INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN UPDATE

For the

SNAKE CREEK WEEKEND TRAINING SITE
Miramar, Broward County, Florida

FLORIDA ARMY NATIONAL GUARD

2018

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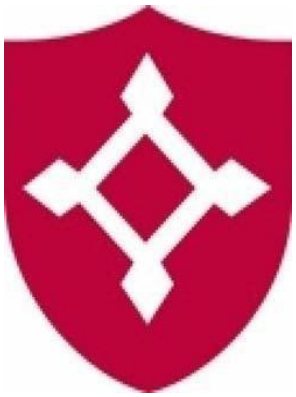

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SIGNATURE PAGE

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
SNAKE CREEK WEEKEND TRAINING SITE
BROWARD COUNTY, FLORIDA

This Integrated Natural Resources Management Plan (INRMP) meets the requirements for INRMPs as specified in the Sikes Act, as amended (16 USC §670a et seq.). It has set appropriate and adequate guidelines for conserving and protecting the natural resources of the Snake Creek Weekend Training Site.

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EXECUTIVE SUMMARY

This Integrated Natural Resources Management Plan (INRMP) Update has been developed for the Florida Army National Guard (FLARNG) Snake Creek Weekend Training Site (SCWTS). The SCWTS encompasses approximately 290 acres and is located in Miramar, Broward County, Florida. The FLARNG has leased the site from the Department of Army since October 1980.

This INRMP Update has been prepared in accordance with the provisions of the Sikes Act (16 USC 670a et. seq.), AR 200-1 –-Environmental Protection and Enhancement, and Department of Defense Instruction 4715.03. The purpose of this INRMP is to ensure that natural resource conservation measures and military activities on mission lands are integrated and consistent with Federal stewardship requirements.

The primary purpose of the SCWTS is to support the military mission of the FLARNG. The INRMP is designed to support and accommodate implementation of the military missions while providing for natural resources stewardship and management. Specific goals identified by the INRMP are:

- **Goal 1:** Manage natural resources at the SCWTS to sustain lands adequate for military training consistent with essential agency function and the military mission.
- **Goal 2:** Eradicate and/or control invasive species and restore natural communities at the SCWTS. This may be accomplished in part by developing partnerships with Federal, State, regional, and local entities.
- **Goal 3:** Manage natural resources at the SCWTS to enhance the propagation of native fish and wildlife consistent with essential agency function and the military mission.
- **Goal 4:** Prevent degradation of surface waters and groundwater by activities at the SCWTS.
- **Goal 5:** Ensure that all biological resources at the SCWTS are appropriately inventoried and managed.

Projects that support these goals are designed to ensure continued successful natural resources management while implementing military mission requirements. The general philosophies and methodologies used throughout the FLARNG's natural resources management program are focused on conducting doctrinally required military training while maintaining ecosystem viability.

This INRMP Update provides a description of the installation (e.g. location, history and mission), information regarding the on-site and adjacent physical and biotic environment, and an assessment of the management strategy and proposed changes to the site to improve the military training capabilities of the site while enhancing the natural environment. Included within the INRMP Update are recommendations for various management practices designed to enhance the natural resource base and improve the training capabilities of the SCWTS.

Additionally, this INRMP Update presents methods that will increase the environmental awareness of FLARNG personnel, guest units using the SCWTS for training, and the general public. Implementation of this INRMP Update at the SCWTS will also promote adaptive stewardship practices that sustain ecosystem and biological integrity while providing for multiple uses of natural resources. Successful implementation will ensure the installation's long-term viability, sustainability, and value as a U.S. military training site. Concurrently, this INRMP

Update complies with applicable Army and Department of Defense policies, as well as applicable Federal, State and local mandates.

In accordance with the National Environmental Policy Act of 1969 (NEPA), the expenditure of federal funds for overall implementation of INRMP-related activities requires an analysis of potential effects to environmental resources, as a result of activities related to those Federal funding expenditures.

The SCWTS has been analyzed in association with three previous NEPA Environmental Assessment (EA) documents: 1.) "Final Florida Army National Guard Environmental Assessment, Construction of a Multi-Unit Armory at the Snake Creek Weekend Training Site (May 2005)", 2.) "Integrated Natural Resources Management Plan and Environmental Assessment 2006– 2010", and 3.) "Environmental Assessment for Enhanced Use Lease of the Northern Parcel of the Snake Creek Weekend Training Site for Private/Public Uses (August 2007)". All three EAs resulted in Findings of No Significant Impact (FNSI), included in Appendix 3.

If a previous environmental analysis (i.e. Environmental Assessment) is sufficient to cover the scope of other similar and/or future activities, then the NEPA allows one to tier off of that original environmental analysis. The FLARNG has determined that the original 2006-2010 INRMP EA, in addition to the two other aforementioned EAs are sufficient to cover activities proposed under this INRMP Update; therefore, another NEPA EA is not warranted for implementation of the INRMP Update. As such, an Army National Guard Environmental Checklist and Record of Environmental Consideration are attached in support of this determination, see Appendix 3.

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ACRONYMS AND ABBREVIATIONS

AR	Army Regulation
ATAG	Assistant to the Adjutant General
BGS	Below Ground Surface
CEQ	Council on Environmental Quality
CFMO-ENV	Construction and Facilities Management Office Environmental Division
CFR	Code of Federal Regulations
CWA	Clean Water Act
DA	Department of the Army
DMA	Department of Military Affairs
DOD	Department of Defense
DODI	Department of Defense Instruction
DUSD	Department of the Under Secretary of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMS	Environmental Management System
EO	Executive Order
EQR	Environmental Quality Report
FDEP	Florida Department of Environmental Protection
FEMA	Federal Emergency Management Agency
FGS	Final Governing Standards
FIRM	Flood Insurance Rate Map
FLARNG	Florida Army National Guard
FLEPPC	Florida Exotic Pest Plant Council
FTX	Field Training Exercises
FWCC	Florida Fish and Wildlife Conservation Commission
G-4	Deputy Chief of Staff for Logistics
GIS	Geographic Information System
IFC	Integrated Fire Control
INRMP	Integrated Natural Resources Management Plan
ISO	International Standards Organization
ITAM	Integrated Training Area Management
MOUT	Military Operations on Urbanized Terrain
MSL	Mean Sea Level
NCDC	National Climatic Data Center
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRM	Natural Resources Manager
PLS	Planning Level Survey
SAIA	Sikes Act Improvement Act
SCWTS	Snake Creek Weekend Training Site
SEARCH	Southeastern Archaeological Research, Inc.
SFRPC	South Florida Regional Planning Commission
SFWMD	South Florida Water Management District
SRP	Sustainable Range Planning
T&E	Threatened and Endangered
TAG	The Adjutant General
TOC	Tactical Operation Center
TSC	Training Site Commander

USACE	United States Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WQC	Water Quality Certification
YBP	Years Before Present

1.0 General information

1.1 Purpose

This Integrated Natural Resources Management Plan (INRMP) has been developed for use by the National Guard Bureau (NGB) and the Florida Army National Guard (FLARNG) as the primary tool for managing natural resources within the FLARNG's Snake Creek Weekend Training Site (SCWTS). This is an INRMP Update developed for the SCWTS, rather than a revision, because no significant changes in natural resource management strategies are planned or anticipated. The FLARNG's SCWTS encompasses approximately 290 acres and is located in Miramar, Broward County, Florida, just north of the Dade County line in Section 36 of Township 51 South, Range 40 East (**Appendix 1: Figures 1-1 & 1-2**).

The purpose of this INRMP is to ensure that natural resource conservation measures and military activities on mission land are integrated and consistent with Federal stewardship requirements. In accordance with the Sikes Act Improvement Act (SAIA), this INRMP:

"shall, to the extent appropriate and applicable, provide for:

A) Fish and wildlife management, land management, forest management, and fish- and wildlife-oriented recreation;

B) Fish and wildlife habitat enhancement or modifications;

C) Wetland protection, enhancement, and restoration, where necessary for support of fish, wildlife, or plants;

D) Integration of, and consistency among, the various activities conducted under the plan;

E) Establishment of specific natural resources management goals and objectives and time frames for proposed action;

F) Sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources;

G) Public access to the military installation that is necessary or appropriate for the use described in subparagraph (F), subject to requirements necessary to ensure safety and military security;

H) Enforcement of applicable natural resource laws (including regulations);

I) No net loss in the capability of military installation lands to support the military mission of the installation; and,

J) Such other activities as the Secretary of the military department determines appropriate."

The FLARNG has embraced the concept of integrating holistic natural resource management with its mission activities. The FLARNG recognizes that its on-going and proposed training activities can potentially use or consume the natural resources on mission land, and that successful execution of their mission is dependent upon the optimum maintenance of their environment in a mode of sustainable use. The FLARNG recognizes its responsibility to guarantee continued access to its land, air, and water resources for realistic military training while ensuring that the natural and cultural resources entrusted to their care are sustained in a healthy condition for scientific research, education, and other compatible uses by future generations.

The FLARNG is justifiably proud of its excellence in training, its natural resources heritage and its tradition of stewardship. As such, the FLARNG is committed to the planned, deliberate management of natural resources, supporting the installation operational mission, meeting or exceeding stewardship requirements, and enhancing the quality of life for its personnel and guests.

1.2 Authority

AR 200-1 provides a brief overview of environmental laws and requirements; sets guidelines to supplement Federal, State, and local environmental laws and regulations; and integrates pollution prevention, natural and cultural resources protection, and the NEPA requirements into the Army Environmental Program.

AR 200-1 sets forth policy, procedures, and responsibilities for the conservation and management of natural resources consistent with the military mission. AR 200-1 states, "*(a)* Develop and implement an integrated natural resources management plan (INRMP) in accordance with 16 USC 670a in cooperation with the USFWS and the State fish and wildlife agency unless significant natural resources are absent. OCONUS installations will develop and implement an INRMP in consonance with Final Governing Standards (FGS) requirements." Additional laws and regulations pertaining to natural resources management are referenced throughout the document.

1.3 Responsibilities

1.3.1 National Guard Responsibilities

The Installations & Environment (ARNG I&E), and Engineering (ARNG-ILI), formed a partnership in April 1996 to implement the Integrated Training Area Management (ITAM) program (National Guard Bureau, 1996a). The ITAM-related responsibilities of each Directorate are as follows:

The ITAM program manager at ARNG-ILI ensures coordination of the ITAM program with other training support requirements. ARNG-ILI validates ITAM projects via the ITAM Workplan.

The Natural Resources Manager at ARNG-IEZ is responsible for reviewing this INRMP and advising the Construction and Facilities Management Office Environmental Division (CFMO-ENV) before formally submitting the plan to Federal and State environmental agencies, including but not limited to the USFWS, and the FWCC. The CFMO-ENV ensures operational readiness by sustaining environmental quality and promoting the environmental ethic, and is responsible for tracking projects, providing technical assistance, quality assurance, and execution of funds.

NGB issued ITAM policy and implementation guidance to the states (National Guard Bureau, 1996b). ITAM responsibilities for FLARNG offices have been outlined with reference to NGB's policy in the ITAM policy and implementation guidance document. Currently, SCWTS does not qualify for ITAM funding.

1.3.2 FLARNG Responsibilities

The Adjutant General (TAG) is directly responsible for the operation and maintenance of the SCWTS, which includes implementation of this INRMP. TAG determines what the state's force structure (types and numbers of units, types of equipment, training events, etc.) will be at the SCWTS throughout the five-year period of this INRMP. TAG ensures that all installation land users are aware of, and comply with, procedures, requirements, or applicable laws and regulations that accomplish the objectives of the INRMP. TAG also ensures coordination of projects and construction between environmental, training and engineering staffs. Two key positions within TAG's Office are the Assistant Adjutant General (ATAG) and the Construction and Facilities Management Officer (CFMO). These positions ensure that natural resource issues are considered in the Florida Department of Military Affairs (DMA) budget and policies. The ATAG also serves as chairman of the DMA Environmental Quality Control Committee, which provides overall guidance and policy direction to the environmental program, including management of the SCWTS natural resources.

The Plans, Operations, and Training Officer (POTO) has the primary responsibility of scheduling military training and safety of all personnel while training exercises are being conducted. The POTO and the Training Site Commander (TSC) determine the training load of the SCWTS based upon the force structure determined by TAG. Secondary to scheduling is maintaining a high-quality training environment, which is also a primary goal of this INRMP.

Together, the TSC and the POTO determine the training load of SCWTS based upon the force structure determined by TAG. The Operations staff is familiar with all aspects of the training site, including training scheduling and conflicts, locations of training facilities, impairments or problems with human-made structures or natural functions and needs for improvement or maintenance of the training site.

The statewide CFMO-ENV is directly responsible for implementing this INRMP. CFMO-ENV manages land use, flora, fauna, air quality and water quality for SCWTS, identifying compliance needs, and advising on the most effecting ways to comply with Federal and State environmental laws and regulations. CFMO-ENV is directly responsible for developing projects, securing permits, conducting field studies, providing Environmental Awareness materials, locating and mapping natural and cultural resources, and preparing plans for SCWTS's natural and cultural resources. More specifically, duties may include identifying and executing LRAM and Range and Training Land Assessment (RTLA) projects, ensuring vegetative cover is maintained on erodible soils, protecting wetlands and rare species habitats from construction and training activities, monitoring stream banks for erosion, protecting cemeteries from disturbance, contracting pest management, and ensuring Environmental Awareness materials are distributed to the troops. CFMO-ENV is also responsible for managing the NEPA process for SCWTS and reviewing the INRMP annually and revising as necessary.

The statewide CFMO provides a full range of environmental, financial, and engineering disciplines for all facilities under the jurisdiction of the DMA, including SCWTS. The CFMO is responsible for master planning and ensuring that all construction projects comply with environmental regulations by consulting with the CFMO-ENV prior to any construction. The CFMO also provides expertise in the development and production of Environmental Awareness materials for distribution to troop commanders.

The statewide Public Affairs Officer (PAO) serves as a liaison between FLARNG and the public at public meetings, prepares media presentations, and offers photography services for natural resources projects and community educational events.

The Staff Judge Advocate (SJA) advises the TAG, POTO and CFMO on laws and regulations that affect training land use and environmental compliance.

1.4 Management Philosophy

This INRMP has been developed in cooperation with the USFWS and the FWCC. Developed using an interdisciplinary approach, information has been gathered from the FLARNG Natural Resources Manager (NRM), as well as other Federal, State and local agencies and special interest groups with an interest in the management of natural resources at the SCWTS. A distribution list for the draft INRMP, as well as initial agency coordination and response letters, has been included in **Appendix 2**.

An INRMP describes the baseline conditions of natural resources at a military installation and provides management programs and guidance allowing for the performance of successful military training, while providing for the conservation of renewable natural resources, preservation of rare and unique resources, and long-term resource sustainability. Specific plan expectations include the following:

- Provide a comprehensive plan for the FLARNG to carry out its mission while promoting ecosystem health and biodiversity at the SCWTS and in the surrounding region
- Document goals, objectives, guidelines, and future direction for natural resources management
- Establish a framework for implementing natural resources programs and ecosystem management
- Provide centralized information on the natural resources program status
- Identify environmental constraints to land use, such as wetlands, cultural resources, and special project areas
- Identify mission-related impacts and options for conflict resolution
- Serve as a baseline of existing environmental conditions for defensible future EAs and Environmental Impact Statements (EISs)
- Ensure that installations comply with environmental regulations
- Identify, prioritize, and schedule long-term budget requirements.

Management programs addressed in this INMRP include:

- Geographic Information Systems (GIS)
- Invasive Species Management
- Fish and Wildlife Management

- Threatened and Endangered Species (T&E) Management
- Water Resources and Wetlands Management
- Landscaping and Grounds Maintenance
- Erosion Control and Soil Conservation
- Integrated Pest Management
- Outdoor Recreation
- Coastal Zone Management
- Cultural Resources Management
- Natural Resources Law Enforcement
- Public Outreach

The overall policies and philosophy of land management at the SCWTS are derived from AR 200-1 and 32 CFR 651. These policies, regulations and programs are based on the concept that natural resources management is an integral component of the primary mission of military use. The FLARNG must train; therefore, the FLARNG will manage the SCWTS to preserve valuable training resources, including the natural environment. Management of natural resources on an ecosystem basis ensures the sustainable use of training lands while considering the effects on the surrounding environment and public concern.

1.4.1 Environmental Management System (EMS)

This INRMP directly supports the FLARNG's Environmental Management System (EMS). EMS is a management system, adopting the management standards of the ISO 14001-2006 (ISO Second edition, 2004-11-15), to enhance mission readiness of the FLARNG through better environmental management and EMS program implementation. The goal of the FLARNG is to achieve the Army's goal to have a working EMS that provides the organization with a framework for managing all of its environmental responsibilities so that this management becomes more efficient and more integrated into overall operations. It is a tool to help the organization not only stay in compliance with legislated and voluntary environmental requirements, but also continuously improves the overall environmental performance.

The FLARNG's implementation of an EMS is the result of the 13 July 2001 directive by the Assistant Chief of Staff for Information Management (ACSIM), through NGB, directing Army installations to adopt this standard, as a goal, to be consistent with the requirements of Executive Order 13148, "Greening the Government Through Leadership in Environmental Management" (April 2000).

The Florida TAG established an environmental policy in 2003 which states, "The Florida Army National Guard has an obligation towards Environmental Compliance, preservation of its natural, cultural and historical resources and a responsibility to overall protection of the State of Florida and this nation's environment as an integrated part of its mission." This INRMP for the SCWTS is consistent with that policy and with the FLARNG EMS.

The SCWTS INRMP is not an identified aspect within the defined scope of the FLARNG EMS in accordance with ISO 14001-2006 standard.

1.4.2 Ecosystem Management

An ecosystem is the "sum of the plant community, animal community, and environment in a

particular region or habitat" (Barbour et al, 1987). Ecosystem management may be defined as management "to restore and maintain the health, sustainability, and biological diversity of ecosystems while supporting sustainable economies and communities" [U.S. Environmental Protection Agency (USEPA) 1994].

The goal of ecosystem management is to ensure that military lands support present and future training and testing requirements while preserving, improving, and enhancing ecosystem integrity. Natural resources at the SCWTS will be managed with an ecosystem management approach.

Principles and guidelines of ecosystem management, per DoD 4715.03 (enclosure 6), are as follows:

1) Guarantee continued access to land, air and water for realistic military training
2) Maintain and improve the sustainability of native species and biodiversity of ecosystems
3) Consider ecological units and timeframes
4) Support sustainable human activities
5) Develop vision of ecosystem health
6) Develop priorities and reconcile conflicts
7) Develop coordinated approaches to work toward ecosystem health
8) Rely on the best science and data available
9) Use benchmarks to monitor and evaluate outcomes
10) Use adaptive management
11) Implement through installation plans and programs

Biological diversity or biodiversity may be defined as "the variety of living organisms considered at all levels of organization, from genetics through species, to higher taxonomic levels, and including the variety of habitats and ecosystems, as well as the processes occurring therein" (Meffe and Carrol 1994). Biodiversity refers to the variety and variability among living organisms and the environment in which they occur. Biodiversity has meaning at various levels including ecosystem diversity, species diversity, and genetic diversity. Specific management practices identified in this INRMP have been developed to enhance diversity and promote native species at the SCWTS.

1.5 Conditions for Implementation and Revision

1.5.1 Implementation

The FLARNG NRM is responsible for directing the management of natural resources and for the development and implementation of the INRMP. Successful implementation of the INRMP will require:

- Administrative and technical support
- Agency cooperation and technical assistance

- Funding
- Priorities and scheduling
- Production of project scopes and budgets
- The ability to amend and revise this document as necessary

Where projects identified in the plan are not implemented because of lack of funding, or other compelling circumstances, the FLARNG will review the goals and objectives of this INRMP to determine whether adjustments are necessary.

Projects requiring heavy equipment for earthwork, resulting in a change in topography at the site, will require an Environmental Resource Permit (ERP). In addition, any work that may be planned along the Snake Creek Canal may require a Right-of-Way Occupancy permit.

1.5.2 Revisions

The INRMP is effective until it is determined by all cooperating agencies that a revision is warranted. Army policy requires annual review of the INRMP to keep the plan current. The INRMP will be reviewed with cooperators for operation and effect at least once every five years. Additional clarification was provided in the DoDI 4715.03. The requirement for the five year formal INRMP review does not necessarily specify that the INRMP will need to be revised. The INRMP will be reviewed to determine if implementation requirements of the Sikes Act are being meet. Page revisions can be made when major revisions are unnecessary. Information such as that relating to the soils, natural vegetation, and environmental data, not requiring revision, will be retained in the plan. Periodic evaluations and revisions will be conducted under the management of the FLARNG NRM with input from the USFWS, FWCC, and internal and external stakeholders, as appropriate.

2.0 What's New in this Update?

This INRMP Update addresses changes to the management strategy of natural resources as a result of baseline planning level surveys performed to date and the results of management activities conducted on the Property over the past 5 years. This update also addresses climate change considerations for natural resource management at SCWTS.

2.1 Property Additions and Disposal

The ~94 acre north parcel was anticipated to be a part of an enhanced lease use (EUL) and was excluded from consideration in the initial SCWTS INRMP. This EUL was never implemented and FLARNG assumed full responsibility. The 2012 INRMP update addressed the inclusion of this parcel as part of the SCWTS to be considered in natural resource management. This parcel is physically separated from the southern parcel of the SCWTS by the Snake Creek Canal, which is owned and maintained by the South Florida Water Management District (SFWMD). The FLARNG has maintained cooperative control over the management of these ~94 acres since acquisition. This previous transfer of responsibility does not significantly modify the management strategy of the SCTWS. The previous update also addressed the designation of 30 acres of the Property as a new Readiness Center/Armed Forces Reserve Center, which is no longer considered to be part of SCWTS and is therefore not included in this INRMP. The updated property boundaries are reflected on all figures and all narratives. No major property additions or disposals altering acreage managed has occurred since the last update. A Phase I Environmental Site Assessment per ASTM Standards and a Phase II Site Investigation were performed on the southern parcel 19 September 2011. No target compounds were detected above applicable cleanup target levels in the soil or the groundwater at the locations tested. These reports are available at the CFMO-ENV Conservation Office in Saint Augustine, Florida.

2.2 Changes in Natural Resource Management Strategy

Prescribed Planning Level Surveys have been performed serving as important baseline surveys of natural resources on the SCWTS. Based on this information, several actions have been performed that have improved the natural environment on the Property. These include removal of invasive species communities by roller-chopping, chipping, and mowing. Many areas have been under contract for regular mowing and are becoming sustainable pasture-like communities dominated by Bahia grass. However, some areas were chipped only and are in the process of regenerating into the previous invasive species dominated shrub communities.

Planting of native species have occurred around the borrow pond perimeter, in the wetland areas on the northern parcel of the Property, and along the boundary of the southern parcel of the property. Since the main community has been successfully converted from a dense Brazilian pepper shrub community to grassy pasture and low shrub re-growth, the FLARNG is considering introducing fire and grazing as other effective means of invasive species control. Areas with new native species planting and the inclusion of the wetland areas on the northern parcel will require revised invasive species control methods including manual removal and targeted herbicidal treatment.

3.0 Installation Overview

3.1 Location and Area

The FLARNG's SCWTS is located in Miramar, Broward County, Florida, just north of the Dade County line in Section 36 of Township 51 South, Range 40 East (**Appendix 1: Figures 1-1 & 1-2**). **Figure 3-2** (**Appendix 1**) depicts all land use codes within a one-mile radius of the property boundaries, as maintained by the Broward County Planning Council. The surrounding area is primarily developed and includes a mixture of commercial and residential properties The 290-acre SCWTS is bordered by Flamingo Road (SW 124th Ave) to the west, undeveloped land and

new construction to the north, new condominium construction to the northeast, a mobile home community to the east, and Honey Hill Drive (NW 202nd Street) to the south. The northern parcel and southern parcel of the SCWTS are divided by the Snake Creek Canal which is owned and maintained by the SFWMD. Refer to **Appendix 1: Figure 3-1** site features.

3.2 Installation History

The SCWTS (HM-03) was established in 1962 as a Nike Hercules missile site during the Cuban Missile Crisis. By June of 1965, permanent buildings, including missile storage facilities were built. HM-03 was designed to store and launch the Nike Hercules missile. The Hercules was the second missile in the Hercules system, following the Ajax, and was designed to be retrofitted to Nike Ajax missile sites. Although the Miramar facility was built expressly for Hercules missiles, the layout echoed that of other Hercules sites that had been originally designed to house Ajax missiles [Southeastern Archaeological Research, Inc. (SEARCH) 2001].

HM-03 originally consisted of two separate parcels of land located approximately one mile apart, with dairy farms in between. The buildings on one parcel, that contained the Administration Area and the Integrated Fire Control (IFC), were demolished to build a post office (6193 NW 183rd Street) in circa 1984. When active, it contained barracks, a mess hall, security and radar control areas. It was located approximately one block west of the intersection of NW 183rd Street (Miami Gardens Drive) and NW 57th Avenue (Red Road) (SEARCH, 2001).

The second parcel, the Launch Area, is now known as the SCWTS and is managed by the FLARNG. The site contained 21 buildings and structures, including the generator buildings, the Administration building, the water works building and water storage tank, the dog kennel storage building and associated dog kennels, the Missile Assembly and Electronic Testing Building, three missile magazines, three guard posts, three generator sheds, three buildings built into berms, and a Masonry Vernacular building related to the Snake Creek Canal. The southern Florida missile batteries (including the Snake Creek facility) remained on active duty until 1979 (SEARCH 2001).

FLARNG has leased the site from the Department of Army since October 1980 and has occasionally used it for unit training. Between 1979 and 2001, many of the buildings and facilities became degraded and were vandalized.

In 2001, the FLARNG contracted Southeastern Archaeological Research, Inc. (SEARCH) to survey the Snake Creek site, locate any archaeological sites or historic properties (structures, buildings, etc.), and assess their potential for listing on the National Register of Historic Places (NRHP). All remaining buildings and structures located on the site were evaluated during this survey. The survey is titled, “A Phase I Cultural Resource Survey of the Snake Creek Weekend Training Facility”, Miramar, Florida.

The survey found that the HM-03 Launch Area was, for the most part, in its original configuration. However, most buildings were heavily vandalized with spray-painted graffiti doors and many windows had been removed. No buildings displayed the military logos or markings unique to military facilities. Many of the roofs leaked, exposing the interiors to the elements. Although HM-03 had significant Cold War historical associations, its integrity had been compromised by the destruction of the IFC and Administration buildings and damage to all other buildings. The HM-03 did not meet the minimum standards of National Register eligibility. Those standards include requirements that a property must be at least 50 years old, have exceptional importance, and retain its integrity (SEARCH 2001). Therefore, in 2004, the FLARNG demolished all of the buildings and facilities on-site. Only foundations remain on-site.

3.3 Military Mission

The mission of the Florida National Guard and the Department of Military Affairs is to provide highly trained military units and personnel to support national security objectives, to protect our citizens, and to support programs and initiatives, which add value to the State of Florida and the Nation. The FLARNG has two primary military missions. The State Military Mission is to protect the lives and property of Florida citizens during times of natural disaster and to preserve the peace, order, and public safety at the direction of the Governor. The FLARNG's federal military mission is upon federalization by the President to assist the federal government in defending the sovereign interests of the United States when they are threatened or violated.

To accomplish these missions the FLARNG maintains quality- training lands to adequately prepare the FLARNG soldiers and units to accomplish their missions. The FLARNG maintains three such training installations: Camp Blanding Joint Training Center, Avon Park Air Force Range, and Snake Creek Weekend Training Site (SCWTS).

In accordance with the Departments of the Army and the Air Force regulation NGR 5-3, Management of Army National Guard Training Centers, 1 February 2002, the SCWTS is categorized as a Local Training Areas (LTA). LTAs support individual and unit training at or near home station. Many FLARNG units in the South Florida Area are located at a distance too great to effectively use APAFR or CBJTC for their inactive duty training (IDT) field training exercises. The proximity of the SCWTS LTA to these units ensures that travel for these training exercises does not exceed the allowable 80 miles (travel to and from training should not exceed 25% of the total training time) travel distance in accordance with NGR 350-1.

SCWTS can support basic battle focused training for individual soldiers, leaders, and some limited collective training events. The FLARNG has proposed improvement to training facilities at the SCWTS to accommodate the training needs of military units in South Florida. Approximately 30-acres of the southern parcel at SCWTS was used for the construction of an Armed Forces Reserve Center (see **Appendix 1: Figure 6-1**). This INRMP addresses natural resources management of the remaining 290-acre at SCWTS.

3.4 Local and Regional Natural Areas

The SCWTS is situated west of the Atlantic Coastal Ridge in the historic Eastern Everglades. This area has been modified greatly during historic times. Drainage of the Everglades began as early as the late 19th century. The Snake Creek Canal was constructed in circa 1952. Historically, native upland plant communities were probably sparse on the SCWTS property due to low elevations, high water tables, and periodic flooding (SEARCH, 2004). Today, the majority of developable land in the vicinity of the SCWTS has been developed and contains no significant natural areas. However, the site is in relatively close proximity to both the Everglades National Park and Big Cypress National Preserve, both managed by the National Park Service.

Everglades National Park, which encompasses over 1.5 million acres, spans the southern tip of Florida and is located approximately 25-30 miles (at its closest point) from the SCWTS. The park contains a variety of both temperate and tropical plant communities, including sawgrass prairies, mangrove and cypress swamps, pinelands, and hardwood hammocks, as well as marine and estuarine environments. It is teeming with wildlife, especially birds, and is the only place in the world where alligators and crocodiles cohabit.

Big Cypress National Preserve, located directly north of Everglades National Park, encompasses over 720,000 acres. The eastern boundary of this preserve is located approximately 35 miles west of the SCWTS. This preserve has much biodiversity and includes plant communities such as pine forests, hardwoods, prairies, mangrove forests, and cypress strands and domes. Wildlife on the preserve includes white-tailed deer, bear, and Florida panther, as well as many other species.

4.0 Physical Environment

4.1 Climate

South Florida has subtropical marine climate characterized by long, warm, rainy summers and mild, dry winters. Temperatures are moderated by the Atlantic Ocean and Gulf Stream, but the moderating effects quickly diminish inland. In winter, the average temperature is approximately 77 degrees F and the average daily minimum temperature is approximately 62 degrees. Frosts occur about once a year. The lowest temperature on record, which occurred in December 1934, is 26 degrees. In summer, the average temperature is approximately 84 degrees and the average daily maximum temperature is approximately 90 degrees. The highest recorded temperature, which occurred in July 1942, is 100 degrees (USDA, 1996).

Rainfall varies greatly on a yearly basis. The total annual precipitation is approximately 58 inches. Thunderstorms occur about 74 days each year, and most occur in late afternoon. Hurricanes occasionally strike south Florida, especially in September and October. The average relative humidity in mid-afternoon is about 74 percent. Humidity is higher at dawn, when the average is about 84 percent. The sun shines 78 percent of the time possible in summer and 66 percent in winter. The prevailing wind is from the east- southeast (USDA, 1996). Refer to **Table 4-1** for average temperatures and rainfall for the Miami area.

Climate change can cause variations in these average weather conditions. An increase or decrease in temperature and precipitation can occur. Overall climate change increases the occurrence of extreme weather. Common effects are drought, flooding, record breaking high and low temperatures, extreme winds, wildfire and an increase in severe weather events such as hurricanes and tropical storms.

Table 4-1. Average Temperatures and Rainfall in Miami, Florida

Month	Average Maximum Temperature (°F)	Average Minimum Temperature (°F)	Average Rainfall (inches)
January	76.2	59.8	1.88
February	78.0	62.1	1.88
March	80.3	64.8	2.56
April	83.2	68.2	3.36
May	86.8	72.7	5.52
June	89.6	76.0	8.54
July	90.8	77.4	5.84
August	90.9	77.5	8.63
September	89.4	76.7	8.38
October	86.3	73.6	6.19
November	81.8	68.1	3.43
December	78.0	63.1	2.18
Year	**84.3**	**70.0**	**58.39**

Source: NOAA National Weather Service Forecast Office (30 year normals from 1981-2010) (www.nws.noaa.gov/climate).

4.2 Topography

In general, the topography of the SCWTS is relatively flat. Based on the U.S. Geological Survey (USGS) 7.5-minute series topographic quadrangle for Opa-Locka, Florida, the elevation of most of the northern parcel is at or near five feet above mean sea level (msl). The elevation of the southern parcel is less than five feet above msl. The Snake Creek Canal, which divides the northern and southern parcels of SCWTS, is at lower elevation than the surrounding land.

4.3 Geology

The stratigraphy of southern Broward County, within the confines of the surficial aquifer system as described by Causaras (1985 and 1987), is as follows:

- Pamlico Sand (Pleistocene - 2 million to 10,000 years before present [YBP]): 0 to 60 feet of white to black, or red, quartz sand, which overlies part of the Miami Limestone and Anastasia Formation.
- Key Largo Limestone (Pleistocene): 0 to 200 feet of coralline reef rock, hard and cavernous, inter-fingers with bryozoan facies of the Miami Limestone and probably with the Fort Thompson Formation.
- Miami Limestone (Pleistocene): 0 to 40 feet of white to yellowish oolitic limestone. Massive to stratified and cross-bedded. Oolitic and bryozoan facies.

- Anastasia Formation (Pleistocene): 0 to 120 feet of coquina, sand, calcareous sandstone, and shell marl. Probably composed of deposits contemporaneous to marine members of the Fort Thompson Formation and Miami Limestone.
- Fort Thompson Formation (Pleistocene): 0 to 150 feet of alternating marine and freshwater marls, limestones, and sandstones.
- Tamiami Limestone (Miocene – 24 million to 5 million YBP): 0 to 100 feet of cream, white and greenish-gray clayey marl, silt, and shelly sands, and sand marl, locally hardened to limestone. The upper part, where permeability is high, forms the basal part of the Surficial Aquifer System. The lower portion of the formation is of low permeability and is considered the top of the Floridan Aquiclude.

4.4 Soils

Based on the Natural Resources Conservation Service (NRCS) Soil Survey for Broward County, the SCWTS is composed of the following soil types (**Appendix 1: Figure 4-1**):

- Basinger Fine Sand (Ba) - Sandy soil that is nearly level, deep, and poorly drained.
- Hallandale and Margate soils (Hm) – Nearly level, poorly drained soils that have been modified by grading, shaping, and covering with 8 to 20 inches of fill material.
- Margate Fine Sand (Ma) - Sandy soil that is nearly level, poorly drained, and underlain by limestone at depths of 20 to 40 inches but has solution holes as deep as 60 inches.
- Plantation Muck (Pm) – Nearly level, very poorly drained soil that has a muck surface layer over sandy mineral material.
- Urban Land (Ur) - Areas that are more than 70 percent covered by airports, shopping centers, parking lots, large buildings, streets, sidewalks, and other structures so that the natural soil is not readily observable.

Margate Fine Sand, Basinger Fine Sand, and Plantation Muck are classified by the Florida Association of Professional Soil Classifiers as hydric soils. However, due to historic draining by the extensive network of ditches and canals created for farming and urban development in south Florida, the original hydric characteristics of these soils in many areas, including the SCWTS, have been altered. Field evaluations of soil profiles down to 16 inches below ground surface (bgs) as well as the plant species composition at the SCWTS indicate that the effects of local farming and urban development have made the soils at the SCWTS less hydric. Soils within the wetland area of the northern parcel at SCWTS have retained their hydric characteristics to a greater degree due to higher underlying water tables, along with soil compaction and disturbance associated with historical livestock operations via grazing lease agreements.

4.5 Water Resources

4.5.1 Surface Waters and Wetlands

In March 2004, CH2M Hill completed a planning level wetland survey titled "Wetland Planning Level Survey, Snake Creek Weekend Training Site in Miramar, Florida". Wetlands were identified based on three key characteristics: hydrology, soils and hydrophilic plants. Based on this survey, the following surface water and wetland features exist within the SCWTS property (**Appendix 1: Figure 3-1**):

- Two (2) Wetland Areas (WTL 1 and WTL 2)
- Snake Creek Canal
- Borrow pond
- Three (3) man-made ditches (D1, D2 and D3) (CH2M Hill 2004).

The two wetland areas are located near the western boundary of the northern parcel of the Property, and referred to as WTL 1 and WTL 2. These wetlands are currently classified as a wet prairie. Wet prairie wetlands are dominated by grasses, sedges, and related vegetation and have less standing water than marshes. The herbaceous stratum (ground cover) of these wetlands has 100 percent vegetative cover and is dominated by Gulf Coast spikerush (*Eleocharis cellulosa*), American bulrush (*Scirpus americanus*), marsh pennywort (*Hydrocotyle umbellata*), haspan flatsedge (*Cyperus haspan*), Mexican primrose willow (*Ludwigia octovalvis*), torpedo grass (*Panicum repens*), and smartweed (*Polygonum hydropiperoides*). A few shrub species (about 10 percent vegetative cover) also exist within these wetlands, including Brazilian pepper *(Schinus terebinthifolius*) and wax myrtle (*Myrica cerifera*). Soils within WTL 1 are organic from 0 to 7 inches bls and dark silty sand from 7 to 16 inches bls. The soil is saturated below 2 inches bls.

FLARNG CFMO-ENV Staff planted approximately 300 Bald Cypress, 300 Red Maple, and 300 Pond Cypress saplings throughout WTL1 in May 2011 in order to establish native wetland species seed sources to compete with invasive and exotic seed sources. It is the intent of the FLARNG CFMO-ENV to monitor and maintain the success of these newly planted native species in WTL1.

The Snake Creek Canal, which flows through the center of the SCWTS property, was constructed in circa 1952 (SEARCH 2001). The canal and its right-of-way are maintained by SFWMD, which controls access to the canal easement. The Snake Creek Canal is approximately 85 feet wide with steep embankments that are approximately four to six feet high and a narrow littoral zone that has sparse vegetation due to periodic maintenance. The Snake Creek Canal flows eastward and ultimately discharges to the Atlantic Ocean.

The borrow pond is located in the north-central part of the southern parcel of SCWTS. Based on historical aerial photographs, this borrow pond appears to have been created to obtain fill for the construction of the adjacent NIKE Hercules Missile facilities in the 1960s. The pond is square-shaped and approximately four acres in size. Depth of the pond is unknown. Its littoral zone is very narrow and sparsely vegetated. Steep bedrock slopes are apparent beyond the littoral zone. Scattered cattails *(Typha latifolia)* are present along the edges of the pond. Brazilian pepper *(Schinus terebinthifolius*) and wax myrtle (*Myrica cerifera*) are present along the banks of the pond. Fish have been observed in the pond, but specific species are unknown.

There are three man-made ditches (D1, D2 and D3) within the SCWTS (see **Appendix 1: Figure 3-1**). Based on historical aerial photographs, these ditches were constructed in the 1950s.

D1 is located on the northern parcel and runs approximately 400 meters north-south. D1 has a channel width that varies from approximately four to six feet, a top-of-bank width that varies from approximately 12 to 15 feet, and moderately steep embankments that vary in height from approximately one to three feet.

D2 was filled and is no longer present on the property.

D3 is an old man-made agricultural ditch located in the west central part of the southern parcel of the SCWTS property. D3 runs east-west and is approximately 525 meters in length. There are no culverts or other connections at either end of D3 and, therefore, it is hydrologically isolated. D3 has a channel width that varies from approximately four to six feet, a top-of-bank width that varies from approximately ten to 15 feet, and moderately steep embankments that vary in height from approximately two to five feet

The remaining two ditches at SCWTS are man-made and it is the intention of the FLARNG CFMO-ENV to have them maintained free of any vegetation other than native herbaceous species.

4.5.2 Floodplains

Floodplains are generally characterized as areas of low level ground present on one or both sides of a stream channel that are subject to either periodic or infrequent inundation by flood waters. Floodplains are typically the result of lateral erosion and deposition that occurs as a river valley is widened. High water tables and flooding are associated with floodplains. Inundation dangers associated with floodplains have prompted Federal, State, and local legislation limiting the development in these areas to recreation, agriculture, and preservation activities. Floodplains are regulated by the Federal Emergency Management Agency (FEMA) with standards outlined in 44 CFR Part 60.3.

EO 11988, Floodplain Management (signed 24 May 1977) directs Federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains. Based on Flood Insurance Rate Maps (FIRMs) developed by FEMA, all of the SCWTS, as well as the entire City of Miramar, is classified as 100-year floodplain Zone AD. Zone AD encompasses areas subject to inundation by 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet.

4.5.3 Ground Water

The Biscayne Aquifer is the main aquifer in Broward and Miami-Dade Counties and is located in a thin layer of surficial sand of recent age and numerous Miocene to Pleistocene aged carbonate units. It is underlain at approximately 200 feet below ground surface by clays and sands which are known as the Florida Aquiclude. The water table elevation ranges from three to 15 feet below mean sea level (msl) and fluctuates one to eight feet seasonally. Regionally, water in the Biscayne Aquifer flows to the southeast toward the Atlantic Ocean. The Biscayne

Aquifer is classified as a sole source unconfined aquifer. The average transmissivity of the Biscayne Aquifer is about five million gallons per foot per day. The specific yield ranges from 0.10 to 0.35 with an average of about 0.20.

4.5.4 Drainage/Watershed

The SCWTS lies within the Broward County South Broward Drainage District and is within the C-9 East Drainage Basin. NW 202nd Street, the southern boundary of SCWTS divides Miami-Dade and Broward Counties.

5.0 Ecosystems and Biotic Environment

5.1 Ecosystem Classification

Based on the National Hierarchical Framework of Ecological Units (also known as Bailey's Ecoregions), the SCWTS is located in the U.S. Ecoregion – Humid Tropical Domain – Savannah Division – Everglades Province. This Province encompasses the southern tip of Florida, south of Lake Okeechobee. The Everglades occupy an extensive, almost flat marl and limestone shelf generally covered with a few feet of muck and a little sand. Elevation ranges from sea level to 25 feet. Included in this Province are extensive areas of swamps and marshes, elevated hammocks, and low beach ridges and dunes. Poorly defined broad streams, canals, and ditches drain into the ocean.

About one-fifth of the area is covered by tropical moist hardwood forest. Cypress forests are most extensive, but mangrove occurs along the eastern and southern coasts. Much of the area is open marsh covered by a variety of grasses, reeds, sedges, and other aquatic herbaceous plants. Within these grasslands there are mesic habitats called "hammocks" that rise above the surrounding, usually wetter areas. These hammocks contain groves of low to medium-tall broadleaf evergreen trees and shrubs.

Wildlife of this Province includes whitetail deer, Florida panther, black bear, raccoon, bobcat, opossum, skunk, various bats, marsh and swamp rabbits, cotton rat, fox squirrel, American alligator, and various snakes and lizards including the rough green snake, key rat snake, southern Florida coral snake, Carolina anole, and brown red-tailed skink. Manatees inhabit estuaries and interlacing channels. Before the water level in much of the Everglades was lowered by drainage, the area was home to large numbers of herons, egrets, limpkins, mottled ducks, Everglade snail kites and other birds. The Everglade snail kite is now classified as endangered.

According to Ecoregions of Florida (EPA, 2008) the site is located in the Miami Ridge/Atlantic Coastal Strip (76-03). This region is a heavily urbanized region, sea level to 25 feet in elevation, with coastal ridges on the east and flatter terrain to the west that grades into the Everglades. The western side originally had wet and dry prairie marshes on marl and rockland and sawgrass marshes, but much of it is now covered by cropland, pasture, and suburbs. To the south, the Miami Ridge extends from near Hollywood south to Homestead and west into Long Pine Key of Everglades National Park. It is a gently rolling rock ridge of oolitic limestone that once supported more extensive southern slash pine forests and islands of tropical hardwood hammocks. The northern part of the region is a plain of pine flatwoods and wet prairie, and coastal sand ridges

with scrub vegetation and sand pine. There are very few natural lakes in the region, but three types of ponded surface waters occur: 1) Pits dug deep into underlying "rock" containing water that is clear, high pH and alkaline, with moderate nutrients; 2) Shallow, surficial dug drains that are darker water; and 3) flow-through lakes (e.g., Lake Osborne) that are colored and nutrient rich.

5.2 Vegetation

5.2.1 Historic Vegetative Cover

Based on an historical Vegetation Map of Southern Florida (Davis, 1943), the subject Property is located at the edge of an area labeled as “saw-grass mashes with wax myrtle thickets” and adjacent to areas to the east labeled “wet prairies” (Davis, 1943). As a result of decades of extensive drainage, filling, and development, few natural vegetative communities remain in this area.

Much of the SCWTS has undergone numerous land use alterations since the early 1940s. The Property has been cleared, farmed, excavated, and extensively drained by man-made ditches and canals. As a result of these alterations, the site does not retain the same hydrology as it did prior to extensive human disturbance. Due to these changes in hydrology, the site no longer supports a prevalence of hydrophytic vegetation, as it may have prior to hydrologic changes.

In recent times, the Property had been mostly abandoned upland pasture in an advanced successional stage and dominated by relatively large trees and shrubs. The Property was heavily overgrown with Brazilian pepper *(Schinus terebinthifolius*) and includes other exotic tree species such as earleaf acacia *(Acacia auriculiformis)*, and bishopwood (*Bischofia javanica*). Because of the dense coverage of exotic species, native plant species diversity has been greatly reduced. Dominant shrub and herbaceous species include saltbush (*Baccharis halimifolia*), Caesar’s weed (*Urena lobata*), arrow-leaf sida (*Sida rhombifolia*), and whitehead broom (*Spermacoce verticilliata*). Invasive species management had begun between 2006 and 2010 and included shrub removal by bush hogging, mulching/chipping on site, and herbicidal treatments to remove Brazilian pepper (*Schinus terebinthifolius*) and other shrub species to enhance the site for military training use. Native plants have been planted to assist in the recovery of the natural ecosystem at SCWTS.

5.2.2 Current Vegetative Cover

Currently, the site vegetation cover on the southern parcel of SCWTS can be described as maintained pasture with scattered trees and shrubs, and recently chipped shrub areas currently under successional regeneration. Due to continual mowing, pasture areas have developed a dominance of Bahia grass (*Paspalum notatum*). The pastures contain a scatter of Cabbage palm (*Sabal palmetto)*, royal palm (*Roystonea regia)*, bishopwood (*Bischofia javanica*), earleaf acacia *(Acacia auriculiformis)*, and laurel oak (*Quercus laurifolia*). The chipped areas have a regenerating growth of the shrub and herbaceous species that dominated the area previously. The vegetative cover on the northern parcel also includes regenerating upland and wetland pasture areas that had recently been chipped. The vegetation within the wetland area has been supplemented by additional planting of native species. The upland habitat along the Snake Creek Canal right-of-way is currently maintained by the SFWMD and consists mainly of mowed bahia grass. The embankments of the canal have very little vegetation as a result of regular maintenance by SFWMD.

See Appendix 6 for Tables 5-1A and 5-1B which contain a list of plant species observed on-site during biological and vegetation surveys conducted by Hall and Newman in 2001 "Threatened and Endangered Species Survey, Final Report of the Snake Creek Training Site, Miramar, Florida" and by LG^2 Environmental Solutions, Inc. in 2009 "Snake Creek Weekend Training Site Baseline Vegetation and Flora Planning Level Survey 2009, Miramar, Broward County, Florida", respectively. The 2001 survey examined all 290 acres of the Property; however, the 2009 Planning Level Survey only included the southern parcel and excluded the Southwest corner of the site, thought at the time to be the site of the new Readiness Center. Taking into account both (2001 & 2009) Flora Planning Level Survey's, one hundred forty-one (141) species were identified on-site. Twenty-two percent or 31 species are exotic, and 21 of the exotic species are listed as Category I (most invasive) invasive species by the Florida Exotic Pest Plant Council (FLEPPC, see **Section 5.2.3**). Although they are not dominant, many native species remain on-site.

The 2009 vegetation and flora planning level survey reported observations of tiny polygala (*Polygala smallii*) and Small's flax (*Linum carteri* var. *smallii*) on the site. Tiny polygala is federally endangered and Small's flax is a federal candidate species and are both extremely rare and thought to be extirpated from the county. Follow-up surveys to specifically search for these species on site were conducted by FLARNG ENV personnel. No observation of any individuals of these species, led FLARNG to conclude that the plant were likely misidentified during the 2009 survey and do not occur on-site. A new vegetation survey specifically looking for T&E species will be scheduled and prioritized.

5.2.3 Invasive Species in Southern Florida

The FLEPPC produces a list of invasive plant species every two years. Exotic species are identified as a Category I or Category II exotic species, based upon the species' tendency to invade native plant communities. Category I species are invasive exotics that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives. Category II species are invasive exotics that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species. In addition to these categories, some plants are further scrutinized by State and Federal mandates (Broward pamphlet – "The Good, The Bad, and The Exotic Plants in Broward County").

The FLEPPC 2017 list of Category I (most invasive) species is provided in Appendix 7 as **Table 5-2**. Thirty-one exotic species have been observed at SCWTS. Twenty-one of the 31 exotic species at the SCWTS are listed as Category I invasive species. Of the 21 category I species, 13 of these species were identified as having a significant presence during the 2009 Vegetation and Flora Survey (LG^2 Environmental Solutions, Inc. 2009). The other eight species were reported as present and having less than one percent cover. The 13 species with significant coverage are discussed in the following sections.

5.2.4 Rosary Pea

Occurrence and Status

This species was introduced to Florida as an ornamental in 1932 and is now naturalized in 27 Florida counties. This species has the ability to invade undisturbed pinelands and hammocks (Langeland and Burks, 1998).

Taxonomy and Physical Description

Rosary pea is a member of the Pea (Fabaceae) family. It is a high-climbing, twining, or trailing woody vine with slender herbaceous branches. Leaves are alternate, two to five inches long, even-pinnately compound with five to 15 pairs of leaflets. Flowers are white to pink or reddish, small, in short-stalked dense clusters at leaf axils. The fruit of this species is a short, oblong pod, and seeds are scarlet with black bases (Langeland and Burks, 1998).

Biology and Reproduction

This vine has a deep root system, making is difficult to eradicate. It flowers in the summer and produces copious amounts of fruit. Seeds are dispersed by birds.

5.2.5 Earleaf Acacia

Occurrence and Status

A native of Australia, Papua New Guinea, and Indonesia, earleaf acacia was introduced to Florida as an ornamental before 1932, and was used extensively in street landscaping in southern Florida for many years. It has become naturalized throughout southern Florida and is common in disturbed areas. It has also invaded pinelands, scrub, and hammocks in south Florida. It has been reported in 24 natural areas in Dade, Broward, Palm Beach, Martin, Collier, and Lee counties, Florida. This species has the capacity to shade out and out-compete many native species, including many threatened and endangered species (Langeland and Burks, 1998).

Taxonomy and Physical Description

A member of the Pea family (Fabaceae), earleaf acacia is an evergreen tree reaching heights of 50 feet. Leaves are alternate, simple, reduced to phyllodes (flattened leaf stalks), slightly curved, five to eight inches long, with three to seven main parallel veins. Leaf surface is dark green. Flowers are mimosa-like, in loose, yellow-orange spikes at leaf axils or in clusters of spikes at stem tips. Fruit is a flat, oblong pod, twisted at maturity, splitting to reveal flat black seeds attached by orange, string like arils (Langeland and Burks, 1998).

Biology and Reproduction

Earleaf acacia is particularly drought resistant, tolerates seasonally waterlogged soils, and grows in a wide range of soil types and soil pH. Similar to other legumes, earleaf acacia is aided in drought resistance and low-nutrient tolerance by mycorrhizal and nitrogen-fixing bacterial associations of the roots. Seeds of this species are dispersed by several bird species, including the introduced European starling (Langeland and Burks, 1998).

5.2.6 Bishopwood

Occurrence and Status

This tree was introduced to Florida as an ornamental by 1947, it was reported as naturalized in Dade County in 1971, and it had become a “weed tree” in south Florida by 1974, invading hammocks. It is now common in old fields and disturbed wetland sites, and invading intact cypress domes and tropical hardwood hammocks, where it displaces native vegetation and alters the structure of the plant community (Langeland and Burks, 1998).

Taxonomy and Physical Description

A member of the spurge family (Euphorbiaceae), bishopwood (*Bischofia javanica*) is an evergreen tree that reaches heights of 35-60 feet. Compound leaves are alternate, long- petioled, and trifoliolate (three leaflets). Leaflets are shiny, bronze-toned, oval-elliptic, six to eight inches long, with margins small toothed. Flowers are tiny, without petals, greenish yellow, in many flowered clusters (racemes) at leaf axils. This species is dioecious, meaning male and female flowers are on separate plants. Fruit is pea-sized, berrylike, fleshy, to 0.33 inches in diameter, brown or reddish or blue-black, three-celled (Langeland and Burks, 1998).

Biology and Reproduction

This species is fast-growing from seed or cuttings, thriving best in moist soil. Flowering occurs in spring, producing copious amounts of fruits. Seeds are dispersed by birds (Langeland and Burks, 1998).

5.2.7 Australian Pine

Occurrence and Status

Several species of Australian-pine (*Casuarina* spp.) were introduced from Australia to Florida in the 1890s and have been planted throughout Florida to form windbreaks around canals, agricultural fields, roads, and houses. Australian-pine trees threaten native central and south Florida beach plant communities by quickly invading newly accreted beaches, beaches where dredge spoil has been deposited, and beaches where a storm has destroyed existing vegetation. Australian-pine trees have also invaded south Florida's hammock and tree island communities in the Everglades. These trees out-compete native vegetation by producing a dense leaf litter beneath them. Australian-pine invasions often displace native plant communities that provide critical wildlife habitat for threatened and endangered plant and animal species and provide little or no native wildlife habitat [Florida Department of Environmental Protection (FDEP), Bureau of Invasive Plant Management – Australian-pine (*Casuarina* species),]. Australian-pine is prohibited by the FDEP.

Taxonomy and Physical Description

Although this species resembles a pine tree, it is an angiosperm, not a conifer. Australian-pine belongs to the Beefwood family (Casuarinaceae). It generally has a single trunk with an open, irregular crown, reaching heights up to 150 feet tall. Its bark is brown to gray, rough, brittle, and peeling. Leaves are reduced to tiny scales, six to eight in whorls encircling joints of branchlets. Flowers are unisexual (monoecious) and inspicuous. Female flowers are in small axillary clusters, and male flowers are in small terminal spikes. Fruit is a tiny, one-seeded, winged nutlet (samara), formed in woody cone-like clusters, 0.75 inch long (Langeland and Burks, 1998).

Biology and Reproduction

Australian-pine has been extremely successful in southern Florida for a variety of reasons, including rapid growth, salt tolerance, abundant seed production, and its ability to colonize disturbed sites. It can colonize nutrient-poor soils as a result of nitrogen-fixing microbial associations. Australian-pine reproduces prolifically by seed, with seeds dispersed by birds, water, and wind. However, this species is sensitive to fire, is not tolerant to freezing temperatures, and topples easily in high winds (Langeland and Burks, 1998).

5.2.8 Air-potato

Occurrence and Status

Air-potato, a native of Africa, was introduced to Florida in the early 1900s as a USDA sample sent to the horticulturalist in Orange County, Florida. This species was likely planted as an ornamental and, due to its aggressive nature, has spread to natural areas in 23 counties. It is considered a noxious weed by the Florida Department of Agricultural and Consumer Services (FDACS) (Langeland and Burks, 1998).

Taxonomy and Physical Description

A member of the Yam Family (Dioscoreacea), this species is a twining herbaceous vine with primarily aerial tubers formed in leaf axils. Leaves are alternate, eight inches long, and broadly heart-shaped. Flowers are small, arising from leaf axils and fruits are capsules. (Langeland and Burks, 1998).

Biology and Reproduction

Air potato is considered extremely aggressive and primarily spreads by aerial tubers. This species can engulf native vegetation by climbing high into mature tree canopies. In Florida, this species rarely flowers or fruits. Aerial stems usually die back in winter. Although aerial tubers are considered the main storage organ, underground tubers have been found up to 9.8 inches in diameter (Langeland and Burks, 1998).

5.2.9 Lantana Camera

Occurrence and Status

Lantana is a shrub from the West Indies that was introduced to Florida as an ornamental in the 1800s. Lantana is found throughout the southeast, including throughout Florida (Langeland and Burks, 1998).

Taxonomy and Physical Description

Lantana is a member of the Vervain (Verbenaceae) Family. Lantana camera has extensively hybridized with all varieties of native lantana (*Lantana depressa*). In addition, it has been widely cultivated in Florida with over 100 forms, cultivars, and hybrids available. It is a multi-stemmed, deciduous shrub growing up to approximately six feet in height. Leaves are opposite, simple, rough hairy, strongly aromatic, and up to six inches in length. Flowers are small, multicolored,

and in dense, flat-topped clusters. Fruits are two-seeded drupes (Langeland and Burks, 1998).

Biology and Reproduction

Lantana flowers year-round and seeds are dispersed by songbirds. It strongly resists herbivory, and is highly toxic to grazing animals. It also produces allelopathic substances in the roots and shoots, increasing its competitive ability (Langeland and Burks, 1998).

5.2.10 Burma Reed

Occurrence and Status

Burma reed was introduced by the USDA to its Plant Introduction Station in Coconut Grove in 1916 and has since spread to several counties in southern and central Florida. It is considered a noxious weed by the FDACS (Langeland and Burks, 1998).

Taxonomy and Physical Description

Burma reed is a member of the Grass Family (Poaceae). It is a robust, reed-like perennial that grows up to 10 feet tall. Stems are often branched and filled with a soft pith. Inflorescence is a large, feathery, silver-hairy terminal panicle. It is similar to the common reed, *Phragmites australis* (Langeland and Burks, 1998).

Biology and Reproduction

This species can grow in a variety of habitats including marshes and sunny, dry, disturbed sites. Aerial stems are killed by frost; however, rhizomes vigorously re-sprout. Burma reed flowers most of the year; seeds are dispersed by wind (Langeland and Burks, 1998).

5.2.11 Torpedo Grass

Occurrence and Status

Topedo grass is an Old World grass introduced to the U.S. in the 1800s. It was introduced as a forage crop in the south in the 1920s and was planted in every southern Florida county by 1950. Torpedo grass occurs naturally in most of Florida's counties.

Taxonomy and Physical Description

Torpedo grass, a member of the Grass Family (Poaceae) is a perennial grass that grows to approximately three feet in height from sturdy, vigorous, widely creeping, or floating rhizomes. Aerial stems are erect or leaning with the lower portions often wrapped in bladeless sheaths. Inflorescence is a loose open terminal panicle, three to nine inches long.

Biology and Reproduction

This species thrives in wet sandy or organic soils, but can tolerate drought and can grow on heavy upland soils. It reproduces primarily by rhizome extension and fragmentation. Torpedo grass flowers nearly year-round, but it is variable in its seed abundance and viability.

5.2.12 Guava

Occurrence and Status

A native of the tropics, guava was introduced to Florida in the 1700s and has been planted extensively for edible fruit and ornament. However, it is weedy and has spread to hammocks and pinelands and has become dominant in the understory of some cypress strands. This species has become naturalized in many Florida counties.

Taxonomy and Physical Description

A member of the Myrtle Family (Myrtaceae), this species is an evergreen shrub or small tree. Leaves are opposite, simple, short stalked, entire, oval to oblong-elliptic, and pubescent below. Flowers are white, fragrant, approximately 1.4 inches wide and are borne singly or a few together at leaf axils. Fruit is an oval or pear-shaped berry, one to four inches long.

Biology and Reproduction

Guava has the ability to form dense thickets. It grows rapidly and tolerates shade. It flowers and fruits year-round. Seed dispersal is by birds and mammals.

5.2.13 Brazilian Pepper

Occurrence and Status

Brazilian pepper, a native of Brazil, Argentina, and Paraguay, has successfully naturalized in over 20 countries worldwide. This species was introduced to the U.S. as an ornamental in the early 1900s and currently occurs in Florida, Louisiana, Texas, California, and Hawaii, as well as the Commonwealth of Puerto Rico. It became popular because of its bright red fruits and shiny leaves and was reportedly distributed across the state and planted along many city streets (FLEPPC, 1997).

Brazilian pepper quickly spread throughout much of the state, as its seeds are spread by frugivorous birds. It became conspicuously dominant in Florida by the 1950s and now covers hundreds of thousands of acres in south and central Florida, making it the most widespread exotic plant in the state (FLEPPC, 1997).

Taxonomy and Physical Description

Brazilian pepper is a member of the Anacardiaceae (Cashew) family. It is an evergreen shrub or small tree that often has a multi-stemmed trunk. Its multiple stems and arching branches often form tangled thickets. Leaves are alternate, odd-pinnately compound with three to 11 (usually seven to nine) leaflets, approximately elliptic to oblong, one to two inches long. Flowers are small, unisexual (dioecious), in short-branched clusters at leaf axils of current-season stems.

Flowers have five petals. Fruit is a small, bright red spherical drupe (Langeland and Burks, 1998).

Biology and Reproduction

Brazilian pepper is considered an aggressive woody weed in Florida to disturbed sites, such as highway, canal and powerline rights-of-way, fallow fields, and drained cypress stands, as well as many undisturbed natural environments. This species currently threatens many of Florida's natural areas and poses a serious threat to species diversity by eliminating many indigenous sources of food for wildlife (FLEPPC, 1997).

Flowering may occur sporadically throughout the year; however the main flowering period for Brazilian pepper is September through October. In about 10% of the population, a second flowering period may occur in March through May. Fruit production occurs November through February, and fruits are generally retained on the tree for up to eight months. Seed dispersal is accomplished by both native and exotic birds. Raccoons and opossums may also spread seeds. Brazilian pepper also has the ability to sprout from above ground stems and root crowns. Re-sprouting is often profuse and growth rates very high.

In addition to threatening Florida's native ecosystems, Brazilian pepper poses several health and safety problems. It belongs to the same Familly (Anacardiaceae) as poison ivy (*Toxicodendron radicans*) and direct contact with the sap can cause severe skin irritation. In addition, airborne chemical emissions can cause sinus and nasal congestion, rhinitis, sneezing, headaches, and eye irritation. "Consumption of foliage by horses and cattle can cause hemorrhages, intestinal compaction, and fatal colic. Birds that feed excessively on the fruit have been known to become intoxicated and later die." (FLEPPC 1997) Brazilian pepper is listed as a noxious weed by the FDACS and is prohibited by the FDEP.

5.2.14 Christmas Senna

Occurrence and Status

A native of South America, Christmas senna has been cultivated in all regions of Florida at least since the 1940s. It has been observed in natural areas of southern Florida since the 1970s and is now naturalized throughout much of Florida.

Taxonomy and Physical Description

Christmas senna is a member of the Pea Family (Fabaceae). It is a sprawling evergreen shrub that grows up to 13 feet tall. Leaves are alternate, even-pinnately compound, with three to six pairs of leaflets. Flowers are yellow to yellow-green in three to 12- flowered racemes near the stem tips.

Biology and Reproduction

Christmas senna is an aggressive shrub that becomes established in sunny openings and then clambers over adjacent canopy. It displaces native vegetation in disturbed and undisturbed areas in Florida's tropical hammocks, coastal strands, and canal banks. It flowers in late fall to

early winter and produces numerous seeds in each pod.

5.2.15 Napier Grass

Occurrence and Status

A native of Africa, Napier Grass was introduced to the United States in the early 1900's as a forage crop and was established in glades in south Florida by 1971. Now commonly naturalized in central and south Florida, infrequently in north and west Florida, most often in disturbed areas such as roadsides, canal banks, and fields, but also in scrub, pine rockland, hammock, sink, lake shore, swamp, and prairie habitats.

Taxonomy and Physical Description

Napier grass is a member of the Grass Family (Gamineae). It is a robust perennial and grows to 13 feet tall, forming thick clumps or colonies from basal offshoots or short rhizomes. Stems often branch above, internodes more or less bluish glaucous, young nodes with white hairs, later becoming smooth, glabrous. Leaf sheaths glabrous, usually shorter than the internodes; ligule a narrow rim densely fringed with long white hairs. Leaf blades linear to tapering, flat, often bluish green, to 39 inch long and one inch wide, pilose near the base, especially on margins, blade margins generally rough, midvein stout, whitish above, strongly keeled below. Inflorescence a dense terminal panicle, spike-like, bristly, tawny to purple-tinged, to about eight inches long and 0.8 inch across. Spikelets 1.5 to 2.5 inches long, solitary or in clusters of two to six on hairy axis, surrounded by sparsely plumose bristles to 0.75 inch long that fall with the spikelets at maturity; outermost glume minute or absent.

Biology and Reproduction

Napier Grass grows well on a wide range of soils and in many habitats, very drought resistant, can form "reed jungles" in rich, moist soils. The plant forms dense clumps by extensive tillering. It propagates vegetatively by root crown divisions or rhizome and stem fragments. It resprouts easily from small rhizomes left after mechanical control (Cunningham 1991). It is able to persist in changing conditions from extensive, deep, fibrous root system, but can be injured by freezes. It flowers July through February.

5.2.16 Small-leaf Spiderwort

Occurrence and Status

A native of South America, Small-leaf Spiderwort is a species of spiderwort also known by the common name wandering jew. It is also known as River Spiderwort, Small-Leaf Spiderwort, Inch Plant, Wandering Trad and Wandering Willie. Naturalization of wandering Jew in floodplain forests and bottomlands has occurred from central Florida to the Pan Handle, in counties including Alachua, Orange, Leon, and Flagler. Small-leaf Spiderwort is considered a Category I exotic invasive by the FLEPPC.

Taxonomy and Physical Description

Small-Leaf Spiderwort is a member of the Spiderwort Family (Commelinaceae). It is a perennial ground cover that spreads along the ground with soft, hairless stems and leaves. The fleshy stems root at any node that is on the surface. The plant has oval, dark-green leaves with pointed tips that are shiny, smooth and slightly fleshy about 1.25 - 2.5 inches long. The flowers are white with three petals and approx. 0.5 to one inch in diameter.

Biology and Reproduction

They are produced in small clusters in summer but do not produce seeds. The seriously invasive qualities of Small-leaf Spiderwort result from a combination of attributes. Forming a dense mat underneath forest tree cover to 12 inches or even more (facilitated by a remarkable shade tolerance) it smothers ground-level plants and prevents the natural regeneration of taller species and if left unchecked, it can lead to the destruction of native forests. Even where the climate does not permit Small-leaf Spiderwort to take root, it still can spread rapidly from being transported by animals or humans and even strong winds. The succulent stems break easily at the nodes and establish themselves wherever they land on moist soil. While Small-leaf Spiderwort does respond to herbicides and other applied weed controls, each segment has the ability to regenerate, so it is able to make a rapid comeback, especially in soft soils where stems may remain underneath the surface.

5.3 Fish and Wildlife

The invasion of exotic species has reduced both native plant species diversity and wildlife diversity at the site. Nevertheless, because it is mostly undeveloped and infrequently used, the SCWTS property likely is used by a variety of wildlife species. Biological surveys were conducted for the entire SCWTS by Hall and Newman in the summer and fall of 2001 'Threatened and Endangered Species Survey, Final Report of the Snake Creek Training Site, Miramar, Florida' and by CH2M-Hill in March 2004 "Wetland Planning Level Survey, Snake Creek Weekend Training Site in Miramar, Florida". After the site had been improved by removal of invasive and exotic plant species and the reintroduction of native plant species in many areas, wildlife usage of the site is expected to increase. In February, 2011, Thompson Environmental Consulting performed a Fauna Planning Level Survey on the southern property. They reported observing Southeastern American Kestrel (*Falco sparverius paulus*), little blue heron (*Egretta caerulea*), cattle egret (*Bubulcis ibis*), glossy ibis (*Plegadis falcinellus*) among other migratory birds during pedestrian transects; however, they reported observing no other focal mammal, reptile, amphibian species. Sampling of the borrow pond revealed Florida bluegill (*Lepomis macrochirus mystacalis*) and sunfish redear (*Lepomis* sp) as well as macroinvertebrates; pouch snails (*Physella* sp.), planar snails (*Gyraulis* sp.), and spired or horned snails (*Pleurocera* sp.). In July 2016, Environmental Resource Solutions, Inc performed a Fauna Planning Level Survey on the entire property. The Tricolored heron (*Egretta tricolor)*, a state threatened species, was the only focal species observed. It was observed fishing in the littoral zones of the excavated borrow pit areas, in the southern parcel. FLARNG staff have observed the Florida burrowing owl near the borrow pit areas and around the adjacent Readiness Center, however none were observed during the survey.

Table 5-3 in Appendix 8 presents a list of wildlife species observed at the site to date. Other wildlife species that could occur at the site include: raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), gray squirrel (*Sciurus carolinensis*), and armadillo (*Dasypus novemcinctus*), as well as herpetofauna. Insect surveys have not been conducted, but several species of butterflies have been observed on-site, including the zebra longwing (*Heliconius charitonius*), Florida's state butterfly.

5.4 Threatened and Endangered Species

Broward County is home to numerous state and federally listed species. General threatened and endangered (T&E) species surveys of the entire SCWTS were conducted by Hall and Newman in the summer and fall of 2001 and by CH2M-Hill in December 2003. In addition, Thompson Environmental Consulting performed a Fauna Planning Level Survey on the southern parcel in February of 2011 and Environmental Resource Solutions, Inc performed a Fauna Level Planning Survey on the entire property in July 2016. These surveys resulted in no federally-listed species sightings and the following four state-listed species sightings:

- Southeastern American kestrel (*Falco sparverius paulus*) – T (Threatened);
- Little blue heron (*Egretta caerulea*), (migratory) - SCC;
- Tricolored heron (*Egretta tricolor)* – T (Threatened)
- Florida burrowing owl (*Athene cunicularia floridana)* – T (Threatened)

Although only four state-listed species were observed, Hall & Newman (2001) noted that additional rare species could occur at the site (see Appendix 9: Table 5-4). For example, the bald eagle (*Haliaeetus leucocephalus*) and the Everglade snail kite (*Rostrhamus sociabilis plumbeus*) are possible inhabitants of this site. USFWS has indicated that the SCWTS is located within the core foraging area (within 18.6 miles) of eleven wood stork (*Mycteria americana*) nesting colonies. The wood stork typically utilizes freshwater marshes, ponds, ditches, tidal creeks and pools, and impoundments as well as other wetlands for foraging. As these habitats occur within the SCWTS, it is likely that the wood stork could be an occasional visitor at the Property. In order to protect potential use of the site by wood storks, the FLARNG uses the USFWS South Florida Programmatic Wood Stork Key to determine if any projects will effect wood storks.

The USFWS has also indicated that habitat suitable for the Eastern Indigo Snake (*Drymarchon corais couperi*) could be present at the SCWTS. The USFWS South Florida Programmatic Eastern Indigo Snake Key is utilized by the FLARNG to determine if a project will effect eastern indigo snakes. Eastern Indigo snakes are frequently associated with high, dry, well-drained soils and have been documented using inactive gopher tortoise (*Gopherus polyphemus*) burrows. It should be noted that no gopher tortoise burrows were identified at the site during the T&E species surveys of the SCWTS conducted by Hall and Newman in the summer and fall of 2001, by CH2MHill in December 2003, and Thompson Environmental Consulting Survey in February 2011. Due to past land use of the site, the potential for EIS to occur at SCWTS are low.

During consultation with USFWS, they noted SCWTS will be in the consultation area of the Florida Bonneted Bat (FBB) and recommends we should schedule acoustic survey's to determine presence or absence of the FBB's at SCWTS, but before implementation of survey double check the final consultation area boundaries to make sure we are located within it.

5.5 Wetlands

As discussed in **Section 4.5.1**, two wetlands were identified during a planning-level wetland delineation and inventory of the entire SCWTS property conducted by CH2M HILL in March 2004. Both of the identified wetlands occurred on SCWTS northern parcel. No wetlands occur on SCWTS southern parcel. This INRMP Update includes descriptions and addresses management of these wetlands.

6.0 Mission Impacts on Natural Resources

6.1 Current Land Use

The SCWTS has been licensed to the FLARNG from the Department of Army since October 1980. FLARNG has conducted the following types of training at the SCWTS:

- Light infantry with wheeled vehicles
- Field Training Exercises (FTX) involving air defense artillery scenarios (dry firing only)
- Military communications transmit and relay
- Battalion Tactical Operation Center (TOC) operations
- Field maintenance of wheeled equipment
- Individual military training
- Army aviation

As a result of intensive disturbance over the years, current training has no additional negative impact on natural resources at the SCWTS. This is primarily due to the condition of the site, which had been extensively drained and was primarily covered by invasive exotic species. Although, management of the site has greatly decreased the extent and dominance of exotic and invasive species on the site, the replacement communities are trending toward sustainable pasture-like communities with scattered trees and hedgerows. These types of landscapes are optimal for military training and are also preferred by many wildlife species and migratory birds. It is anticipated that military training activities will be compatible with wildlife and bird species that may utilize the site.

6.2 Future Land Use

The FLARNG intends to expand its use of the SCWTS. Current plans include the construction of some additional training facilities (e.g., jump tower, obstacle course, and similar facilities) throughout the site. The FLARNG also intends to develop the site into a more usable training site, with specific uses yet to be determined. Potential future uses of the site are depicted in **Appendix 1: Figure 6-1**. The FLARNG will seek consultation from state and federal agencies regarding potential adverse effects to natural resources before these projects are implemented, when an adverse effect is anticipated. The continued eradication and control of invasive species and the reintroduction of native species has improved the site for successfully conducting military training. The FLARNG intends to continue to implement the exotic and invasive species management plan that will control invasive species on the site to enhance training opportunities while reintroducing and promoting native species and implementing sound natural resource management at the SCWTS. Eradication and/or control of invasive species enhances the natural environment, while creating a usable training area.

6.3 Natural Resources Needed to Support the Military Mission

The FLARNG recognizes its responsibility to guarantee continued access to its land, air and water resources for realistic military training while ensuring that the natural and cultural resources entrusted to their care are sustained in a healthy condition for scientific research, education and other compatible uses by future generations. Continued eradication and/or control of invasive species at the site will be maintained to fully utilize the Property as a training site. Once invasive species have been removed from the site, natural vegetation is expected to repopulate the area in addition to the native vegetation reintroduced to the SCWTS. However, supplemental native vegetation planting may be required in order to enhance the natural environment and support military training. Only native species would be utilized in supplemental vegetation efforts. Species which could potentially be used include, but are not limited to, those identified in **Appendix 10: Table 6-1** (Broward County, Natives For Your Neighborhood, http://regionalconservation.org/beta/nfyn/PlantList.asp).

The goal of the exotic and invasive species management plan is to eradicate exotic and invasive species while promoting the establishment of native species, compatible with military training and the military mission. The desirable goal for this training site is to optimize the site for military training maneuvers by establishment of pasture-like cover with scattered individual and clumps of mature trees and shrubs that would offer a combination of open space divided by natural barriers and cover. Currently, most of the existing scattered mature trees serving this function on the site are exotic and invasive species; bishopwood and earleaf acacia. Although it is the intent to plant native trees and shrubs to establish native species and eradicate non-native species, it is realized that the optimal structure will not be provided until the planted native trees mature at about 15-25 years of age. It is the intention of FLARNG to allow these invasive trees to remain to provide this structure while native trees eventually replace them through selective management. Ongoing mowing, burning, and removal of any new plants that may become established on site will control the proliferation of invasive trees and shrubs. Once native trees and shrubs reach the size that serve the military and training functions, then all of the non-native and invasive plants will be removed.

Planting of larger specimens may significantly decrease the time for native species replacement. Larger 30 gallon specimens will be encouraged; however, even larger spaded trees could be considered. Such larger native trees might be donated from development sites and will significantly decrease the establishment period; however, the spading operation as well as the monitoring and care to assure tree survival could be costly.

6.4 Natural Resources Constraints to Missions and Mission Planning

The SAIA, requires that INRMPs provide for "…no net loss in the capability of military installation lands to support the military mission of the installation" (16 USC §670 et seq.). Primary impacts result from restrictions placed upon areas of environmental concern, including wetlands and endangered species locations. Training may also be adjusted periodically to allow for natural resources management activities.

Environmental constraints promote awareness on the part of soldiers. Learning to plan around environmental restrictions helps develop a disciplined mindset that is a valuable asset to today's soldier. However, this must be balanced to avoid inadequate training caused by excessive constraint.

Areas on the SCWTS that require restriction would comprise the wetlands and appropriate buffer on the northern parcel of the Property and the borrow pond surface waters. The restriction will include encroachment or use of these areas that would result in fill, soil disturbance, changes in ground surface contours, significant vegetation disturbance, placement of any structures, or water quality degradation. Most pedestrian activities in the wetlands, or boating and swimming related training activities in the lake, would be acceptable as long as they do not significantly affect the natural environment. All activities that require discharge of fill material, construction of any structure, or disturbance of soil and surface contours would likely require permits and mitigation from the FDEP, SFWMD and/or the USACE. Significant disturbance activities such as those caused by wheeled or track vehicles and other large equipment will be expressly prohibited. Restrictions in these areas will be detailed in the environmental awareness pamphlet and will be discussed in any pre-activity briefings of trainees.

Other natural resource restrictions to missions and mission planning involve the Migratory Bird Treaty Act. On July 31, 2006, the DoD and the USFWS entered into a Memorandum of Understanding (MOU) to promote the conservation of migratory birds, in accordance with Executive Order 13186, "Responsibilities of the Federal Agencies to Protect Migratory Birds." This MOU describes specific actions that should be taken by DoD to advance migratory bird conservation; avoid or minimize the take of migratory birds; and ensure DoD operations-other than military readiness activities-are consistent with the Migratory Bird Treaty Act. The final rule was published in the Federal Register on February 28, 2007. The measure directs the Armed Forces to assess the effects of military readiness activities on migratory birds, in accordance with the National Environmental Policy Act. It also requires the Armed Forces to develop and implement appropriate conservation measures if a proposed action may have a significant adverse effect on a migratory bird population. The rule also provides that when conservation measures require monitoring of migratory bird populations, the Armed Forces retain the data for five years.

On-site field reviews by FLARNG environmental staff, along with the 2011 Thompson Fauna Survey and 2016 Environmental Resource Solutions, Inc. Fauna Planning Level Survey, in addition to research for information on migratory bird data for the South Florida area all indicate that migratory birds utilize the SCWTS for foraging opportunities. Although migratory birds do utilize the property for foraging, the FLARNG has concluded that INRMP implementation activities may affect, but not likely to adversely affect migratory birds. The following rationale is provided in support of this determination:

A. Foraging areas (i.e. grass areas) exist on the property; with possible nesting habitat on, or within the immediate vicinity of the property. The property is regularly maintained grass, with few dense stands of trees

B. INRMP activities are considered to have a positive ecological effect. Birds have been observed foraging in recently mowed grass areas. Removal of invasive and exotic vegetation allows for the regeneration of valuable, native habitat

C. Activities, when possible, will not be conducted during the breeding season

D. Site specific survey's looking for the presence of birds and/or nests will be completed in the proposed project area prior to project implementation.

E. A best practices approach will be used during routine maintenance, retrofitting and management actions.

Activities proposed under this INRMP Update, which are not considered military readiness activities include the following:

1. Natural resource management activities, including, but not limited to, habitat management, erosion control, forestry activities, agricultural out leasing, conservation law enforcement, and invasive weed management.

7.0 Natural Resources Management

The purpose of this section is to outline natural resources management that will support and be consistent with the military mission while protecting and enhancing such resources in accordance with accepted stewardship principles. Natural resource management issues at the SCWTS include:

- Geographic Information Systems (GIS)
- Invasive Species Management
- Fish and Wildlife Management
- Threatened and Endangered Species Management
- Water Resources and Aquatic Habitat Management
- Landscaping and Grounds Maintenance
- Erosion Control and Soil Conservation
- Integrated Pest Management

The above-mentioned issues are discussed in the following subsections.

A recommended management calendar (which may be subject to change, as necessary) is included in this INRMP as **Appendix 5**. Many of the recommended management measures that are codified within **Section 7.0** are included within this management calendar, which will aid in performing in-field inspections at the SCWTS.

7.1 Geographic Information Systems (GIS)

Natural resources data are maintained by FLARNG environmental management program and natural resources personnel. GIS technology is used to manipulate and analyze data. Currently, the FLARNG has electronic data files for the following natural resources on the SCWTS:

- Aerial (Digital Ortho Quarter Quad [DOQQ] years 1984, 1999, 2005, 2009)
- Soils (USDA SSURGO)
- Snake Creek Canal
- Borrow Pond
- Man-made Ditches
- Wetlands
- Training site boundary
- Roads
- 2003 Aerial Photography of Site
- Invasive Species Management Compartments
- Surrounding Land Use
- Florida Land Use Cover Forms and Classification System (FLUCFCS)
- Topography (USGS and County LIDAR)

GIS continues to be an integral part of the natural resources and training land management. GIS data files for the SCWTS are managed through the FLARNG NRM in St. Augustine, Florida. All GIS data must meet SDSFIE standards.

7.2 Invasive Species Management

7.2.1 Overview

The SCWTS was once blanketed with invasive and exotic species and significant resources have been expended to implement an invasive species management plan. Continued management of exotic and invasive species is key to the successful management of natural resources at the SCWTS. Invasive and exotic species may include plants, insects, or animals. An **invasive** species is defined as “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” An alien (or **exotic**) species is defined as a “species including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem (EO 13112)”. Due to their invasive capacity, many exotic species have the ability to spread rapidly through ecosystems since their natural predators are often not present. Such species often retard natural succession and reforestation and generally cause a reduction of biological diversity in natural ecosystems.

Noxious weeds are defined as “any living stage (including but not limited to, seeds and reproductive parts) of any parasitic or other plant of a kind, or subdivision of a kind, which is of foreign origin, is new to or not widely prevalent in the United States, and can directly or indirectly injure crops, other useful plants, livestock, or poultry or other interests of agriculture, including irrigation, or navigation, or the fish and wildlife resources of the United States, or the public health (Federal Noxious Weed Act of 1974).”

7.2.2 Laws and Regulations

Laws and regulations pertaining to invasive and exotic species include the following:

Federal

- Federal Noxious Weed Act of 1974 (revised 1997) (7 USC §2801 et seq.)
- Federal Insecticide, Fungicide, and Rodenticide Act (7 USC §136)
- Federal Pest Plant Act (7 USC §150a et seq.)
- EO 13112, Invasive Species
- EO 11987, Exotic Organisms
- Harmful Aquatic Organisms Act (92 SB0957)

Florida

There are numerous state laws and regulations pertaining to invasive and exotic species including state noxious weed laws, aquatic weed quarantines, and plant pest quarantine regulation. The state also enforces the Federal Noxious Weed Act. There are several plant species that are considered noxious and control is mandatory for those found on the Federal list. A helpful website that includes laws and regulations pertaining to invasive species in Florida is:

http://www.invasivespeciesinfo.gov/laws/state/fl.html

7.2.3 Current Management

Current management of invasive and exotic plant species on the Property includes a combination of herbicide application, bush-hogging, chipping, and mowing. The FLARNG has periodically applied spray herbicide to the fence line and in man-made ditches to help control invasive vines and overgrown vegetation. The FLARNG contracted removal of Brazilian Pepper and other invasive shrubs and small trees by bush-hogging, roller chopping, and chipping. The continuation of invasive species regeneration control contracts will be necessary to control the return of invasive species and keep many areas on the site in a pasture-like state. **Figure 7.1 (Appendix 1)** shows the current management of the site, showing areas that are currently under continual mowing and areas that have been chipped and bush-hogged. A vegetative community planning level survey was performed in 2009 by LG^2 Environmental Solutions, Inc. to establish a monitoring baseline of the site. The survey established a system of belt transects designed to cover 10 percent of the study area (125 acres under invasive species regeneration control contracts at that time) in which species composition and percent-cover was determined. This study established a baseline survey that can be repeated on a regular basis to track the progress of native species establishment and invasive and exotic species eradication.

7.2.4 Management Opportunities

Great progress has been made in removing invasive and exotic species at SCWTS. Areas that have not been fully managed in the past and the threat of invasive species require continuous invasive species management through a variety of established and/or new management techniques. Invasive species will be eradicated if feasible; however, when invasive species are well established, as some have been at SCWTS, eradication may not be feasible. In these cases control methods will be employed, where feasible, to prevent the spread or lessen the impacts of invasive species. The following is a discussion of various management and control measures that will be continued and/or considered.

7.2.4.1 Potential Management Results

Control and management options for dealing with invasive species include eradication within a local area, population suppression, limiting dispersal, reducing impacts, and other diverse objectives. The goal in management of invasive and exotic species and establishment of native species has two considerations: 1) establishment of a native species community and 2) creating a vegetative community conducive to military training and the military mission.

Eradication - Eradication refers to the complete removal of a species from an area. The permanent eradication of an invasive species in a known colony or extended location is often expensive and labor intensive. The preferred form of control, eradication, is often not feasible for relatively large infestations of invasive species. The immediate results of eradication may leave the ground disturbed and in prime condition for the colonization of an alternate invasive species. Complete sustainable eradication of invasive and exotic species from the SCWTS is not feasible due to an ample seed source and the continual reintroduction of seeds from wildlife from other populations in the vicinity.

Population Suppression - Population suppression of most invasive and exotic plants can be achieved by three common means: 1) fire, 2) mowing, and 3) grazing. Due to the urban environment surrounding the SCWTS, as well as potential issues associated with burning brazilian pepper, fire suppression was not considered an appropriate control method for the SCWTS in the past. The dense nature of the shrub community would have caused a severe fire hazard to adjacent residential communities, as the fire would have been large and intense. However, since the areas have been roller chopped, chipped, and mowed in recent years converting the areas into pasturelands and low lying regenerating shrub communities, controlled burning could be considered a viable management tool for suppressing undesirable vegetation.

Suppression by mowing can yield both positive and negative results. Mowing invasive and exotic vegetation can cause a reduction in the plant size and, if accompanied by the application of an herbicide, can cause eradication. The negative aspects associated with mowing are spreading, scattering, and dispersion of seeds, which result in the further spread of invasive and exotic species. In addition, native woody species would also be suppressed. However, mowing with some herbicidal application that selects against most broad-leaves while favoring grasses, a near monoculture of Bahia grass, or other similar grass, can be achieved. Either broadcasting herbicide or other mechanized methods, such as the Burch Wet Blade system (Mullanhey and

Williams, 2001)), can be considered to keep out undesirable vegetation.

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Limited Dispersal and Impact Reduction - One of the most effective means to controlling any living plant is to avoid the further spread of the species. By limiting the dispersal of a species, a plant's chance for future survival is greatly decreased. This process often involves the removal or decay of the reproductive means of the plant. For example, if the seed head is removed from a thistle, it is no longer a threat to future spreading. Limited dispersal and impact reduction can both be achieved by the early control of a plant. The fewer in number of a species, the easier and quicker a remedy can be identified and proper control means put into effect for an eradication. Control measures effective in limiting dispersal and impacts would include burning, mowing, and grazing.

7.2.4.2 Control Methods

Invasive exotic species may be controlled using one or a combination of the following control techniques: biological, mechanical, physical, and/or chemical. Several management and control methods have been implemented greatly reducing Brazilian Pepper, which was previously the predominant species on this landscape. This INRMP update discussion is geared towards the eradication and control of several other species that exist on the Property. The specific plan for detailed eradication methods planned for the SCWTS can be found in the Invasive Species Eradication Implementation Plan (ISEIP) located in **Appendix 4**.

Biological control is the use of predators, parasites, or disease organisms to control pests. Biological control does not eradicate weeds. It simply restores a natural balance between the weed and its enemies. Biological control can be self-regulating since the introduced natural enemies often become part of the ecosystem (FLEPPC, 1997). Research is being conducted on insect species that could potentially be used to control Brazilian pepper. However, currently, there are no biological controls that have been released in the United States for Brazilian pepper. University of Florida scientists have identified two insect species, which may prove to be effective biological control agents, a sawfly and a thrips. The sawfly causes defoliation and the thrips feeds on new shoots. UF scientists expect authorization to release these insects in the future. However, their effectiveness for controlling Brazilian pepper in Florida is unknown at this

time (University of Florida, 2003). Currently there are no known biological control agents for other exotic species found on the SCWTS property.

Mechanical control of Brazilian pepper and exotic species such as bishopwood and earleaf acacia may be accomplished, if feasible, through the use of heavy equipment such as bulldozers, front-end loaders, root rakes, and other specialized equipment. Currently invasive and exotic species are being managed by bush hogging, chipping, and mowing. Once areas are essentially cleared of shrubs and trees, regular mowing could effectively control the growth of new invasive and exotic species shoots before they reach reproductive stages. Regular mowing occurs over most of the Property; however, approximately 30 acres of the southern parcel and 107 acres of the northern parcel have only been bush-hogged and chipped. FLARNG intends to add these areas to the regular invasive species regeneration control contracts.

An herbicide application is highly recommended to prevent re-growth from the remaining stumps. Stumps that fail to be chemically treated will re-sprout. A chainsaw may be used for the removal of single trees or small clumps of trees. Once the vegetation has been cut and treated the remaining foliage may be burnt, left to decay, or taken to a yard trash recycler for proper management. If plants are cut and mulched, this should be accomplished while plants are not in fruit to prevent spreading the seeds. As Brazilian pepper fruit production generally occurs during the winter (November to February) and ripe fruits may be retained on the tree for up to eight months, timing of this type of mechanical control is important. Fruits will be dispersed prior to the following flowering season, which generally occurs September to October (FLEPPC, 1997). In addition, a combination of mechanical and herbicidal control can be accomplished by use of the Burch Wet Blade Mower (Mullahey and Williams, 2001). This method automatically distributes the underside of the mower blades with a continual film of herbicide. As the mower blade cuts the plant, a very small amount of herbicide is applied directly to the plant's vascular system. A much smaller amount of herbicide is needed as it does not have to penetrate the plant's normal defenses such as typical waxy leaf and stem surfaces. This method greatly reduces the amount of herbicide needed, reduces herbicide drift, runoff damaging non-target species, and improves applicator safety.

Physical Control

Plants can be stressed, or even killed, by the physical environment. Temperature and salinity variations, water level fluctuations, the presence or absence of fire, natural disasters and grazing by domestic animals are examples of physical conditions that can dictate vegetation patterns. Land managers use many of these natural limiting factors to manipulate the environment for vegetation management. More often than not, however, nature controls these physical changes and the land manager is forced to take a side seat and observe the changes.

Fire: Research has shown that Brazilian pepper seeds are killed by fire and Brazilian pepper trees less than one meter in height, have an increased mortality rate when subjected to five-year fire intervals. However, Brazilian pepper found in other habitat types may persist with a similar fire regime due to water levels and plant growth rates. Research has indicated that fire is not an effective control method for mature Brazilian pepper stands. However, current management activities have greatly reduced the amount of mature Brazilian pepper plants throughout the SCWTS site. Individuals of this species have been reduced to new shoots in managed pasture areas and shoots regenerating from untreated stumps in areas bush hogged and chipped.

Control methods of mechanical mowing and bush hogging have kept Brazilian pepper to small shoots and low shrubs. Previous to this management, the use of prescribed fire for control was impractical and hazardous to surrounding residential and commercial properties. However, prescribed fire as a tool for invasive and exotic species control can be practical for pasture-like lands and low shrub lands. Regular control burns could effectively limit and even eradicate many invasive and exotic species. A prescribed fire management plan will be developed with FDACS, if feasible.

Flooding: Recent evidence has shown that flooding Brazilian pepper may stress, or in some cases, kill mature trees and seedlings. Brazilian pepper is absent from marshes and prairies with hydro periods exceeding six months at Everglades National Park. Case studies have indicated that when Brazilian pepper is mechanically removed along with the underlying soil (to bedrock), native wetland species will return, while Brazilian pepper does not. This method is not practical for this site as it has been effectively drained and long hydro periods are not expected nor desired on the Property.

Natural disasters: Natural disasters, such as hurricanes, can drastically alter vegetative communities due to extreme wind and rain resulting in flooding. Forceful winds produced by these natural disasters can destroy trees and shrubs of varying life stages. Generally, larger trees experience uprooting more, while defoliation is common for trees of all sizes (Bonilla-Moheno 2010). The destruction of mature trees allows light to reach understory plants that were previously shadowed and allow them to thrive. Winds can also spread plants far from their source through seed dispersal. Natural disasters can destroy both invasive and native species, with land managers having no control of the potential positive or negative effects on species composition. Due to its location, SCWTS in South Florida is at great risk to annual natural disasters (hurricanes, tropical cyclones), with an increased risk in the future due to climate change. Hurricane Irma struck SCWTS in August 2017, resulting in downed trees, mostly invasive Bishopwood and Earleaf Acacia. To replace these downed trees, a native tree-planting plan will be developed and implemented.

Grazing: Grazing can greatly affect the species composition of property. Alone, grazing will rarely, if ever, completely eradicate invasive and exotic plants. However, when grazing treatments are combined with other control techniques, such as herbicides, fire, mechanical, or biological control, severe infestations may be reduced and small infestations may be eliminated. Grazing animals may be particularly useful in areas where herbicides cannot be applied (e.g., near water) or are prohibitively expensive (e.g., large infestations). Animals can also be used as part of a restoration program by breaking up the soil and incorporating seeds of desirable native plants. When not properly controlled, however, grazing or other actions of grazing animals (wallowing, pawing up soil) can cause significant damage to a system, and promote the spread and survival of invasive weeds. Overgrazing without other control methods can reduce native plant cover, disturb soils, weaken native communities, and allow exotic weeds to invade. In addition, animals that are moved from pasture to pasture can spread invasive plant seeds.

Cattle will graze invasive grasses, can trample inedible weed species, and can incorporate native seeds into soil. Sheep and goats prefer broadleaf herbs and have been used to control leafy spurge (*Euphorbia esula*), Russian knapweed (*Acroptilon repens*), and toadflax (*Linaria* spp.). These animals appear to be able to neutralize the phytochemicals toxic to other animals that are present in these and other forbs (Walker 1994). Goats can control woody species because they can climb and stand on their hind legs, and will browse on vegetation other animals cannot reach (Walker 1994). Goats additionally, tend to eat a greater variety of plants

than sheep.

Animals will be brought into an infested area at a time when they will be most likely to damage the invasive species without significantly impacting the desirable native species. Grazing during seed or flower production can be especially useful. On the other hand, some weeds are palatable only during part of the growing season. Grazing will be closely monitored and the animals promptly removed when the proper amount of control has been achieved and/or before desirable native species are impacted.

Herbicidal Control

Herbicides may be applied in a variety of ways. The most common application methods are foliar spray, stump treatment, basal soil treatment, and basal bark application. In addition, a combination of herbicidal and mechanical methods referred to as the Burch Wet Blade Mower can be utilized that greatly increases effectiveness of the herbicide while reducing the amount of herbicide needed and the collateral consequence of herbicide usage (Mullahey and Williams, 2001). This method is described in more detail in the above section on mechanical control.

In foliar treatments the herbicides are pre-mixed with diluents and sprayed onto the foliage of the plant. Usually the leaves are “sprayed-to-wet” which means applying only enough solution to begin running off the leaf surface. Due to fact that foliar applications are a physiologically indirect means of killing root systems, the probability for long lasting success with this method is low, for vigorous, easily sprouting species like Brazilian pepper. Aerial application of herbicides can be used in areas that are remote or where there are large monotypic stands; however, due to the close proximity of residences and businesses to the SCWTS, aerial application methods are not appropriate for the subject Property.

Another technique is to treat the stump with an herbicide solution immediately after cutting the tree at or near ground level. Stump treatments are suitable only when tops are required to be removed from the site. They give temporary control and are labor intensive.

Basal soil treatments can be used with either liquid or dry formulations. The material is broadcast onto the soil under the canopy of the tree. Rainfall carries the herbicide into the root zone of the plant where it is absorbed by the roots.

The basal bark application consists of the herbicide solution being applied, most commonly by backpack sprayer, in a wide band on the stems of the plants near the base. The material is absorbed into the plant and translocated throughout the plant. Stump treatments are suitable only when tops are required to be removed from the site. They give temporary control and are labor intensive.

There are other application methods such as the “frill and girdle”, and various direct injection techniques for the control of exotic species.

The timing of herbicide application is important. The advantages of springtime application include low water levels, which increase accessibility, reduced environmental hazards associated with introducing herbicides to flooded soil, and herbicide uptake is greatest if applied when a plant is metabolically active.

The SCWTS is currently being maintained as pasturelands and low shrubs with scattered Brazilian pepper, Australian-pine, earleaf acacia, and bishopwood. To determine the best control technique, the following will be considered:

- Extent of infestation and presence of other plant communities
- Relation of infestation to topography, soils, and hydrology
- Available management techniques
- Long-term cost of control measures
- Public perception of control activities
- Schedule for initial treatment and maintenance control

7.2.5 Relationship to Other Natural Resources Management

Fish and wildlife management – Herbicides and pesticides could impact non-target species. Best managements practices will be implemented during herbicidal treatments of invasive vegetation.

With the inclusion of the ~94 acre northern parcel at SCWTS, two isolated wetland systems are added to the management plan. Like the remainder of the Property, these wetland areas were dominated with undesirable invasive and exotic species. These areas also were bush-hogged and chipped with the remainder of the Property. In addition, numerous native one-gallon wetland tree specimens were planted within the wetland area. The establishment of a management plan that selectively removes invasive and exotic species through mechanical and herbicidal treatments will promote a more native forested and herbaceous wetland mix. These types of wetlands favor the recruitment and nursery of numerous species of reptiles, amphibians, and birds. As the wetland systems mature under the management plan, they will provide more of the desired wildlife functions.

Water quality – Herbicides and pesticides could impact water quality, with subsequent aquatic habitat implications. Any potential adverse impacts to water quality will be avoided or minimized with the use of best management practices during herbicide application.

7.2.6 Military Mission Considerations

Invasive and exotic species have the capability to form dense strata within the forest, which could interfere with on-the-ground training activities. Regular treatments using mechanical and herbicidal methods with well-planned prescribed fire and grazing could provide an optimal and sustainable training platform with open areas interspersed by individual and clumps of trees and shrubs. Prescribed fire and grazing will be planned as not to conflict with military training events.

7.2.7 Climate Change Considerations

Climate change is altering temperature, precipitation, extreme weather events, and land cover. These factors play a great role in species survival and home range distributions. With warming temperatures home ranges are likely to expand, resulting in an increase in invasive species naturally making their way into new habitats (Hellmann et al 2008). Changes in nutrients and water levels can stress an ecosystem, making them more vulnerable to these invasions. With an increase in the number of invasive species due to climate change, proactive adaptive management is required. Regular treatments using mechanical and herbicidal methods could provide an optimal management strategy to prevent future invasions of exotic species.

7.3 Fish and Wildlife Management

7.3.1 Overview

The SCWTS is a significantly disturbed site affected by a long history of draining, farming, and abandonment, being recently covered by exotic invasive species. Effective land management over the past 5 years has improved the Property to mostly open pasture land with scattered trees and shrubs. The 4-acre pond on-site provides a year-round water source for wildlife. Therefore, the site does provide habitat for wildlife in the middle of a rapidly developing area. The site likely provides refuge for many species.

7.3.2 Laws and Regulations

Protection and management of fish and wildlife resources will be conducted in accordance with federal laws and regulations, executive orders (EOs), AR 200-1, DoD Directive 4715.03, USFWS regulations and agreements, and other applicable laws and guidance from higher headquarters. Laws and regulations pertaining to fish and wildlife management include:

- Bald Eagle Protection Act (16 USC §668a-d);
- Endangered Species Act of 1973 (16 U.S.C 1536);
- EO 11990, Protection of Wetlands;
- Fish and Wildlife Conservation Act (USC §2901 et seq.);
- Fish and Wildlife Coordination Act, as amended (16 USC §661 et seq.);
- Migratory Bird Treaty Act, as amended (16 USC §703-712);
- Migratory Bird Permits; Take of Migratory Birds by the Armed Forces, Final Rule (50 CFR Part 21)
- EO 13186. Memorandum of Understanding to Promote the Conservation of Migratory Birds.

On December 2, 2002, the President signed the 2003 National Defense Authorization Act. Section 315 of the Authorization Act provides that the Secretary of the Interior shall exercise his/her authority under section 704(a) of the Migratory Bird Treaty Act (MBTA) to prescribe regulations to exempt the Armed Forces for the incidental taking of migratory birds during military readiness activities.. The Final Rule, Migratory Bird Permits; Take of Migratory Birds by the Armed Forces (50 CFR Part 21) authorizes the take of migratory birds, with limitations, that result from military readiness activities of the Armed Forces. If any Armed Forces determine that a proposed or ongoing military readiness activity may result in a significant adverse effect on a population of a migratory bird species, then they must confer and cooperate with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects. In accordance with EO 13186, the DoD established a memorandum of understanding (MOU) with the USFWS regarding the protection of migratory birds. Under this MOU, the DoD is responsible for managing military lands to support migratory bird conservation and habitat restoration/enhancement. The FLARNG must consider migratory birds during habitat management activities, and facilities design and construction to mitigate for any potential negative effects. Onsite field reviews by FLARNG environmental staff, along with the 2011 (Thompson) and 2016 (Environmental Resource Solutions, Inc) Fauna Surveys, in addition to research for migratory bird data for South Florida, indicate that migratory birds utilize the SCWTS for foraging opportunities. The FLARNG has concluded that INRMP implementation activities will have positive effects on migratory birds. The following rationale is provided in support of this determination:

- Removal of invasive vegetation in conjunction with native planting will allow for development of more optimal foraging and breeding habitat for migratory birds.
- Continual mowing of open pasture land provides foraging opportunities for migratory birds. Birds have been observed foraging in recently mowed grass areas.
- Activities, when possible, will not be conducted during the breeding season
- Site specific survey's looking for the presence of birds and/or nests will be completed in the proposed project area prior to project implementation.
- A best practices approach will be used during routine maintenance, retrofitting and management actions
- The FLARNG will consult with the USFWS on a project by project basis for new construction before implementation to determine any possible adverse effects to migratory birds.

Military Readiness activity is defined in the Authorization Act to include all training and operations of the Armed Forces that relate to combat, adequate and realistic testing of military equipment, vehicles, weapons, and sensors for the proper operation and suitability for combat use. It includes activities carried out by contractors, when such contractors are performing military readiness activity in association with the Armed Forces, including training troops on the operation of a new weapons system or testing the interoperability of new equipment with existing weapons systems. Military Readiness does not include (a) the routine operation of installation operating support functions, such as administrative offices, military exchanges, commissaries, water treatment facilities, storage facilities, schools, housing, motor pools, laundries, morale, welfare, recreation activities, shops, and mess halls, (b) the operation of industrial activities, or (c) the construction or demolition of facilities listed above. State laws pertaining to wildlife are found in Florida Statutes, Chapter 372 (Wildlife).

7.3.3 Current Management

Due to the urban nature of surrounding lands, the site is not expect to be utilized by large mammals and reptiles that require large home ranges due to fragmentation and segregation from large natural areas; however, the site is expected to be used by local small wildlife typical of urban areas as well as migratory and non-migratory birds. The only direct current management involves the installation of bat houses on the Property. A vegetation buffer zone has been left undisturbed around the water areas to provide habitat for various wildlife species, including herpetofauna. Indirect management of wildlife may be occurring through vegetation management of invasive species eradication or control activities on the site. These activities improve the vegetative structure and species diversity on the site and not only favor the military training missions, but also wildlife habitat.

Currently, the SCWTS in not open to the public. However, evidence indicates that local residents trespass and fish in the pond on site. No direct management is occurring at the site with respect to fish or fishing.

7.3.4 Management Opportunities

It is intended that the eradication and control of invasive exotic plant species will allow native species to grow and will improve wildlife use of the site. With the control of invasive species, areas of the SCWTS may become re-established with native species. Planting some native species would help inhibit the return of invasive species and/or exotics.

Planning level surveys performed over the past 5 years indicate a relatively low diversity and usage of the site by wildlife due to the unfavorable dense invasive plant communities. As the site is improved and converted into more favorable communities, the planning level surveys will be repeated for all biological resources to monitor the effects of these management opportunities.

7.3.5 Relationship to Other Natural Resources Management

Control of invasive species using herbicides has the potential to impact non-target species; however, proper use of herbicides as directed should minimize those effects. The management of the vegetative community, invasive and exotic species, and wildlife go hand-in-hand. Improvement of the site by removing dense stands of invasive species greatly increases the diversity of the site vegetation and structure thus improving opportunities for use by wildlife. Improving the wetland areas on the northern parcel of the Property also improves the site for the interrelated community dynamics and food chains of amphibians, reptiles, and wading birds.

7.3.6 Military Mission Considerations

General fish and wildlife management is accomplished in conjunction with the military mission and training activities; therefore, fish and wildlife management will not interfere with the military mission.

7.3.7 Climate Change Considerations

With an increase in natural invasions, disease vectors are likely to change, and increase the spread of disease among fish and wildlife (Githeko et al 2000). Disease, along with low or changing nutrients, causes increased competition among native fauna. Due to constantly changing environmental conditions, a proactive adaptive management strategy is required. In conjunction with vegetation and invasive species management, constant monitoring through fauna planning level surveys are required to assess community composition changes.

7.4 Threatened and Endangered Species Management

7.4.1 Overview

No Federally listed endangered or threatened species and four State-listed species have been documented at the SCWTS. The State-listed species documented at SCWTS include little blue heron (*Egretta caerulea*), Southeastern American kestrel (*Falco sparverius paulus*), Tricolored heron (*Egretta tricolor*), Florida burrowing owl (*Athene cunicularia floridana*). Other state-listed wading bird species, such as the white ibis (*Eudocimus albus*), as well as the federally endangered wood stork (*Mycteria americana*) are also expected to have the potential to forage in the canal and borrow pond (Hall and Newman, 2001). In addition, the report, "Fauna Planning Level Survey" performed by Thompson Environmental Consulting in February of 2011, also mentioned that other birds were present but did not identify them. Therefore, the potential for use of the site for roosting, resting, foraging, and nesting is high. See **table 7-4 in Appendix 11** for list of current threatened and endangered species found in Broward County, Florida.

Invasive and exotic species in the on-site man-made ditches have been managed but still exist to some extent diminishing the potential of these man-made ditches to be used by wading birds. The Southeastern American kestrel was sighted along the Snake Creek Canal right-of-way, which is regularly maintained by mowing. The mowed canal right-of-way provides good foraging habitat for the kestrel. Suitable foraging habitat for this species is very limited elsewhere on the SCWTS site due to the overgrown vegetation (Hall and Newman, 2001).

7.4.2 Laws and Regulations

Laws and regulations pertaining to the management of threatened and endangered species include:

- Endangered Species Act of 1973 (16 U.S.C 1536)
- AR 200-1, Natural Resources Management
- DODI 4715.03, Environmental Conservation Program
- Florida Endangered Species Act (F.S. 372.072)
- Migratory Bird Treaty Act, as amended (16 USC §703-712)
- Migratory Bird Permits; Take of Migratory Birds by the Armed Forces, Final Rule (50 CFR Part 21)

7.4.3 Current Management

Currently, the FLARNG is not conducting any direct specific management with respect to threatened and endangered species; however, the indirect effects of the invasive and exotic species eradication and control management is expected to increase wildlife use of the site in general. With increased wildlife use, the likelihood of use by listed species, such as wood storks, exists. The FLARNG utilizes the programmatic effect determination keys for the eastern indigo snake and wood stork prior to any project implementation. Current natural resource management at the SCWTS is predicted to "may affect, but not likely to adversely affect any federally or state listed species."

7.4.4 Management Opportunities

The eradication and control of invasive exotic plant species will allow native species to grow. With the continued control of invasive species and reintroduction of native plant species, areas of the SCWTS may convert to plant communities dominated by native species. Future opportunities would be to conduct thorough and extensive T&E survey's to better document the presence of T&E species at the SCWTS. The FLARNG will also consult with USFWS and FFWCC on any new future natural resource management actions not included in this INRMP that may affect endangered or threatened species.

7.4.5 Relationship to Other Natural Resources Management

Control of invasive species using herbicides has the potential to impact non-target species; however, proper use of herbicides as directed should minimize this impact. During implementation of eradication methods (mechanical and chemical controls) selective removal will be employed to the greatest extent possible in the wetland restricted areas.

7.4.6 Military Mission Considerations

The presence of threatened and endangered species may minimize or prohibit the use of some areas. In cases where mission activities "may affect" endangered or threatened species, the FLARNG consultation will consult with the USFWS and FWCC to obtain guidance and recommendations on measures that could be implemented to avoid adverse impacts on any listed species, if not possible, than FLARNG will engage in formal consultation with the USFWS.

7.4.7 Climate Change Considerations

With an increase in natural invasions and the potential spread of disease, threatened and endangered species are at a greater risk for extinction. Moreover, these stressors are likely to increase the number of species listed as threatened and endangered because of changing and declining habitats. Due to constantly changing environmental conditions, a proactive adaptive management strategy is required. In conjunction with vegetation and invasive species management, constant monitoring through fauna planning level surveys are required to assess community composition changes. Extensive invasive species management is required so current threatened and endangered species habitat is not degraded.

7.5 Water Resources and Aquatic Habitat Management

7.5.1 Overview

Water resources and aquatic habitats on the Property exist in the form of one borrow pond and one man-made ditch located on the southern parcel, two wetland areas, and one man-made ditch located on the northern parcel.

The USACE and the USEPA define wetlands as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR §328.3 (b))."

7.5.2 Laws and Regulations

Both Federal and State laws and regulations protect waters of the state, which includes wetlands. The Clean Water Act (CWA) is the primary law protecting US waters. Section 404 of the CWA (33 USC 1344) prevents the discharge of dredged or fill material into waters of the US without a permit from the USACE. Generally, whenever a Section 404 permit is required, a Section 401 Water Quality Certification (WQC) issued by the State of Florida is also required.

EO 11990 (Protection of Wetlands) requires Federal agencies to take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the beneficial values of wetlands.

Prior to 1993, State and local governmental entities with the authority to regulate wetlands, including State agencies, Water Management Districts (WMDs), and local governments, developed independent delineation methodologies and regulated wetlands differently. This caused an overlap in the jurisdictional powers among different governmental entities and confusion with respect to different wetland boundaries on the same parcel of land.

As a result, the Florida Environmental Reorganization Act of 1993 (Reorganization Act) was enacted. This Act has established a uniform system of delineating and defining wetlands, and has streamlined wetlands permitting into a single regulatory approval known as an Environmental Resource Permit (ERP).

7.5.3 Current Management

The borrow pond on-site is not currently managed or maintained other than removal of invasive plants and planting of native tree species around the pond perimeter. The man-made ditches have been treated with herbicide and limited mechanical removal of invasive and exotic species; however, many of these plants appear to be quickly regenerating. The wetland areas on the northern parcel were bush-hogged and chipped with the remainder of the Property. Some planting of native tree specimens has occurred in the wetlands. The planted trees are very small and are stressed as they compete with other herbaceous and perennial plant species.

The Snake Creek Canal is currently maintained and managed by the SFWMD and is not part of this INRMP.

7.5.4 Management Opportunities

Management by selective removal of invasive and exotic species around the pond perimeter through herbicidal and mechanical means will continue, if feasible. Stocking of the pond with other suitable fish species could help increase fish diversity and improve wading bird foraging.

The man-made ditches on the site have been treated with herbicides and have had mechanical removal of invasive shrubs but they tend to quickly regenerate. Since the ditches are man-made, do not provide any hydrologic or drainage function, are isolated from all other surface waters and wetlands, and do not provide any significant wildlife function, it may be preferable to fill them in. The man-made ditches should be considered “upland-cut” ditches with no connections to other surface waters.

Wetlands management on the Property represents the best management opportunity to affect water quality and wildlife use. The management plan goals will be the establishment of native forest and herbaceous wetland communities with control and eradication of exotic and invasive species. First, the wetland areas and an adequate upland buffer surrounding the wetlands will be placed in a restricted area prohibiting specific activities, if feasible. The restriction will include encroachment or use of these areas that would result in fill, soil disturbance, changes in ground surface contours, significant vegetation disturbance, placement of any structures, or water quality degradation. Most pedestrian activities in the wetlands would be acceptable as long as they do not significantly affect the natural environment. All activities that require discharge of fill material, construction of any structure, or disturbance of soil and surface contours would likely require permits and mitigation from the FDEP, SFWMD, and/or the USACE. Significant disturbance activities such as those caused by wheeled or track vehicles and other large equipment will be expressly prohibited. Restrictions in these areas will be detailed in the environmental awareness pamphlet and will be discussed in any pre-activity briefings of trainees. Second, an invasive and exotic species management plan will seek to control invasive and exotic species while promoting the growth and establishment of desirable native trees, shrubs, and herbaceous cover. In order to protect planted trees and establish native vegetation, selective mechanical removal and direct herbicide treatment to exotic/invasive plant individuals and stumps will be implemented, if feasible. Additional supplemental planting of native species could also expedite the desired effect of the wetland management. Planting more native trees of a size that gives the specimen a height and dominance advantage over the surrounding vegetation would be preferable. In most cases, 30- gallon trees and/or shrubs could advance the wetland structure by as much as 10 years.

7.5.5 Relationship to Other Natural Resources Management

Fish and Wildlife Management – Wetlands and aquatic areas provide high-quality, productive habitat. Significant improvement to wetlands and the borrow pit pond would significantly increase the foraging and breeding habitat of these areas for many species of amphibians, reptiles, small mammals, and birds.

7.5.6 Military Mission Considerations

Protection and avoidance of wetlands and other water resources limit lands available for training. However, the protection of wetlands and other water resources is important to the ecological integrity of ecosystems. Most pedestrian activities in the wetlands would be

acceptable as long as they do not significantly affect the natural environment. All activities that require discharge of fill material, construction of any structure, or disturbance of soil and surface contours would likely require permits and mitigation from the FDEP, SFWMD, and/or the USACE. Significant disturbance activities such as those caused by wheeled or track vehicles and other large equipment will be expressly prohibited, if feasible.

7.5.7 Climate Change Considerations

Changing precipitation and temperature levels can drastically affect water resources and aquatic habitat. Increased water temperature and changes in precipitation levels can alter flora and fauna community compositions (Poff et al 2002). Moreover, drought and/or flooding can alter water chemistry and lead to habitat changes. Implementing an invasive species management plan, planting native species, and stocking the wetlands/ponds with native fish will keep the natural ecological integrity of this ecosystem. Monitoring for species composition and water quality is needed to avoid degradation of water resources and aquatic habitats.

7.6 Landscaping and Grounds Maintenance

7.6.1 Overview

Currently, there is an active contract in place for grounds maintenance and landscaping at the SCWTS. The right-of-way along Snake Creek is maintained by the SFWMD. The southern and northern parcel of SCWTS are currently under contract for regular mowing and they have become sustainable pasture-like dominated by Bahia grass. Some planting of native species has occurred around the borrow pond, in the wetlands on the northern parcel, and around the boundary of the southern parcel; however, the nature of these plantings is for native plant community establishment rather than for landscaping and aesthetic purposes, and will not be addressed further in this section.

7.6.2 Laws and Regulations

An Executive Memorandum, dated 26 April 1994, directs Federal executive departments and agencies to use regionally native plants in landscaping for Federal grounds and Federally-funded projects. Native species generally provide better habitat for wildlife and have relatively low irrigation requirements. In addition, the use of native species generally reduces the need for pesticides and fertilizers.

7.6.3 Current Management

Currently, the SCWTS is under contract for the regular mowing of the northern and southern parcels, tree limb trimming around the fence, land leveling of the aerobic trail and lime rock road, management of vegetation around the trail, and debris removal. All activities are to follow best management practices to avoid degradation of the trees and land. The SCWTS is mowed at a minimum of eight times per year. The grass is cut to less than 12″ inches in height and there is a ~3 foot buffer around all trees and water bodies. The existing slopes are maintained to ensure proper drainage and erosion control. Vegetation around the trails are managed to ensure minimal vegetation intrusion on the trails. The vendor may spray herbicides around the trail but must be certified by the State, follow BMP′s and maintain all records. No work is to be done after rainstorms or when the grounds are soft to avoid damage, and only recommence work once the grounds are properly dry and no such damage will occur.

7.6.4 Management Opportunities

As the FLARNG develops portions of the SCWTS, areas around buildings as well as areas adjacent to the fence line may require landscaping. The FLARNG might employ principles of xeriscaping in future landscaping at the SCWTS.

In addition to possibly following xeriscape principles, the FLARNG will implement the following strategies:

- Use native species in any new landscaping
- Ensure that use of herbicides and pesticides are minimized in accordance with Integrated Pest Management Plan (IPMP) strategies

7.6.5 Relationship to Other Natural Resources Management

The following issues and programs are related to landscaping and grounds maintenance.

Integrated Pest Management (IPM) – Native species are generally more resistant to pests than non-native species.

7.6.6 Military Mission Considerations

Landscaping and grounds maintenance generally does not have an impact on mission activities.

7.7 Erosion Control and Soil Conservation

7.7.1 Overview

Erosion control and soil conservation are important water resource protection issues. Accelerated erosion, continued compaction, or the removal of topsoil can drastically alter soils. Sediment resulting from erosion affects surface water quality and aquatic organisms. Two main types of soil erosion exist, wind erosion and water erosion. The soils present at the SCWTS are Hallandale and Margate Soils, Margate Fine Sand, Basinger Fine Sand, Plantation Muck, and Urban Land soil designations. Margate soils could become highly erodible (by wind) in cultivated areas, while Basinger soils would only be slightly erodible (USDA, 1996).

7.7.2 Laws and Regulations

Laws and regulations that are associated with control and abatement of pollution in U.S. waters, and erosion control and soil conservation include:

- Federal Water Pollution Control Act as amended by the CWA of 1977 (33 USC §1251)
- Soil Conservation Act (16 USC §590a et seq.)
- EO 11989, Off-road vehicle use

7.7.3 Current Management

As erosion is generally not an issue at the SCWTS because of the relatively flat topography and the majority of soil types, there is no active erosion management at the site. However, general BMPs are utilized during activities that could potentially affect water resources to prevent the introduction of sediments into the Snake Creek Canal and to reduce soil losses. FLARNG will assess the erodibility of a site during NEPA review of new projects.

7.7.4 Management Opportunities

Due to the relatively flat nature of the site, erosion is generally not a problem and management has not been required. Erosion control techniques will be utilized as necessary if land disturbing activities occur, where feasible.

7.7.5 Relationship to Other Natural Resources Management

Erosion control and soil conservation practices are related to the following other natural resources management issues:

Water quality – Erosion negatively impacts the water quality of receiving streams.

Wetlands – Erosion negatively impacts wetlands and aquatic habitats through increased potential for siltation.

7.7.6 Military Mission Considerations

Appropriate soil conservation and erosion control are vital to the military mission. Threats to the military mission, as characterized by removal of and/or lack of accessibility to available training lands and other resources, such as infrastructure components, include:

- Undermining of roads
- Loss of topsoil, which would decrease revegetation rates
- Impacts to area streams or other aquatic habitats, potentially resulting in CWA implications

7.7.7 Climate Change Considerations

Increased rainfall and intensity of rainfall due to climate change will cause a greater rate of erosion. Erosion, inundation and flooding can all affect soil chemistry. Currently erosion is not a concern at SCWTS but should be monitored in the future to prevent soil degradation.

7.8 Integrated Pest Management (IPM)

7.8.1 Overview

The IPM approach considers best available scientific information, updated target population monitoring data, and the environmental effects of control methods in selecting a range of complementary technologies and methods to implement to achieve a desired objective. Control actions are often carried out by or in cooperation with State or local agencies and may span jurisdictional borders. Adequate funding of cross-jurisdictional efforts along with support and understanding are critical to success (National Invasive Species Council, 2001, https://www.denix.osd.mil/).

IPM involves the judicious use of both chemical and non-chemical control techniques to prevent pests from exceeding an acceptable population or damage threshold. Emphasis is placed on minimizing environmental disruption. IPM depends on surveillance to establish the need for control and to monitor the effectiveness of management efforts (FLARNG, 2006). An IPM Plan (IPMP) that encompasses all FLARNG facilities was completed in 2006 and revised in 2017. The IPMP covers all types of animal and plant pests including: termites, other insects, roosting birds and bats, rodents and other small mammals, noxious weeds, invasive plants, and other various pest animals and plants.

7.8.2 Laws and Regulations

Laws and regulations pertaining to integrated pest management include the following:

- Federal Noxious Weed Act of 1974 (7 USC §2801 et seq.)
- Federal Insecticide, Fungicide, and Rodenticide Act (7 USC §136)
- Federal Pest Plant Act (7 USC §150a et seq.)
- EO 13112, Invasive Species
- Harmful Aquatic Organisms Act (92 SB0957)
- Department of Defense (DOD) Instruction 4150.7, 22 April 1996, DOD Pest Management Program
- Memorandum, NGB-ILE, 21 January 1997, subject: (All States Log Number P97-

0027) Integrated Pest Management

7.8.3 Current Management

Herbicides that are used at the SCWTS are used in compliance with the FLARNG IPMP (2017). Special consideration is given prior to conducting pest control operations in sensitive areas identified on pesticide labels. No pesticides are applied directly to wetlands or water areas (lakes, rivers, creeks, ditches, etc.) unless its use is specifically approved on the label. In addition to aquatic and marine habitats, sensitive areas also include critical habitat to endangered, threatened, or rare flora or fauna species, and unique geological and other natural features. The sensitive areas on-site at SCWTS include surface waters such as Snake Creek Canal.

7.8.4 Management Opportunities

The FLARNG intends to eradicate and/or control to the extent practicable invasive species at the SCWTS. As discussed in the Invasive Species Eradication Implementation Plan (see **Appendix 4**), the FLARNG will implement mechanical removal and herbicide use consistent with the FLARNG IPMP. Additional information pertaining to invasive species is provided in **Section 7.2**.

7.8.5 Relationship to Other Natural Resources Management

Fish and wildlife management – Herbicides and pesticides could impact non-target species, including threatened and endangered species. Pesticide labels will be followed to prevent these possible impacts. Bats are considered to be pests when they utilize urban structure to roost. If bats do roost in the structures at SCWTS, surveys and species identification will be done to determine if the protected Florida bonneted bat is present before any pest management is completed.

Water quality – Herbicides and pesticides could impact water quality, which could affect aquatic insects. Pesticide labels will be followed to prevent these possible impacts.

7.8.6 Military Mission Considerations

Control of invasive species at the SCWTS will enhance training opportunities.

7.8.7 Climate Change Considerations

With the increased potential for future pest species, a proactive adaptive management approach is required to avoid future degradation of the habitats present at SCWTS.

7.9 Outdoor Recreation

7.9.1 Overview

The SAIA requires that INRMPs provide for fish- and wildlife-oriented recreation, as long as it is consistent with the use of the military installation to ensure the preparedness of the Armed Forces. Currently the SCWTS is not open to the public and does not offer any specific type of fish and wildlife-oriented recreation. However, the borrow pond on-site could provide fishing opportunities. The Snake Creek canal may also be used for fishing; however, the canal is not

under control of the FLARNG.

7.9.2 Laws and Regulations

Laws and regulations that pertain to outdoor recreation:

- Sikes Act Improvement Act

7.9.3 Current Management

The SCWTS is currently not available for public outdoor recreational purposes.

7.9.4 Current Management

As a result of continued intensive invasive species control over the next several years, the FLARNG does not intend to create outdoor recreation facilities at the SCWTS at this time. However, the FLARNG is considering recreational activities, specifically use of the pond on-site, for the future.

7.9.5 Relationship to Other Natural Resources Management

As the site is not currently available for outdoor recreation, other natural resources management is not affected by outdoor recreation at the SCWTS.

7.9.6 Military Mission Considerations

As the site is not currently available for public outdoor recreation, there are no conflicts with the military mission.

7.10 Coastal Zone Management

In 1972, Congress enacted the Coastal Zone Management Act, which sought to preserve, protect, develop, and where possible, to restore and enhance the resources of the nation's coastal zone. It encouraged coastal states to develop and implement comprehensive management programs, which balance the need for coastal resource protection with the need for economic growth and development within the coastal zone. The Florida Coastal Management Program (FCMP) was authorized in 1978 by the Florida Coastal Management Act, and approved by the United States Department of Commerce in 1981. Administered by the FDEP, the program coordinates the actions of a network of state agencies with the goal of more effectively implementing Florida's state coastal regulations. The entire state of Florida is considered within the Coastal Zone.

7.11 Cultural Resources Management

A Statewide Integrated Cultural Resources Management Plan (ICRMP) for the FLARNG, which includes SCWTS, was finalized in September 2007, revised in 2011 and updated in 2018. Developed in accordance with Army Regulation (AR) 200-1, DoD Instruction 4715.16: Environmental Conservation Program, and DoD Measures of Merit, the ICRMP integrates cultural resource management with mission activities and other management programs at SCWTS. The ICRMP provides guidance on the identification and evaluation of cultural

resources, including inadvertent finds at SCWTS, and provides a schedule to accomplish the plan objectives during a five-year period. EO 13175 "Consultation and Coordination With Indian Tribal Governments" (09 November 2000) sets forth policy to establish regular and meaningful consultation and collaboration with Tribal officials in the development of Federal policies that have Tribal implications, to strengthen the United States government-to-government relationships with Indian Tribes, and to reduce the imposition of unfunded mandates upon Indian Tribes. The DoD "American Indian and Alaska Native Policy" (2007) directs FLARNG to make internal decisions on whether a Federal action has the potential to significantly affect protected Tribal resources, Tribal rights, or Indian lands.

In accordance with EO 13175 and the DoD "American Indian and Alaska Native Policy", the development of the ICRMP was closely coordinated with Federally-recognized Native American Tribes to obtain their input on plan development. Consultations with Native American Tribes occurs annually. The proceedings of the consultation meetings have been documented in transcripts kept on file at the FLARNG Headquarters in St. Augustine, Florida. Measures to be taken in the event of an inadvertent discovery of a cultural resource at the SCWTS are provided in Standard Operating Procedure (SOP) No. 5, Inadvertent Discovery, outlined in Section 4.2.5 of the 2007 ICRMP. These measures have been developed for the protection and assessment of the discovered resource, determination of mitigation measures for significant resources, and the coordination of the discovery with pertinent Native American Tribes and regulatory agencies.

A Cultural Resources Survey was conducted at the SCWTS in 2001. No cultural resources with the potential to be listed on the NRHP were identified. Therefore, no current management is required. In the future, any potential cultural resources that are discovered at the site will be managed in accordance with the ICRMP.

7.12 Natural Resources Law Enforcement

Law enforcement in the vicinity the SCWTS is provided by local police forces. Police protection is provided by three law enforcement agencies: the Broward County Sheriff's Department, Pembroke Pines Police Department, and Miramar Police Department. There are no law enforcement officers or game wardens that specifically monitor the SCWTS.

7.13 Public Outreach

Educating and informing the public of management practices at the SCWTS (i.e., invasive species control) generally increases support rather than opposition from the public. Articles published in local newspapers and public service announcements on television or radio are excellent means of communication. Such media reaches a diverse audience, and can be specifically designed to promote the FLARNG within the context of stewardship. All media reports will be coordinated through the FLARNG Public Affairs Office (PAO).

The FLARNG is also committed to cultivating a conservation ethic in local youth. Scouts, in particular, often need support with projects, merit badges, and conservation talks. The FLARNG will work with youth groups whenever possible.

8.0 Management Goals, Objectives, and Projects

This chapter lists the goals and objectives for future natural resources management at the SCWTS. Previous chapters that presented important background information on resources, current conditions, and management issues at the SCWTS were used to formulate natural resources management goals. Goals listed below reflect the FLARNG's vision for the desired condition of the natural resources and environment at SCWTS. These goals are supported by objectives and projects, which provide management strategies and specific actions to achieve these goals.

GOAL 1: ERADICATE AND/OR CONTROL INVASIVE SPECIES AND RESTORE NATURAL COMMUNITIES AT THE SCWTS.

- OBJECTIVE 1.1: Eradicate and/or control invasive exotic species at the site.
    - PROJECT 1.1.1: Continue Invasive Species Eradication Plan (see **Appendix 4, Section 4.2**).
        - Project 1.1.1.1: Continue invasive species regeneration control contracts on Management Compartments (see **Appendix 1; Figure 7.1**)
        - Project 1.1.1.2: Prepare and add bush-hogged and chipped areas the northern parcel and the southwest corner of the southern parcel for an invasive species regeneration control contract.
        - Project 1.1.1.3: Establish a Restricted Zone around wetlands and wetlands buffer. Establish permanent signs or markers at the wetlands buffer boundaries.
        - Project 1.1.1.4: Begin wetlands management plan-selective removal by hand-clearing and herbicidal treatment of invasive and exotic species in wetland areas and buffer.
    - PROJECT 1.1.2: Invasive and exotic species monitoring.

      OBJECTIVE 1.3: Continue to develop partnerships with Federal, State, regional, and local entities to address the eradication of invasive and exotic species at the SCWTS and promote outreach and education efforts designed to raise the awareness of the threat posed by invasive and exotic species.
    - OBJECTIVE 1.4: Continue to work closely with the SFWMD, FDEP, and Broward County to implement effective invasive and exotic species control at the SCWTS, as well as creating habitat for native wildlife and reintroducing native plant species.

GOAL 2 : MANAGE NATURAL RESOURCES AT THE SCWTS TO ENHANCE THE PROPAGATION OF NATIVE FISH AND WILDLIFE.

- OBJECTIVE 2.1: Create better wildlife habitat throughout the site.
    - PROJECT 2.1.1. Develop a Native Species planting plan to replace exotic trees and shrubs
    - PROJECT 2.1.2. Implement planting plan to replace exotic trees and shrubs.
    - PROJECT 2.1.3. Install duck boxes in borrow pit pond.

GOAL 3: PREVENT DEGRADATION OF SURFACE WATERS AND GROUNDWATER BY ACTIVITIES AT THE SCWTS.

- OBJECTIVE 3.1: Ensure that all FLARNG personnel, as well as contractors, understand and comply with all relevant BMPs associated with pollution prevention and erosion control at the SCWTS.
    - PROJECT 3.1.1: Create an informational pamphlet to be distributed to SCWTS users. Create Eastern Indigo Snake and Wood Stork poster and post them throughout the SCWTS.

- OBJECTIVE 3.2: Ensure that herbicides applied at the SCWTS are applied as recommended by the manufacturer label and that only appropriate herbicides are used in and around surface waters, including the man-made ditches.

GOAL 4 : ENSURE THAT ALL BIOLOGICAL RESOURCES AT THE SCWTS ARE APPROPRIATELY INVENTORIED AND MANAGED.

- OBJECTIVE 4.1: Complete PLSs every five years, or as deemed necessary by the NRM (see **Section 8.1**). Ensure all T&E survey's follow USFWS protocol and standards.
    - PROJECT 4.1.1: Repeat Flora and Vegetation survey as one PLS. Add thorough T&E plant species survey.
    - PROJECT 4.1.2: Repeat Fauna and Wildlife survey as one PLS. Add T&E animal species survey to effort.
    - PROJECT 4.1.3: Conduct acoustic survey to detect presence/absence of Florida Bonetted Bats
    - PROJECT 4.1.4: Repeat Wetland Delineation and Jurisdictional Review

8.1 Planning Level Surveys

Natural Resources PLS are training site-wide inventories to characterize essential components of the training site natural resources. The kinds, locations, and sensitivity of the resources serve as the foundation for environmental planning, including preparation of the INRMP. Training sites must conduct PLS as the foundation for natural resources management planning, including preparation of the INRMP. PLS include spatial products that can be hard-copy maps, GIS data layers, or both according to training site needs and capabilities. Required PLS include:

Topography PLS: At a minimum, this is a map that shows elevation, elevation contours, and associated data consistent with USGS standards and topographic map products. For current use of the site, USGS topographic quadrangle data is sufficient.

Wetlands PLS: At a minimum, this survey must describe and map the distribution and extent of wetlands on a training site. A Wetlands PLS was completed for the SCWTS in 2004 (CH2M Hill 2004).

Surface Waters PLS: At a minimum, this is a survey that describes and maps the distribution and extent of surface waters, consistent with U.S. Geological Survey standards. The Wetlands PLS completed for the SCWTS by CH2M Hill in March 2004 includes surface waters.

Soils PLS: At a minimum, this survey must classify, categorize, describe, and map soils by map

unit, and meet current National Cooperative Soil Survey standards and procedures. Based on current use of the site, the Soil Survey for Broward County (1984) is sufficient.

Threatened & Endangered Species/Army Species at Risk PLS: At a minimum, this survey must produce a map that shows the kinds and known distribution of Federally endangered, threatened, proposed, and candidate species occurring on the training site. Threatened & endangered (T&E) species surveys of the entire SCWTS were conducted by Hall and Newman in the summer and fall of 2001 and by CH2M-Hill in December 2003. Additional T&E surveys of flora and fauna are a priority and scheduled to be completed in 2018. **Flora PLS:** At a minimum, this is training site-wide vascular plant survey that produces a list of plant species with verified nomenclature, classification, and annotation compatible with the USDA NRCS's Plant List of Accepted Nomenclature, Taxonomy, and Symbols (PLANTS). Although a Flora PLS has not been completed, flora was noted in the 2001 surveys completed by Hall and Newman. A Vegetation and Flora PLS was performed by LG2 Environmental Solutions, Inc. in 2009

Vegetation Communities PLS: At a minimum, this survey, including field data, must describe and map the distribution and extent of plant alliances (alliances are characterized by diagnostic species or group of diagnostic species usually occurring in the dominant and uppermost stratum, similar to cover type). Positional and classification accuracy must be field checked. Although a Vegetation Community PLS has not been completed, vegetation was noted in the 2001 surveys completed by Hall and Newman. A Vegetation and Flora PLS was performed by LG^2Environmental Solutions, Inc. in 2009.

Fauna PLS: At a minimum, this survey, including field data, must describe and map the distribution and extent of sensitive species (e.g., locally rare and keystone). A Fauna PLS was completed in 2016 by Environmental Resource Solutions, Inc. Thompson Environmental Consulting performed a vertebrate and invertebrate survey in 2011.

9.0 Natural Resources Program Implementation

The FLARNG depends on natural resources for the sustainability of many training programs and will manage natural resources to ensure sustainable use. The INRMP is not intended to impair the ability of the FLARNG to perform its mission. The FLARNG has no plans or intentions for activities that contribute to habitat degradation, curtailment of recreational activities, or removal of natural resources.

Implementation of this INRMP will be realized through the accomplishment of specific goals and objectives as measured by the completion of projects described within this INRMP. An INRMP is considered implemented if an installation:

- Actively requests, receives, and uses funds for “must fund” projects and activities
- Ensures that sufficient numbers of professionally trained natural resources management staff are available to perform the tasks required by the INRMP
- Coordinates annually with cooperating agencies
- Documents specific INRMP action accomplishments undertaken each year

9.1 Natural Resources Program Management

Intra- and inter-agency cooperation, coordination, and communication at the Federal, State and local levels (for example, USFWS, FWCC) are requisite to the success of the INRMP. Specialized expertise is required to adequately manage natural resources at the SCWTS, especially with respect to invasive species control. Technical assistance will be sought from Federal and State agencies, Universities, and special interest groups. The NRM at ARNG-IEZ is responsible for reviewing this INRMP and advising the CFMO-ENV before formally submitting the plan to Federal and State environmental agencies.

The FLARNG NRM administers the Natural Resources Program at the SCWTS. Responsibilities of the NRM include:

- Implementing this INRMP
- Managing all phases of the SCWTS Natural Resources Program with appropriate natural resources management professionals
- Developing and implementing programs to ensure the inventory, delineation, classification, and management of all applicable natural resources
- Providing for the training of natural resources personnel
- Maintaining maintenance records (that is, prescribed burns, herbicide treatments, brush-clearing, etc.)
- Reviewing all environmental documents (for example, environmental impact assessments and remedial action plans), construction designs, and proposals to ensure adequate protection of natural resources, while ensuring that technical guidance as presented in this INRMP is adequately considered
- Evaluating impacts of training missions and providing guidance to trainers
- Coordinating potential public recreation and potential public outreach programs at the SCWTS
- Coordinating with local, State and Federal governmental and civilian conservation organizations relative to the SCWTS natural resources management program
- Assisting the Adjutant General with developing funding priorities for all natural resource programs

The CFMO-ENV also receives support from the FLARNG staff, each of whom has significant duties in addition to natural resources support. Additional labor resources may include:

- Federal agencies (for example, USFWS, NRCS; USACE-CERL, and the U.S. Army Environmental Command)
- State agencies
- Local and regional Universities
- Scouting groups and other volunteers
- Special interest groups (such as, Audubon Society)

9.2 Funding

Implementation of this INRMP is subject to the availability of annual funding. The installation will request funding through appropriate channels. Funding for the NRM staff and standard supplies comes from direct funding sources. Funding sources for specific projects can be grouped into three main categories by source: Federal NGB Funds, Other Federal Funds, and Non-Federal Funds. Each is discussed in the following subsections. Estimated funding requirements for implementing specific INRMP goals and programs are presented in **Table 9-2**.

Where projects identified in the plan are not implemented due to lack of funding, or other compelling circumstances, the installation will review the goals and objectives of this INRMP to determine whether adjustments are necessary in future revisions to the SCWTS INRMP.

The following discussion of funding options is not all-inclusive of funding sources. Since many funding sources rely on a variety of grant programs, award criteria and amounts can change considerably from one year to another. Funding through grant programs can occur on a one-time award, annually or in multiples of years.

9.2.1 NGB/FLARNG Funding

Funding from the following NGB/FLARNG sources will be required to implement the INRMP over the next five years:

ARNG-IEZ is the primary source of funding to support the management of natural resources at the SCWTS through a master cooperative agreement with the FLARNG. A budget of this type is managed by the Environmental Program Manager for the FLARNG. The ARNG-IEZ provides funding for natural resource surveys, RTLA monitoring projects for ITAM sites and any compliance-related projects.

ARNG-IEZ provides funding for the personnel, equipment and supplies in support of the FLARNG. This office is involved in planning, scheduling and oversight of training, maintenance of roads and trails, vegetation management, pest management, facilities infrastructure, and military construction planning, all of which are critical to the natural resources management program.

9.2.2 Other Federal Funds

The Legacy Resource Management Program provides financial assistance to DoD efforts to preserve natural and cultural resources on Federal lands. Legacy projects could include regional ecosystem management initiatives, habitat preservation efforts, archeological investigations, invasive species control, and/or flora or fauna surveys. Legacy funds are rewarded based on project proposals submitted to the program.

Program initiatives under the CWA provide funding through several sources. The USEPA's Office of Water sponsors those projects related to the CWA. Available funding may support programs such as cost-sharing for overall water-quality management (e.g., monitoring, permitting, and enforcement), lake water quality assessments and mitigation measures, and implementation of non-point source pollution control measures.

9.2.3 Non-Federal Funds

Other funding sources that could be considered include The Public Lands Day Program, which coordinates volunteers to improve the public lands they use for recreation, education, and enjoyment, and the National Environmental Education & Training Foundation, which manages, coordinates, and generates financial support for the program.

9.2.4 Soil and Plant Conservation Funding

The NRCS manages the Federal Domestic Assistance Program (Plant Materials for Conservation) that assembles, evaluates, selects, releases, and introduces into commerce and promotes the use of new and improved plant materials for soil, water, and related resource conservation and environmental improvement programs. NRCS has been an outstanding partner in assisting the FLARNG in protecting the valuable natural resources at the installation while helping the FLARNG responsibly develop the Property in support of doctrinally required military training.

9.3 Annual Coordination Requirements

Per DoD policy, the FLARNG reviews the INRMP annually in informal cooperation with the USFWS and FWCC. These annual reviews facilitate "adaptive management" by providing an opportunity to review the plan's goals and objectives, and to make schedule revisions as necessary. These annual reviews will be documented through letters or joint memorandum.

9.4 INRMP Implementation

Implementation of the INRMP will be accomplished in part through the implementation of projects. Actual implementation year dependent on funding. **Table 9-1 in Appendix 12** identifies projects and scheduled implementation.

9.5 Monitoring INRMP Implementation

The Secretary of Defense issued a policy memo, "Implementation of The Sikes Act Improvement Act, Updated Guidance", on 10 October 2002, which established "New Conservation Metrics for Preparing and Implementing INRMPs". Progress toward meeting these measures of merit is reported in the annual EQR to Congress. Reporting requirements include:

- The installation name and state
- The year the most recent INRMP was completed or revised
- Date planned for the next revision
- Was the INRMP coordinated with appropriate military trainers and operators?
- Were projects added to the INRMP as a result of comments from military trainers and operators?
- Were segments of the INRMP concerning the conservation, protection and management of fish and wildlife resources agreed to by the U.S. Fish and Wildlife Service (FWS) Regional Director? (FWS coordination)
- Were projects added to the INRMP as a result of FWS comments?
- Has annual feedback been requested from the FWS?
- Has annual feedback been received from the FWS?
- Were segments of the INRMP concerning the conservation, protection and management of fish and wildlife resources agreed to by the State fish and wildlife agency Director? (State coordination)
- Were projects added to the INRMP as a result of State comments?
- Has annual feedback been requested from the State fish and wildlife agency?
- Has annual feedback been received from the State fish and wildlife agency?

- Does the INRMP contain a list of projects necessary to meet plan goals and objectives, as well as timeframes for implementation of any such projects?
- $ spent in reporting FY to implement the INRMP
    - $ spent on Class 1 requirements
    - $ spent on Class 2 requirements
- $ requirements for unfunded Class 0 and 1 projects
- # of Class 2 projects required
- # of Class 2 projects unfunded
- List of unfunded Class 2 projects >$50K
- # of Class 2 projects funded
- Did the installation seek public comment on the draft INRMP?
- Were projects added to the INRMP as a result of public comments?

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Corvallis, Oregon 97333

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Appendix 1. Figures

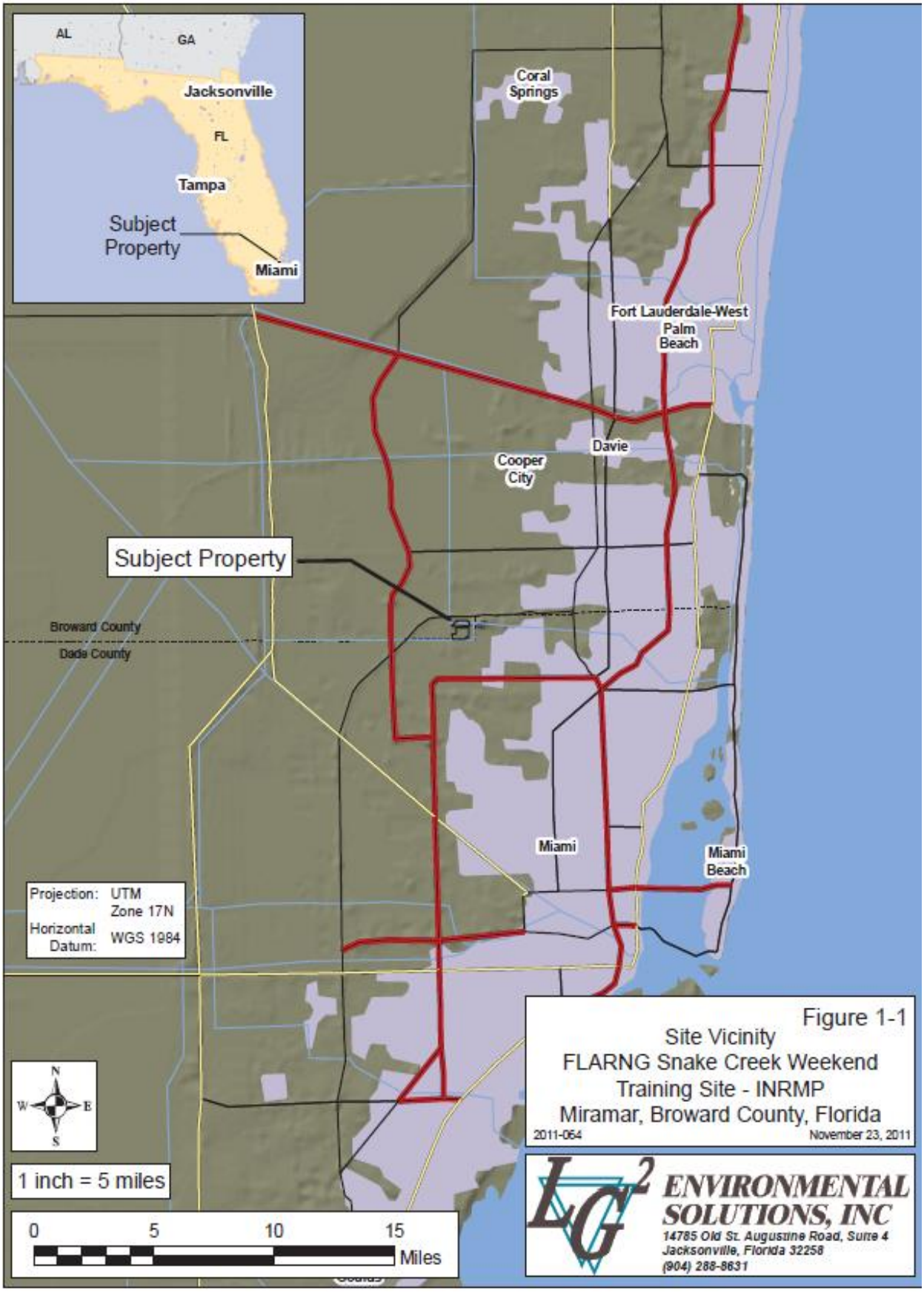

Figure 1-1
Site Vicinity
FLARNG Snake Creek Weekend Training Site - INRMP
Miramar, Broward County, Florida
2011-064
November 23, 2011

LG2 ENVIRONMENTAL SOLUTIONS, INC
14785 Old St. Augustine Road, Suite 4
Jacksonville, Florida 32258
(904) 288-8631

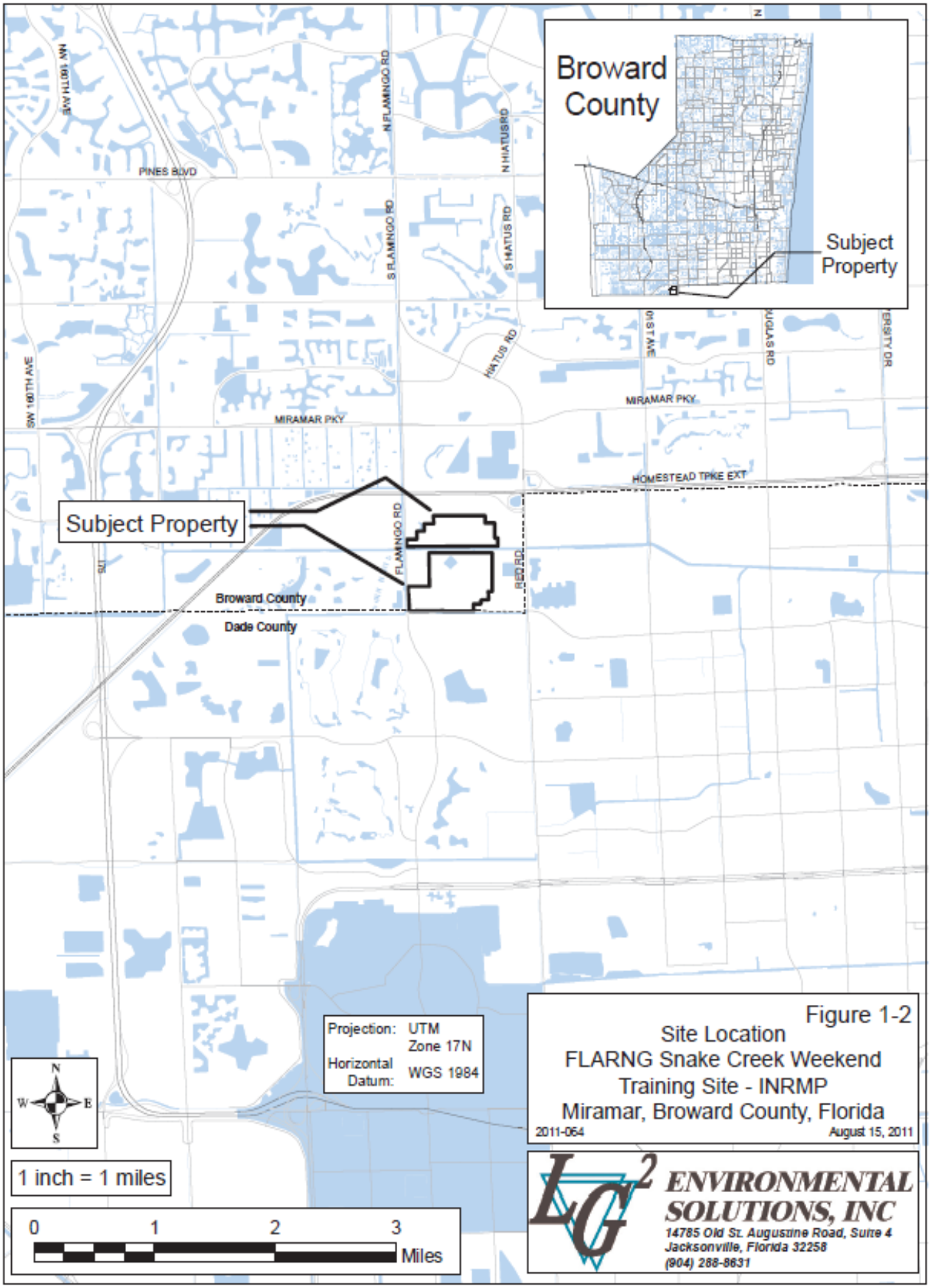

Figure 1-2
Site Location
FLARNG Snake Creek Weekend Training Site - INRMP
Miramar, Broward County, Florida
2011-064 August 15, 2011

ENVIRONMENTAL SOLUTIONS, INC
14785 Old St. Augustine Road, Suite 4
Jacksonville, Florida 32258
(904) 288-8631

Figure 3-1

Site Features
2009 True Color Orthophoto
FLARNG Snake Creek Weekend Training Site - INRMP
Miramar, Broward County, Florida

2011-064 November 23, 2011

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14785 Old St. Augustine Road, Suite 4
Jacksonville, Florida 32258
(904) 288-8631

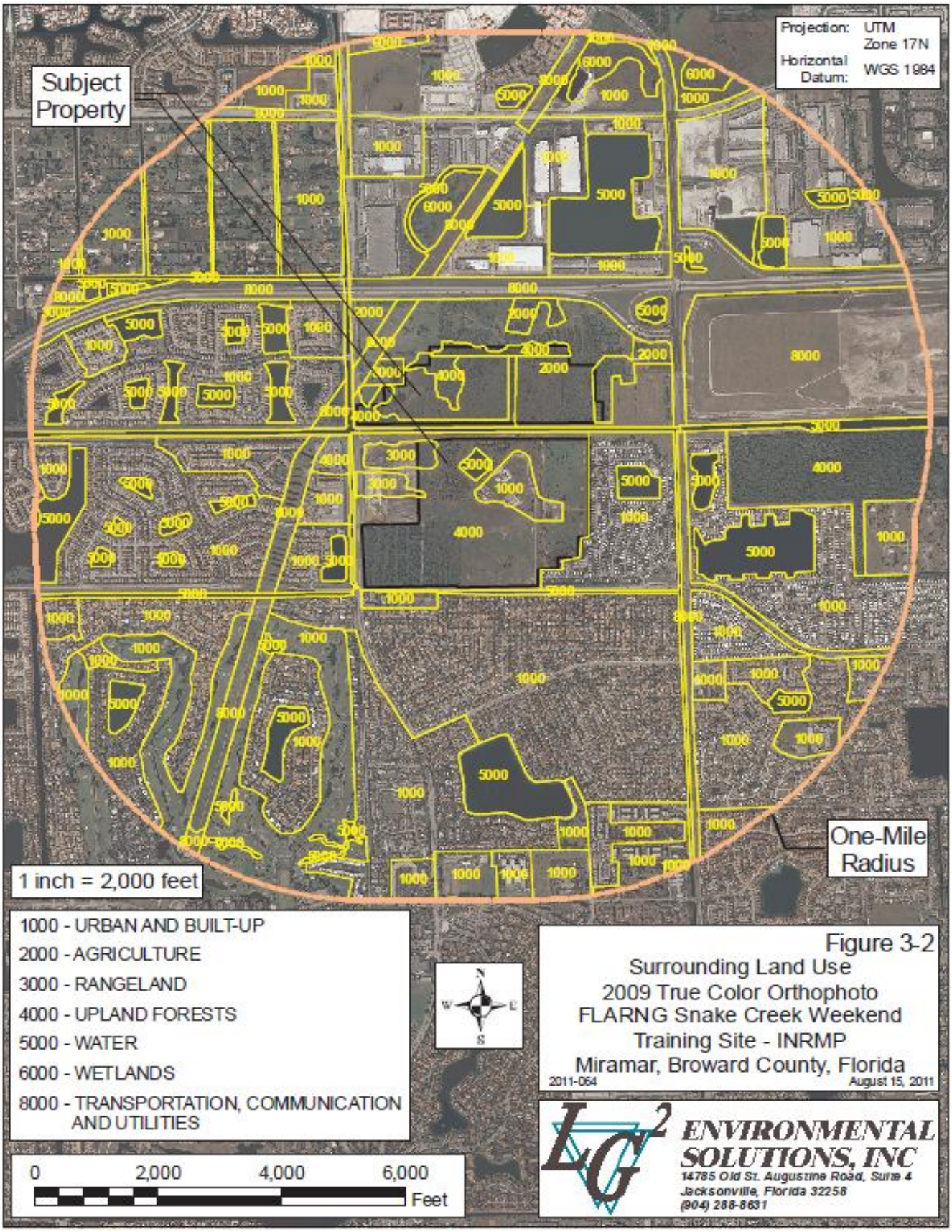

Figure 3-2
Surrounding Land Use
2009 True Color Orthophoto
FLARNG Snake Creek Weekend Training Site - INRMP
Miramar, Broward County, Florida
2011-064
August 15, 2011

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(904) 288-8631

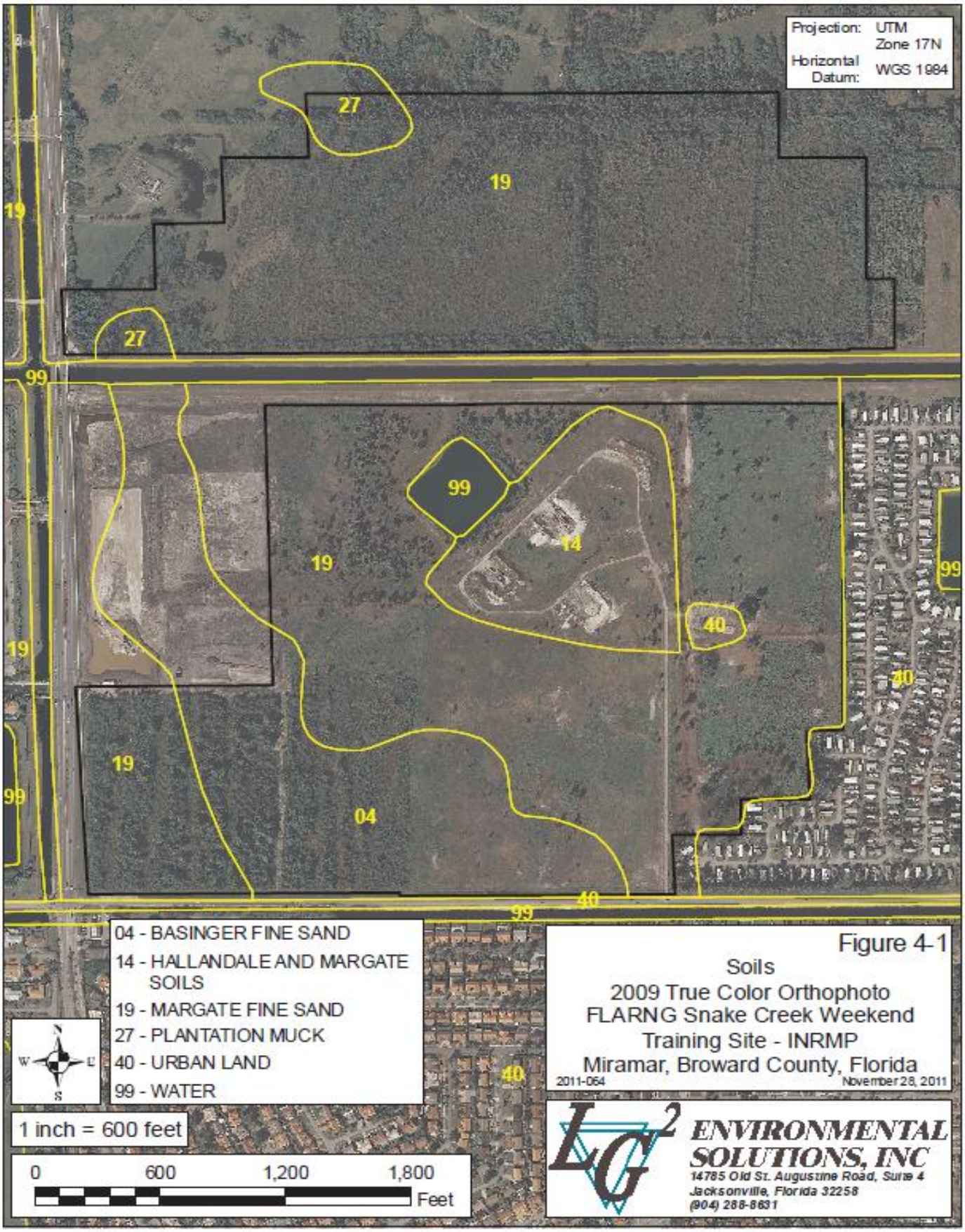

Figure 4-1

Soils
2009 True Color Orthophoto
FLARNG Snake Creek Weekend
Training Site - INRMP
Miramar, Broward County, Florida

2011-064

November 28, 2011

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Jacksonville, Florida 32258
(904) 288-8631

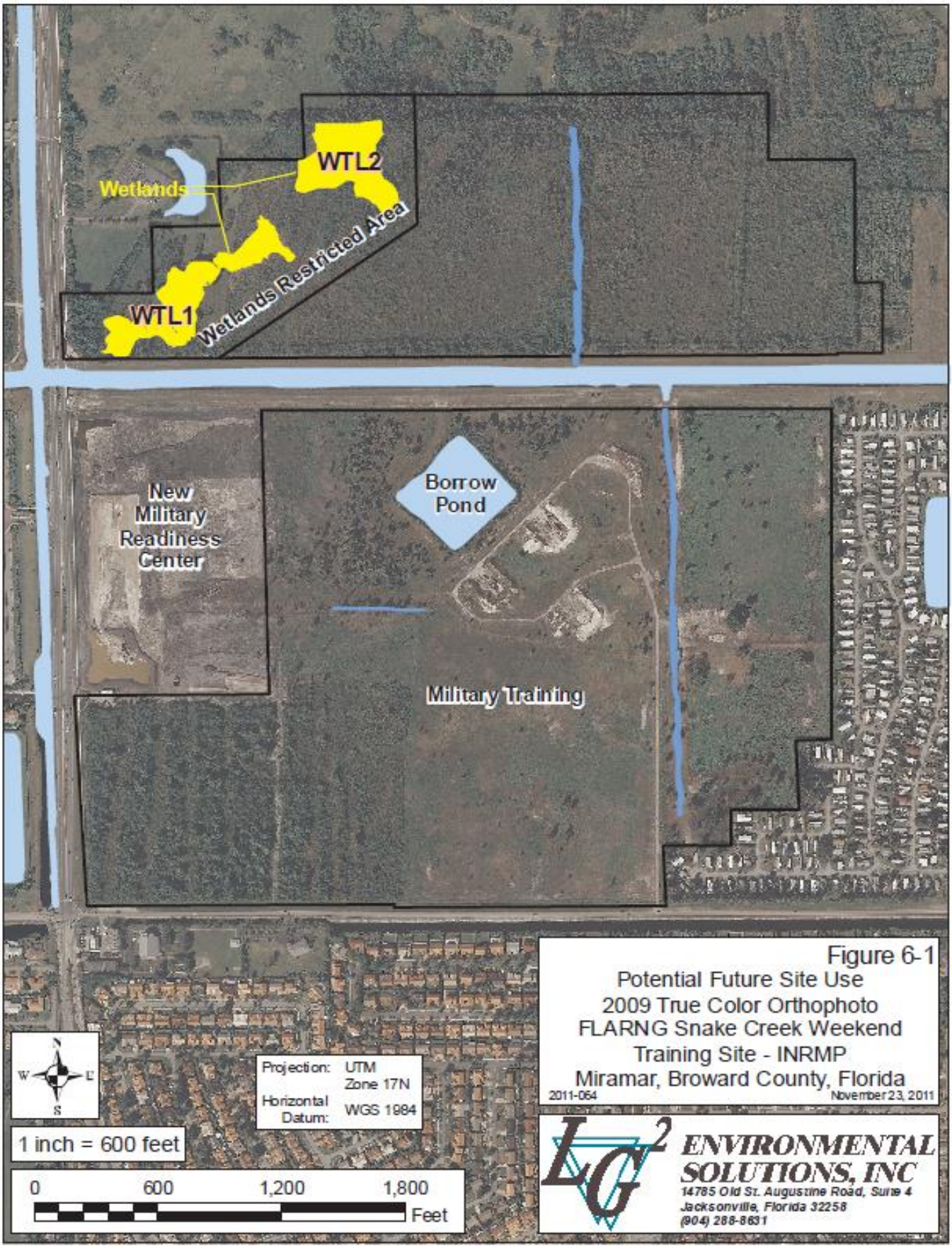

Figure 6-1
Potential Future Site Use
2009 True Color Orthophoto
FLARNG Snake Creek Weekend Training Site - INRMP
Miramar, Broward County, Florida
2011-064
November 23, 2011

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14785 Old St. Augustine Road, Suite 4
Jacksonville, Florida 32258
(904) 288-8631

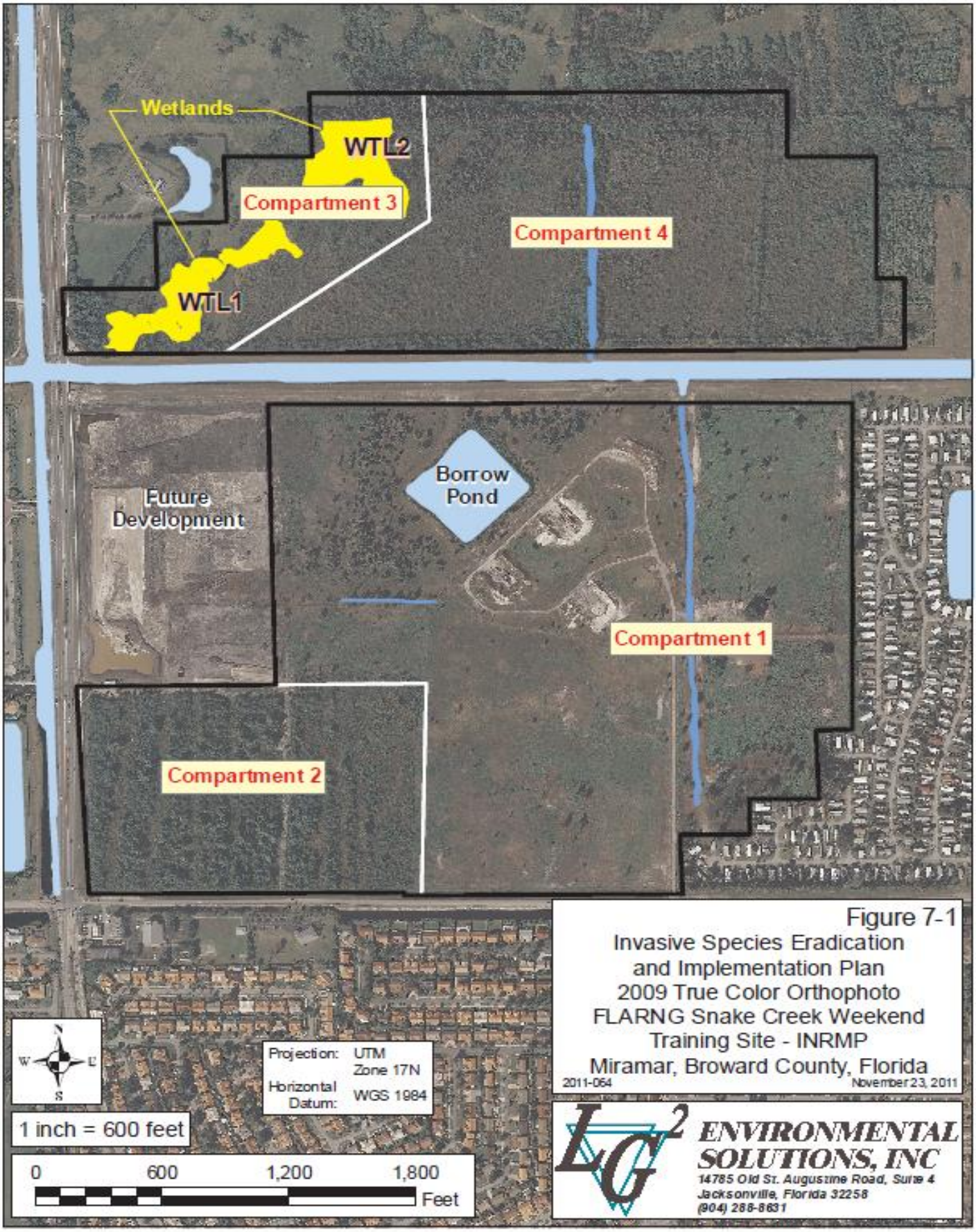

Figure 7-1
Invasive Species Eradication and Implementation Plan
2009 True Color Orthophoto
FLARNG Snake Creek Weekend Training Site - INRMP
Miramar, Broward County, Florida
2011-064
November 23, 2011

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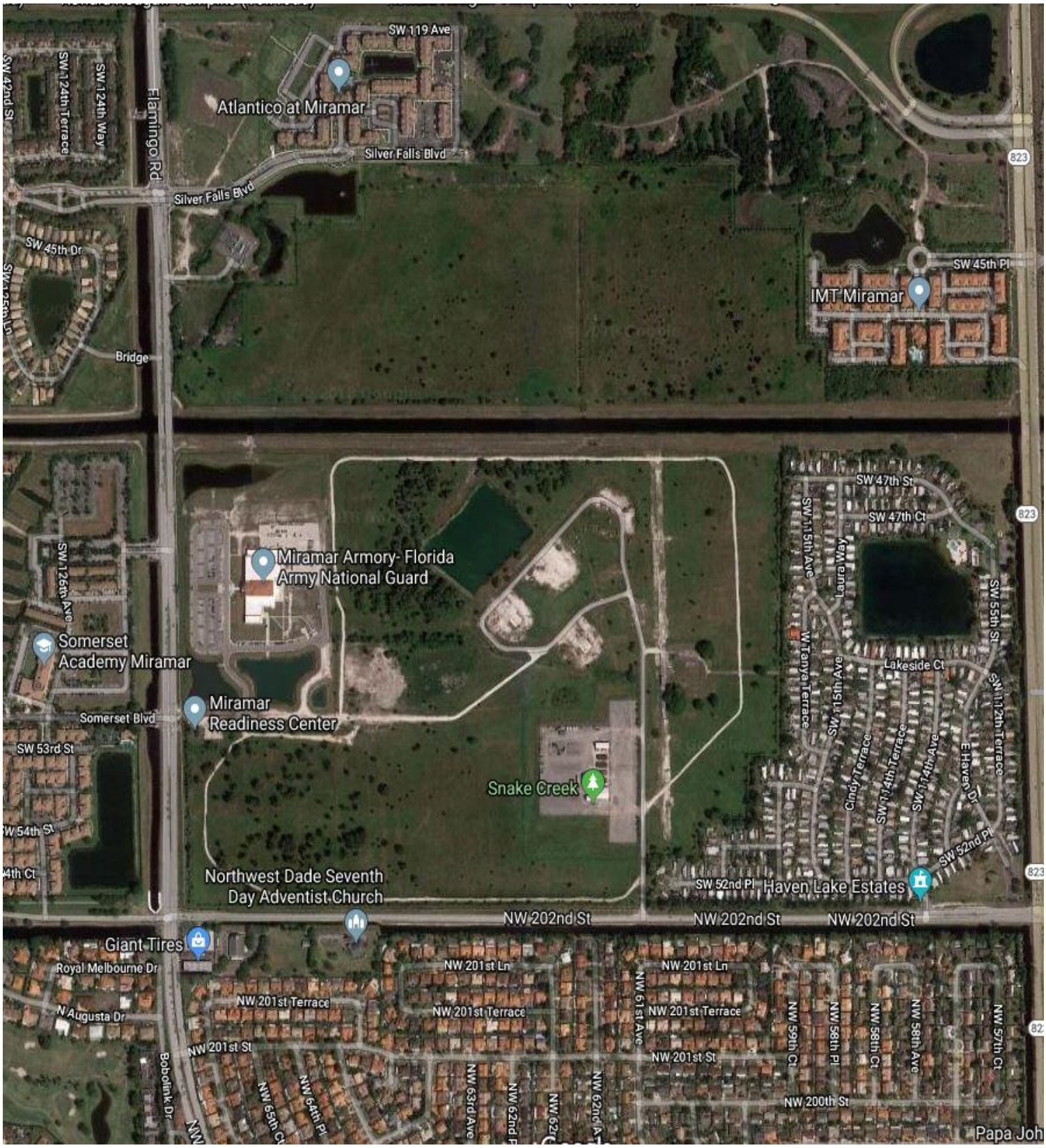
Jacksonville, Florida 32258
(904) 288-8631

Figure 8: Current Snake Creek Weekend Training Site Boundary

Figure 9: 2017 aerial image of Snake Creek Weekend Training Site



Appendix 2. Distribution List

SCWTS INRMP COPY DISTRIBUTION LIST

1) National Guard Bureau
ATTN: ARNG-ILE-T
111 George Mason Boulevard Arlington,
Virginia 22204

2) Florida Army National Guard
ATTN: CFMO-ENV
2305 State Road 207
St. Augustine, FL 32086

Appendix 3. NEPA Record of Environmental Consideration (REC) and Agency Coordination

FINDING OF NO SIGNIFICANT IMPACT (FNSI)
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN (INRMP) AND ENVIRONMENTAL ASSESSMENT (EA) FOR THE SNAKE CREEK WEEKEND TRAINING SITE, FLORIDA

The Florida Army National Guard (FLARNG) has prepared an EA to identify and evaluate potential environmental effects from implementation of the INRMP for the Snake Creek Weekend Training Area, Miramar, Florida. The FLARNG prepared the EA in accordance with the National Environmental Policy Act (NEPA) (42 USC § 4321 to 4370e), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (CEQ Regulations, 40 CFR Parts 1500-1508), and *Environmental Analysis of Army Actions* (32 CFR 651).

1. Description of Proposed Action and Alternatives

Proposed Action. The Proposed Action is the FLARNG's Preferred Alternative. The Proposed Action consists of implementing an INRMP for the FLARNG Snake Creek Weekend Training Area. The purpose of the Proposed Action is to provide for long-term management of the site's natural resources while ensuring the efficiency of Federal and State missions. The INRMP will provide for the conservation, rehabilitation, and sustainable use of natural resources on the installation.

The need for the Proposed Action is to ensure that natural resources are managed effectively at the Snake Creek Weekend Training Area. The Sikes Act (as amended) and Army Regulation (AR) 200-3 require the development of an INRMP. Implementation of the Proposed Action will enable mission accomplishment while maintaining compliance with applicable laws and regulations.

Alternatives Considered. The FLARNG analyzed a No Action Alternative. Current natural resources management measures would remain in effect under the No Action alternative, but there would be no comprehensive plan to integrate mission needs with natural resources management. The No Action Alternative is not viable to the FLARNG because it does not meet the requirements of the Sikes Act or AR 200-3. An environmental analysis of a No Action Alternative is required by CEQ regulations to serve as a benchmark against which the Proposed Action can be evaluated.

The FLARNG also considered a Modified Action Alternative that consists of implementing only those actions that are required by laws, regulations, and/or Executive Order. Proactive management, not required by law, would not be implemented. The FLARNG considers all the goals, objectives and projects identified in the INRMP necessary to promote ecologically sound natural resources management in an economic fashion, while allowing essential military mission objectives to be met. As such, this alternative was removed from further analysis.

2. Environmental Analysis

Based upon the analysis contained in the EA, it has been determined that the known and potential impacts of the Proposed Action on the physical, cultural, and natural environment will be of a positive nature. Implementation of the INRMP will result in the effective management of natural resources at the site. No mitigation measures will be required for implementation of the INRMP.

3. Regulations

The Proposed Action will not violate NEPA, the CEQ Regulations, 32 CFR 651, or any other Federal, state, or local environmental regulations.

4. Commitment to Implementation

The National Guard Bureau (NGB) and FLARNG affirm their commitment to implement this EA in accordance with NEPA. Implementation is dependent on funding. The FLARNG and the NGB's Environmental Programs Division will ensure that adequate funds are requested in future years' budgets to achieve the goals and objectives set forth in this EA.

5. Public Review and Comment

The draft EA and draft INRMP were made available for public review from January 11 to February 9, 2006, at the Southwest Regional Library, 16835 Sheridan Street, Pembroke Pines, FL 33028; and at the South Regional / Bcc Library 7300 Pines Boulevard, Pembroke Pines, FL 33024. The review period for the document was advertised in the Miami Herald Newspaper on January 11, 2006. No comments with regard to the draft INRMP or EA were received during the public participation period. The final INRMP, EA, and the draft FNSI were made available for public review and comment from May 16 through June 14, 2006. No comments were received.

For further information, please write to the Florida Army National Guard Camp Blanding Joint Training Center, ATTN: Ms. Amy Wiley, Route 1, Box 465, Starke, Florida 32091

6. Finding of No Significant Impact

After careful review of the EA, I have concluded that implementation of the Proposed Action will not generate significant controversy or have a significant impact on the quality of the human or natural environment. This analysis fulfills the requirements of NEPA and the CEQ Regulations. An Environmental Impact Statement will not be prepared, and the National Guard Bureau is issuing this Finding of No Significant Impact.

3 AUGUST 2006
Date

Gerald I. Walter
Colonel, US Army
Chief, Environmental
Programs Division

Enviro Tracking #:	**ARNG ENVIRONMENTAL CHECKLIST**	State ARNG
	Enter information in the yellow shaded areas.	Florida

PART A - PROJECT INFORMATION

1. PROJECT NAME:

Snake Creek Weekend Training Site (SCWTS) - Integrated Natural Resources Management Plan (INRMP) Update

2. PROJECT NUMBER: (MILCON if applicable)	3. DATE PREPARED:
N/A	3/1/2018

4. DESCRIPTION AND LOCATION OF THE PROJECT/PROPOSED ACTION:

a. Location (Include a detailed map, if applicable):

The property is located in Miramar, Broward County, Florida. The approximate coordinates of the center of the property are: 25.95°N 80.29°W.

b. Description:

The Proposed Action entails the approval and implementation of the 2017-2022 SCWTS INRMP Update. The subject update addresses on-going land management strategies, land management initiatives and long-term natural resource management goals.

c. The proposed action will involve (check all that apply):

- ☐ Training activities/areas
- ☐ Maintenance/repair/rehabilitation
- ☐ Innovative readiness training project
- ☐ Other (Explain):
- ☐ Construction
- ☐ Real estate action
- ■ Natural resource management
- ☐ Environmental plans/surveys

d. Project size (acres): ~290 (if applicable) Acres of new surface disturbance (proposed): 0 (if applicable)

5. START DATE of PROPOSED ACTION (dd-mmm-yy):	04/01/2018	Note: This must be a future date.
6. PROGRAMMED FISCAL YEAR (if applicable):	2018	
7. END DATE (if applicable):	2022	

PART B - DECISION ANALYSIS GUIDE

To use a categorical exclusion, the project must satisfy the following three screening criteria: no segmentation, no exceptional circumstances and a qualifying categorical exclusion that covers the project. The following decision tree will guide the application and documentation of these three screening criteria. The criteria were extracted from 32 CFR Section 651.29 and represent the most common screening conditions experienced in the ARNG. NOTE: Each question in Part B must have an applicable block checked for concurrence with REC.

1. Is this action segmented (the scope of the action must include the consideration of connected, cumulative, and similar actions)? ☐ YES (go to #30) ■ NO (go to #2)

2. Is there reasonable likelihood of significant environmental effects (direct, indirect,and cumulative)? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ■ NO (go to #3)

3. Is there a reasonable likelihood of significant effects on public health, safety or the environment? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ■ NO (go to #4)

4. Is there an imposition of uncertain or unique environmental risks? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ■ NO (go to #5)

5. Is the project of greater scope or size than is normal for the category of action? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ■ NO (go to #6)

6. Does the project introduce or employ unproven technology? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ■ NO (go to #7)

PART B - DECISION ANALYSIS (continued)

7. Will there be reportable releases of hazardous or toxic substances as specified in 40 CFR Part 302? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question.

☐ YES (go to #30) ■ NO (go to #8)

8. If proposed action is in a non-attainment or maintenance area, will air emissions exceed de minimus levels or otherwise require a formal Clean Air Act (CAA) conformity determination? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ☐ NO (go to #9) ☑ NA (go to #9)

9. Will the project have effects on the quality of the environment that are likely to be highly controversial? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question.

☐ YES (go to #30) ■ NO (go to #10)

10. Will the project establish a precedent (or make decisions in principle) for future or subsequent actions that are reasonably likely to have future significant effects? If action meets screening criteria but is assessed in an existing EA or EIS, check NO and proceed to the next question. ☐ YES (go to #30) ■ NO (go to #11)

11. Has federal funding been secured for the Innovative Readiness Training (IRT) project?

■ N/A (go to #13) ☐ YES (go to #13) ☐ NO (go to #12)

12. NOTE: IRT projects not currently funded can secure approved NEPA documentation. However, once funding is secured State ARNG is required to coordinate with ARNG-ILE-T to complete natural and cultural surveys via proponent funding.

☐ CONFIRMED (go to #27)

13. Do you have a species list from the U.S. Fish and Wildlife Service that is less than 90 days old?

■ YES (go to #14) Date of List: 03/01/2018 ☐ NO (update species list return to #13)

14. In reviewing the species list, what determination was made by the State ARNG?

☐ No species present (go to #16)
☐ No affect (go to #16)
■ May affect but not likely to adversely affect (go to # Date of USFWS concurrence: 03/01/2018
☐ May affect likely to adversely affect (go to #15)

15. Does an existing Biological Opinion cover the action?

☐ YES (go to #16) Date of BO: ☐ NO (go to #30)

16. Have the Endangered Species Act, Section 7 requirements completed?

■ YES (go to #17) Date of Documentation: 03/01/2018 ☐ NO (complete documentation, return to #16)

17. Does the project involve an undertaking to a building or structure that is 50 years of age or older?

☐ YES (go to #18) ■ NO (go to #20)

18. Has the building or structure been surveyed for the National Register of Historic Places?

☐ YES (go to #19) ☐ NO (complete inventory, return to #18)

19. Is the building or structure eligible for or listed on the National Register of Historic Places?

☐ YES (go to #20) ☐ NO (go to #20)

20. Does the action involve ground disturbing activities?

■ YES (go to #21) ☐ NO (go to #22)

21. Has an archaeological inventory or research been completed to determine if there are any archeological resources present?

■ YES (go to #22) ☐ NO (complete inventory or conduct research, return to #21)

22. In reviewing the undertaking, under the National Historic Preservation Act (NHPA) (for both above and below ground resources), what determination was made by the State ARNG?

■ No 106 undertaking; no additional consultation required under NHPA (go to question #27)
☐ No properties affected (go to #24) Date of SHPO Concurrence:
☐ No adverse effect (go to #24) Date of SHPO Concurrence:
☐ Adverse effect (go to #23)

23. Has the State ARNG addressed the adverse effect?

☐ YES (place date of MOA or existing PA and explanation of mitigation in box below, go to #24) ☐ NO (go to #30)

23a.

PART B - DECISION ANALYSIS (continued)

24. Per DoDI 4710.02 did the state ARNG determine that tribal consultation was necessary for this project?

☐ YES (go to #25)

☐ NO (Provide reason in this block 24a, go to #27)

24a.

25. Did the Tribes express an interest or respond with concerns about the project?

☐ YES (go to #26) ☐ NO (go to #27) Date of Documentation:

26. Has the State ARNG addressed the Tribal concerns?

☐ YES (place date of MOU or explanation of how State ARNG addressed tribal concerns in box below, go to #27)

☐ NO (address concerns, return to #26)

Complete only if additional documentation is required in question #26

26a.

27. Does the project involve an unresolved effect on areas having special designation or recognition such as those listed below? For any yes responses go to #30 otherwise go to #28. If any No response is a result of negotiated and/or previously resolved effects please describe resolution in box 27a below.

TYPE	Unresolved Effects?	TYPE	Unresolved Effects?
a. Prime/Unique Farmland	no	e. Wild/Scenic River	no
b. Wilderness Area/National Park	no	f. Coastal Zones	no
c. Sole-Source Aquifer	no	g. 100-year Floodplains	no
d. Wetlands	no	h. National Wildlife Refuges	no

27a.

28. Is this project addressed in a separate EA or EIS review?

■ YES (complete table below; go to Part C, Determination) ■ NO (go to #29)

Document Title:	Integrated Natural Resources Management Plan and Environmental Assessment 2006-2012
Lead Agency:	FLARNG
Date of Decision Document:	August 2006 FNSI

29. Does the project meet at least one of the categorical exclusions listed in 32 CFR 651 App B?

■ YES (complete table below; go to Part C, Determination) ☐ NO (go to #30)

List primary CAT EX code	D-4: Studies, data collection, monitoring, and information gathering…
Descibe why CAT EX applies	This INRMP Update focuses on incorporating natural resource surveys

30. At this time your project has not met all the qualifications for using a categorical exclusion under 32 CFR 651. Unless the scope of the project is changed, it will require an Environmental Assessment or possibly an Environmental Impact Statement. If you feel this is in error, please call your NEPA Regional Manager to discuss. If needed, go to Part C Determination.

Additional Information (if needed):

PART C - DETERMINATION

On the basis of this initial evaluation, the following is appropriate:

- ☐ IAW 32 CFR 651 Appendix B, the proposed action qualifies for a Categorical Exclusion (CX) that does not require a Record of Environmental Consideration.
- ■ A Record of Environmental Consideration (REC).
- ☐ An Environmental Assessment (EA).
- ☐ *A Notice of Intent (NOI) to prepare an* Environmental Impact Statement (EIS).

Signature of Proponent (Requester)	Environmental Program Manager
Megan Rasmussen	Neal Newton
Printed Name of Proponent (Requester)	Printed Name of Env. Program Manager
3/1/2018	3/5/18
Date Signed	Date Signed

Other concurrence (as needed):

Signature	Signature
Printed Name	Printed Name
Date Signed	Date Signed
Signature	Signature
Printed Name	Printed Name
Date Signed	Date Signed
Signature	Signature
Printed Name	Printed Name
Date Signed	Date Signed

Enviro Tracking #:	**ARNG Record of Environmental Consideration** **Enter information in the yellow shaded areas.**	**State ARNG**

1. PROJECT NAME:
Snake Creek Weekend Training Site (SCWTS) - Integrated Natural Resources Management Plan (INRMP) Update

2. PROJECT NUMBER: (MILCON if applicable)	3. DATE PREPARED:
N/A	3/1/2018

4. START DATE of PROPOSED ACTION (dd-mmm-yy): 04/01/2018 Note: This must be a future date

5. PROGRAMMED FISCAL YEAR: 2018

6. END DATE (if applicable): 2022

7. DESCRIPTION AND LOCATION OF THE PROPOSED ACTION:

a. Location (Include a detailed map, if applicable):

The property is located in Miramar, Broward County, Florida. The approximate coordinates of the center of the property are: 25.95°N 80.29°W.

b. Description:

The Proposed Action entails the approval and implementation of the 2018-2022 SCWTS INRMP Update. The subject update addresses on-going land management strategies, land management initiatives and long-term natural resource management goals.

8. CHOOSE **ONE** OF THE FOLLOWING:

☐ An existing environmental assessment* adequately covers the scope of this project. Attach FNSI if EA was completed by another federal agency (non-ARNG).

EA Date (dd-mmm-yy): Lead Agency: FLARNG

☐ An existing environmental impact statement* adequately covers the scope of this project.

EIS Date (dd-mmm-yy): Lead Agency:

■ After reviewing the screening criteria and completing the ARNG environmental checklist, this project qualifies for a

Categorical Exclusion Code: D-4: Studies, data collection, monitoring, and information gatherir
See 32 CFR 651 App. B

Categorical Exclusion Code:
See 32 CFR 651 App. B

Categorical Exclusion Code:
See 32 CFR 651 App. B

☐ This project is exempt from NEPA requirements under the provisions of:

Cite superseding law:

*Copies of the referenced EA or EIS can be found in the ARNG Environmental Office within each state.

9. REMARKS:

Signature of Proponent (Requester)

Megan Rasmussen
Printed Name of Proponent (Requester)

03/01/2018
Date Signed

Environmental Program Manager

Neal Newton
Printed Name of Env. Program Manager

3/5/18
Date Signed

Proponent Information:

10. Proponent:	Megan Rasmussen
11. Address:	2305 SR 207 ST. AUGUSTINE, FL 32086
12. POC:	Megan Rasmussen
13. Comm. Voice:	904-823-0249
14. Proponent POC e-mail:	megan.e.rasmussen2.nfg@mail.mil

DEPARTMENTS OF THE ARMY AND THE AIR FORCE
FLORIDA NATIONAL GUARD
OFFICE OF THE ADJUTANT GENERAL
ST. FRANCIS BARRACKS, P.O. BOX 1008
ST. AUGUSTINE, FLORIDA 32085-1008

CFMO-ENV 03/01/2018

MEMORANDUM FOR RECORD

SUBJECT: Endangered Species Act (ESA) Section 7 Consultation for the Florida Army National Guard – Snake Creek Weekend Training Site (SCWTS) - Integrated Natural Resource Management Plan (INRMP) Update 2017-2021

1. In association with the FLARNG's environmental stewardship responsibilities under the National Environmental Policy Act (NEPA), the FLARNG CFMO-ENV has prepared this Memorandum for Record (MFR) in regards to the Endangered Species Act as it relates to continued implementation of the FLARNG's SCWTS Integrated Natural Resource Management Plan (INRMP). The REC for this plan update is intended to cover all aspects of the related activities for the entire state of Florida.

2. The Florida Army National Guard – SCWTS- Integrated Natural Resource Management Plan (INRMP) Update 2017-2021 requires an internal ESA review of the proposed action's effect on federally listed species and any known or potential habitat of such species, and critical habitat within the action area.

3. The following list of federally listed species and critical habitat for Broward County, Florida was retrieved from the U.S. Fish & Wildlife Service (USFWS) Environmental Conservation Online System (https://ecos.fws.gov/ecp/) on 03/01/2018

Common Name	Scientific Name	Habitat Present	Critical Habitat	Determination
Everglade snail kite	Rostrhamus sociabilis plumbeus	No	No	No effect
Wood stork	Mycteria americana	Yes	No	May affect but not likely to adversely affect
Audubon's crested caracara	Polyborus plancus audubonii	No	No	No effect
Florida scrub-jay	Aphelocoma coerulescens	No	No	No effect

Red knot	Calidris canutus rufa	No	No	No effect
Okeechobee gourd	Cucurbita okeechobeensis ssp. okeechobeensis	No	No	No effect
Beach jacquemontia	Jacquemontia reclinata	No	No	No effect
Tiny polygala	Polygala smallii	No	No	No effect
Bartram's hairstreak Butterfly	Strymon acis bartrami	No	No	No effect
Florida leafwing Butterfly	Anaea troglodyta floridalis	No	No	No effect
West Indian Manatee	Trichechus manatus	No	No	No effect
Florida panther	Puma (=Felis) concolor coryi	No	No	No effect
Southeastern beach mouse	Peromyscus polionotus niveiventris	No	No	No effect
Puma (=mountain lion)	Puma (=Felis) concolor (all subsp. except coryi)	No	No	No effect
American alligator	Alligator mississippiensis	No	No	No effect
Hawksbill sea turtle	Eretmochelys imbricata	No	No	No effect
Leatherback sea turtle	Dermochelys coriacea	No	No	No effect
Loggerhead sea turtle	Caretta caretta	No	No	No effect
Eastern indigo snake	Drymarchon corais couperi	Yes	No	May affect but not likely to adversely affect
Gopher tortoise	Gopherus polyphemus	No	No	No effect

4. The potential effects of the continued implementation of the FLARNG's SCWTS INRMP on those federally-protected species were reviewed and assessed for significance. The SCWTS INRMP covers proposed land restoration activities, natural resource surveys and the creation and incorporation of education T&E posters throughout the property. According to the USFWS South Florida, Vero Beach Office, the Eastern Indigo Snake, Wood Stork and Florida Bonneted Bat have the potential to use

the SCWTS. The FLARNG will conduct project specific site inspections and utilize programmatic keys for these species to determine potential impacts from proposed actions prior to implementation. Because of these measures we have determined that the Proposed Action "may affect, but not likely to adversely affect" federally-listed species, proposed species, or designated critical habitat. If any of these species are sighted during project implementation, all activities will cease and former consultation with the USFWS will be sought.

5. **Migratory Bird Treaty Act.** While the numerous bird species are known to occur within Broward County, Florida, most of which are protected under the Migratory Bird Treaty Act, the Proposed Action is not likely to result in the take of any migratory birds. If a nest is identified on the subject property, all persons are advised to avoid any activity that may cause disturbance to the birds or the nest. If this avoidance interferes with or limits project activities, USFWS will be notified for consultation.

6. The POC is: Megan Rasmussen, megan.e.rasmussen2.nfg@mail.mil, 904-823-0249.

Megan Rasmussen
CIV, FLNG
NEPA/ Natural Resources Coordinator

DEPARTMENTS OF THE ARMY AND THE AIR FORCE
FLORIDA NATIONAL GUARD
OFFICE OF THE ADJUTANT GENERAL
ST. FRANCIS BARRACKS, P.O. BOX 1008
ST. AUGUSTINE, FLORIDA 32085-1008

CFMO-ENV 18 January 2012

MEMORANDUM FOR RECORD

SUBJECT: Cultural Resources Analysis for the Integrated Natural Resources Management Plan (INRMP) Update, Snake Creek Weekend Training Site (SCWTS), Miramar, Florida

Cultural Resources Survey Summary for SCWTS

A site-specific cultural resources survey of the entire SCWTS property was conducted by Southeastern Archaeological Research, Inc. (SEARCH), in July 2001. SEARCH identified and evaluated 19 buildings and two structures to determine their eligibility for listing in the National Registry of Historic Places (NRHP). The onsite buildings and structures at the SCWTS date to the 1962 Cuban Missile Crisis. The site was initially a temporary NIKE Hercules missile battery but by 1965 the military decided to establish the facility as a permanent Hercules base (designated HM-03). SEARCH concluded that, although the HM-03 has significant Cold War historical associations, its integrity had been compromised due to previous historical vandalism and overall dilapidation. As such, none of the identified structures met the eligibility criteria for listing in the NRHP. Also, SEARCH excavated a total of 133 shovel tests across the SCWTS at 25-, 50-, and 100-meter intervals. No cultural material was found in any of the shovel tests or on the surface. As a result, no archeological sites were identified during this survey.

State of Florida Division of Historical Resources (OHR) Consultation Summary for SCWTS

The final cultural resources survey report prepared by SEARCH, titled *A Phase I Cultural Resource Survey of the Snake Creek Weekend Training Facility, Miramar, Florida* was submitted to the State OHR for review. In a letter dated May 6, 2002, the OHR stated that it concurs with the determination by SEARCH that "none of the resources identified during the survey are considered individually eligible for listing in the National Register and that the proposed undertaking will have no effect on any historic properties eligible for listing in the National Register."

Also, the FLARNG Environmental Office invited the OHR to participate as a cooperating agency on the development of the INRMP Update document. In an electronic mail correspondence, dated 9 January 2012 (attached), Ms. Susan Harp (OHR Historic Preservation) indicated that the OHR does not consider the SCWTS to contain any significant cultural resources, in light of the previous archaeological survey, survey report, and previous OHR reviews of Proposed Actions at SCWTS, and did not have any desire to comment on the INRMP Update.

National Environmental Policy Act (NEPA) Summary for SCWTS

The SCWTS has been assessed in three (3) previous NEPA documents:

1. Final Florida Army National Guard Environmental Assessment, Construction of a Multi-Unit Armory at the Snake Creek Weekend Training Site (May 2005)
2. Integrated Natural Resources Management Plan and Environmental Assessment 2006-2010
3. Environmental Assessment for Enhanced Use Lease of the Northern Parcel of the Snake Creek Weekend Training Site for Private/Public Uses (August 2007)

All 3 Environmental Assessments resulted in Findings of No Significant Impact (FNSI).

Native American Consultation Summary for SCWTS

Native American tribal consultation was conducted during the preparation process for each of the 3 previous NEPA Environmental Assessments associated with the SCWTS.

The Tribes were invited to participate as consulting parties in association with the preparation of the Environmental Assessments. The Federally-Recognized Native American Tribes invited to participate in the NEPA consultation process were:

- *Chickasaw Nation*
- *Choctaw Nation of Oklahoma*
- *Miccosukee Tribe of Indians of Florida*
- *Mississippi Band of Choctaw Indians*
- *Muscogee (Creek) Nation of Oklahoma*
- *Seminole Nation of Oklahoma*
- *Seminole Tribe of Florida*

Only one formal response was received during this consultation process. The Miccosukee Tribe of Indians of Florida submitted a letter to the FLARNG, dated 24 February 2005, indicating that the tribe determined that there are no cultural, historical, or religious sites of the Tribe at the SCWTS. All other tribes indicated via telephone conversation or electronic mail that they have no interests in the project area.

The INRMP update was briefed to these same Native American Tribes at the 2011 Multi-State Native American Consultation, which was held in Oklahoma City, Oklahoma, 26-29 September 2011. None of the tribal representatives voiced any concerns or comments regarding the INRMP update.

FLARNG Point of Contact (POC): If you have any questions or would like additional information regarding the Proposed Action, please feel free to contact Brian Athon, at brian.athon@us.army.mil or 904.823.0275.

Athon, Brian H Mr CIV NG FLARNG

From: Harp, Susan [Susan.Harp@DOS.MyFlorida.com]
Sent: Monday, January 09, 2012 8:29 AM
To: Athon, Brian H Mr CIV NG FLARNG
Subject: RE: FLARNG - Integrated Natural Resources Management Plan (UNCLASSIFIED)

Categories: Red Category

Brian - We have already written this area off as there are no significant resources. Thus, we do not need to review any subsequent plans, etc.

Thanks for asking.

Susan

Secretary of State Kurt Browning is committed to maintaining a high level of service in all areas of the Department of State. If you have feedback on your service, please take the department's Customer Satisfaction Survey. Thank you in advance for your participation.

DOS Customer Satisfaction Survey:
http://survey.dos.state.fl.us/index.aspx?email=Susan.Harp@DOS.MyFlorida.corn
-----Original Message-----
From: Athon, Brian H Mr CIV NG FLARNG [mailto:brian.athon@us.army.mil]
Sent: Wednesday, January 04, 2012 1:49 PM
To: Harp, Susan
Cc: Stowe, Matthew J Mr CIV NG FLARNG
Subject: FLARNG - Integrated Natural Resources Management Plan (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: FOUO

Susan,

The Florida Army National Guard is preparing an update to its Integrated Natural Resources Management Plan (INRMP) for its Snake Creek Weekend Training Site (SCWTS), in Miramar, Florida. The INRMP is a requirement Does the Division of Historical Resources need to review this document, or wish to consult on its preparation, given the status of SCWTS that no resources eligible/potentially eligible for inclusion on the National Register of Historic Places (NRHP) exist on the property (refer to DHR File No. 2002-03976)?

Respectfully,

Brian Athon
NEPA Coordinator/Cultural Resources Manager Florida Army National Guard CFMO-ENV
2305 State Road 207
St. Augustine, FL 32086
904-823-0275
brian.athon@ us.army.mi

DIVISIONS OF FLORIDA DEPARTMENT OF STATE
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Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
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Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Ms. Anne V. Stokes, Ph.D.
Southeastern Archaeological Research, Inc.
P.O. Box 14776
Gainesville, Florida 32604

May 6, 2002

Re: DHR No. 2002-03976 / Date Received by DHR: April 29, 2002
A Phase I Cultural Resource Survey of the Snake Creek Weekend Training Facility, Miramar, Florida (Final Report)

Dear Dr. Stokes:

Our office has received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and *36 C.F.R., Part 800: Protection of Historic Properties*. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties listed or eligible for listing in the *National Register of Historic Places*, assessing effects upon them, and considering alternatives to avoid or minimize adverse effects.

Results of the survey indicate that nineteen previously unrecorded historic structures (8BD3387 - 8BD3392, 8BD3342 - 8BD3347, 8BD3379 - 8BD3386) and one historic canal (8BD3393) were identified. These resources, with the exception of building 8BD3392 and canal 8BD3393, are associated with the former Nike Hercules Missile launch facility HM-01/HM-03. This launch facility directly relates to the Cold War and the Cuban Missile Crisis. However, the integrity of HM-01/HM-03 has been compromised by the complete destruction of its Administrative and Integrated Fire Control areas. Therefore the Snake Creek facility (HM-01/HM-03) is not considered eligible for listing in the *National Register of Historic Places*. None of the resources identified during this survey are considered individually eligible for listing in the *National Register*. It is the opinion of Southeastern Archaeological Research that the proposed undertaking will have no effect on any historic properties eligible for listing in the *National Register*. Based on the information provided, this office concurs with these determinations and finds the submitted report complete and sufficient.

If you have any questions concerning our comments, please contact Mary Beth Fitts, Historic Sites Specialist, at mbfitts@mail.dos.state.fl.us or (850) 245-6333. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Frederick P. Gaske, Deputy SHPO

for Janet Snyder Matthews, Ph.D., Director, and
State Historic Preservation Officer

Florida Fish and Wildlife Conservation Commission

Commissioners
Bo Rivard
Chairman
Panama City

Robert A. Spottswood
Vice Chairman
Key West

Richard Hanas
Oviedo

Gary Nicklaus
Jupiter

Sonya Rood
St. Augustine

Michael W. Sole
Tequesta

Office of the
Executive Director
Eric Sutton
Executive Director

Thomas H. Eason, Ph.D.
Assistant Executive Director

Jennifer Fitzwater
Chief of Staff

850-487-3796
850-921-5786 FAX

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

620 South Meridian Street
Tallahassee, Florida
32399-1600
Voice: 850-488-4676

Hearing/speech-impaired:
800-955-8771 (T)
800 955-8770 (V)

MyFWC.com

February 8, 2018

Neal Newton, Program Manager
Department of Military Affairs
Florida Army National Guard
Environmental Division
2305 State Road 207
Saint Augustine, FL 32086

RE: 2017 Integrated Natural Resources Management Plan Five Year Update: Snake Creek Weekend Training Site, Miramar, Broward County, Florida

Dear Mr. Newton:

Florida Fish and Wildlife Conservation Commission (FWC) staff has completed a review of the 2017 update of the Integrated Natural Resources Management Plan (INRMP) for the Snake Creek Weekend Training Site, Miramar, Broward County, in fulfillment of the Sikes Act.

We appreciate the opportunity to review and comment on this project. FWC staff concurs that the 2017 update of the INRMP fulfills the requirements of the Sikes Act. We also agree that the proposed strategies are appropriate for the continued survival of any potential fish and wildlife resources on the property and applaud your efforts to incorporate climate change considerations into this update. We have attached a list of suggested changes for your consideration and incorporation into the final draft along with the requested signature page. We encourage you to contact us if you need any additional wildlife or habitat related information to support personnel training, public awareness, or future wildlife inventory and monitoring efforts.

Thank you again for engaging the FWC staff and allowing us to assist with review of this INRMP. We look forward to working with you and your staff during future reviews and in continuing to foster our long-term productive partnership. If you or your staff would like to coordinate further regarding this project review, please contact us by email at FWCConservationPlanningServices@MyFWC.com. If either your agency or your representatives have specific questions regarding the content of this letter, please contact Mark Asleson by phone at (352) 732-1225 or by email at mark.asleson@MyFWC.com.

Sincerely,

Morgan Richardson

Morgan Richardson
Landowner Assistance Program Administrator
Office of Conservation Planning Services

mr/maa
Snake Creek Weekend Training Site_34465_020818
Enclosures

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

April 2, 2018

Neal R. Newton
Environmental Manager
Florida Army National Guard
2305 State Road 207
St. Augustine, Florida 32086

Service Consultation Code: 04EF2000-2018-I-0104
Date Received: October 31, 2017
Project: Snake Creek Weekend Training Site Integrated Natural Resources Management Plan, 2017
Applicant: Florida Army National Guard
County: Broward

Dear Mr. Newton:

The U.S. Fish and Wildlife Service (Service) received the Florida Army National Guard's (FLARNG) request for consultation and signature of the Snake Creek Weekend Training Site (SCWTS) Integrated Natural Resource Management Plan (INRMP), dated October 2017. SCWTS is located in Miramar, Broward County, Florida (25°57'42.01"N Latitude and -80°18'12.91W Longitude). This letter transmits a signed copy of the INRMP and is provided in accordance with the provisions of the Sikes Improvement Act (74 Stat. 1052;16 U.S.C 670, *et seq.*) and Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*).

Upon review of the October 2017 SCWTS INRMP the Service identified several points that needed clarification of past and ongoing activities on SCWTS. The Service and SCWTS worked cooperatively to reach a mutual understanding on what key items warranted revision and update and how this could be implemented with the 2017 INRMP and future revisions. SCWTS provided the Service a Memorandum for Record (FLARNG 2018) to respond to the Service's request and memorialize the agreements reached for modifications. This letter also summarizes a subset of the topics discussed.

The SCWTS INRMP provides the basis for protecting and enhancing natural resources using ecosystem management, consistent with the military mission. Provisions of this INRMP apply to SCWTS, tenants of SCWTS, and individuals who either directly or indirectly impact SCWTS

natural resources as well as units and outlying detachments of personnel assigned or attached to SCWTS. Currently no federally listed species have been observed on the property, but FLARNG recognizes the potential for the threatened eastern indigo snake (*Drymarchon corais couperi*; indigo snake), and wood stork (*Myceria americana*) to occur. In addition, FLARNG is committed to including more up to date and comprehensive natural resource surveys as part of their natural resources management program. This will include more thorough surveys for listed species (flora and fauna), acoustic surveys for Florida bonneted bats, identifying water resources including wetlands, describing vegetation cover, and other important natural resources identified to gain a more complete picture of natural resources on SCWTS. Currently, the goal of the SCWTS INRMP is to outline future natural resource projects in order to maintain the land as suitable to support the military mission while protecting natural resources.

Additional clarifications in FLARNG's March 5, 2018, Memorandum for the Record include, but are not limited to:

1. Construction plans for possible future military readiness projects are currently unavailable. As projects are identified, the FLARNG will consult with the Service on a project by project basis, when warranted. To this end FLARNG will use the Service's most up to date consultation guidelines currently the Consultation Key for the Eastern Indigo Snake – Revised (Service 2017) and the South Florida Programmatic Concurrence, Wood Stork (Service 2010).

2. Based on ongoing efforts to update information on Florida bonneted bats, the Service expects the species may occur on SCWTS. Therefore, FLARNG has incorporated habitat and acoustic surveys for the species into their future survey efforts.

3. FLARNG will post signage around the SCWTS property to alert personnel of the potential to encounter indigo snakes or wood storks, and what to do if they are seen.

4. With the help of the Service, the FLARNG will identify their highest priority natural resource survey requirements and incorporate them into the schedule for future land management projects outlined in the 2017 SCWTS INRMP Update.

The FLARNG determined that implementation of the SCWTS INRMP may affect, but is not likely to adversely affect the indigo snake and wood stork. Based FLARNG's commitments in the March 5, 2018, Memorandum for the Record, the Service concurs with this determination.

The Service commends FLARNG for the revisions they have committed to implementing in the future as well as for their ongoing work implementing invasive species management and restoring natural habitats on its lands. We believe this INRMP will ultimately benefit native plants, wildlife, and federally listed species habitats at the SCWTS. Thank you for your

cooperation and effort in protecting federally listed species and fish and wildlife resources. If you have any questions regarding this letter and summary, please contact Ted Martin at 772 - 469-4232.

Sincerely yours,

Roxanna Hinzman
Field Supervisor
South Florida Ecological Services Office

Enclosure

cc: electronic only
FLARNG, St. Augustine, Florida (Matthew Welsh)
FWC, Tallahassee, Florida (Morgan Richardson)

References Cited

Florida Army National Guard (FLARNG) 2018. Memorandum for the Record, Subject: FLARNG's response to USFWS concerns relating to the October 2017 Snake Creek Weekend Training Site (SCWTS) Draft Integrated Natural Resource Management Plan (INRMP) Update. March 5, 2018. Departments of the Army and the Air Force, Florida National Guard, Office of the Adjutant General, St Augustine, Florida.

U.S. Fish and Wildlife Service (Service). 2010. South Florida Programmatic Concurrence Wood Stork. Service Consultation Code 41420-2007-I-0964. May 18, 2010. South Florida Ecological Services Office. Vero Beach, Florida.

U.S. Fish and Wildlife Service (Service). 2017. Consultation Key for the Eastern Indigo Snake - Revised. August 1, 2017. Service Consultation Code 41420-2009-I-0467-R001. South Florida Ecological Services Office, Vero Beach, Florida.

Appendix 4: Invasive Species Eradication Implementation Plan

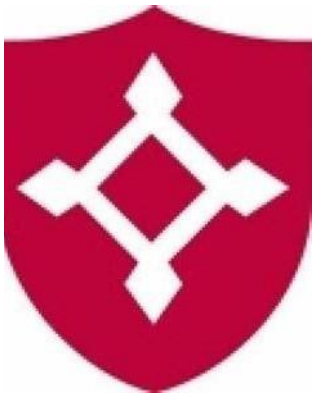
INVASIVE SPECIES ERADICATION IMPLEMENTATION PLAN

UPDATE

For the

SNAKE CREEK WEEKEND TRAINING SITE

Miramar, Broward County, Florida



FLORIDA ARMY NATIONAL GUARD

LG^2 Environmental Solutions, Inc.

2018

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LIST OF ACRONYMS AND ABBREVIATIONS

CMPT	Compartment
ERP	Environmental Resource Permit
FDEP	Florida Department of Environmental Protection
FLARNG	Florida Army National Guard
ISEIP	Invasive Species Eradication and Implementation Plan
NPDES	National Pollution Discharge Elimination System
TNC	The Nature Conservancy
UF/IFAS	University of Florida, Institute of Food and Agriculture Science
UTM	Universal Transverse Mercator
SCWTS	Snake Creek Weekend Training Site

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1.0 INTRODUCTION

The FLARNG's Snake Creek Weekend Training Site (SCWTS) is located in Miramar, Broward County, Florida, just north of the Dade County line in Section 36 of Township 51 South, Range 40 East (see **Section 6.0 Figure ISEIP-1**). The approximately 290-acre SCWTS is bordered by Flamingo Road (SW 124th Ave) to the west, pasture land to the north, pasture land and plant nurseries to the northeast, a mobile home community to the east and southeast, and Honey Hill Drive (SW 55th St) to the south.

Previously, the property was heavily overgrown with Brazilian pepper (*Schinus terebinthifolius*) trees, and other exotic tree species were also present, such as Melaleuca (*Melaleuca quinquenervia*), earleaf acacia (*Acacia auriculiformis*), and bishopwood (*Bischofia javanica*). In its current state, the site has been managed over the past 5 years through a combination of mechanical and herbicide treatments that resulted in a pasture-like landscape over much of the property. Approximately 22% of the vegetative species (or 31 of 141 total) that have been documented on-site are non-native, invasive, or exotic. As such, the FLARNG has determined that preparation of this stand-alone Invasive Species Eradication Implementation Plan (ISEIP) is necessary to continue to bring vegetative conditions under control for the support and sustainment of military training in a natural environment.

Twenty-one of the 31 exotic species on-site are listed as Category I Species (most invasive) by the Florida Exotic Pest Plant Council (FLEPPC) (see **Table 1**). To ensure that the SCWTS is a viable training area, the FLARNG intends, to the extent practicable, to control these Category I species (as well as all other exotic and invasive species) from the SCWTS. Of the 21 Category I species listed, only 13 of those species have a dominant extent that is currently affecting the military use and establishment of a native plant community. The other 8 species were recorded merely as a presence within the belt transects and not considered to be a significant component. It is anticipated that regular management including mechanical (mowing, fire, and grazing) and herbicide treatments should keep these minor species from becoming a major component of the community. This management plan only addresses the 13 species that have established significant coverage. Monitoring should occur regularly to document the progress of current invasive species management. Should any additional species reach a significant and controlling cover, then that species should be added to this management plan.

Table 1: Category I Invasive Species at SCWTS

Scientific Name	Common Name	Significant cover at SCWTS (over 1%)
Abrus precatorius	Rosary pea	✓
Acacia auriculiformis	Earleaf acacia	✓
Albizia lebbeck	Woman's tongue	
Ardesia elliptica	Shoebutton ardesia	
Bischofia javanica	Bishopwood	✓
Casuarina equisetifolia	Australian-pine	✓
Dioscorea bulbifera	Air potato	✓

Lantana camera	Lantana	✓
Ludwigia peruviana	Primrose willow	
Lygodium japonicum	Japanese climbing fern	
Lygodium microphyllum	Old world climbing fern	
Neyraudia reynaudiana	Burma reed	✓
Panicum repens	Torpedo grass	✓
Pennisetum purpureum	Napier grass	✓
Psidium guajava	Guava	✓
Sapium sebiferum	Chinese tallow tree	
Schefflera actinophylla	Queensland umbrellata tree	
Schinus terebinthifolius	Brazilian pepper	✓
Senna pendula	Christmas senna	✓
Tradescantia fluminensis	Small-leaf spiderwort	✓
Urena lobata	Cesear's weed	

Source: (Significant cover was determined by Snake Creek Weekend Training Site, Baseline Vegetation and Flora Planning Level Survey, LG^2 Environmental Solutions, Inc. 2009)

The FLARNG intends to utilize the Nature Conservancy's Adaptive Weed Management Approach as a model to control invasive species at the SCWTS. This approach includes the following steps:

1) Establishment of conservation targets and goals
2) Identification and prioritization of species / infestations that hinder accomplishment of established targets and goals
3) Assessment of control techniques
4) Development and implementation of a weed management plan
5) Monitoring and assessment of the impacts of management actions
6) Review and modification of control methods

2.0 CONSERVATION TARGETS AND GOALS

The overall goal of the FLARNG natural resources management program for the SCWTS, as well as this ISEIP specific to the SCWTS, is to modify and/or enhance existing conditions (to the extent necessary and practicable) to support and sustain military training.

As such, the FLARNG has determined that preparation of this stand-alone ISEIP is necessary to bring vegetative conditions under control to the extent that the site can support and sustain military training. The specific goals of this ISEIP are as follows:

- **Control and Eradication of Category I Invasive Species**
  - Through the use of a phased eradication strategy, control the occurrence of Category I Invasive Species to an extent that they do not hinder military training operations at the SCWTS.
- **Control and Eradication of General Invasive/Exotic Species**
  - By using a phased eradication strategy, control the occurrence of other (non-Category I) invasive and/or exotic species to an extent that native species dominate the vegetative community at the SCWTS.
  - Reduce the overall areal extent of invasive and/or exotic species to less than 10% of the vegetative cover at the SCWTS.
- **Formation of a Relatively Open Landscape**
  - Upon removal and control of thickets of Brazilian pepper (and other Category I species), replace these with native herbaceous vegetation as well as scattered shrubs that do not form dense thickets.

Through phased accomplishment of the goals outlined above, the FLARNG anticipates that the SCWTS will become a viable military training site.

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3.0 TECHNICAL APPROACH

3.1 Target Species and Control Methods

As they are the most destructive to natural communities, the 13 Category I Invasive Species that are known to occur at the SCWTS are the main species discussed in this plan. The primary species of concern is Brazilian pepper, as it has the most opportunity to dominate the SCWTS landscape if management of the site was to cease. Although current management has reduced or eliminated much of the Brazilian pepper on the site, many of the other exotic species exist scattered throughout the site including bishopwood and earleaf acacia. These exotic trees have remained for the purpose of adding appropriate vegetative structure to the site desirable for military training. These trees offer needed groundcover and site partitioning. It is the overall intent over time to replace these remaining invasive species with native species.

To assist in the identification and eradication of invasive species present at the SCWTS, figures and illustrations have been included in **Section 6.0** relating to each invasive species discussed below.

3.1.1 Rosary Pea

Rosary pea is a member of the Pea (Fabaceae) family. It is a toxic, high-climbing, twining, or trailing woody vine with slender herbaceous branches (see **Section 6.0: Photograph 6-1**). Leaves are alternate, two to five inches long, even-pinnately compound with five to 15 pairs of leaflets. Flowers are white to pink or reddish, small, in short-stalked dense clusters at leaf axils. The fruit of this species is a short, oblong pod, and seeds are scarlet with black bases (Langeland and Burks, 1998).

Rosary pea may be controlled by cutting large woody vines down and applying triclopyr ester immediately. This species may also be controlled by foliar spray such as triclopyramine or glyphosate. The roots of this plant are deep and difficult to pull up.

Rosary Pea	
Treatment Method	**Treatment Means**
	Mechanical
Dozing	Selective razing at or just below ground level, subsequent debris removal
Chipping/Grinding	Selective razing at ground level; disarticulation of debris
Cutting	Selective cutting of large woody vines
Burning	Selective, controlled, prescribed burning
	Chemical
Application to cut vines	Triclopyr ester (10% Garlon 4)(immediate application) and a 90% spray adjuvant such as CideKick)
Foliage treatment	Triclopyr amine (50% Garlon 3A) Glyphosate (1-3% Roundup) Triclopyr amine (10% Garlon 4) and 90% spray adjuvant such as CideKick

Herbicide recommendations source: University of Florida, Institute of Food and Agricultural Science (UF/IFAS) Website: http://edis.ifas.ufl.edu/WG209

3.1.2 Earleaf Acacia

A member of the Pea family (Fabaceae), earleaf acacia is an evergreen tree reaching heights of 50 feet (see **Section 6.0: Photograph 6-2**). Leaves are alternate, simple, reduced to phyllodes (flattened leaf stalks), slightly curved, five to eight inches long, with three to seven main parallel veins. Leaf surface is dark green. Flowers are mimosa-like, in loose, yellow-orange spikes at leaf axils or in clusters of spikes at stem tips. Fruit is a flat, oblong pod, twisted at maturity, splitting to reveal flat black seeds attached by orange, string like arils (Langeland and Burks, 1998).

Earleaf acacia may be controlled using herbicides or a combination of mechanical means and herbicides.

Earleaf Acacia	
Treatment Method	**Treatment Means**
	Mechanical
Dozing	Selective razing at or just below ground level, subsequent debris removal
Chipping/Grinding	Selective razing at or just below ground level; disarticulation of debris
Burning	Selective, controlled, prescribed burning
	Chemical
Basal bark application	10% Garlon 4
Stump-cut treatment	50% Garlon 4 with an oil based adjuvant

*Addition of 3% Stalker will increase consistency
Herbicide recommendations source: University of Florida, Institute of Food and Agricultural Science (UF/IFAS) Website: http://edis.ifas.ufl.edu/WG209

3.1.3 Bishopwood

A member of the spurge family (Euphorbiaceae), bishopwood (Bischofia javanica) is an evergreen tree that reaches heights of 35-60 feet (see **Section 6.0: Photograph 6-3**). Compound leaves are alternate, long-petioled, and trifoliolate (three leaflets). Leaflets are shiny, bronze-toned, oval-elliptic, six to eight inches long, with margins small toothed. Flowers are tiny, without petals, greenish yellow, in many flowered clusters (racemes) at leaf axils. This species is dioecious, meaning male and female flowers are on separate plants. Fruit is pea-sized, berrylike, fleshy, to 0.33 inches in diameter, brown or reddish or blue-black, three-celled (Langeland and Burks, 1998).

Bishopwood can be controlled by physical removal by gutting, chipping or grinding with herbicide treatments of stumps.

Bishopwood	
Treatment Method	**Treatment Means**
	Mechanical
Dozing	Selective razing at or just below ground level, subsequent debris removal
Chipping/Grinding	Selective razing at or just below ground level; disarticulation of debris
Burning	Selective, controlled, prescribed burning
	Chemical
Basal bark application	10% Garlon 4 with an oil based adjuvant

* Large trees require applying a wider band of herbicide on the trunk, or increasing the concentration of Garlon 4 to 20%. Herbicide recommendations Source: University of Florida, UF/IFAS Website: http://edis.ifas.ufl.edu/WG209

3.1.4 Australian Pine

Although this species resembles a pine tree, it is an angiosperm, not a conifer. Australian-pine belongs to the Beefwood family (Casuarinaceae). It generally has a single trunk with an open, irregular crown, reaching heights up to 150 feet tall (see **Section 6.0: Photograph 6-4**). Its bark is brown to gray, rough, brittle, and peeling. Leaves are reduced to tiny scales, six to eight inch whorls encircling joints of branchlets. Flowers are unisexual (monoecious) and inconspicuous. Female flowers are in small axillary clusters, and male flowers are in small terminal spikes. Fruit is a tiny, one-seeded, winged nutlet (samara), formed in woody cone-like clusters, 0.75 inch long (Langeland and Burks, 1998).

Austrialian pine can be controlled by physical removal followed by herbicide treatment of stumps and continued mowing and prescribed burns.

Australian Pine	
Treatment Method	**Treatment Means**
	Mechanical
Dozing	Selective razing at or just below ground level, subsequent debris removal
Chipping/Grinding	Selective razing at or just below ground level; disarticulation of debris
Burning	Selective, controlled, prescribed burning
	Chemical
Basal bark application	4-10% Garlon 4 oil mixture to trees 8 inches or less in diameter. For trees up to 20 inches, use 15-30% Galon 4. See chemical directions for trees larger than 20 inches.

Stump-cut treatment	10% Garlon 4* with appropriate oil adjuvant

* When basal bark treatment is used on trees greater than 1 foot in diameter it may be necessary to slough off loose bark in the application area to prevent the bark from trapping the herbicide. Addition of 3% Stalker will increase consistency on older trees. Broadcut or 4-6 lb Velpar ULW may be used when appropriate.

Herbicide recommendations Source: University of Florida, UF/IFAS Website: http://edis.ifas.ufl.edu/WG209

3.1.5 Air-potato

A member of the Yam Family (Dioscoreacea), this species is a twining herbaceous vine with primarily aerial tubers formed in leaf axils (see **Section 6.0: Photograph 6-5**). Leaves are alternate, eight inches long, and broadly heart-shaped. Flowers are small, arising from leaf axils and fruits are capsules. This species is similar to *Dioscorea alata*, which is native to Florida (Langeland and Burks, 1998).

Vines should be cut (approximately three feet above ground level) during growing season (spring to midsummer), and triclopyr amine or glyphosate should be applied. Tubers should be removed during winter months when vines have died back. All plant material and tubers/bulbils should be disposed in plastic bags or incinerated if possible. Follow-up applications of herbicide are necessary.

Air-potato	
Treatment Method	**Treatment Means**
	Mechanical
Dozing	Selective razing at or just below ground level, subsequent debris removal and disposal in plastic or incineration
Chipping/Grinding	Selective razing at or just below ground level; disarticulation of debris and disposal in plastic or incineration
Cutting	Vines should be cut approximately three feet above ground level during the growing season. Tubers should be removed during the winter months when vines have died back.
Burning	Selective, controlled, prescribed burning
	Chemical
Basal bark application	Round-up application
Application to cut vines	50% Garlon 3A or Roundup (immediate application); 10% solution of Garlon 4 with surfactant, such as Improve or Frigat
Foliage treatment	Roundup (3%) with surfactant, such as Improve or Frigat. Weedmaster 2,4-D (3%) with surfactant, such as Improve or Frigat

Herbicide recommendations Source: Land Management Program at Archbold Biological Station, Lake Placid, FL website: http://www.archbold-station.org

3.1.6 Lantana

Lantana is a member of the Vervain (Verbenaceae) Family. Lantana camera has extensively hybridized with all varieties of native lantana (*Lantana depressa*). In addition, it has been widely cultivated in Florida with over 100 forms, cultivars, and hybrids available. It is a multi-stemmed, deciduous shrub growing up to approximately six feet in height (see **Section 6.0: Photograph 6-6**).

Leaves are opposite, simple, rough hairy, strongly aromatic, and up to six inches in length. Flowers are small, multicolored, and in dense, flat-topped clusters. Fruits are two-seeded drupes (Langeland and Burks, 1998).

Control must be integrated, including manual removal, burning, shading, chemical control and revegetation. In many cases natural restoration is difficult after removal of thickets, due to reduced seed banks of native species.

Lantana	
Treatment Method	**Treatment Means**
	Mechanical
Dozing	Selective razing at or just below ground level, subsequent debris removal
Chipping/Grinding	Selective razing at or just below ground level; disarticulation of debris
Cutting	Removal of vegetation at ground level
Burning	Selective, controlled, prescribed burning
Shading	Installation of opaque materials such as black plastic or similar
	Chemical
Basal bark / Foliage application	Roundup, dichlorprop (DP600) with surfactant such as Improve or Frigat

Global Invasive Species Database: http://www.issg.org/database/welcome/

3.1.7 Burma Reed

Burma reed is a member of the Grass Family (Poaceae). It is a robust, reed-like perennial that grows up to ten feet tall (see **Section 6.0: Photograph 6-7**). Stems are often branched and filled with a soft pith. Inflorescence is a large, feathery, silver-hairy terminal panicle. It is similar to the common reed, Phragmites australis (Langeland and Burks, 1998).

Its deep roots make mechanical removal an extremely labor intensive and costly undertaking and causes extensive disturbance to the soil. A more effective management approach involves a combination of cutting or prescribed burning, followed by application of herbicides. A 90% kill rate can be achieved by cutting culms with a steel-bladed trimmer, allowing resprouting to 15 - 20 centimeters and applying Roundup. It is recommended that the remaining plants be removed by hand and that the site be monitored for at least two years. The cut culms should be removed in

pineland situations so as not to add nutrients to the soil and hence, make a more suitable environment for other exotics (George Gann-Matzen of Ecohorizons, Inc., in Guala, 1990). By applying Roundup at 1% with a surfactant (Improve or the cheaper brand Frigat) at 1%, without cutting the culms, a 100% kill rate can be achieved (Terry and Barbara Glancy, private land owners in Homestead (Gann-Matzen, 1990). Wick application of Roundup might be a reasonable course of action especially in areas in which small native herbs are still persisting within the population. Cutting or mowing alone does not work. Fire may even compound the problem by introducing disturbance. Mechanical removal may work if done by hand but bulldozing may also compound the problem due to the ability of the grass to resprout from rhizome segments.

Burma Reed	
Treatment Method	**Treatment Means**
	Mechanical
Dozing	Not recommended
Cutting	Utilization of a steel-bladed trimmer and subsequent chemical treatment of young sprouts/root mass/stems
Burning	Not recommended; burning may be used to reduce the cut debris.
	Chemical
Sprouts/Root mass/stem application	1-3% Roundup

Herbicide recommendations Source: Global Invasive Species Database: http://www.issg.org/database/welcome/

3.1.8 Torpedo Grass

Torpedo grass, a member of the Grass Family (Poaceae) is a perennial grass that grows to approximately three feet in height from sturdy, vigorous, widely creeping, or floating rhizomes (see **Section 6.0: Photograph 6-8**). Aerial stems are erect or leaning with the lower portions often wrapped in bladeless sheaths. Inflorescence is a loose open terminal panicle, three to nine inches long.

Control of torpedo grass requires the application of herbicides. Glyphosate should be applied in late fall when leaves are bright green. Reapplications are necessary. Tilling and cultivation should be avoided as this stimulates grass growth.

Torpedo Grass	
Treatment Method	**Treatment Means**
	Mechanical
Dozing	Not recommended
Burning	Selective, controlled, prescribed burning
	Chemical

Sprouts/Root mass/stem application	1-3% Roundup with surfactant, such as Improve or Frigat. If in a large acreage with no woody plants add imazapyr for greater control

Herbicide recommendations Source: Global Invasive Species Database: http://www.issg.org/database/welcome/

3.1.9 Napier Grass

A native of Africa, Napier Grass was introduced to the United States in the early 1900's as a forage crop and was established in the glades of south Florida by 1971 (see **Section 6.0: Photograph 6-13**).. Now Napier Grass is commonly naturalized in central and south Florida, infrequently in north and west Florida, most often in disturbed areas such as roadsides, canal banks, and fields, but also in scrub, pine rockland, hammock, sink, lake shore, swamp, and prairie habitats. Napier Grass is a member of the Grass Family (Gamineae). It is a robust perennial that grows to 13 feet tall, forming thick clumps or colonies from basal offshoots or short rhizomes.

Control following initial removal should be accomplished by continual mowing and herbicide treatments.

Napier Grass	
Treatment Method	**Treatment Means**
	Mechanical
Dozing	Not recommended
Cutting	Utilization of a steel-bladed trimmer and subsequent chemical treatment of young sprouts/root mass/stems
Burning	Not recommended; burning may be used to reduce the cut debris.
	Chemical
Sprouts/Root mass/stem application	1-3% Roundup with surfactant, such as Impove or Frigat

3.1.10 Guava

A member of the Myrtle Family (Myrtaceae), this species is an evergreen shrub or small tree (see **Section 6.0: Photograph 6-9**). Leaves are opposite, simple, short stalked, entire, oval to oblong-elliptic, and pubescent below. Flowers are white, fragrant, approximately 1.4 inches wide and are borne singly or a few together at leaf axils. Fruit is an oval or pear-shaped berry, one to four inches long.

Mechanical: Because of the huge quantities of seed that are dispersed by feral pigs, and other exotic invasive species, feral species management is a practical and necessary first step in guava management. Manual and mechanical control measures work reasonably well and are recommended where practical. Seedlings and saplings originating from seed can be uprooted. Uprooted plants may re-sprout or re-root in

some areas, especially if the plants are set on the ground. Manual and mechanical methods are less effective on root sprouts.

Chemical: A number of effective chemical control measures have been developed. It has been shown that undiluted picloram (Tordon 22K) is highly effective on guava as a cut stump treatment. Tordon 22K was used at Hawaii Volcanoes but discontinued because of unfavorable effects on non-target plants. It was replaced by Tordon RTU, which was nearly as effective, but less harmful to surrounding vegetation. Undiluted dicamba (Banvel) proved to be highly effective in a cut surface treatment. Additionally, undiluted glyphosate (Roundup) has proven to be effective using a ""hack and squirt"" method. Resource Managers in Hawaii found undiluted triclopyr ester (Garlon 4) to be effective as a cut-stump treatment, with 80% of plants dead and 90% of treated plants without re-sprouts after 21 months. A frill application of undiluted triclopyr amine (Garlon 3A) was somewhat less effective, with 11 of 20 stems dead and all trees defoliated after 21 months. Fifty percent Garlon 4 and 3A were about 50% effective. A major drawback of cut-stump treatment methods in very wet areas was re-sprouting of slash from cut stump and wood fragments from felling larger trees. Garlon is recommended because of its lack of mobility and relatively short half-life, four to six weeks. In addition, the research is more thorough and definitive on control methods for Garlon than other herbicides.

Guava	
Treatment Method	**Treatment Means**
	Mechanical
Dozing	Selective razing at ground level, subsequent debris removal
Chipping/Grinding	Selective razing at ground level, disarticulation of debris
Burning	Selective, controlled, prescribed burning
	Chemical
Basal Bark application	10% Garlon 4 with appropriate oil adjuvant
Stump-cut treatment	10% Garlon 4

Herbicide recommendations Source: Global Invasive Species Database: http://www.issg.org/database/welcome/

3.1.11 Brazilian Pepper

Brazilian pepper (see **Section 6.0: Photograph 6-10**) is a member of the Anacardiaceae (Cashew) family. It is an evergreen shrub or small tree that often has a multi-stemmed trunk. Its multiple stems and arching branches often form tangled thickets. Leaves are alternate, odd-pinnately compound with three to 11 (usually seven to nine) leaflets, approximately elliptic to oblong, one to two inches long. Flowers are small, unisexual (dioecious), in short-branched clusters at leaf axils of current-season stems. Flowers have five petals. Fruit is a small, bright red spherical drupe (Langeland and Burks, 1998).

Flowering may occur sporadically throughout the year; however, the main flowering

period for Brazilian pepper is September through October. In about 10% of the population, a second flowering period may occur in March through May. Fruit production occurs November through February, and fruits are generally retained on the tree for up to eight months. Seed dispersal is accomplished by both native and exotic birds. Raccoons and opossums may also spread seeds. Brazilian pepper also has the ability to sprout from above ground stems and root crowns. Re-sprouting is often profuse and growth rates very high.

In addition to threatening Florida's native ecosystems, Brazilian pepper poses several health and safety problems. It belongs to the same Family (Anacardiaceae) as poison ivy (*Toxicodendron radicans*) and direct contact with the sap can cause severe skin irritation. In addition, airborne chemical emissions can cause sinus and nasal congestion, rhinitis, sneezing, headaches, and eye irritation. "Consumption of foliage by horses and cattle can cause hemorrhages, intestinal compaction, and fatal colic. Birds that feed excessively on the fruit have been known to become intoxicated and later die (FLEPPC 1997)." Brazilian pepper is listed as a noxious weed by the Florida Department of Agriculture and Consumer Services (FDACS) and is prohibited by the Florida Department of Environmental Protection (FDEP).

Most of the methods to control Brazilian pepper are a combination of mechanical control and the use of herbicides. Heavy equipment is often used to remove the plants, including their extensive root systems. Following mechanical removal, herbicides should be used, as plants can often rebound and regrow. Foliar herbicides should be used following mechanical control to kill sprouts and remaining individuals.

Entire saplings, including root systems, can be pulled up by hand, but by the time the plant is several feet tall, hand pulling may be impossible. If as much as one-quarter of the root system is left in the ground, the plant may re-sprout.

Brazilian Pepper	
Treatment Method	**Treatment Means**
	Mechanical
Dozing	Selective razing at ground level, subsequent debris removal
Chipping/Grinding	Selective razing at ground level, disarticulation of debris
Burning	Selective, controlled, prescribed burning
	Chemical
Basal Bark application	10% Garlon 4 with appropriate adjuvant
Stump-cut treatment	10% Garlon 4 with appropriate adjuvant
Foliage treatment	10% Garlon 4 with appropriate adjuvant

http://edis.ifas.ufl.edu/WG209

3.1.12 Christmas Senna

Christmas senna (see **Section 6.0: Photograph 6-11**) is a member of the Pea Family (Fabaceae). It is a sprawling evergreen shrub that grows up to 13 feet tall. Leaves are

alternate, even-pinnately compound, with three to six pairs of leaflets. Flowers are yellow to yellow-green in three to 12 flowered racemes near the stem tips. Christmas senna can be controlled by herbicide application to basal bark or foliage on a spray-to-wet basis.

Christmas Senna	
Treatment Method	**Treatment Means**
	Mechanical
Dozing	Selective razing at ground level, subsequent debris removal
Chipping/Grinding	Selective razing at ground level, disarticulation of debris
Burning	Selective, controlled, prescribed burning
	Chemical
Basal Bark application	0.5% Garlon 3A + 0.375% Induce
Foliage treatment	

Herbicide recommendations Source: University of Florida, UF/IFAS Website: http://edis.ifas.ufl.edu/WG209

3.1.13 Small-Leaf Spiderwort

Small-Leaf Spiderwort is a member of the Spiderwort Family (Commelinaceae). A native of South America, Small-leaf Spiderwort is a species of spiderwort also known by the common name Wandering Jew (see **Section 6.0: Photograph 6-12**). It is also known as River Spiderwort, Inch Plant, Wandering Trad, and Wandering Willie. Naturalization of Small-Leaf Spiderwort in floodplain forests and bottomlands has occurred from central Florida to the Pan Handle, in counties including Alachua, Orange, Leon, and Flagler. It is a perennial ground cover that spreads along the ground with soft, hairless stems and leaves. The fleshy stems root at any node that is on the surface. The plant has oval, dark-green leaves with pointed tips that are shiny, smooth and slightly fleshy, about 1.25 - 2.5 inches long. The flowers are white with three petals and approx. 0.5 - one inch in diameter. Spiderwort can be controlled by mechanical pulling and mowing, but will require chemical treatments as any cut stem will quickly regenerate and spread vegetation.

Small-leaf Spider Wort	
Treatment Method	**Treatment Means**
	Mechanical
Dozing	Selective razing at ground level, subsequent debris removal
Chipping/Grinding	Selective razing at ground level, disarticulation of debris

Burning	Selective, controlled, prescribed burning
	Chemical
Foliage treatment	10% Garlon 3A Round-up

3.2 Eradication Phases

The SCWTS has been divided into four compartments (**Section 6.0: Figure ISEIP-1**). Invasive species eradication and control in each of the four targeted compartments will be accomplished through a phased approach as summarized in the table below. Mechanical and chemical treatment will be utilized throughout the eradication process.

Phase	Mechanical Control	Chemical Control	Monitoring	Planting
Phase 1	Use of heavy equipment (i.e. bulldozers, chippers, brontosaurus). Chip material on-site or transport off-site.	Use of herbicide treatments on remaining invasive/exotic species and stumps.	Record areas where invasive/exotic species are removed.	No planting during initial efforts
Phase 2	Hand-pull sprouts (if practicable). Selective mechanical control (mowing). Control by use of prescribed fire and/or grazing. Wetland restricted area: hand removal only.	Use selective herbicide treatments (i.e. foliar spray)	Monitor success of control methods.	No planting during initial efforts
Phase 3	Hand-pull sprouts (if practicable). Selective mechanical control (mowing). Control by use of prescribed fire and/or grazing. Wetland restricted area: hand removal only.	Selective herbicide treatments (as necessary)	Monitor success of control methods on an annual basis.	Native revegetation for perimeter, boundary areas, and throughout site.
Phase 4	Continual mowing will be required to	Selective herbicide	Monitor success of plantings.	Plant native species around

	maintain pasture-like communities. Continuing opportunity for exotic and invasive species to re-establish, around native trees and shrubs, hand pulling or other mechanical treatment may be required on a minimal scale	treatment (as necessary)	Monitor for re-growth of invasives.	the periphery of the site to form a buffer. Eventually plant native species to replace large exotic trees temporarily left in place.

3.2.1 Phase 1 – Initial Removal and/or Stump Treatment

Phase 1 is intended to encompass primarily mechanical means of control (selective to a certain extent, so as not to destroy the limited existing native plants present), with subsequent treatment of stumps and basal bark with herbicides to retard growth.

As the site has been heavily disturbed in the past and no natural communities occur on-site, the use of heavy equipment is appropriate for eradication efforts at the SCWTS. Removal of Brazilian pepper and other exotic/invasive woody species should be accomplished using mechanical means. Mechanical control can be performed with large machinery or by hand using machetes and chainsaws. There are many large machines available that can be used to accomplish mechanical removal. These machines can cut, stack, or grind trees and other woody vegetation. One machine, simply known as the "brontosaurus", uses a chipper on a long boom to grind standing trees all the way down to the ground, leaving piles of mulch/chips. Another machine, called a feller-buncher, grasps trees, clips them off at the base, and applies herbicide to the remaining stump, then stacks the trees for later disposal. A third machine, known as a Barko-chipper, pushes the trees over and grinds them up as it advances. The Barko-chipper is often used to cut roads and fire lines when fighting wild fires. Each machine has its advantages and all of them work best on large expanses of trees. Portable chipping equipment works on all but the large logs from adult trees (http://tame.ifas.ufl.edu). Remaining stumps should be treated with herbicides.

Mechanical control for Brazilian pepper should be accomplished while the trees are not in fruit (September – October). This will help prevent the spread of Brazilian pepper tree seeds during mechanical control efforts.

3.2.2 Phase 2 – Follow-up Treatment

Phase 2 is intended to include mechanical means of control (if necessary), with monitoring and treatment of sprouts with chemical herbicide. Follow-up treatments should generally be accomplished in the spring of the year. Hand-pull (as applicable) and use herbicides to remove and treat invasive species, including new sprouts from previously treated stumps. Mechanical means of control should be used as necessary. Currently, the primary mechanical method is regular mowing by bush-hog under

contract.

In addition, to mowing and herbicide treatments, prescribed fire and grazing might be initiated during this phase. Grazing can be allowed on areas that may not be used extensively for training. The primary area of interest for grazing could be the north parcel.

3.2.3 Phase 3 - On-Going Maintenance and Monitoring

Phase 3 is intended to consist of monitoring, with treatment by hand-pulling or spot-spraying of small infestations or individuals by chemical herbicide. It is anticipated that re-vegetation efforts will be initiated during this phase for perimeter, boundary areas, and throughout site (for native species establishment methods see **Section 3.2.4**).

On-going Maintenance

On-going maintenance is required to control the spread of invasive species. On-going control may include any of the following techniques:

Periodic mowing – Periodic mowing hinders the establishment of woody species, such as Brazilian pepper. Periodic mowing should be coupled with the use of herbicides to remove any exotic grasses or forbs that become established.

Herbicide use. Herbicides should be used to control invasive species infestations that persist.

Prescribed Fire. Prescribed fire might be used sometime in the future to control invasive species and enhance a natural regeneration of native grassland species.

Grazing. Grazing might be used to control invasive species but would need to be accompanied by mowing or prescribed fire to remove new shoots that may be undesirable to grazing animals.

Invasive Species Monitoring

The SCWTS should be monitored annually for presence and extent of invasive species. Information obtained during annual monitoring should include the areal extent of invasive species infestations, by type/species. For invasive species control to be successful at the SCWTS, the FLARNG must assess the success of control efforts annually to determine needed changes in control methodology.

3.2.4 Phase 4 - Establishment of Native Species

Phase 4 is intended to focus efforts on re-vegetation and re-colonization of native species. Selective chemical and mechanical treatments are used as necessary to control invasive species regrowth, if necessary, as determined during invasive species monitoring efforts. Continual mowing will be required to maintain a dominance of pasture-like communities. As there will be continuing opportunity for exotic and invasive species to re-establish, especially in and around native trees and shrubs, occasional hand-pulling or other localized mechanical treatment may be required on a minimal scale. Previous planting efforts are to be monitored for successful growth, and additional plantings should be evaluated, if necessary.

Upon completion of mechanical and/or removal of invasive/exotic species, native species and/or sod will be planted around the perimeter of the site to form a buffer between the interior of the site and surrounding land areas. Native trees, shrubs, and

sod will also be planted throughout the site as appropriate, consistent with training uses of the property. Native trees and shrubs that may be utilized include, but are not limited to: wax myrtle (*Myrica cerifera*), sea grape (*Coccoloba uvifera*), Jamacan caper (*Capparis cynophallophora*), Seven-year apple (*Casasia clusifolia*), Rosemary (*Ceratiola ericoides*), Florida privet (*Forestiera segregata*), yaupon holly (*Ilex vomitoria*), Cabbage palmetto (*Sabal palmetto*), and sweet acacia (*Acacia farnesiana*). Prior to planting, the FLARNG will evaluate site conditions in order to select the appropriate species.

Although current management has reduced or eliminated much of the Brazilian pepper on the site, many of the other exotic species exist scattered throughout the site including bishopwood and earleaf acacia. These exotic trees have remained for the purpose of adding appropriate vegetative structure desirable for military training. It is the intent over time to replace these species with native species. Native tree and shrub species should be planted strategically across the site in such a manner that exotic species can be removed once the native species have reached a size that fulfills the military training purpose.

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4.0 ERADICATION / CONTROL LOGISTICS

Eradication Compartments

As illustrated in **Section 6: ISEIP-1** the SCWTS has been divided into four management compartments. These compartments (CMPTs) are labeled based on their relative position to one another. Compartments are labeled as follows:

Compartment 1	130 acres
Compartment 2	40 acres
Compartment 3	27 acres
Compartment 4	69 acres

4.1 Schedule

<table>
<tr><th>Section/ Year</th><th>CMPT 1</th><th>CMPT 2</th><th>CMPT 3</th><th>CMPT 4</th></tr>
<tr><td>2017</td><td>Phase 3 & 4</td><td>Phase 3 & 4</td><td>Phase 1</td><td>Phase 1 & 2</td></tr>
<tr><td>2018</td><td>Phase 3 & 4</td><td rowspan="3">Phase 3 & 4</td><td>Phase 1 & 2</td><td>Phase 1& 2</td></tr>
<tr><td>2019</td><td>Phase 3 & 4</td><td rowspan="2">Phase 3</td><td rowspan="2">Phase 3</td></tr>
<tr><td>2020</td><td rowspan="3">Phase 4</td></tr>
<tr><td>2021</td><td rowspan="2">Phase 4</td><td rowspan="2">Phase 4</td><td rowspan="2">Phase 4</td></tr>
<tr><td>2022</td></tr>
</table>

5.0 SUMMARY

In summary, the FLARNG will implement a phased approach (within each compartment) to control to the extent practicable invasive species populations at the SCWTS. The four phases are:

- Initial Removal and/or Stump Treatment
- Follow Up Treatment
- On-Going Maintenance and Monitoring
- Establishment of Native Species

Through this phased approach, the FLARNG intends to promote and enhance military training opportunities at the SCWTS by creating a relatively open landscape, free of dense thickets of invasive species. This will allow the FLARNG to carry out its assigned mission requirements.

It should be noted that the removal of invasive species does not necessarily require a FDEP Environmental Resources Permit (ERP); however, use of earth moving equipment that changes the topography of the site will require an ERP. In addition, as a requirement of the National Pollutant Discharge Elimination System (NPDES) general permit, an erosion control plan would be required prior to land clearing/soil disturbing activities.

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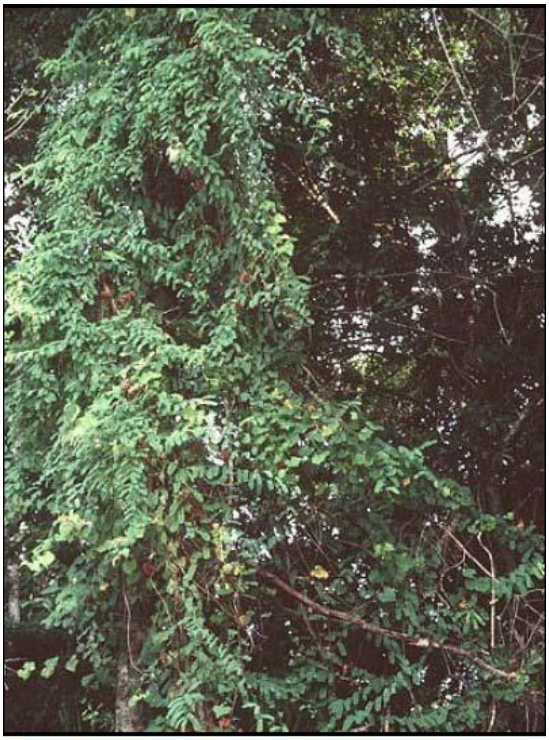
6.0 FIGURES AND ILLUSTRATIONS



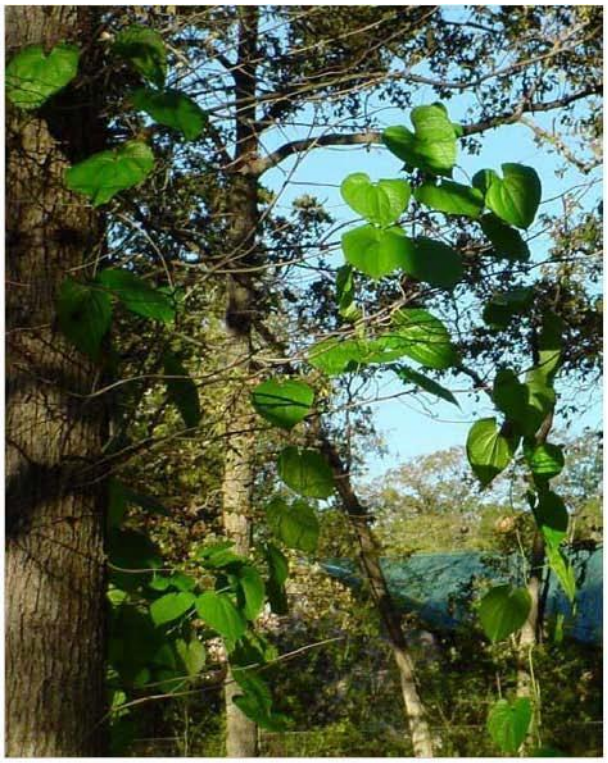
Photograph 6-1: Rosary Pea

Photograph 6-2: Earleaf Acacia

Photograph 6-3: Bishopwood

Photograph 6-4: Australian Pine

Photograph 6-5: Air-potato



Photograph 6-6: Lantana Camera

Photograph 6-7: Burma Reed

Photograph 6-8: Torpedo Grass

Photograph 6-9: Napier Grass

Photograph 6-10: Guava

Photograph 6-11: Brazilian Pepper

Photograph 6-12: Christmas Sienna

Photograph 6-13: Small-leaf Spiderwort

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7.1 IMPLEMENTATION

7.2 Emergency Information:

Emergency Contact – 911

Memorial Hospital Miramar – (954) 538-5000

Police Department – (954) 602-4000

Site POC – Matt Stowe – (904) 823-0249

7.3 Blank Maps / Sample Maps

See the following blank map of the SCWTS for sketching use in monitoring events and other site activities pertaining to invasive species management.

7.4 Examples of Forms Used in Collecting Monitoring Data

Data collection sheets are attached for use in invasive species monitoring and herbicide use events.

7.5 Herbicide Use Protocol

Refer to the FLARNG Integrated Pest Management Plan (IPMP) for guidance for any herbicide use at SCWTS. Only certified pesticide applicators may apply herbicide.

7.6 Herbicide Use Records

When using herbicides it is required by law to keep detailed records of all relevant information. Ideally, records would include data on the condition of the site prior to herbicide application, the type of species present, and percent cover of invasive and native species prior to application. This information will be valuable in evaluating the effectiveness of the herbicide. Prior to application, all herbicides must be on the FLARNG State Pesticide Use List (SPUL). At the time of application, take detailed notes of the type and concentration of the herbicide, the amount, location, and method of application, weather conditions, and any other observations made during the course of application. This information is important in evaluating the project's success, improving methodology, and identifying mistakes. In addition, it documents the procedure for future site managers and biologists.

DD Form 1532-1 must be submitted to the Integrated Pest Management (IPM) Coordinator in the CFMO-ENV office after each application of herbicides.

7.7 Herbicide Labels

The Label is the Law. Always follow the label directions.

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INVASIVE SPECIES MONITORING FORM
SNAKE CREEK WEEKEND TRAINING SITE
MIRAMAR, BROWARD COUNTY, FLORIDA

Date	Eradication Compartment	Most Recent Invasive Species Control Effort	Dominant Invasive Species Present/Areal Extent within Compartment (% cover)	Site Conditions/Sprouting Present/Additional Invasive Species Present/Additional Notes	Recommended Action

Note: Sketch of Invasive Species Populations Should Be Made on Site Map.

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Snake Creek Weekend Training Site Pest Management Record
Computer Generated DD Form 1532-1

DD Form 1532-1 Log Sheet

SCWTS Area	Acreage or Square Feet	Date	Target Pest	Pesticide Name	Pesticide EPA Registration #	% Conc	Amount Quarts/Gallons	Applicator Initials

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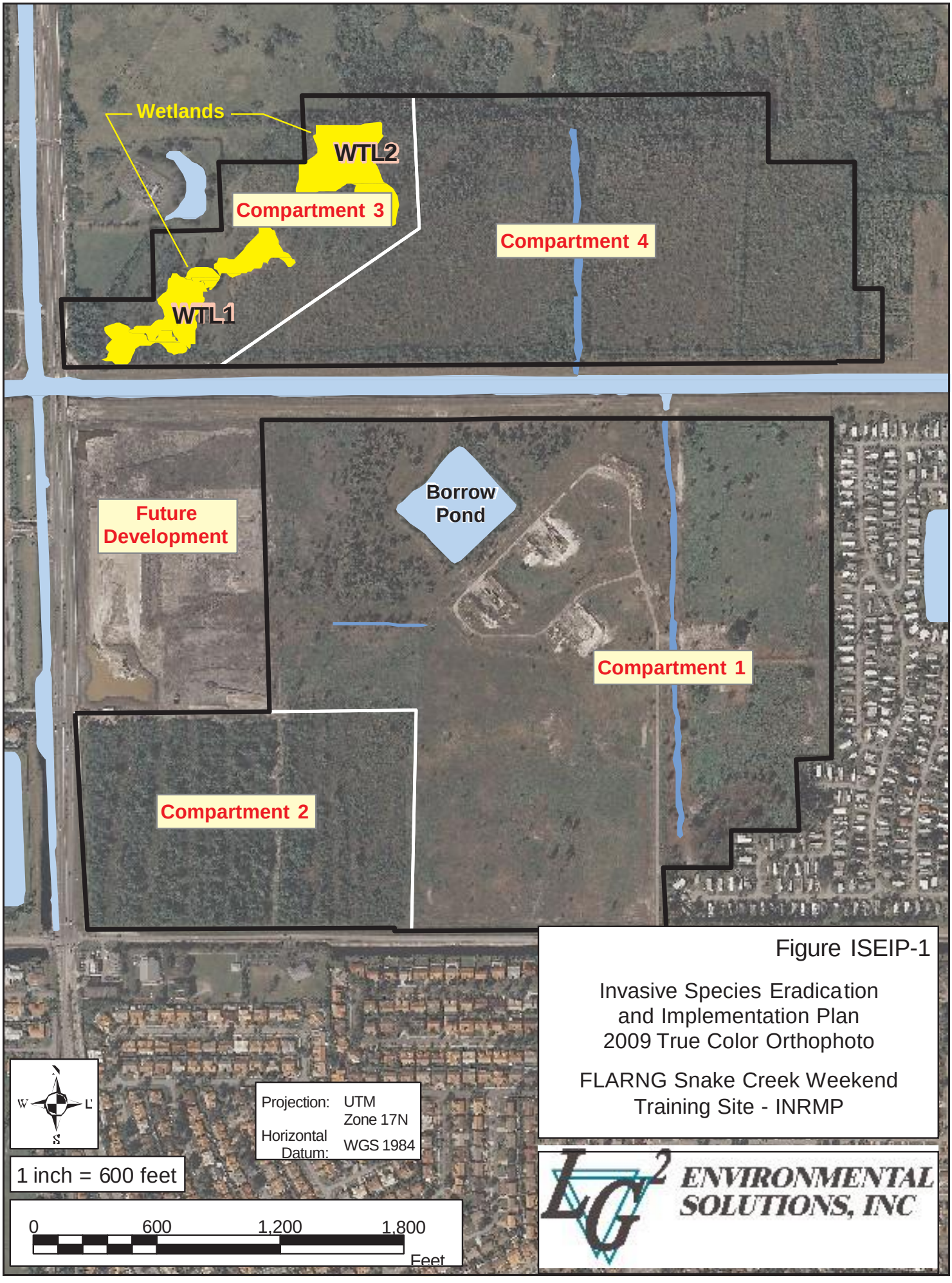
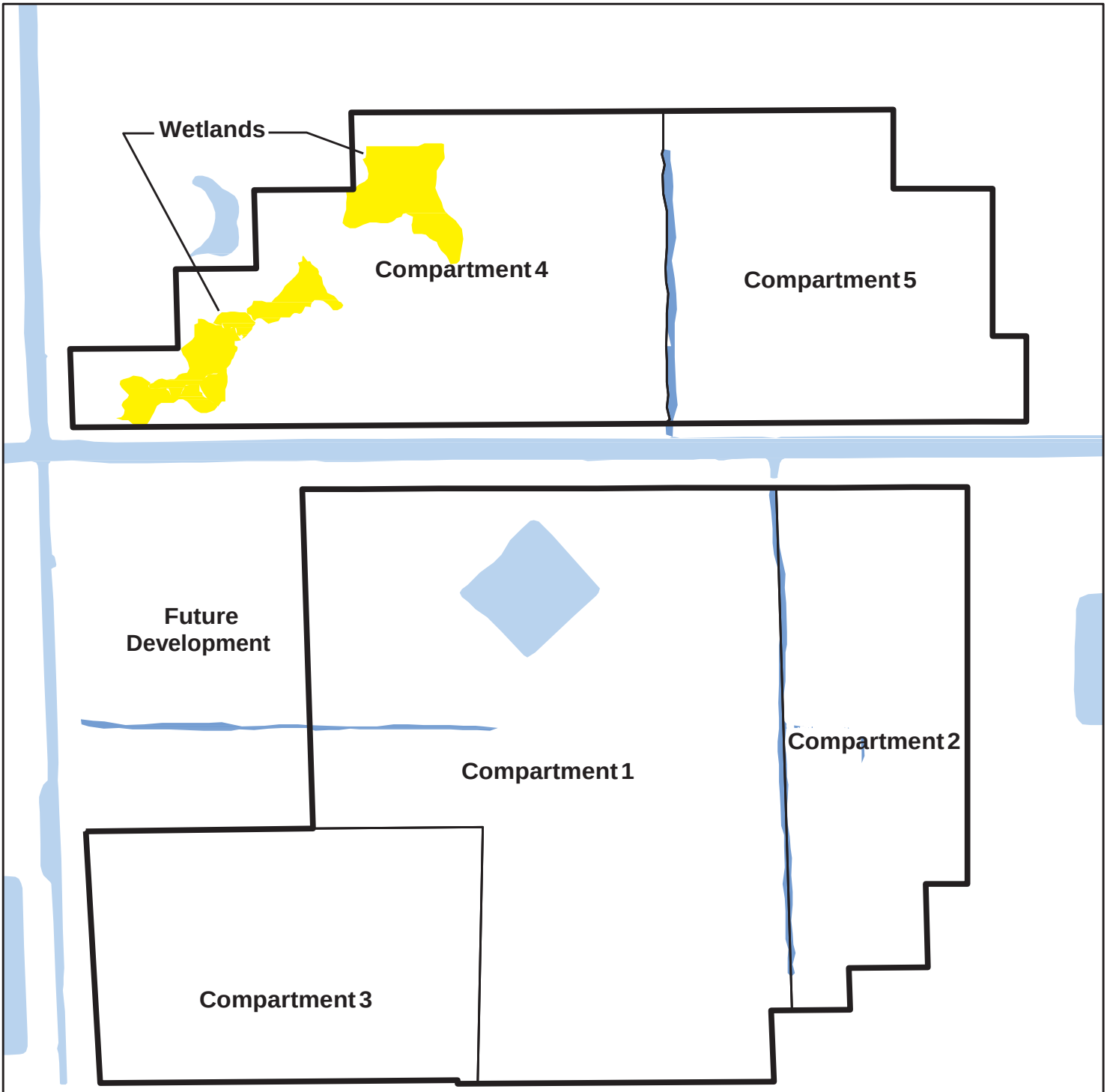


Figure ISEIP-1

Invasive Species Eradication and Implementation Plan
2009 True Color Orthophoto

FLARNG Snake Creek Weekend Training Site - INRMP

LG2 ENVIRONMENTAL SOLUTIONS, INC



Invasive Species Eradication and Implementation Plan
Blank Map

FLARNG Snake Creek Weekend Training Site - INRMP

Miramar, Broward County, Florida

N
W E
S

1 inch = 600 feet

Projection: UTM Zone 17N

Horizontal Datum: WGS 1984

0 600 1,200 1,800

Feet

LG² ENVIRONMENTAL SOLUTIONS, INC

Appendix 5. Management Calendar

SCWTS – NATURAL RESOURCES MANAGEMENT CALENDAR

Natural Resources Management Calendar	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Inspect roads for erosion												
Inspect pond banks for erosion												
Inspect outlying areas for erosion												
Inspect drainage structures												
Record types and locations of training damage that has occurred												
Inspect areas for dead / dying trees												
Inspect for unauthorized use of area												
Inspect roads for invasive and noxious species (Spring and Summer)												
Inspect training area for invasive and noxious species (Spring and Summer)												
Inspect Bat Houses												

Appendix 6. Vegetation observed during Flora Planning Level Surveys

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Table 5-1A. Vegetation observed at SCWTS in 2001.

Scientific Name	Common Name	Exotic
Abrus precatorius	Rosemary pea	Yes
Acacia auriculiformis	Earleaf acacia	Yes
Ambrosia artemisiifolia	Ragweed	No
Ampelopsis arborea	Peppervine	No
Andropogon glomeratus	Bush broom grass	No
Andropogon ternarius	Splitbeard bluestem	No
Asclepias curassavica	Scarlet milkweed	No
Aster simmondsii	Large headed bushy aster	No
Axonopus fissifolius	Common carpet grass	No
Axonopus fircatis	Big carpet grass	No
Baccharis glomeruliflora	Silvering Groundsel Bush	No
Baccharis halimifolia	Groundsel bush	No
Bidens alba	Common begger-ticks	No
Bischofia javanica	Bishopwood	Yes
Buchnera americana	Blueheart	No
Casuarina equisetifolia	Australian-pine	Yes
Catharanthus roseus	Madagascar periwinkle	No
Cenchrus echinatus	Southern sandspur	No
Cenchrus incertus	Field sandspur	No
Centella asiatica	Coinwort	No
Cephalanthus occidentalis	Buttonbush	No
Cestrum diurnum	Day-flowering jessamine	Yes
Chamaesyce hirta	Garden spurge	No
Chamaesyce hypericifolia	Upright spruge	No
Chromolaena odorata	Bitter bush	No
Cissus verticillata	Possum-grape	No
Coccoloba uvifera	Seagrape	No
Conoclinum coelestinum	Mist-flower	No
Conyza Canadensis	Horse weed	No
Cynodon dactylon	Bermuda grass	Yes
Cyperus croceus	Globe sedge	No
Cyperus lanceolatus	Silver sedge	No
Cyperus strogosus	September sedge	No
Dactylocternium aegyptium	Crowfoot grass	Yes
Desmodium incanum	Creeping beggar-weed	No
Desmodium triflorum	Sagotia beggar-weed	No
Digitaria bicornis	Tropic crabgrass	No
Diodia virginiana	Button weed	No
Dioscorea bulbifera	Air-potato	Yes
Eleusine indica	Goose grass	No
Eragrostis spectabilis	Purple love grass	No

Eremochloa ophiuroides	Centipede grass	No
Eriobotrya japonica	Loquat	No
Eulophia alta	Wild coco	No
Eupatorium capillifolium	Dog fennel	No
Eustacys glauca	Saltmarsh finger grass	No
Eustachys petraea	Rock finger grass	No
Ficus aurea	Strangler fig	No
Ficus citrifolia	Wild banayan tree	No
Heliotropium polyphyllum	Pineland heliotrop	No
Heterotheca subaxillaris	Camphor weed	No
Hydrocotyle species	Pennywort	No
Hyptis verticillata	John Charles	No
Ipomoea triloba	Little Bell Morning-glory	No
Iresine diffusa	Bloodleaf	No
Juncus marginatus	Shore rush	No
Kalanchoe pinnata	Cathedral bells	Yes
Kalanchoe tubiflora	Chandelier bells	No
Lantana camara	Lantana	Yes
Leucaena leucocephala	Lead tree	No
Ludwigia octovalviv	Long-fruited primrose willow	No
Ludwigia peruviana	Primrose-willow	Yes
Lygodium microphyllum	Small-leaf climbing fern	Yes
Momordica charantia	Balsam-pear	Yes
Myrica cerifera	Wax myrtle	No
Neyraudia reynaudiana	Burma reed	Yes
Oplismenus hirtellus	Woodsgrass	No
Osmunda regalis	Royal fern	No
Panicum hemitomon	Maidencane	No
Panicum repens	Torpedo grass	Yes
Panicum rigidulum	Redtop panic grass	No
Parthenocissus quinquefolia	Virginia creeper	No
Paspalum blodgettii	Coral paspalum	No
Paspalum conjugatum	Sour paspalum	No
Paspalum notatum	Bahia grass	No
Paspalum setaceum	Thin paspalum	No
Paspalum urvillei	Vasey grass	No
Passiflora incarnata	Maypop	No
Passiflora suberosa	Corkystem passion-flower	No
Persea palustris	Swampbay	No
Phragmites australis	Common reed	No
Physalis walteri	Sticky ground-cherry	No
Pluchea rosea	Godfrey's fleabane	No
Poinsettia cyathophora	Painted-leaf	No
Psidium guajava	Guava	Yes

Rapanea punctata	Myrsine	No
Richardia grandiflora	Large-flower pursley	No
Ricinus communis	Castor-bean	Yes
Rhynchospora colorata	Whitetop sedge	No
Rhynchospora microcarpa	Southern beakrush	No
Roystonea regia	Royal palm	No
Sabal palmetto	Cabbage palm	No
Sacciolepsis indica	India cupscale grass	No
Salix caroliniana	Coastal plain willow	No
Sambucus canadensis	Elderberry	No
Schinus terebinthifolius	Brazilian pepper	Yes
Senna obtusifolia	Sicklepod	No
Senna pendula	Christmas senna	Yes
Serenoa repens	Saw palmetto	No
Seteria glauca	Yellow foxtail grass	No
Setaria parviflora	Knotroot foxtail	No
Sida rhombifolia	Arrow-leaf sida	No
Solanum americanum	American black nightshade	No
Solidago tortifolia	Twisted-leaf goldenrod	No
Spermacoce verticillata	White head broom	No
Sporobolus indicus	Smut grass	No
Stenotaphrum secundatum	St. Augustine grass	No
Thelypteris hispidula	Hairy maiden fern	No
Thelypteris interrupta	Spreading tri-vein fern	No
Tradescantia zebrine	Wandering-jew	Yes
Trema micranthum	Florida trema	No
Typha domingensis	Southern cat-tail	No
Urena lobata	Caesar's weed	Yes
Verbena litorais	Seashore vervain	No
Vitis cinerea	Florida grape	No
Vitis rotundifolia	Wild grape	No
Walthera indica	Sleepy morning	No
Wedelia trilobata	Wedelia	Yes

Source: Hall and Newman, 2001

Table 5-1B. List of plant species observed on-site during a baseline vegetation and Flora planning level survey in 2009.

Scientific Name	Common Name	Exotic
Abrus precatorius	rosary pea	Yes
Acacia auriculiformis	earleaf acacia	Yes
Albizia lebbeck	woman's tongue	Yes
Ambrosia artemisifolia	ragweed	No
Ampelopsis arborea	peppervine	No
Andropogon glomeratus	bushy broom grass	No
Ardisia elliptica	shoebutton ardisia	Yes
Axonopus fissifolius	common carpet grass	No
Baccharis halimifolia	groundsel bush	No
Bidens alba	common beggar-ticks	No
Bischofia javanica	bishopwood	Yes
Blechnum serrulatum	swamp fern	No
Carica papaya	papaya	No
Catharanthus roseus	Madagascar periwinkle	No
Causuarina equisetifolia	Australian pine	Yes
Centella asiatica	coinwort	No
Cestrum diumum	day jessamine	Yes
Chamaesyce hypericifolia	upright spurge	No
Chromolaena odorata	bitter bush	No
Coccoloba uvifera	seagrape	No
Commelina diffusa	day-flower	No
Conoclinum coelestinum	purple mist flower	No
Cyperus croceus	globe sedge	No
Cyperus haspan	flat sedge	No
Cyperus lanceolatus	silver sedge	No
Dioscorea bulbifera	air-potato	Yes
Eriobotrya japonica	loquat	No
Erogrostis spectabilis	purple lovegrass	No
Eupatorium capillifolium	dog fennel	No
Ficus microcarpa	laurel fig	No
Forestiera segregata var. pinetotum	Florida pinewood privet	No
Glandularia maritima	coastal vervain	No
Hydrocotyl umbellata	pennywort	No

Hypericum spp.	St. Johns-wort	No
Hyptis verticillata	John Charles	No
Jacquemontia curtissii	pineland jacquemontia	No
Lantana camera	lantana	Yes
Linum carteri var. *smallii**	Small's flax	No
Ludwigia peruviana	Peruvian primrose willow	Yes
Lygodium japonicum	Japanese climbing fern	Yes
Melia azedarach	chinaberry	Yes
Momordica balsamina	balsam apple	No
Myrica cerifera	wax myrtle	No
Panicum hemitomon	maidencane	No
Panicum repens	torpedo grass	Yes
Parthrnocissus quinquefolia	Virginia creeper	No
Paspalum notatum	bahiagrass	No
Pennisetum purpureum	Napier grass	Yes
Pluches rosea	Godfrey's fleabane	No
Poinsettia cyathophora	painted-leaf	No
*Polygala smallii**	tiny polygala	No
Phyllanthus pentaphyllus var. *floridanus*	Florida five-petaled leaf-flower	No
Psidium guajava	guava	Yes
Rhynchospora colorata	whitetop sedge	No
Rhynchospora spp.	beakrush	No
Roystonea elata	Florida royal palm	No
Sabal palmetto	cabbage palm	No
Sapium sebiferum	Chinese tallow tree	Yes
Schefflera actinophylla	Queensland umbrella tree	Yes
Schinus terebinthifolius	Brazilian pepper	Yes
Selaginella eatonii	Eaton's spikemoss	No
Senna pendula	Christmas senna	Yes
Serenoa repens	saw palmetto	No
Seteria glauca	yellow foxtail grass	No
Sida rhombifolia	arrow-leaf sida	No
Smilax laurifolia	catbrier	No
Solidago spp.	goldenrod	No
Spermacoce verticillata	white head broom	No
Sporobolis indicus	smut grass	No
Swietenia mahogoni	West Indies mahogany	No

Syagrus romanzoffiana	queen palm	Yes
Thelypteris hunthii	hairy maiden fern	No
Tradescantia fluminensis	small-leaf spiderwort	Yes
Typha latifolia	cattail	No
Urena lobata	Caesar's weed	Yes
Vitis spp.	grape vine	No

Source: LG2 Environmental Solutions, Inc. 2009

*Follow-up surveys by FLARNG personnel found no occurrence of this species and has concluded that it was likely misidentified and does not exist on-site.

Appendix 7. FLEPPC Category 1 Species

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Table 5-2: Florida Exotic Pest Plant Council (FLEPPC) 2017 List of Category I (Most Invasive)

Scientific Name	Common Name	Government Listing Designation	Observed at the Snake Creek SCWTS
Abrus precatorius	Rosary pea	I-N	✓
Acacia auriculiformis	Earleaf acacia	I	✓
Albizia julibrissin	Mimosa, silk tree	I	
Albizia lebbeck	Woman's tongue	I	✓
Ardisia crenata	Coral ardisia	I-N	
Ardisia elliptica	Shoebutton ardisia	I-N	✓
Asparagus aethiopicus (A. densiflorus)	Asparagus-fern	I	
Bauhinia variegata	Orchid tree	I	
Bischofia javanica	Bishopwood	I	✓
Calophyllum antillanum	Santa maria, mast wood	I	
Casuarina equisetifolia	Australian-pine	I-P,N	✓
Casuarina glauca	Suckering Australian-pine	I-P,N	
Cinnamomum camphora	Camphor tree	I	
Colocasia esculenta	Wild taro	I	
Colubrina asiatica	Lather leaf	I-N	
Cupaniopsis anacardioides	Carrotwood	I-N	
Deparia petersenii	Japanese false spleenwort	I	
Dioscorea alata	Winged yam	I-N	
Dioscorea bulbifera	Air-potato	I-N	✓
Eichhornia crassipes	Water-hyacinth	I-P	
Eugenia uniflora	Surinam cherry	I	
Ficus microcarpa	Laurel fig	I	
Hydrilla verticillata	Hydrilla	I-P,U	
Hygrophila polysperma	Green hygro	I-P,U	
Hymenachne amplexicaulis	West Indian marsh grass	I	
Imperata cylindrica	Cogon grass	I-N,U	
Ipomoea aquatica	Water-spinach	I-P,U	
Jasminum dichotomum	Gold Coast jasmine	I	
Jasminum fluminense	Brazilian jasmine	I	
Lantana camara	Lantana, shrub verbena	I	✓
Ligustrum lucidum	Glossy privet	I	
Ligustrum sinense	Chinese privet, hedge privet	I-N	
Lonicera japonica	Japanese honeysuckle	I	
Ludwigia hexapetala	Uruguay waterprimrose	N	
Ludwigia peruviana	Peruvian primrose willow	I	✓
Lumnitzera racemosa	Black mangrove	I	
Luziola subintegra	Tropical American water grass	I	
Lygodium japonicum	Japanese climbing fern	I-N	✓
Lygodium microphyllum	Old World climbing fern	I-N	✓

Macfadyena unguis-cati	Cat's claw vine	I	
Manilkara zapota	Sapodilla	I	
Melaleuca quinquenervia	Melaleuca, paper bark	I-P,N,U	
Melinis repens	Natal grass	I	
Microstegium vimineum	Japanse stiltgrass	N	
Mimosa pigra	Catclaw mimosa	I-P,N,U	
Nandina domestica	Nandina, heavenly bamboo	I	
Nephrolepis cordifolia	Sword fern	I	
Nephrolepis brownii	Asian sword fern	I	
Neyraudia reynaudiana	Burma reed, cane grass	I-N	✓
Nymphoides cristata	Crested floating heart	I	
Paederia cruddasiana	Sewer vine	I-N	
Paederia foetida	Skunk vine	I-N	
Panicum repens	Torpedo grass	I	✓
Pennisetum purpureum	Napier grass	I	✓
Phymatosorus scolopendria	Wart fern	I	
Pistia stratiotes	Water-lettuce	I-P	
Psidium cattleianum (*P. littorale*)	Strawberry guava	I	
Psidium guajava	Guava	I	✓
Pueraria montana var. *lobata*	Kudzu	I-N	
Rhodomyrtus tomentosa	Downy rose-myrtle	I-N	
Ruellia simplex2	Mexican petunia	I	
Salvinia minima	Water spangles	I	
Sapium sebiferum (Triadica sebifera)	Popcorn tree, Chinese tallow	I-N	✓
Scaevola taccada	Half-flower, beach naupaka	I-N	
Schefflera actinophylla	Schefflera, Queensland umbrella tree	I	✓
Schinus terebinthifolius	Brazilian pepper	I-P,N	✓
Scleria lacustris	Wright's nutrush	I	
Senna pendula var. *glabrata*	Chirstmas cassia, Christmas senna	I	✓
Solanum tampicense	Wetland nightshade, aquatic soda apple	I-N,U	
Solanum viarum	Tropical soda apple	I-N,U	
Sporobolus jacquemontii	West Indian dropseed	I	
Syngonium podophyllum	Arrowhead vine	I	
Syzygium cumini	Java plum	I	
Tectaria incisa	Incised halberd fern	I	
Thelypteris opulenta	Jeweled maiden fern	I	
Thespesia populnea	Seaside mahoe	I	
Urena lobata	Ceasar's weed	I	✓
Tradescantia fluminensis	Small-leaf spiderwort	I	✓
Urochloa mutica	Para grass	I	
Vitex rotundifolia	Beach Vitex	I	

I = Category I Exotic Invasive P = Prohibited plant by FDEP
N = Noxious weed listed by the Florida Department of Agriculture & Consumer Services
U = Noxious weed listed by the U.S. Department of Agriculture

Appendix 8. Wildlife Species Observed at SCWTS

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Table 5-3: List of Wildlife Species Observed at the SCWTS

Scientific Name	Common Name
REPTILES	
Anolis carolinensis	Green anole
Anolis cristatellus	Puerto Rican Crested Anole
Anolis equestris	Knight Anole
Anolis sagrei	Brown anole
Apalone ferox	Soft Shell Turtle
Basiliscus vittatus	Brown Basilisk
Diadophis punctatus	Ring Necked Snake
Hemidactylus mabouia	Tropical House Gecko
Iguana iguana	Green Iguana
Terrapene Carolina bauri	Florida Box Turtle
Trachemys scripta scripta	Yellow-bellied Slider
BIRDS	
Agelauis phoeniceus	Red-winged Blackbird
Ammodramus savannarum	Grasshopper Sparrow
Anhinga anhinga	Anhinga
Aramus guarauna	Limpkin
Ardea alba	Great Egret
Ardea heroidias	Great Blue Heron
Athene cunicularias	Florida Burrowing Owl
Bubulcus ibis	Cattle Egret
Buteo lineatus	Red-shouldered Hawk
Calinus virginianus	Northern Bobwhite
Caprimulgus carolinensis	Chuck-wills-widow
Cardinalis cardinalis	Northern Cardinal
Cathartes aura	Turkey Vulture
Charadrius vociferus	Killdear
Circus cyaneus	Northern Harrier
Coragyps atratus	Black Vulture
Cyanocitta cristata	Blue Jay
Dendroica pinus	Pine Warbler
Dumetella carolinensis	Gray Catbird

Scientific Name	Common Name
BIRDS CONT	
Egretta caerulea	Little Blue Heron
Egretta thula	Snowy Egret
Egretta tricolor	Tri-colored Heron
Falco sparverius paulus	Southeastern American kestrel
Hirundo pyrrhonota	Cliff Swallow
Lanius ludovicianus	Loggerhead Shrike
Megaceryle alcyo	Belted Kingfisher
Melanerpes carolinus	Red bellied Woodpecker
Mimus polyglottos	Northern Mockingbird
Myiopsitta monachus	Monk Parakeet
Pandion haliaetus	Osprey
Plegadis falcinellus	Glossy Ibis
Podilymbus podiceps	Pie-billed Grebe
Polioptila caerulea Bluegray	Bluegray Gnatcatcher
Riparia riparia	Bank Swallow
Spizella paserina	Chipping Sparrow
Stekgidotpteryx serripennis	Northern Rough-winged Swallow
Tyto alba	Barn owl
Zenaida macroura	Mourning Dove
FISH	
Gambusia affinis	Mosquito Minnows
Lepomis sp	Sunfish Redear
Lepomis macrochirus mystacalis	Florida Bluegill
Micropterus salmoides	Largemouth Bass
Pelmatolapia mariae	Spotted Tilapia
MACROINVERTEBRATES	
Gyraulis sp	Planar Snails
Physella sp	Pouch Snails
Pleurocera sp	Horned Snails
MAMMALS	
Sigmodon hispidus	Hispid Cotton Rat
Procyon lotor	Racoon

Appendix 9. Rare Species that could have habitat at SCWTS

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Table 5-4: Rare Species that may have habitat present at the SCWTS

Scientific Name	Common Name	Federal/ State Designation	Habitat Types
Plants			
Acrostichum aureum	Golden Leather Fern; Leather Fern	N/T	Marshes
Asclepias curtissii	Curtis' Milkweed	N/E	Hammock-upland
Asplenium serratum	Bird's Nest Spleenwort; American Bird's Nest Fern; Wild Bird's Nest Fern	N/E	Hydric hammock, lake shore, slough
Bletia purpurea	Pine-pink Orchid	N/T	Wet flatwoods
Chrysophyllum oliviforme	Satin Leaf	N/T	Upland hammock
Coccothrinax argentata	Silver Palm; Biscayne Palm; Silver Top; Seamberry Palm	N/T	Upland hammock
Ctenitis submarginalis	Brown-hair Comb Fern	N/E	Wet disturbed soil
Drypetes lateriflora	Guiana Plum	N/T	Upland hammock
Epidendrum anceps	Dingy-flowered Epidendrum	N/E	Upland hammock
Epidendrum difforme	Umbelled Epidendrum	N/E	Upland hammock
Myrcianthes fragrans	Simpson's Stopper; Naked - wood;Pale Stopper	N/T	Hammock
Nemastylis floridana	Celestial-lily; Fall- flowering Ixia	N/E	Wet flatwoods, marshes
Nephrolpis biserrata	Giant Sword Fern; Boston Fern	N/T	Mesic hammock
Osmunda cinnamomea	Cinnamon Fern	N/CE	Marshes
Osmunda regalis	Royal Fern; King's Fern; Osmunde Royale,	N/CE	Marshes
Pecluma ptilodon	Swamp Plume Polypody	N/E	Hydric hammock
Pithecellobium keyense	Blackbead; Guadeloupe Blakbead; Ram's Horn	N/T	Upland hammock
Pteris bahamensis	Bahama Ladder Brake; Plumy Ladder brake; Bahama Brake; Long- leaved Brake	N/T	Upland hammock
Spiranthes laciniata	Lace-lip Ladies'- tresses; Lace-lip Spiral Orchid	N/T	Wet flatwoods, marshes
Swieteni mahagoni	Mahogany; West Indian Mahogany; Madeira	N/T	Hammock

Thelypteris reptans	Creeping Star-Hair Fern; Walking Wood Fern; Creeping Fern	N/E	Mesic hammock
Thelypteris reticulata	Lattice-vein Fern; Cypress Fern	N/E	Hydric hammock
Tillansdsia balbisiana	Inflated Wildpine; Reflexed Wildpine	N/T	Mesic & wet flatwoods, hammocks
Tillansdia flexuosa	Twisted Air Plant; Banded Air Plant; Flexuous Wildpine	N/T	Disturbed hammocks
Tillandsia utriculata	Giant Wildpine; Swollen Wildpine	N/E	Mesic and wet flatwoods, hammock
Tillandsia valenzuelana	Soft-leaved Wildpine	N/T	Hammock
Zamia pumilla	Coontie; Wild Sago; Florida Arrowroot; Contis; Compties; Comfort-root; Bay-rush	N/CE	Disturbed hammocks & flatwoods, mesic hammocks
Animals			
Rana capito	Gopher Frog	ISMP	Mesic flatwoods, marshes, swales, ponds/lakes
Aramus guarauna	Limpkin	ISMP	Marshes, ponds/lakes, streams/rivers, sloughs
Egretta caerulea	Little Blue Heron	N/T	Marshes, swales, ponds/lakes, streams/rivers, shores
Egretta thula	Snowy Egret	ISMP	Marshes, swales, ponds/lakes, sloughs
Egretta tricolor	Tricolored Heron	N/T	Marshes, swales, ponds/lakes, sloughs
Eudocimus albus	White Ibis	ISMP	Disturbed pastures, marshes, ponds/lakes, streams/rivers, sloughs
Falco sparverius paulus	Southeastern American Kestrel	N/T	Disturbed open lands, disturbed pastures, Disturbed open fields
Antigone canadensis pratensisT	Florida Sandhill Crane	N/T	Disturbed pastures, marshes, swales
Mycteria americana	Wood Stork	LT/T	Disturbed pastures, marshes, swales, streams/rivers, sloughs
Rostrhamus sociabilis plumbeus	Everglade Snail Kite	LE/E	Marshes/swales, ponds/lakes
Rynchops niger	Black Skimmer	N/T	Disturbed pastures, spoil, marshes, ponds, lakes
Athene cunicularia floridana	Florida Burrowing Owl	N/T	Disturbed pastures, disturbed old fields
Sterna antillarum	Least Tern	N/T	Disturbed pastures, marshes

Blarina carolinensis(= brevicauda)shermani	Sherman's Short-tailed Shrew	N/T	Wet hammocks
Alligator mississippiensis	American Alligator	SAT	Marshes, swales, ponds/lakes, streams/rivers, slough
Drymarchon corais couperi	Eastern Indigo Snake	LT/T	Disturbed pastures, wet hammock
Gopherus polyphemus	Gopher Tortoise	C/T	Disturbed pastures

Sources: Hall and Newman, 2001 and LG^2 Environmental Solutions, 2009; Weaver, Richard E. and Patti J. Anderson. Notes on Florida's Endangered and Threatened Plants; http://ecos.fws.gov/tess_public/pub/Species

LE – Federally endangered
LT – Federally threatened
N – Not listed
ISMP – Part of the states Imperiled Species Management Plan
E – Listed as Endangered by the FWC
T – Listed as Threatened by the FWC
SAT - Similarity of Appearance to a Threatened taxon
C – Candidate species for listing by the Federal Endangered Species Act
CE – Commercially exploited

Appendix 10. Potential Native Species for Supplemental Vegetation

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Table 6-1: Potential Native Species for Planting

Scientific Name	Common Name	Availability
Trees		
Annona glabra	Pond Apple	Widely cultivated
Bursera simaruba	Gumbo-limbo	Widely cultivated
Chrysophyllum oliviforme	Satinleaf	Widely cultivated
Diospyros virginiana	Common persimmon	Cultivated at native plant nurseries
Eugenia axillaris	White stopper	Widely cultivated
Ficus aurea	Strangler/Golden fig	Widely cultivated
Ilex cassine	Dahoon holly	Widely cultivated
Morus rubra	Red mulberry	Cultivated at native plant nurseries
Pinus elliottii var. densa	South Florida slash pine	Widely cultivated
Quercus virginiana	Virginia live oak	Widely cultivated
Sabal palmetto	Cabbage palm	Widely cultivated
Salix caroliniana	Coastal Plain willow	Cultivated at native plant nurseries
Zanthoxylum fagara	Wild-lime	Cultivated at native plant nurseries
Shrubs and Woody Groundcovers		
Ardisia escallonioides	Marlberry	Cultivated at native plant nurseries
Baccharis qlomeruliflora	Silverling	Cultivated at native plant nurseries
Baccharis halimifolia	Saltbush, Grounsel tree, Sea-myrtle	Cultivated at native plant nurseries
Callicarpa americana	American beautyberry	Widely cultivated
Chiococca alba	Common snowberry, Milkberry	Cultivated at native plant nurseries
Chrysobalanus icaco	Coco-plum	Widely cultivated
Erythrina herbacea	Coralbean, Cherokee bean	Widely cultivated
Hamelia patens var. patens	Firebush	Widely cultivated
Hypericum hypericoides	St. Andrew's-cross	Widely cultivated
Licania michauxii	Gopher-apple	Cultivated at native plant nurseries
Myrica cerifera	Wax myrtle, Southern Bayberry	Widely cultivated
Myrsine cubana	Myrsine, Colicwood	Widely cultivated
Opuntia humifusa	Pricklypear	Cultivated at native plant nurseries
Psychotria nervosa	Shiny-leaved wild coffee	Widely cultivated
Sambucus nigra subsp. Canadensis	Elderberry, American elder	Cultivated at native plant nurseries
Serenoa repens	Saw palmetto	Widely cultivated

Source: http://regionalconservation.org/beta/nfyn/PlantList.asp

Appendix 11. Current List of threatened and endangered species found in Broward County, Florida

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Table 7-4: Threatened and Endangered species in Broward County, FL

	Common Name	Scientific Name	Federal Status
Mammals	Florida Panther	*Puma concolor coryi*	E
	Puma (mountain lion)	*Puma concolor*	T/SA
	Southeastern beach mouse	*Peromyscus polionotus niveiventris*	T
	Wesi Indian manatee	*Trichechus manatus*	E
Birds	Audubon's crested caracara	*Polyborus plancus audubonii*	T
	Everglade snail kite	*Rostrhamus sociabilis plumbeus*	E
	Florida scrub-jay	*Aphelocoma coerulescens*	T
	Ivory-billed woodpecker	*Campephilus principalis*	E
	Piping plover	*Charadrius melodus*	T
	Red-cockaded woodpecker	*Picoides borealis*	E
	Red knot	*Calidris canutus rufa*	C
	Wood stork	*Mycteria americana*	E
Reptiles	American crocodile	*Crocodylus acutus*	T
	American alligator	*Alligator mississippiensis*	T/SA
	Eastern indigo snake	*Drymarchon corais couperi*	T
	Green sea turtle	*Chelonia mydas*	E
	Hawksbill sea turtle	*Eretmochelys imbricata*	E
	Leatherback sea turtle	*Dermochelys coriacea*	E
	Loggerhead sea turtle	*Caretta caretra*	T
Fishes	Smalltooth sawfish	*Pristis pectinata*	E
Invertebrates	Bartram's hairstreak butterfly	*Strymon acis bartrami*	E
	Florida leafwing butterfly	*Anaea troglodyta floridalis*	T
	Staghorn coral	*Acropora cervicornis*	T
Plants	Beach jacquemontia	*Jacauemontia reclinata*	E
	Johnson's seagrass	*Halophila johnsonii*	T
	Okeechobee gourd	*Cucurbita okeechobeensis* ssp. *okeechobeensis*	E
	Tiny polygala	*Polygala smallii*	E

Appendix 12. Five year project list for SCWTS

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Table 9-1: Five year anticipated project list

Management Goal	Project	Description	Goal Implementation Year	Actual Execution Date
Eradicate and/or control invasive species and restore natural communities	Project 1.1.1	Continue Invasive Species Eradication Plan	2011-Recurring	Continuous
	Project 1.1.1.1	Continue invasive species regeneration control contracts on Property	2011-Recurring	Continuous
	Project 1.1.1.2	Prepare and add bush-hogged and chipped northern parcel and southwest corner of southern parcel to invasive species regeneration control contract	2020	
	Project 1.1.1.3	Establish Restricted Zone around wetlands and wetland buffer. Establish permanent signs or markers at buffer boundary	2021	
	Project 1.1.1.4	Begin wetland management plan-selective removal by hand-clearing and herbicidal treatment of invasives and exotics in wetland area and buffer	2011-Recurring	
	Project 1.1.2	Invasive species monitoring	2012-Recurring	Continuous
Create better wildlife habitat throughout the site	Project 2.1.1	Develop a Native Species Planting Plan to replace exotic trees and shrubs	2012-2019	1-Jun-17
	Project 2.1.2	Implement planting plan to replace exotic trees and shrubs	2012-2021	
	Project 2.1.3	Repair and re-Install duck boxes in borrow pit pond, maintain annually	2021	
	Project 2.1.4	Repair and reinstall bat house	2018	
Ensure all SCWTS users understand and comply with all BMPs associated with pollution prevention and erosion control	Project 3.1.1	Update information pamphlet to be distributed to SCWTS users. Create and distribute EIS and Wood Stork posters.	2018	

Manage natural resources at the SCWTS to enhance propagation of native flora and fauna	Project 4.1.1	Repeat Flora and Vegetation surveys into one PLS. Add T&E plant species survey to PLS effort	2018	
	Project 4.1.2	Complete comprehensive T&E fauna species survey	2019	
	Project 4.1.3	Acoustic survey for Florida Bonneted Bats	2020	
	Project 4.1.4	Repeat Wetland Delineation and Jurisdictional Review	2019	
Ensure FLARNG personnel have proper training and equipment to implement projects	Training needs	Herbicide applicator license	Continuous	
	Equipment needs	1 - Four-wheel Drive All Terrain Vehicle 1- Utility vehicle	Continuous	

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