to be determined by existing natural hydrologic conditions.

Land Management Unit	Current Dominant Use/ Vegetative Cover	Projected Dominant Use	Planned Management Activities
FW-6	Flatwoods/Scattered Cypress Domes/Sand Hills • Canopy—Longleaf Pine • Understory—Gallberry • Groundcover—Wild Rosemary and Bracken Fern • Canopy—Slash Pine • Understory—Fetter-Bush, Grape sp., Black Titi, and Sawbrier • Groundcover—Sparse • Canopy—None • Understory—Turkey Oak, Longleaf Pine, Sand Live Oak, and Gallberry • Groundcover—Wild Rosemary, Bracken Fern, Saw Palmetto, and Beardgrass sp.	Flatwoods/Scattered Cypress Domes/Sand Hills • New dormitories, dining hall, fitness facilities, etc. planning and under construction south of Loop Road. Planned expansion of Commando Village housing into flatwoods areas south and west of the existing housing development.	Maintain areas outside of planned development as natural areas and buffers along east side of installation; scattered populations of Curtiss' sand grass and netted chain fern occur; upland areas bordering industrial units may be further developed. Survey for flatwoods salamander prior to developing natural areas. Naturalize areas adjacent to Golf Course Road and Independence Road with native wildflower mixes.
FW-7	Flatwoods • Canopy—Slash Pine • Understory—Black Titi, Gallberry, Fetter-bush, Bamboo-Vine, Loblolly Bay, and Blueberry sp. • Groundcover—Wiregrass, Bracken Fern, Beardgrass, and Beakrush	New Access Road to EOD and Additional Family Housing	Document all projects through the EIAP, insure proper environmental permitting (including wetland permitting) for all projects. Implement best management practices to prevent erosion from construction sites.
GC-1	Golf Course • Highly managed turf (bermudagrass), trees, shrubs, and scattered longleaf pine.	Golf Course	Minimize fertilizer and pesticide use through implementation of integrated pest management practices. Improve irrigation system efficiency. Pursue certification through the New York Audubon Society's program.
IM-1	Improved Main Cantonment Areas • Mowed turf, landscape trees, and scattered small remnants of natural vegetation surrounding installation facilities.	Main cantonment areas with continuous demolitions, renovations, and new construction as detailed in the Long-Range Facilities Development Plan.	Continue implementing the Hurlburt Field Landscape Development Plan. Document all projects through the EIAP, insure proper environmental permitting for all projects, implement hest management practices to prevent erosion from construction sites.

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Land Management Unit	Current Dominant Use/ Vegetative Cover	Projected Dominant Use	Planned Management Activities
IM-2	Improved Military Family Housing and Marina Area • Highly managed turf, trees, and ornamentals.	Improvements to military family housing and new marina facility.	Construct new marina facility at the location of the current marina. Ensure all actions are addressed through EIAP with regulatory agency coordination.
IM-3	Improved Recreational, Unaccompanied Housing and Community Services • Landscaped Areas with Live Oak, Southern Magnolia, S. Red Cedar, Slash Pine, Loquat, Laurel Oak, Longleaf Pine, Weeping willow, Hickory, Butia Palm, Sabal Palm, and Bahia Grass Turf	Conference Center/Hotel	Ensure compliance with EIAP and all required regulatory agency coordination. Preserve existing vegetation to the maximum extent possible and maintain a buffer along Santa Rosa Sound. Encourage naturalization of landscape vegetation through natural succession of wooded areas and planting of native wildflowers and grasses in open areas.
IM-4	Improved Commando Village Housing • Military family housing with moderately to highly managed turf, trees, and ornamentals. Numerous specimen trees from pre-development.	Military family housing with moderately to highly managed turf, trees, and ornamentals. Numerous specimen trees from pre-development.	Modify road network to accommodate additional military family housing immediately south and west of the existing housing. Provide least-toxic pest management guidance and materials to housing occupants through the self-help program. Protect populations of Curtiss' sand grass
MH-1	Maritime Hammock (Open Space Grassy Area Adjacent to U.S. 98) • Canopy—Live Oak, Southern Red Cedar, and Southern Magnolia • Understory—Sparkleberry and Yaupon • Groundcover—Bullbrier and Yaupon	Additional Officer Housing	Preserve as much tree cover as possible. Leave a vegetative buffer between Santa Rosa Sound and any new housing.
MH-2	Maritime Hammock • Canopy—Loblolly Pine (Also Live Oak and Southern Magnolia on East Side) • Subcanopy—Southern Magnolia and Sweetbay • Understory—Southern Magnolia (East Side of Stand is Cleared of Understory and is Mowed) • Groundcover—Virginia Creeper, Yaupon, and Poison Ivy	Maritime Hammock	Maintain as a unique natural area and buffer zone. No prescribed burning or clearing.

Land Management Unit	Current Dominant Use/ Vegetative Cover	Projected Dominant Use	Planned Management Activities
MH-3	Famcamp Location/Maritime Hammock • Canopy—Loblolly Pine and Live Oak • Subcanopy—Southern Magnolia, Southern Red Cedar, and Live Oak • Understory—Southern Magnolia and Myrtle sp. • Groundcover—Muscadine Grape and Virginia Creeper	Famcamp Expansion and Paint Ball Area	Preserve as much tree cover as possible – especially live oaks and southern magnolia.
MH-4	Maritime Hammock • Canopy—Loblolly Pine and Live Oak • Subcanopy—Southern Magnolia, Southern Red Cedar, and Live Oak • Understory—Southern Magnolia and Myrtle sp. • Groundcover—Muscadine Grape and Virginia Creeper	Natural area with nature trail and outdoor environmental education facility. Gravel off-loading facility.	Close group picnic area and naturalize. Maintain a selected site within the existing picnic area to use as a low-impact outdoor environmental education facility. Evaluate possible restoration of the picnic area to maritime hammock. Complete the existing nature trail as a loop back to the Famcamp area. Preserve existing natural areas to the maximum extent possible.
MH-5	Maritime Hammock • Canopy—Loblolly Pine and sand Pine • Subcanopy—Sweetbay, Live Oak, and Southern Magnolia • Understory—Yaupon, Myrtle sp., Southern Red Cedar, Sand Live Oak, and Sparkleberry • Groundcover—Saw Palmetto, Fetter-Bush, Bracken Fern, Wild Rosemary, and Muscadine Grape	Maritime Hammock	Maintain as unique natural area bordering Santa Rosa Sound.

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Land Management Unit	Current Dominant Use/ Vegetative Cover	Projected Dominant Use	Planned Management Activities
SI-1	Semi Improved Portion of EOD Area and Old Landfill • Canopy—None • Understory—Slash Pine and Myrtle sp. • Groundcover—Blackberry sp., Wild Rosemary, Bullbrier, Beardgrass, and Sedge sp. • Some Disturbed Areas Devoid of Vegetation	Continued EOD Usage and Buffer Area	Maintain sandhill and herbaceous wetland north of road in semi-natural condition for wildlife; disturbed sandhill south of road is maintained as EOD area. Control cogon grass.
SI-2	Semi Improved EOD Storage	EOD Storage	Preserve scattered areas of Curtiss' sand grass, netted chain-fern, white-top pitcherplant, and parrot pitcherplant within the southernmost section of the unit.
SI-3	Semi Improved • Open Space—Buffer • Canopy—Slash Pine and Longleaf Pine • Understory—Yaupon, Sand Live Oak, and Live Oak • Groundcover—Saw Palmetto, Gallberry, Wiregrass, and Bullbrier	Open Space and New Family Housing in the Eastern Portion of the LMU	Document all aspects of any construction projects within the LMU through the EIAP, insure proper environmental permitting for all projects, implement best management practices to prevent erosion from construction sites.
SI-4	Semi Improved See SI-3	New Family Housing	Document all projects through the EIAP, insure proper environmental permitting for all projects, implement best management practices to prevent erosion from construction sites.
SI-5	Semi Improved • Open Space—Buffer • Canopy—Longleaf Pine and Slash Pine • Subcanopy—Black Titi (Wet Areas Only) • Understory—Turkey Oak, Gallberry, Fetter-Bush (Wet Areas Only) • Groundcover—Saw Palmetto, Wild Rosemary, Wiregrass, Sand Live Oak, Bracken Fern, and Bullbrier	New Access Road to EOD and Additional Military Family Housing	Document all projects through the EIAP, insure proper environmental permitting (including wetland permitting) for all projects. Implement best management practices to prevent erosion from construction sites.

Land Management Unit	Current Dominant Use/ Vegetative Cover	Projected Dominant Use	Planned Management Activities
SI-6	Semi Improved • Open Space/Old Sandy Dredge Spoil with Some Sparse Beach/Dune Vegetation • Live Oak, Southern Magnolia, Longleaf Pine, Laurel Oak, Slash Pine, and S. Red Cedar	Rental Cabins, Picnic Area, and Other Outdoor Recreational Facilities	Preserve as much existing vegetation as possible, revegetate disturbed areas with native species and protect adjacent Santa Rosa Sound with a buffer.
SI-7	Semi Improved Clear Zone/Bahiagrass-Dominated Turf	Clear Zone/Bahiagrass-Dominated Turf	Continue current mowing practices
SI-8	Semi Improved Sewage treatment with some associated improved turf landscape ornamentals and remnant bald cypress trees.	Sewage treatment with some associated improved turf landscape ornamentals and remnant bald cypress trees.	Maintain in current condition. Develop borrow pit pond into a fishing resource for youth.
SP-1	Sand Pine • Canopy—None • Understory—Slash Pine and sand Pine • Groundcover—Wiregrass, Bracken Fern, Beardgrass sp., and Wild Rosemary	Restored Longleaf Pine/Wiregrass Community	Reforestation with longleaf pine; prescribed burns, encourage re-establishment of longleaf pine, and to maintain populations of Curtiss' sand grass bordering wetlands; forage areas for wildlife. Protect flatwoods salamander habitat.
SP-2	Sand Pine • Canopy—None • Understory—Sand Pine and Gallberry • Groundcover—Wild Rosemary, Wiregrass, and Beardgrass sp.	Restored Longleaf Pine/Wiregrass Community	Reforestation with longleaf pine; prescribed burns, encourage re-establishment of longleaf pine, and to maintain populations of Curtiss' sand grass bordering wetlands; forage areas for wildlife.
SP-3	Sand Pine Canopy—Sand Pine and Slash Pine	Vegetated Buffer between US 98 and Maritime Hammock Recreational Areas and Santa Rosa Sound	Maintain as vegetative buffer.
SP-4	Sand Pine Canopy—Sand Pine and Slash Pine	Vegetated Buffer between US 98 and Maritime Hammock Recreational Areas and Santa Rosa Sound	Maintain as vegetative buffer.

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