PROGRAMMATIC ENVIRONMENTAL ASSESSMENT FOR LAND CLEARING ACTIVITIES

Prepared for



45th Space Wing
Patrick Air Force Base, FL

Prepared by

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Finding of No Significant Impact and Finding of No Practicable Alternative

Land Clearing Activities

45th Space Wing, Florida

January 2005

Pursuant to the Council on Environmental Quality regulations, the provisions of the *National Environmental Policy Act of 1969* (40 CFR Parts 1500-1508), and Air Force Instruction (AFI) 32-7061, *Environmental Impact Analysis Process* (32 CFR Part 989), the United States Air Force (USAF) conducted a Programmatic Environmental Assessment (PEA), hereby incorporated by reference, of the potential environmental consequences and benefits of new land clearing methods and the no action alternative. These new methods are designed to restore and enhance native habitats that support sensitive species, including threatened and endangered (T&E) species such as the federally threatened Florida scrub jay and decease the frequency of clearing by removing roots. Many of the areas must be cleared and maintained to assure Lines of Sight (LOS), security zones, canals, utility corridors, firebreaks, and airstrips, used by the 45th Space Wing (45SW) at Cape Canaveral Air Force Station (CCAFS), Patrick Air Force Base (PAFB), Malabar Transmitter Annex (MTA), and Jonathan Dickinson Missile Tracking Annex (JDMTA) function properly to satisfy mission requirements. The purpose and need of this PEA is to maximize efficiencies of time, effort, and cost, by accomplishing the required environmental review and approval of these recurring activities in one document.

Several alternatives for clearing LOS were previously considered and eliminated from further consideration because they did not meet mission requirements and would result in more land clearing. Under the no action alternative land clearing activities would continue to be performed; however, individual areas proposed for clearing activities would need to be reviewed independently on a case–by-case basis, which is time consuming. In cases where the environmental effects of land clearing activities could differ from those described in this PEA, additional environmental analysis would be completed and this PEA would be referred to where possible to eliminate repetitive discussions of activities already analyzed.

Environmental Consequences and Benefits

No significant environmental impacts were identified that would require the completion of an Environmental Impact Statement. However, some less than significant and beneficial impacts were identified and are summarized below.

Air Quality

Land clearing, open burning of cleared vegetation, and prescribed burning activities would affect air quality as a result of the production of smoke emissions from burning activities, exhaust emissions from machinery used in the land clearing, and the

suspension of dust particles (i.e., particulate matter (PM)) during project activities. Protective masks would be used by workers to eliminate the inhalation of fine dust particles and hazardous fire byproducts. Weather conditions would be monitored to reduce smoke dispersion and control prescribed burns.

Biological Resources

Many general benefits to biological resources would result from implementing the proposed action. Prescribed burning in combination with mechanical/manual vegetation removal is highly recommended for wildlife habitat management in southern forests, especially those considered fire sub-climax communities. When vegetation in fire dependant communities is not removed, vegetation becomes dense, rendering the habitat unsuitable for many indigenous wildlife species. An increase in the yield and quality of herbage, legumes, browse from hardwood sprouts, and the creation of openings for feeding, caching, and travel would result from the proposed land clearing method.

Tapering of the edges of cleared areas would present sharp contrasts in vegetation heights that contribute to predation of small mammals and birds by raptors. Also, biodiversity generally increase with the creation of edge areas. The treatment of invasive species would allow native species to recolonize certain areas.

Many of the areas that would be cleared support migratory birds and other sensitive animals, such as the eastern indigo snake, Florida scrub jay, and southeastern beach mouse, all of which are Federally listed as threatened, and the gopher tortoise, a species of special concern. Clearing activities would not be conducted during the main nesting season in areas where migratory bird nests are found, unless prolonging clearing would hinder mission needs. When activities are likely to disturb gopher tortoise burrows, CCAFS biologists would relocate tortoises and indigo snakes to other suitable areas in accordance with the existing Gopher Tortoise Relocation Permit.

Artificial lighting disorients federally protected sea turtles and hatchlings. When vegetation is removed near nesting areas that currently blocks artificial lighting, the 45SW's Instruction 32-7001 would be followed to protect nesting turtles/hatchlings from artificial light induced disorientation. The restoration of scrub habitat would provide additional foraging and nesting habitat for scrub jays and link habitat allowing jays to more easily disperse. Beach mice would benefit by the creation of preferred habitat (i.e., open areas) and the greater availability of herbaceous forage following burning.

One Federally listed plant, the endangered *perforate cladonia*, is present on JDTMA. In addition, several state-listed species, species of special concern, and rare plant species are present in the proposed action areas. The creation of open areas and the reintroduction of fire would create habitat for several sensitive plants. Project activities would be monitored to minimize impacts to sensitive plant populations. For example, perforate cladonia only multiplies via vegetative fragmentation. Therefore, areas harboring this species would not be burned or cleared. Instead, selective trimming of the overstory would occur to reduce shading impacts.

Floodplains and Wetlands

According to the USAF Environmental Impact Analysis Process Supplement 1 (32 CFR Part 989), a proposal for routine operations and maintenance such as grass-cutting and controlled burning in a floodplain or wetland does not generally require a Finding of No Practical Alternative (FONPA) in compliance with Executive Order 11990, *Protection of Wetlands* and Executive Order 11988, *Floodplain Management*. However, the proposed action also includes land clearing activities. Selective trimming and removal of vegetation in surface waters and adjacent floodplains, including wetlands, would be required to satisfy essential mission requirements such as clear LOS and security zones. Impacts to these aquatic and semi-aquatic environments would be minimized primarily by avoidance. Where avoidance is not possible, trimming with the use of hand tools would be conducted. In cases where heavy equipment must be utilized, mitigation for impacts would occur as specified in permits issued by the U.S. Army Corps of Engineers and the Florida Department of Environmental Protection (FDEP). Where vegetation removal creates bare areas, seeding and/or planting of native species would occur to control the spread of invasive species. Where feasible, trimming of mangroves would be conducted in accordance with the *Florida Mangrove Trimming and Preservation Act*. Herbicides would not be utilized on mangroves. No other more environmentally preferable alternative was identified that would satisfy mission requirements.

Cultural Resources

In order to preserve CCAFS' cultural resources, all work scheduled to occur near any of its known archaeological sites or historic properties would be coordinated with the 45 Civil Engineering Squadron, Environmental Flight, Conservation, and Planning Element. Hand tools would be used in archeological sites to avoid soil disturbance. This includes all activities occurring along the Banana River shoreline. No cultural resources are known to exist on PAFB, MTA or JDMTA.

Geology, Soil and Water Resources

Land disturbance and burn activities have the potential to accelerate erosion. Prior to and during land clearing and burning activities, erosion and sediment control measures would be designed and implemented to retain sediment on-site and prevent violations of State and Federal water quality standards. Any erosion or shoaling that could cause adverse impacts to water resources would be mitigated by implementing Best Management Practices (BMPs) established by the Florida Division of Forestry, and where applicable, BMPs required by water quality certifications and NPDES permits.

Hazardous Materials and Hazardous Waste

Some of the canals and areas identified for land clearing activities may be contaminated by hazardous waste (*e.g.*, groundwater plumes). To ensure potential contamination is not disturbed, the Installation Restoration Program (IRP) Office at CCAFS would be consulted prior to scheduling any land clearing activities on IRP sites and other areas suspected of being contaminated.

Cumulative Impacts

Cumulative impacts were considered for the proposed action and no action alternatives and would only be anticipated to affect biological resources. If the no action alternative were selected, adverse cumulative impacts to biological resources would continue to occur. Specifically, sensitive species, including T&E species (*e.g.*, Florida scrub jay and Curtiss' milkweed) that depend upon fire or anthropogenic disturbances would not benefit from the creation of early seral stage habitats (bare areas and low-lying scrub). In addition, invasive species would continue to out-compete native species resulting in the additional loss of threatened native vegetation. If the proposed action were selected, the converse would occur resulting in the expansion of sensitive species populations and their native habitats, possibly leading to the delisting of T&E species.

Alternatives Considered Including the No Action Alternative

Under the no action alternative, land clearing activities would continue to support mission requirements; however, the activities would need to be approved on a case-by-case basis, and would not be included under a comprehensive, environmentally-sound, programmatic approach. Currently, under the no action alternative, there is a need for last minute emergency clearing to satisfy mission requirements, increasing the probability of negative impacts to the environment.

Selection of the no action alternative is not considered a viable option, as it would not enable the 45SW to utilize the best management techniques and options available to support mission requirements while protecting and enhancing valuable natural resources. Other environmentally preferable alternatives were not identified that would protect sensitive species, restore native habitats, and satisfy mission requirements such as clear security zones and LOS.

Conclusion

The PEA and Draft FONSI were both made available to the affected public for a 30-day public comment period from 27 October, 2004 to 30 November, 2004. The affected public was notified by advertisements placed in the Brevard and Martin Counties newspapers. The EA and FONSI were made available by placing on file in the town library of Cape Canaveral and 45SW Public Affairs Office.

The Draft PEA and FONSI were sent to the State Clearinghouse for review by the Florida Department of Environmental Protection, Florida Fish and Wildlife Conservation Commission, Florida Department of State, East Central Florida Regional Planning Council, Treasure Coast Regional Planning Council, South Florida Water Management District, and St. John's River Water Management District. The FDEP deemed the proposed action to be consistent with the Florida Coastal Management Plan. All other agencies had no comments and/or stated that the proposed action is consistent with their relevant goals, policies, and objectives. Copies of all comments are located in Appendix D of the PEA. The USFWS also reviewed the PEA and FONSI and found that the proposed action is not likely to adversely affect resources protected by the Endangered Species Act.

Practicable Alternatives And Environmental Effects

EO 11990 directs that each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements. The proposed action would have unavoidable impacts to wetlands because selective trimming and removal of vegetation in surface waters and adjacent floodplains, including wetlands, would be required to satisfy essential mission requirements such as clear LOS and security zones.

Finding of No Significant Impact

Based on the attached EA, conducted in accordance with the Council on Environmental Quality Regulations implementing the National Environmental Policy Act of 1969 (Public Law 91-190, 42 U.S.C. §§4321-4347), as amended, and 32 CFR 989, 15 Jul 1999, and amended 28 Mar 2001, an assessment of the identified environmental effects has been prepared for the proposed land clearing methods on 45SW lands, Florida. I find that the action will have no significant impact on the quality of the human environment; thus, an Environmental Impact Statement is not warranted.

Finding of No Practicable Alternative

Pursuant to Executive Orders 11990 and 11988, the authority delegated by SAFO 780-1, and 32 CFR Part 989 and taking the submitted information into account, I find that there is no practicable alternative to this action that would avoid wetlands and floodplains and the proposed action includes all practical measures to minimize harm to the environment.

26 MAY 05
Date

DANIEL P. LEAF, Lieutenant General, USAF
Vice Commander, AFSPC

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Acronyms and Abbreviations

ACI	Archaeological Consultants Inc.
AEIs	Air Emissions Inventories
AFI	Air Force Instruction
AOC	Area of Concern
BMPs	Best Management Practices
BO	Biological Opinion
CAA	Clean Air Act
CCAFS	Cape Canaveral Air Force Station
CCTV	Closed Circuit Television
CEQ	Council on Environmental Quality
45CES/CEVP	45 Civil Engineering Squadron, Environmental Flight, Conservation, and Planning Element
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibel
dBA	“A-weighted” logarithmic scale
DoD	Department of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EO	Executive Order
EPA	Environmental Protection Agency
ER	Eastern Range
ESA	Endangered Species Act
FAAQS	Florida Ambient Air Quality Standards
FAC	Florida Administrative Code

FCREPA	Florida Committee on Rare and Endangered Plants and Animals
FETSA	Florida Endangered and Threatened Species Act
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDF	Florida Division of Forestry
FNAI	Florida Natural Areas Inventory
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
FSA	Fuel Storage Area
FWCC	Florida Fish and Wildlife Conservation Commission
HQ AFSPC/CEVP	Headquarters Air Force Space Command/Civil Engineering
HQ USAF/CEV	Headquarters United States Air Force/Civil Engineering
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
J-BOSC	Joint-Base Operations Support Contract
JDMTA	Jonathan Dickinson Missile Tracking Annex
KSC	Kennedy Space Center
LC	Launch Complex
LDN	Day-Night Average Sound Level
LOCC	Launch Operations Control Center
LOS	Line of Sight
LTM	long term monitoring
LTO	long term operation
MBTA	Migratory Bird Treaty Act
MINWR	Merritt Island National Wildlife Refuge
MSL	mean sea level
MTA	Malabar Transmitter Annex

NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFA	No Further Action
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NOx	Nitrogen Oxides
NOTU	Naval Ordnance Test Unit
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetland Inventory
OSHA	Occupational Safety and Health Administration
PAFB	Patrick Air Force Base
PEA	Programmatic Environmental Assessment
PM	Particulate Matter
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SCS	Soil Conservation Service
SFWMD	South Florida Water Management District
SGS	Space Gateway Support
SHPO	State Historic Preservation Office
SI	Site Investigation
SIP	State Implementation Plan
SJRWMD	Saint John's River Water Management District
SLC	Space Launch Complex
SMARF	Solid Motor Assembly and Ready Facility
SOx	Sulfur Oxides
45SW	45th Space Wing
T&E	Threatened and Endangered

UCS	Universal Camera Site
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
VIB	Vehicle Integration Building
VOCs	Volatile Organic Compounds

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Chapter 1: Introduction

This Programmatic Environmental Assessment (PEA) provides a tool to the USAF to assess the potential impacts of program management activities associated with current and future land clearing activities, and has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, Air Force Instruction (AFI) 32-7061, *Environmental Impact Analysis Process*, as amended by interim change dated March 12, 2003, which adopted Title 32 of the Code of Federal Regulations (CFR) Part 989, and Department of Defense (DoD) Directive 6050. The environmental consequences and benefits associated with land clearing and maintenance of lines of sight (LOS), canals, utility corridors, security clear zones, firebreaks, and aircraft strips (i.e., skid strips), used by the 45th Space Wing (45SW) at Cape Canaveral Air Force Station (CCAFS), Patrick Air Force Base (PAFB), Malabar Transmitter Annex (MTA), and Jonathan Dickinson Missile Tracking Annex (JDMTA), all of which are located along or near the eastern coast of Florida (Figure 1-1), were evaluated.

Chapter 1 of this PEA provides background information on CCAFS, PAFB, MTA, and JDMTA; describes the purpose of and need for the proposed action. A description of the proposed action and the no action alternative is provided in Chapter 2. Chapter 2 also presents the scope of this PEA. Chapter 3 describes the existing condition of environmental resources that could be affected by implementation of the proposed action. Chapter 4 addresses how those resources would be affected by implementation of the proposed action and identifies mitigation measures to reduce impacts to the environment.

Background

In the late 1980s the Florida scrub jay *(Aphelocoma coerulescens)* population was declining on CCAFS because the required low-lying scrub habitat for nesting and open, sandy habitat for foraging was shrinking as dense thickets of over-mature scrub formed during a period of fire suppression and a lack of prescribed burning. On June 03, 1987, the Florida scrub jay was designated as threatened in its entire range. Under the Endangered Species Act (ESA), all Federal lands where scrub jays exist must be managed so that the survivability of the species is improved. Recovery efforts throughout Florida and consultations between the United States Fish and Wildlife Service (USFWS) and the USAF led to a Biological Opinion (BO) in January of 1991, prepared by the USFWS, regarding the first scrub jay management plan for CCAFS. The scrub jay management plan initiated the development of a strategy for scrub habitat restoration required for this threatened species.

A scrub habitat restoration program was initiated in 1991 at CCAFS to restore over-mature scrub to a condition suitable to support the Florida scrub jay. Initially, this program was accomplished solely through the application of controlled (prescribed) fire. Subsequently, it was determined that over-mature oak scrub could not be managed through controlled burning alone. Mechanical treatment prior to and/or after burning was deemed necessary in some areas to control regrowth. In 2004, the 45 Civil Engineering Squadron, Environmental Flight, Conservation, and Planning Element (45 CES/CEVP) prepared a Policy on Land Clearing Activities to provide a summary of the new



Figure 1-1 45th Space Wing Mainland Assets

requirements for land clearing activities. Specifically, they developed these guidelines to ensure land clearing-related mission capabilities are satisfied, that invasive species are controlled, and habitat for sensitive species is enhanced. The clearing methodology employed would create corridors that are easier to maintain and minimize the need for last minute, emergency clearing. Further, the clearing specifications would better mimic natural scrub components (e.g., scalloped edges as opposed to vertical edges) that provide habitat for a variety of species and enhances biodiversity.

In January 1997, 45 CES/CEVP completed an Environmental Assessment for the Proposed Construction and Maintenance of Instrumentation Lines of Sight (LOS) on CCAFS. This PEA updates the 1997 EA to include the recent changes in land clearing methodologies, and expands the scope to include other land clearing activities on CCAFS, PAFB, MTA, and JDMTA that are currently being performed and are proposed to be used in the future.

Background information on the locations and missions of CCAFS, PAFB, MTA, and JDMTA is provided in the following sections.

Cape Canaveral Air Force Station

The approximately 15,800 acre CCAFS is located on the easternmost coast of the Canaveral Peninsula approximately 20 miles north of PAFB. The 4.5 mile wide Canaveral Peninsula is a barrier island located approximately 155 miles south of Jacksonville, 210 miles north of Miami, and approximately 60 miles east of Orlando. The northern boundary of CCAFS abuts the Kennedy Space Center (KSC) boundary on the barrier island. The southern boundary abuts Port Canaveral. The Banana River separates CCAFS from KSC. The Atlantic Ocean borders CCAFS along its eastern margin. Approximately 30% (4,700 acres) of CCAFS is developed; the remaining 70% (11,100 acres) is unimproved land.

Designated as one of the Eastern Range (ER) stations, the primary mission of CCAFS is to provide launch and tracking facilities, safety procedures, and test data to a variety of users. Major users at CCAFS include the United States Air Force (USAF), the United States Navy (USN), the National Aeronautics and Space Administration (NASA), and commercial launch companies. The 45SW of the USAF operates CCAFS. The primary mission of the 45SW is to develop, maintain, operate, and manage the ER.

A total of 36 launch complexes have been constructed at CCAFS over the years with 12 launch complexes currently active and 24 inactive. The various launch support facilities of CCAFS are connected with the centralized Industrial Area by 81 miles of paved roads. Approximately 7,400 people are currently employed at CCAFS.

The majority of the coastal land south of CCAFS has been developed. The beaches of Cape Canaveral and Cocoa Beach (south of CCAFS) have become attractive locations for houses, condominiums, and hotels/motels. The only natural areas remaining in the vicinity are federally owned lands (CCAFS, KSC, Merritt Island National Wildlife Refuge (MINWR) and Canaveral National Seashore) to the north.

Patrick Air Force Base

Currently the home of the 45SW Headquarters, PAFB is located on a barrier island on the east-central coast of Florida,

south of the City of Cocoa Beach. The Base covers approximately 1,937 acres bounded by the Atlantic Ocean on the east and the Banana River on the west. There is little topographic relief across PAFB, with elevations from 0 to 6.1 meters above mean sea level (msl); the highest elevation corresponds to sand dunes along the Atlantic Ocean. From the dunes, the site gently slopes northwest toward the Banana River shoreline.

As a component of the USAF Space Command, PAFB is the center of administrative activities that support the Headquarters of the 45SW, CCAFS, MTA, JDMTA, two downrange stations at Antigua and Ascension Island, and other tracking stations. Mission responsibilities include safety, planning, engineering support services, scheduling, test operations, launch and range operations, directing or supporting operations, test results evaluation, and providing similar support to other DoD and non-DoD programs.

Most of PAFB is developed, except for the coastal areas. Exceptions include the Officers' Club, Non-Commissioned Officers' Club, some Base housing, and a radar site near the south end of PAFB. Riprap is present in several areas along PAFB's beach, and a sea wall is located along the Officers' Club facility and parking lot. The Archie Carr National Wildlife Refuge to the south, and Federally owned lands (CCAFS, KSC, and Canaveral National Seashore) to the north are considered "natural" areas near PAFB.

Malabar Transmitter Annex

Located in Palm Bay, Florida, approximately eight miles southwest of Melbourne and 35 miles southwest of CCAFS, MTA occupies a square mile section (640 acres) comprised of forest, grassy fields, abandoned runways, antenna fields, and numerous transmitter and support buildings. MTA is one of five mainland Florida instrumentation sites, which are part of the 45SW.

The mission of MTA is to collect, process, and deliver test-related data to user agencies conducting tests or space launches from CCAFS, KSC, and submarine test launches conducted in offshore waters. Various groups use MTA as a training site. This annex provides a secluded area to perform training exercises without the threat of interfering with launch-related activities occurring on CCAFS.

Jonathan Dickinson Missile Tracking Annex

Located 120 miles south of PAFB and 15 miles north of West Palm Beach, JDMTA occupies approximately 11 acres in the southern end of Jonathan Dickinson State Park in Martin County, on Florida's east coast. The site houses four telemetry units, which provide in-flight monitoring of launch vehicle performance, electronics, and associated subsystems. The site also provides radar, flight test support systems, a microwave relay to CCAFS, and a command destruct system remotely activated from CCAFS to protect life and property should a launch vehicle veer off course.

Purpose and Need for the Proposed Action

The proposed action is to implement a programmatic approach for land clearing of LOS, security clear zones, canals, utility corridors, firebreaks, and other areas employing the methodology and approach defined in the 2004 45SW *Policy on Land Clearing Activities*. The following is a

summary of the purpose and need to clear and maintain the various areas.

Lines of Sight on CCAFS

On CCAFS, LOS are required to provide optical tracking data to Range Safety computers within the first minute after launch of space vehicles. Range Safety has a requirement that launch vehicles be viewed from the base of the pad for up to approximately 15-18 seconds after the missile is launched. At this point, radar takes over the process. The vehicle is optically tracked from Universal Camera Sites (UCS), which are the only source for tracking the vehicle, until radar takes over. All optical data gathered from the sites are fed into the central computer that provides data to the Range Safety Officer. If an emergency were to occur within the first 15-18 seconds after launch and the vehicle had to be destroyed, the optical tracking information provided to the central computer is the only source of information Range Safety has to determine the exact location of the vehicle. Additionally, engineering data is gathered with these cameras and utilized later to assess flight performance. All but one LOS (i.e., for the Delta IV vehicle launched from Space Launch Complex (SLC) 37) has been previously cleared. However, most LOS are severely overgrown due to the lack of maintenance over the past several years, rendering the sites ineffective.

Security Clear Zones on CCAFS, MTA, PAFB, and JDMTA

In accordance with AFI 31-101, *The Air Force Installation Security Program* (2000), security clear zones are required around critical facilities to ensure security has an unobstructed view around the entire perimeter of the facility. Security regulations require either bare ground or mowed grass that contains no trees, landscape vegetation, or variances in topography/grade, such as ditches, swales, holes, etc. The highest level of facility security requirements includes: dual fencing, motion detectors, Closed Circuit Television (CCTV) surveillance cameras, and three clear zones (between and on both sides of the two fences).

Firebreaks, Utility Corridors and Canals on CCAFS, MTA, PAFB, and JDMTA

Firebreaks around critical facilities must be maintained in a bare ground condition to effectively protect the resources of the 45SW from fire. Canals must be cleared to provide free-flow of water and to serve as firebreaks. Utility right-of-ways must be cleared to permit access for maintenance activities.

Invasive Species Management

Invasive species that colonize an area may gain an ecological edge over indigenous species since the insects, diseases, and foraging animals that naturally keep its growth in check in its native range are generally not present in its new habitat. Once established, these plant species easily out-compete and displace native plant species, disrupt ecological processes, and significantly degrade entire plant communities. Many invasive plant species spread quickly and grow so densely that native species cannot remain or become established in areas infested by invasive species. Native plants can be crowded out or their populations threatened by hybridization with invasives. Endangered species may be extirpated from their habitats by invasive plant species. Aquatic invasive species clog waterways, disrupt groundwater flows, degrade water quality, and alter native plant and animal communities. Therefore, specific management of invasive species

is required to preserve the natural flora and fauna of the area.

Executive Order 13112, *Invasive Species*, the Sikes Act, as amended (16 USC 670, February 3, 1999), and other Federal and State regulations and policies require control of invasive species to reduce their ecological impact. Some of the other laws and regulations include:

- Federal Plant Pest Act (7 U.S. code [U.S.C.] 150aa et seq.)
- Federal Noxious Weed Act of 1974, as amended (7 U.S.C. 2801 et seq.)
- Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)
- Lacey Act, as amended (18 U.S.C. 3371 et seq.)
- 40 Code of Federal Regulations, Chapters I and V, Protection of Environment
- Department of Defense Instruction (DODI) 4715.3 – Environmental Conservation Program
- AFI 32-7064 – Integrated Natural Resources Management, 2004
- Interagency Agreement for Professional and Technical Assistance in Wildlife, Waterfowl and Wetlands Management between the USAF and USFWS, dated November 19, 1992

Executive Order (EO) 13112 specifically requires Federal agencies to "detect and respond rapidly to control populations of such species in a cost effective and environmentally sound manner." This EO also requires prevention of the spread of invasive species.

Endangered, Threatened and Sensitive Species Management

The USAF is required by Section 7 of the ESA to protect and preserve threatened, endangered, and sensitive species and their habitat on land under their control. AFI 32-7064, *Integrated Natural Resources Management*, requires the USAF to protect State-listed endangered, threatened or rare species, when possible. One of the major components of optimal habitat for the Federally-listed Florida scrub jay is open, sandy areas that serve as insect foraging and acorn caching habitat. Scrub jays also utilize low-lying scrub as their primary nesting habitat. As a result of the proposed land clearing activities, Florida scrub jays, as well as other listed and/or sensitive species would benefit from the creation of these habitats.

Chapter 2: Description of Proposed Action and Alternatives

This section defines the scope of this PEA and describes the proposed action and alternatives.

Scope of Programmatic Environmental Assessment

Initially, the 45 CES/CEVP completed a USAF Form 813 (Request for Environmental Impact Analysis) and identified potential impacts to biological resources (Appendix A). This PEA will evaluate the environmental consequences associated with the general land clearing program at CCAFS, PAFB, MTA, and JDMTA and the no action alternative. The potential environmental impacts associated with the proposed land clearing activities are considered on a programmatic level. Vegetation removal in support of major construction projects is not covered in this PEA and such activities would need to be addressed separately by the USAF Environmental Impact Analysis Process (EIAP).

Tiering of environmental documents refers to the process of addressing a broad, general program, policy, or proposal in an initial environmental document, and analyzing a narrower site-specific proposal, related to the initial program, plan, or policy in a subsequent, abbreviated environmental document. The concept of tiering was promulgated in the 1978 CEQ regulations; the preceding CEQ guidelines had not addressed the concept. The Council's intent in formalizing the tiering concept was to encourage agencies "to eliminate repetitive discussions and to focus on the actual issues ripe for decisions at each level of environmental review" (Federal Register, 1978). Future land clearing activities that have the potential to impact the environment and are not part of the proposed action, as defined in this PEA, would be reviewed in separate EAs. Such analyses would tier off of this PEA to eliminate repetitive discussions of issues already addressed and focus on newly identified issues, such as the potential effects to an endangered species that is discovered to utilize the proposed action areas.

Alternatives Previously Analyzed

In the *Environmental Assessment for the Proposed Construction and Maintenance of Instrumentation Lines of Sight on Cape Canaveral Air Force Station, FL* (1997), several alternatives to the proposed land clearing of LOS were previously considered but eliminated from further evaluation. The rationale used for elimination of these alternatives in 1997 is still applicable, therefore, the alternatives were not reanalyzed in this PEA. These alternatives are presented below.

Construct New Universal Camera Sites

In order for a new UCS to be used, the site would require the proper angular separation between the pad and the other five camera sites used during each launch. Precise triangulation is a Range Safety requirement to adequately track the missile. New camera sites would require an engineering study/survey to pinpoint the exact location for each new

site. Additionally, new communication and power lines would be required for each new camera site. If a new camera site were chosen, the possibility exists that the resulting LOS would require clearing to meet Range Safety requirements. This alternative, in addition to being costly, could result in as much or more land clearing than the proposed action.

Elevate Existing Camera Sites

Elevating existing camera sites is a possible alternative; however, it could be a costly solution. New engineering surveys/studies would be required to ensure the proper angle to the pads is achieved for optimal tracking of the missile. Although power and communication lines already exist at the sites, they would require modification to accommodate a new elevation. In order to view the base of the pad, some of the existing camera sites would require a significant increase in elevation. The resulting greater slope of the UCS would reduce the flexibility in the number of instruments, which could be used to track launches. In addition, the elevation would have to be high enough to remain above the projected growth of the vegetation for several years.

Reactivate Abandoned Camera Sites

There are several abandoned UCS locations that could be reactivated; however, the primary reason these sites were abandoned originally is that the site lines were not being used or maintained. Although this alternative is possible, LOS would probably require extensive clearing. Since these sites were abandoned, new communication and power lines would be required. This action could create a greater impact to existing vegetation since these LOS have not been maintained for several years.

Relocated Camera Sites to Buildings or Other Structures

Range Safety has a requirement for six camera sites per launch to triangulate the location of the launch vehicle. Any new site would require the proper angular separation to the pad from the other five sites in order to track the vehicle. This would require an engineering/tracking survey for each site. New power and communication lines would also be required. The weight of some of the equipment used in optical tracking is extremely heavy and there was concern as to whether available building structures could support several tons of tracking equipment. The building/structure would also require enough height to avoid clearing any new sight lines. For these reasons, this alternative was not preferred.

Description of Proposed Action

The proposed action is to implement a programmatic approach for land clearing of LOS, security clear zones, canals, utility corridors, firebreaks, and other areas employing the methodology and approach defined in the 2004 45SW *Policy on Land Clearing Activities*. This management approach would restore fire-suppressed native habitats, which have been impacted by invasive vegetation, to a state that is beneficial to various species. This programmatic approach would enable the USAF to assess the potential impacts of general

land clearing activities and would be available for use in the future as a base tiering document for similar land clearing activities. Tiered documents require less analysis and therefore result in a more efficient use of personnel and resources.

Clearing in Lines of Sight

Identified LOS areas would be cleared, re-established and/or maintained by creating a 100-foot-wide bare ground strip in the center with 50-foot-wide strips on both sides where vegetation has been cut between 6 and 18 inches-above-grade (Figure 2-1). Dimensions for the widths of the three strips comprising the cleared area are somewhat variable within the length of the LOS. The edges of vegetated strips on either side of the bare strip would have a gradation from low (approximately six inches in height) to high (approximately 18 inches in height) for scrub jay preferences.

The 100-foot-wide "bare ground" center strip would be cleared in a way that reduces re-growth/re-sprouting/re-establishment of trees, woody shrubs, and palmetto. The initial removal would be accomplished using bulldozers, front-end loaders with root-rake attachments, chainsaws, feller-bunchers, V-blades, etc. The "bare ground" grassy center strip would provide an unobstructed view of the launch pad/complex while creating insect foraging and acorn caching areas for the Federally-listed as threatened Florida scrub jay. Removal of all trees and their root system creates a strip that can be mowed and maintained without future disturbance by heavy equipment.



Figure 2-1: Example of Cleared LOS

The 50-foot-wide strips on either side of the "bare ground" center would be cut with heavy equipment such as a Hydro-ax, Kershaw, V-blade, or feller-buncher. This action is being taken to preserve the root systems of scrub oaks that are to remain and to recreate Florida scrub jay nesting habitat [1.6-4.8 feet (0.5-1.5 meters) in height], adjacent to bare ground strips that are used for foraging.

The LOS that are proposed to be cleared include but are not limited to:

- UCS 1 for SLCs 17, 36, and 40 – located adjacent to Tel IV (facility N6-2296) on KSC
- UCS 2 for SLCs 40 and 41 – located on the west side of the Banana River, off of Static Test Road, approximately 1 mile north of the NASA Causeway
- UCS 3 for SLCs 36, 40, and 41 – located north of the CCAFS/KSC boundary, southeast of SLC 41
- UCS 5 for SLCs 39, 40 and 41 – located on KSC off State Road 407, west of the intersection with Happy Creek Road

- UCS 6 for SLC 39, 40, and 41 – located on the west edge of Banana River Creek, about 1 mile north of the Banana Creek VIP viewing site
- UCS 7 for SLCs 40 and 41 – located on KSC between SLCs 39A and 39B
- UCS 8 for SLCs 39 and 41 – located on CCAFS approximately 0.5 kilometers southwest of SLC 40, and just off of the east side of the road/railroad connecting the Titan VIB and SLC 41
- UCS 9 for SLC 39 – located just west of Playalinda Road on the Canaveral National seashore, approximately 3 kilometers north of the KSC/Playalinda Beach security boundary
- UCS 10 for SLCs 39, 40, and 41 – located on the north end of Boondocks Road on Canaveral National Seashore
- UCS 12 for SLC 17 – located north of SLC 41 on the east side of Phillips Parkway on KSC
- UCS 15 for SLCs 40 and 41 – located on the northern end of Static Test Road on KSC
- UCS 18 for SLCs 40 and 41 – located on Schwartz Road, south of the VAB on the KSC
- UCS 19 for SLC 17 – located off of Pier Road near the intersection of Pier Road and Samuel Phillips Parkway
- UCS 20 for SLC 36 – located southeast of the USAF Space Museum on the south side of Pier Road
- UCS 21 for SLCs 17 and 36 - located north of the CCAFS airfield near the western end of Control Tower Road
- UCS 22 for SLC 36 – located east of the CCAFS Industrial Area, on the north side of Central Control Road near the TV Operations Building, Facility 1663
- UCS 23 for SLCs 36, 37B, 40, and 41 – located on the north side of ICBM Road between SLC 16 and SLC 19
- UCS 24 for SLCs 40 and 41 – located north of the CCAFS Industrial Area and west of Samuel Phillips Parkway
- UCS 25 for SLC 36 – located on Pier Road southeast of the USAF Museum
- UCS 26 for SLCs 17 and 36 – located on the east side of Samuel Phillips Parkway, across from Fuel Storage Area #1, Facility 1047
- U247L116 for SLC 40 – located on the east side of North Phillips Parkway, adjacent to former SLC 37
- U71R147 for SLC 17 – located west of SLC 17, at the intersection of Lighthouse Road and Skybolt Road
- LOCC for SLC 17 – located north of the CCAFS Airfield and southeast of the Industrial Area
- LOCC for SLC 36 – located on the Launch Operations Control Center Roof, Facility 27220 on CCAFS

Clearing in Security Clear Zones

Security regulations require bare ground or mowed and maintained grassy areas that contain no trees, landscape vegetation, or variances in topography/ grade, such as ditches, swales, and holes. Most security areas have been previously cleared (Figure 2-2). Security clear zones would be a 30-foot-wide

bare ground or grassy area and an additional approximately 50-foot-wide "vegetated clear zone". The same clearing method as described for LOS clearing would be utilized.

The security clear zones that are proposed for clearing at the 45 SW include, but are not limited to:

- Fuel Storage Area (FSA) 1 – exterior clear zone
- SLC 40 – exterior clear zone
- Area 59 – east side of exterior clear zone
- Launch Operations Control Center (LOCC) – exterior clear zone
- Vehicle Integration Building (VIB) – exterior clear zone (west side)
- Solid Motor Assembly and Ready Facility (SMARF) – vegetation between fences
- Non Destruct Test Facility (X-ray Facility) – exterior clear zone
- FSA 5 – clear zone



Figure 2-2: Perimeter Fence Requiring Clearing at MTA

- Area 57 – clear zone
- Command Control Facility – clear zone
- Facility 60510 – rear of building clear zone
- Security Boat Dock – clear area adjacent to boat dock
- South Boundary – clear area adjacent to river and Base boundary fence
- SLC 36B – clear zone
- Perimeter Fence for MTA
- Perimeter Fence for JDMTA

Clearing of Firebreaks

Firebreaks must be maintained in a bare ground condition to effectively protect the resources of the 45SW. The bare ground area would extend at least 30 feet from the edge of the resource to be protected from fire. A 50-foot-wide strip of vegetation would be cut adjacent to the bare ground firebreak. The methods used to create the bare area and adjacent vegetated strip would be the same as that described for LOS clearing. A 30-foot-wide firebreak would not necessarily prevent a "spot-over" fire from occurring; however, the additional 50-foot-wide vegetated firebreak would significantly minimize this potential.

Clearing in Canals and Utility Corridors

Canals (Figure 2-3) would be cleared using herbicides or heavy equipment (such as a drag line) annually, or as required to maintain free flow of water. Establishment and/or maintenance of utility corridors (Figure 2-4) would be conducted using methods similar to those described for LOS clearing. The



Figure 2-3: Example of Canal on CCAFS



Figure 2-4: Example of Utility Corridor on CCAFS

area directly beneath overhead utility lines and within its easement would be cleared and grubbed. Buried utilities would have a cleared "easement" with the utility "line" in its center and cut vegetation on either side of the utility corridor. The amount and location (one side of utility or both) of the cut vegetation will be dependant on the location of the utility, such as adjacent to a roadway, facility, or through previously undeveloped land.

Clearing of Miscellaneous Areas

Minor land clearing is anticipated to occur for other purposes that have not been fully identified. For example, installation of groundwater monitoring wells requires clearing enough space to permit access to the installation site and to allow for periodic water quality monitoring. These types of clearing do not necessarily have defined clearing requirements (e.g. width of clearing) as discussed above for other activities. Clearing for these types of activities would generally involve small areas; however, they have the potential to produce similar impacts to the human environment.

Vegetative Debris Disposal

One or more of the following methods would be utilized to dispose of vegetative debris resulting from any of the above-described clearing methods:

Brush piles may only be constructed to one side or the other of the centerline (not in the center). They must not abut un-cut vegetation and must include an adequate firebreak between the pile and any un-cut trees. The 45CES/CEVP would be responsible for burning the brush piles after clearing has been accomplished. As a supplement to this method, the trunks and large branches of oak trees can be cut into four-foot sections and palletized for sale as firewood.

Vegetative debris may be disposed by burning in a "burn box" or using a forced draft blower/trench burner (i.e., air curtain incinerator).

Vegetative debris may be chipped or mulched on-site. The chips and/or

mulch may be disposed on-site by spreading the material over the ground, without creating piles. This material must be small enough to not inhibit future mowing maintenance of the "bare ground" portion of the areas. If the amount of chips/mulch cannot be spread effectively, the material may be removed and used at the CCAFS landfill for cover. Should this method of disposal become necessary, the 45CES/CEVC must be contacted to receive approval from the Florida Department of Environmental Protection (FDEP). Disposal in the CCAFS landfill should only be considered if all other options prove to be impractical.

Another option for disposal of vegetative debris and/or chips would be to transport the material to the Brevard County Landfill in Cocoa.

Maintenance Activities

After initial development of the LOS, security clear zones, firebreaks, utility corridors, and other areas in accordance with these guidelines, periodic maintenance would be provided as described below.

Bare ground/mowed grassy areas: Semi-annual mowing would adequately maintain the clear zones while meeting the objectives of the scrub habitat restoration program. Initially, the bare center portions would have all bushes and trees (and their root systems) removed to accommodate mowing. This maintenance would be accomplished with plows and/or disc harrows pulled behind rubber-tired tractors.

Vegetated side strips: The side strips would be permitted to regrow after the initial cutting. Research shows that scrub jays prefer scrub oaks in the 0.5-1.5 meter height range for nesting immediately adjacent to open bare ground/sandy/grassy areas. Scrub vegetation would require maintenance on a 3-5 year schedule. The side strips would be maintained using a Hydro-ax, Kershaw, roller chopper, or similar type equipment.

Clearing by Prescribed Burning

A total of 8,030 acres of unimproved lands were compartmentalized to facilitate a scrub management program on CCAFS in 1991. One hundred thirty-four management compartments delineated by existing roads, firebreaks, LOS, canals, and natural interdunal swales were identified to receive various scrub habitat manipulations, including prescribed burning (Figure 2-5).

With adequate funding, the USAF would burn 150-300 acres per year for the initial restoration treatment. Secondary burning would occur approximately three years after the initial burns. Thereafter, burning would be completed on a five-year cycle. After the initial burning, heavy equipment would be



Figure 2-5: Example of Prescribed Burning on CCAFS

used to create bare strips and low-cut strips within the areas after regrowth.

Invasive Species Management

For all of the land clearing activities discussed above, invasive species would be managed to prevent the establishment and spread of these species. Species that are of immediate concern to the 45SW are Brazilian pepper (*Schinus terebinthifolius Raddi*), Australian pine (*Casuarina equisetifolia*), Cogon grass (*Imperata cylindrical)*, torpedo grass (*Panicum repens*), and Melaleuca (*Melaleuca quinquenervia*). This vegetation may be managed by a variety of methods including burning, mechanical methods, or herbicide application. Further detail on invasive species management can be found in the *Invasive Plant Species Control Plan, Patrick Air Force Base, Florida,* June 2004 and *Invasive Plant Species Control Plan, Cape Canaveral Air Force Station, Florida (including Malabar Tracking Annex and Jonathan Dickinson Missile Tracking Annex),* July 2004.

Brazilian Pepper

Brazilian pepper predominates the invasive flora at all four proposed action sites. This species was most often found in undeveloped areas and on the margins of improved/semi-improved areas including roadways.

Heavy equipment such as bulldozers, front-end loaders, root rakes, and other specialized equipment may be used for mechanical control of Brazilian pepper. Mechanical control would be used along ditch banks, utility rights-of-way, and other previously disturbed areas. Herbicide application would be used to prevent regrowth from stumps. A saw would be used to cut the trunk as close to the ground as possible. Within 5 minutes, herbicide that contains the active ingredient glyphosate or triclopyr would be applied as carefully as possible to the cambium, which is just inside the bark of the stump. Trees would generally be cut when they are not fruiting. When Brazilian peppers with fruits attached are cut, care would be taken not to spread the fruits. Fruiting trees would be controlled using a basal bark herbicide application. A herbicide product that contains triclopyr ester, such as Garlon 4® with a penetrating oil or Pathfinder II® (i.e., 19% Garlon 4 in oil), would be applied to the Brazilian pepper's bark up to 18 inches from the ground. Basal bark treatments are most effective when performed in the fall when the Brazilian pepper flowers. Fruiting occurs during winter and Brazilian pepper trees that have been controlled using a basal bark treatment may retain their fruit.

Foliar herbicide application would be used on Brazilian pepper seedlings. A herbicide containing triclopyr or glyphosate would be applied directly to the tree's foliage. The leaves will wilt and the herbicide will be translocated to other parts of the tree. Foliar applications require considerably more herbicide.

Australian Pine

Australian pine is found on CCAFS and PAFB. The plants have not been observed at MTA or JDMTA. This species is found throughout CCAFS in small populations (usually not greater

than 1.5 acres in size), and on PAFB singly or as small, dense stands along the coast of the Banana River on the west side of the Base, and around the southeastern end of the airfield.

Australian pine has a phenomenal growth rate that outpaces most other plants. It can reproduce by thousands of windborne seeds per plant or by coppicing (production of shoots from stools or roots). This produces close, impenetrable, monotypic stands that harbor few native plants or animals. Manual removal is the preferred method for new or small infestations of seedlings, saplings, and young trees. Raking and removal of leaf litter, cones, and seeds would be done whenever possible.

Applying a systemic type herbicide to bark, cut stumps, or foliage would be the method used for heavy infestations of Australian pine. A 2% mixture of triclopyr ester (Garlon 4) in diesel oil applied using the basal bark method is the most common treatment to eradicate Australian pine. The basal bark method applies the herbicide with a small sprayer in a band around the tree up to 18 inches above the ground. A second treatment may be necessary for large trees.

Cogon Grass

Cogon grass was only identified on CCAFS; there were no populations identified at PAFB, MTA or JDMTA. Most often the populations identified at CCAFS were found as dense patches along roads and other disturbed sites.

To effectively manage Cogon grass, a combined mechanical-chemical protocol would be used. First, the infested area would be mowed or burned in late spring/early summer to remove last year's growth and accumulated thatch layer. About six to eight weeks later, when about eighty percent of the Cogon grass has re-sprouted to a height of 6-12 inches, the site would be disked as deeply as possible. Disking may not be possible in all areas, due to the sensitive nature of some ecosystems. When adequate regrowth of the Cogon grass has occurred, systemic herbicides are applied.

Torpedo Grass

Torpedo grass is found at MTA and PAFB along ditches and other wetland and riparian habitats. This species was not found at CCAFS or JDMTA. Torpedo grass grows in moist, often sandy soil along beaches and dunes, margins of lagoons, marshy shorelines of lakes and ponds, drainage ditches, and canals. It can form dense floating mats that may impede water flow in ditches and canals and restrict recreational use of shoreline areas of lakes and ponds.

The invasiveness of this species causes the loss of wetland habitat for waterfowl and fur bearing animals. Torpedo grass forms a dense vertical wall along infested shorelines that wildlife cannot penetrate. Torpedo grass has numerous dormant buds associated with extensive rhizomes making this plant extremely difficult to control. Several years of re-application of herbicides may be necessary for complete eradication.

Management techniques that may be utilized include the cookie cutter, which is a barge/cutting system that cuts openings in shoreline and wetland areas

through emergent wetland plants and invasive aquatic plant species. An aquatic plant harvester would collect plant biomass since the cookie cutter reduces vegetation to small fragments. Fragments can resprout and spread the plant to new locations, exacerbating the problem.

Flail choppers would provide short-term clearing of herbaceous plants and young invasive woody plants, but if invasive species were woody and established this method would not be used. As with other mechanical chopping procedures, plant biomass would need to be collected and removed.

Plants can be removed from small areas by pulling or cutting the vegetation with hand tools. Hand removal may be required more than once in a growing season. The best time for hand removal of torpedo grass is after seedhead production but before flowering. Pulling the roots is not generally recommended since it may stimulate new shoot production.

Harvesting may also be used to control torpedo grass. The plant harvester would travel on the water to the target area and collects the vegetation. Either the harvester or a transport vessel would be used to move the cut material to a disposal site. The harvesters should have shore conveyor or trailer conveyor systems that allow the cut vegetation to be unloaded and transported to an upland disposal site.

Foliar application of 0.75 - 1.5% glyphosate (Rodeo) plus a surfactant solution works well. The herbicide would be reapplied as necessary when plants regrow to 4 - 6 inches in height. Foliar application of 0.5% as spot treatment or 4 pints per acre broadcast treatment of imazapyr (Arsenal) is another option.

Melaleuca

Melaleuca was only found in minor populations at PAFB and on CCAFS in a developed area around buildings and appeares to have been planted as ornamentals. The large-scale removal of melaleuca by mechanical means is not a viable option because of potential disturbance to soils and non-target vegetation. Removal using heavy equipment is an acceptable control along canals, utility rights-of-way, and other similar areas adjacent to infested wetlands. The only methods of mechanical control currently being utilized are the felling of trees that are less than 7 feet in height followed by the manual removal of seedlings.

Herbicides are usually needed for extensive infestations of mature melaleuca trees and may be applied to freshly cut stumps or to girdled trunks. One commonly used method is the frill or girdle (hack-and-squirt) method, which entails girdling the circumference of mature trees and applying herbicide directly to the tree's cambium. Another herbicide method is the cut-stump strategy, where the herbicide is applied to the stump of a cut tree to prevent coppicing. The cut-stump method would typically be used on small trees (<2 inches in diameter). Follow-up treatment within two years of the initial treatment would be required.

Issues Eliminated from Detailed Analysis

Ten broad environmental components were initially considered to provide a context for understanding the potential effects of the proposed action and as a basis for assessing the significance of potential impacts. The areas of environmental consideration were air quality; biological resources; cultural resources; hazardous materials and waste; health and safety; infrastructure and transportation; land use; noise; geology, soil, and water resources; and socioeconomics. Following a preliminary analysis, it was determined that no impacts or less than significant impacts would be anticipated to health and safety, infrastructure and transportation, land use, noise, and socioeconomics. The following is a summary of the beneficial and/or minor impacts that might be anticipated for these categories.

Health and Safety

Common safety hazards associated with heavy equipment operation, working along traffic corridors, and tree-felling activities would exist. All appropriate regulations, including Occupational Safety and Health Administration (OSHA) regulation 29 CFR 1926, *Safety and Health Regulations for Construction*, would be followed during project activities. Construction personnel would wear dust masks, as appropriate, to limit the inhalation of particulates. Burn operations would follow air quality human health protective measure requirements and burn personnel would meet State of Florida training and certification requirements. Less than significant impacts are anticipated to health and safety from proposed action activities.

Infrastructure and Transportation

Traffic would only be temporarily delayed to allow project vehicles to safely enter and exit work areas and to slow the flow of traffic adjacent to active work zones. Modifications to the existing infrastructure and transportation system would not occur. Less than significant impacts are anticipated to infrastructure and transportation from the proposed action.

Land Use and Zoning

The USAF, as a federal landowner, is obligated to act responsibly and effectively in the use of natural resources under their control. The proposed action is a multiple land use approach that is compatible with the mission of the 45SW and various Federal and State acts that require protection of human health and the environment. The proposed action is consistent with the 2002 CCAFS General Plan. Less than significant impacts are anticipated to land use and zoning from the proposed action.

Noise

Heavy equipment, vehicles, and other land clearing equipment used during work activities would generate low to moderate levels of noise. The decibel (dB) is the accepted standard unit for measuring the level of noise and is

generally adjusted to the "A-weighted" logarithmic scale (dBA) to better correspond to the normal human response to different frequencies. Several metrics have been developed for multiple-noise event analysis. The one most commonly used is the LDN (Day - Night Average Sound Level) metric. This is the dBA level averaged over a 24-hour period, with an additional ten-dBA penalty added for noise events occurring between 10 p.m. and 7 a.m. (because noise at night is judged to be more annoying than noise during the day). The threshold noise level for compatible land uses is an LDN of 65 dBA. Areas outside (less than) the 65-dBA LDN contour are compatible with residential and other noise-sensitive land uses. Vehicles associated with the proposed action typically have a dBA between 65 and 100, at a distance of 50 feet (USEPA, 1971).

All work activities would be confined to daylight hours to avoid nuisance noise in the evenings. The use of hearing protection devices during the operation of equipment would mitigate potential impacts to personnel. Noise abatement devices on equipment and vehicles would further minimize the potential for adverse effects from noise to personnel and wildlife. The moderate level of noise generated from land clearing activities would act as a warning mechanism for wildlife within the proposed clearing zones, allowing them time to temporarily vacate the area. Less than significant impacts would be anticipated.

Socioeconomics

Slight positive impacts would be expected to local socioeconomic conditions due to an increase in work associated with land clearing activities.

Potential Environmental Issues

Potential impacts from the implementation of the proposed action have been identified for air quality; biological resources; geology, soil, and water resources; hazardous materials and waste; and cultural resources. A summary of the potential impacts resulting from the proposed action is given below. A more detailed analysis of impacts to these resources and their regulatory requirements is presented in Chapter 4.

Air Quality

Land clearing, open burning, and prescribed burning activities could affect air quality through smoke emissions from burning activities, exhaust emissions from machinery used in the land clearing, and the suspension of dust particles (*i.e.*, particulate matter (PM)) during project activities.

Biological Resources

Many of the areas that are proposed to be cleared are known to support special concern, threatened, and endangered species, such as the Florida scrub jay, gopher tortoise (*Gopherus polyphemus*), Eastern indigo snake (*Drymarchon corais couperi*), and southeastern beach mouse (*Peromyscus polionotus niveiventris*). The proposed action areas are also home to numerous birds that are protected by the Migratory Bird Treaty Act (MBTA). Several areas contain federally protected waters of the U.S. and waters of the State of Florida,

including wetlands that may be potentially impacted by project activities.

Cultural Resources

Some of the areas identified in the proposed action cross areas that are known to contain archaeological sites or are adjacent to historical structures. Land clearing activities that disturb soil have the potential to impact archaeological sites. Tree-felling and heavy equipment activities in these areas could damage historic structures.

Geology, Soil, and Water Resources

Land disturbance and burn activities have the potential to accelerate erosion. Herbicide use could contaminate surface and ground water resources.

Hazardous Materials and Hazardous Waste

Installation Restoration Program (IRP) sites (*e.g.*, groundwater plumes), which contain various hazardous contaminants, are located throughout CCAFS and on PAFB. Some of the canals on CCAFS, as well as other areas identified for land clearing activities, may be contaminated.

Description of Alternatives to the Proposed Action

No Action Alternative

No action was the only alternative identified to the proposed action. Under the no action alternative, land clearing activities would continue to support mission requirements; however, the activities would need to be approved on a case-by-case basis. There would still be a requirement to conduct site specific EAs for each of the activities covered in this PEA, and those impacting wetlands and/or floodplains would require separate staffing to and approval from the Major Command level. This inefficiency would result in delays and increase the time, effort, and cost for the 45SW to accomplish these tasks.

All applicable state and federal regulations would still be followed under the no action alternative. However, native plants and animals, including T&E species, such as the Florida scrub jay, would not benefit from the creation of specific habitat for these species. For example, under the preferred alternative "bare ground" grassy center strips would not only provide an unobstructed view of the launch pad/complex but would also create insect foraging and acorn caching areas for the Florida scrub jay. In addition, under the no action alternative, by not removing all trees and their root systems, a strip that could be easily mowed and maintained without future disturbance by heavy equipment would not be created.

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Chapter 3: Affected Environment

In compliance with NEPA and CEQ guidelines, this chapter describes the existing environment within the proposed action areas at CCAFS, PAFB, MTA, and JDMTA. This information serves as a baseline from which to identify and evaluate potential environmental changes resulting from implementation of the proposed action. These resources include the following areas: air quality; biological resources; geology, soil, and water resources; hazardous materials and waste; and cultural resources. The level of information presented for each category varies depending on the relevance on the proposed action to the specific category. For example, more background information is provided for biological resources due to the higher potential for impacts, both positive and negative, on biological resources.

Air Quality

All of the proposed action areas are located in counties that are in attainment with NAAQS and FAAQS.

CCAFS

This AF Station is considered a major source of air pollution (i.e., criteria and hazardous air pollutants) and therefore is subject to the Title V Air Operating Permit requirements of the CAA. Currently, CCAFS operates under an active Title V Permit and is preparing an application package for submission to FDEP for modification of the Title V Air Operating Permit requesting limitations on hazardous air pollutants (HAPs) for facility-wide emission sources.

PAFB

In 1997, PAFB became a minor source of HAPs emissions. At this time, PAFB voluntarily accepted limitations on the HAP potential to emit (PTE) for Base-wide emissions sources through a Federally Enforceable State Operating Permit (FESOP). This method of permitting allowed PAFB to become a minor source of HAPs. The FESOP limits the Base's PTE to 22 tons of HAPs per year and 8 tons per year for each HAP.

MTA

This annex is exempt from Title V requirements per FAC 62-210.300(3)(b)1. There are no major sources of air emissions at MTA. The only source of air emissions at MTA would be from emergency generators. The generators operate on diesel fuel and the total fuel consumption is less than 32,000 gallons per year. The generators are therefore exempt from air permitting and/or reporting requirements per FAC 62-210.300(3)(a)20.

JDMTA

This annex is also exempt from Title V requirements per FAC 62-210.300(3)(b)1. There are no major sources of air emissions at JDMTA. The only source of air emissions at JDMTA would be from emergency generators. The generators operate on diesel fuel and the total fuel consumption is less than 32,000 gallons per year. The

generators are therefore exempt from air permitting and/or reporting requirements per FAC 62-210.300(3)(a)20.

Biological Resources

The USAF is committed to the long-term management of all natural areas on its installations, as directed by AFI 32-7064, *Integrated Natural Resources Management.* Long-term management objectives are identified in the 45SW's *Integrated Natural Resources Management Plan (INRMP)* with specific land-management objectives identified in the Scrub Jay and Sea Turtle Management Plans located in the appendices of the INRMP. The following information was derived from several sources, including the 2001 INRMP, which is currently being updated.

Biological resources covered in this section include native and naturalized vegetation communities and special-status species. Vegetation communities include both upland and wetland habitats. Special-status species include State and Federal species of special concern, threatened and endangered species, rare species, and migratory birds. Appendix B contains lists of common wildlife species that have been observed on CCAFS, PAFB, MTA, and JDMTA.

CCAFS

Invasive Species

Most of the areas on CCAFS that are disturbed, including roads, utility corridors, and launch complexes, have a healthy invasive species component. Brazilian pepper predominates the invasive flora at CCAFS with six other invasive weeds present in lower densities. The most widespread of these is Australian pine. Australian pine trees grow singly or as small, dense groves scattered across the base. In addition, cogon grass, melaleuca, mistletoe *(Phoradendron serotinum),* and small populations of thistles *(Cirsium spp.)* and nettles *(Urtica spp.)* are present. (Invasive Plant Species Control Plan for CCAFS, 2004) The presence of these and other invasive species is discussed below by habitat type.

Native Vegetation Communities and Wildlife

The topographic position of natural communities on CCAFS reflects the various erosional and depositional processes of coastal land formation. Generally, older communities are found on the western margin of the Canaveral Peninsula, along the Banana River; newer and successional communities are forming along the eastern coast. The current vegetative communities found on CCAFS are described below in the general order of the zones they occupy, east to west (Figure 3-1). Wildlife species, including sensitive and special-status species, are discussed by vegetation community.

Beach Dunes

Of all the community types on CCAFS, beach dunes receive the most direct influence from the coastal processes of erosion and deposition. Dunes are highly unstable and dynamic communities. Two beaches on CCAFS are prograding (growing): since 1847

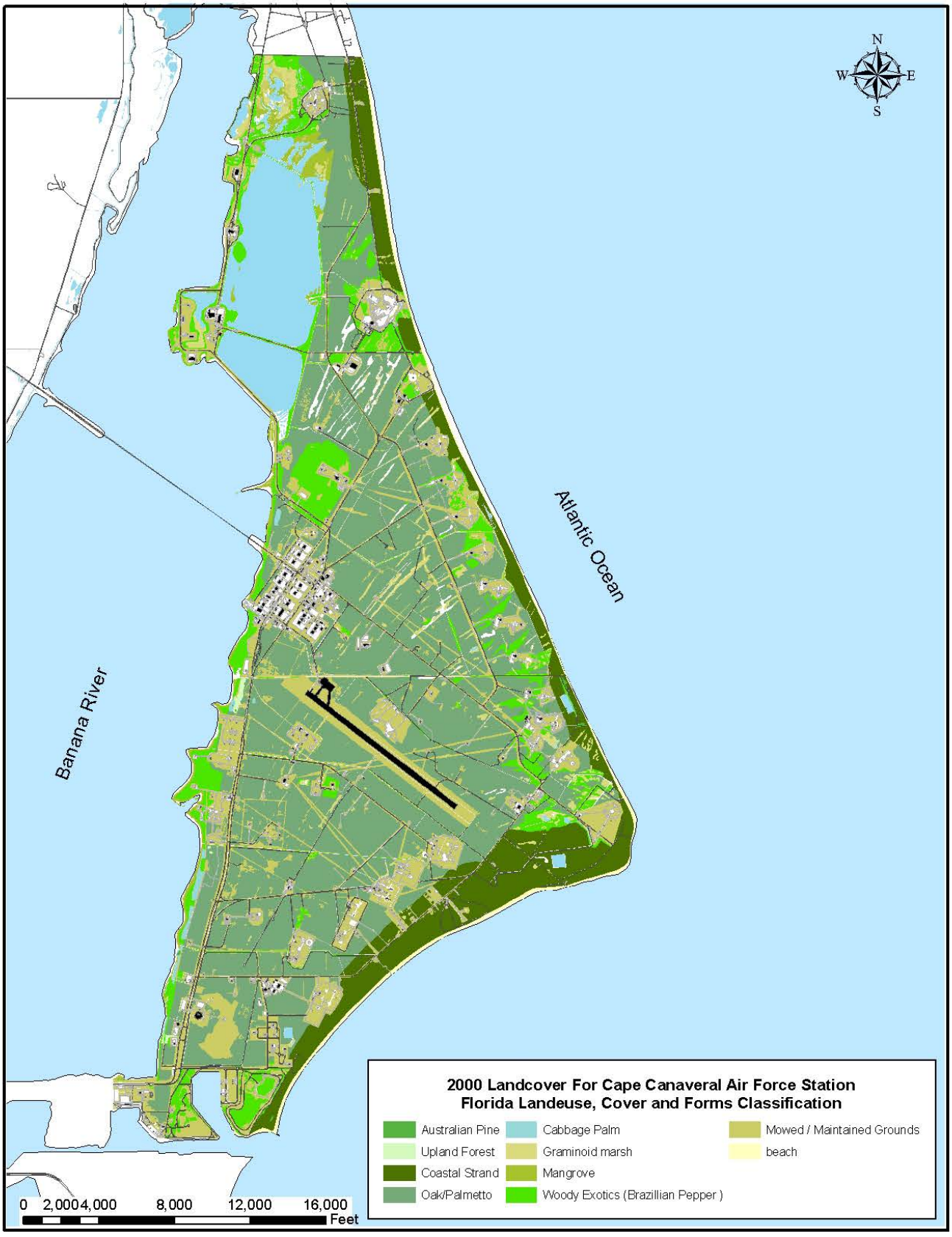


Figure 3-1: Vegetative Communities on Cape Cananveral Air Force Station

False Cape at the north end of the station has had a net increase of approximately 0.1 mile; Cape Canaveral is also prograding as demonstrated by several parallel lines of dunes and by conspicuous offshore sand bars. Other beach areas are eroding, with sands being deposited offshore or downshore.

Beach dunes are inhospitable environments for most plant species, which must be able to tolerate a constantly shifting substrate, salt deposition, and abrasion from wind-blown sands. Species typical of CCAFS beach dunes include sea oats *(Uniola paniculata),* beach elder *(Iva imbricata),* railroad vine *(Ipomea pes-caprae),* beach croton *(Croton punctatus),* bitter panic grass *(Panicum amarum),* salt grass *(Distichlis spicata),* camphorweed *(Heterotheca subaxillaris),* and beach cordgrass *(Spartina patens).*

The Atlantic Ocean borders the beach dune community on the east, and grades inland to coastal grassland or coastal strand communities. Where the dunes are low or dissected, and storm overwash is frequent, coastal grassland has developed in flat areas directly behind the dunes. In higher or more stable areas, beach dunes may grade directly into shrub dominated coastal strand.

State-listed plant species found on dunes at CCAFS are coastal vervain *(Glandularia maritima),* beach star *(Remirea maritima),* and sea lavender *(Tournefortia gnaphalodes).*

Several rare animal species are documented on CCAFS beach dunes. The southeastern beach mouse inhabits beach dunes and adjacent communities. A colony of least terns has been documented to nest on CCAFS beaches. Black skimmers have also been documented nesting on the beach. Beaches on CCAFS are also very important nesting habitat for two species of sea turtles, the Atlantic green sea turtle and loggerhead turtle. There have been documented nestings by the endangered leatherback turtle as well.

Coastal Grasslands

This flat, open community lies directly landward of the beach dunes on CCAFS. It occurs in two types of situations: on relatively young deposits of sand on prograding beaches, and in low areas where saltwater overwash has killed woody strand vegetation. Inland, coastal grassland is bordered by coastal strand or coastal oak scrub, both of which develop on older sand deposits protected from frequent disturbance. In the absence of storm overwash or other disturbance, grassland will probably be colonized by woody species and eventually succeed into scrub or strand. According to Johnson and Muller (1993), this community is present only on prograding beaches, primarily on the northern Florida coast.

Coastal grasslands are densely vegetated areas that contain mostly herbaceous species, although woody species such as varnish leaf *(Dodonea viscosa),* wax myrtle *(Myrica cerifera),* and saw palmetto *(Serenoa repens)* are scattered throughout. The most conspicuous grasses are muhly grass *(Muhlenbergia capillaris),* sea oats, beach cordgrass, sandspur *(Cenchrus*

spp.) and fingergrass *(Eustachys petraea).* Other common or conspicuous herb species include camphorweed, prickly pear *(Opuntia stricta),* partridge-pea *(Chamaecrista fasciculata),* beach croton, railroad vine, bitter panic grass, seaside bean *(Canavalia rosea),* and seaside gentian *(Eustoma exaltatum).*

Two State-listed plant species occur in coastal grasslands on CCAFS: coastal vervain and Florida lantana *(Lantana depressa var. floridana).*

Gopher tortoises, southeastern beach mice, deer, and raccoons are just a few of the wildlife species that inhabit coastal grasslands. Least terns and black skimmers may nest in the transition zone between the beach dunes and coastal grassland if the vegetation is sparse.

Coastal Strand

This community develops in the absence of natural disturbance on somewhat older deposits of sand, inland of beach or coastal grassland. It is a dense, shrub-dominated community that grades landward into scrub or maritime hammock. The most distinctive feature of coastal strand is the wedge-shaped profile of its low canopy, which is constantly pruned and shaped by windborne salt spray.

Coastal strand forms a dense thicket of shrubs, usually dominated by live oak *(Quercus virginiana),* buckthorn *(Bumelia [Sideroxylon] tenax),* sea grape *(Coccoloba uvifera),* wax myrtle, and saw palmetto. Coastal strand is distinguished from scrub by the presence of calciphilic plant species, such as Florida privet *(Forestiera segregata),* Hercules' club *(Zanthoxylum clava-herculis)* and buckthorn, and by tropical species, such as twinberry *(Myrcianthes fragrans)* and myrsine *(Rapanea punctata).* Sand live oak *(Quercus geminata),* a distinguishing plant species of scrub on CCAFS, is absent from coastal strand. Coastal strand has relatively low species diversity, with herbs and short shrubs, such as gopher apple *(Licania michauxii),* prickly pear, and varnish leaf, occurring in disturbed or open areas. Some areas of strand are densely blanketed with catbrier *(Smilax auriculata)* or coin vine *(Dalbergia ecastophyllum).*

Two State-listed plant species have been documented from disturbed areas and natural openings in coastal strand on CCAFS: beach star and coastal vervain.

The Florida scrub jay, Florida mouse, and southeastern beach mouse have been observed in coastal strand at CCAFS. Gopher tortoise burrows are common in clearings in the strand. Burrows provide important refugia for Eastern indigo snakes, eastern diamondback rattlesnakes, and Florida pine snakes.

Coastal Interdunal Swales

Receding shorelines dating from the Pleistocene era have left behind a series of old dune ridges alternating with swales on CCAFS. These relict sand deposits form long ridges that are usually oriented in a northeast to southwest direction. The ridges and swales are conspicuous on topographic maps and aerial photographs of CCAFS. Swales

are seasonally saturated or inundated from groundwater part of the year and support distinctive wetland plant communities.

Coastal interdunal swales are open, grassy habitats with few woody plants. The swales are dominated by grasses, primarily sand cordgrass *(Spartina bakeri)* and muhly grass. Wiregrass *(Aristida stricta)* and bushy beargrass *(Andropogon glomeratus)* are occasionally present. A variety of wetland herbs may be present in the wetter swales. These include: white-top sedge *(Dichromena colorata)*, lance-leaved arrowhead *(Sagittaria lancifolia)*, semaphore-plant *(Eupatorium mikanioides)*, giant bristle-grass *(Setaria magna)*, sawgrass *(Cladium jamaicense)*, frog-fruit *(Phyla nodiflora)*, sabatia *(Sabatia stellaris)*, and fleabane *(Pluchea rosea).* A species of *Nostoc*, a cyanobacteria, forms a wet, slippery, dark green groundcover in swales during wet periods and a thick, black crust during dry spells. An alga, *Chara spp.*, is also present in pools in wet swales. Drier swales support a scattering of woody shrubs and stunted trees, including wax myrtle, live oak, saw palmetto, and groundsel tree *(Baccharis halimifolia).* Weedy invasive species that are found in some swales include Brazilian pepper and Madagascar periwinkle *(Catharanthus roseus).*

One State-listed plant species that requires open, sunny conditions has been observed in dry swales, coastal vervain.

Gopher tortoises have been observed in these coastal interdunal swales; however, their burrows are more common in drier swales. Wading birds, such as the great egret and great blue heron, forage in the wetter swales. Bobcats have also been observed in the swales.

Scrub

Three phases of the scrub community occur on CCAFS: coastal oak scrub, oak scrub, and rosemary scrub.

Coastal Oak Scrub

Coastal oak scrub occurs directly landward of beach dunes or, if they are present, coastal strand or grassland. Coastal oak scrub consists of dense, salt-pruned thickets of live oak, sand live oak, myrtle oak, and buckthorn, sometimes densely interwoven with catbrier. Hog plum *(Ximenia americana)* and gopher apple are common in openings and around margins of small outcroppings. Scrub may occupy the same landscape position as coastal strand, but its low species diversity and oak dominance distinguish it. Although mapped by the Soil Conservation Service (SCS) as occurring on similar soils as coastal stand, the lack of calciphilic plant species suggests that coastal oak scrub occurs on older, more weathered, and more acidic soils.

Oak Scrub

Oak scrub occurs inland of coastal scrub, out of the salt-spray zone, primarily occupying the oldest, most weathered sand deposits on the Canaveral Peninsula. Oak scrub on CCAFS occupies the highest, driest habitats. It grades westward into maritime and hydric hammock along the Banana River and eastward into

maritime hammock, coastal strand, or coastal oak scrub.

Four species of oak characterize oak scrub on CCAFS: live oak, myrtle oak, sand live oak, and Chapman's oak *(Quercus chapmanii).* Live oaks and myrtle oaks are found in other Canaveral communities, such as xeric and maritime hammocks and coastal strand. However, the presence of sand live oak and Chapman's oak is considered diagnostic for this community type on CCAFS. Sand pines, which are occasionally found in these communities, occurs in no other community on CCAFS and are also considered indicative of scrub. Florida hickory *(Carya floridana)* is also found in many scrub sites.

Saw palmetto is abundant in all oak scrub, forming a dense layer in many areas. Other shrub species found frequently in oak scrub are rusty lyonia *(Lyonia ferruginea)*, wax myrtle, hog plum, and shiny blueberry *(Vaccinium myrsinites).* Rosemary *(Ceratiola ericoides)* is found abundantly in only one scrub location on CCAFS, described below as rosemary scrub. However, a few senescent rosemary shrubs are found scattered in other scrub sites, suggesting that rosemary was once more common in the shrub layer of oak scrubs on CCAFS.

The herb layer in these old, fire-suppressed scrubs is very depauperate. Some members of the sedge family, nutrush *(Sceleria triglomerata)*, hair sedge *(Bulbostylis ciliatifolia)*, and large-seeded beak-rush (*Rhynchospora megalocarpa)*, are usually present. The lichen species *Cladina evansii* and *Cladonia leporina* are locally common in some scrubs. Herb species diversity is high along the edges of scrub and in open clearings. Such open areas frequently contain herbs such as silky golden aster *(Pityopsis graminifolia)*, October-flower *(Polygonella polygama)*, clammy weed *(Polanisia tenuifolia)*, gopher apple, partridge pea, and false foxglove *(Agalinis setacea).* Vines such as Muscadine grape *(Vitis rotundifolia)*, Calusa grape *(V. shuttleworthii)*, catbrier, and Virginia creeper *(Parthenocissus quinquefolia)* are often abundant in oak scrub.

Rosemary Scrub

Rosemary scrub occurs in only one location on CCAFS, at the north end bordering the Banana River. The rosemary scrub is relatively open, with scattered clumps of rosemary interspersed with dense thickets of myrtle oak and sand live oak. Openings among the shrubs are either bare or vegetated with gopher apple, hog plum, and shiny blueberry. The herb layer is sparse but more diverse than in oak scrub. Species such as partridge pea, standing cedar *(Ipomopsis rubra)*, three awn *(Aristida tenuispica)*, rockrose *(Helianthemum nashii)*, foxglove *(Aureolaria pectinata),* and large-seeded beakrush are present. Lichens *(C. evansii and C. leporina)* are a prominent component of the rosemary scrub. Two rare herb species - sand dune spurge *(Chamaesyce cumulicola)* and nodding pinweed *(Lechea cernua)* - are found along the sand road that bisects the rosemary scrub. Gopher tortoises and scrub jays are often seen in the rosemary scrub.

Xeric Hammock

This community consists of scrubby, dense, low canopy forest with little understory other than saw palmetto (FNAI and FDNR, 1990). Large portions of the interior of CCAFS meet this description. Xeric hammock occupies many of the broad, old dune ridges that angle across CCAFS, interspersed with coastal interdunal swales.

Xeric hammock is bordered on the west primarily by oak scrub. The transition from scrub to xeric hammock is marked by the absence from the hammock canopy of the typical scrub oaks: sand live oak, myrtle oak, and Chapman's oak. On the eastern side of CCAFS, xeric hammock grades into coastal strand or maritime hammock, where it may occasionally contain a typical maritime hammock species such as red bay *(Persea borbonia)*. Many areas of xeric hammock include coastal interdunal swales.

Although lack of fire has certainly played a role in the development of xeric hammock on CCAFS, it is also likely that this community occupies a transition zone of moderately weathered sands between maritime hammock and scrub. In this respect, xeric hammock may be viewed as a depauperate maritime hammock lacking the soils to support the calciphilic tropical species found in maritime hammocks. Similarly, the neutral to alkaline sands in the central area of CCAFS does not support the species adapted to the acid sands that underlay scrub.

Xeric hammock is species depauperate: the canopy is composed of live oak and the shrub layer of saw palmetto. American beautybush *(Callicarpa americana)* and groundsel tree are weedy shrubs that may occur in xeric hammocks. The occasional presence of scrub-related species such as myrtle oak, fetterbush *(Lyonia lucida)*, and rusty lyonia in the shrub layer suggest that some xeric hammock is overgrown scrub in need of fire. Herb species are few but usually include wingstem *(Verbesina virginica)*, passionflower *(Passiflora incarnata)*, and climbing aster *(Aster carolinianus)*. Occasionally, herb species from adjacent swales may occur in openings within the xeric hammocks. Woody vines are the most conspicuous and diverse component of xeric hammocks. Muscadine grape, Calusa grape, catbrier, pepper vine *(Ampelopsis arborea)* and Virginia creeper are found in most xeric hammock. Large expanses of grapevines, commonly draped across the canopy of scrub and xeric hammock on CCAFS, are evidence of fire suppression.

Maritime Hammocks

Maritime hammock is found on CCAFS in two locations: on the east side of the Installation, just landward of coastal strand, referred to here as Atlantic maritime hammock; and on the west side of the Canaveral Peninsula, bordering the Banana River, referred to as Banana River maritime hammock. The distinction between the types of maritime hammock blends toward the north end of CCAFS where the peninsula narrows to less than half a mile. Atlantic maritime hammock would not be impacted by the proposed action.

Banana River Maritime Hammock

Banana River maritime hammocks largely occupy a ridge of shell midden along the west side of CCAFS. Banana River maritime hammocks differ from the Atlantic maritime hammocks in several respects. They are somewhat sheltered from direct impacts of storms, as well as salt spray; they are found in association with Indian shell middens and mounds, which have soils with higher pH and permeability; and they have also received more direct impacts from settler and homesteading activities.

Banana River maritime hammocks are bordered by scrub to the east and frequently intergrade with hydric hammocks and small basin swamps to the west. These hammocks are ecologically significant since they provide habitat for numerous tropical species that approach their northern limits in these forests.

A canopy of live oak, red bay, cabbage palm, Carolina laurelcherry *(Prunus caroliniana)* and red mulberry *(Morus rubra)* characterize Banana River maritime hammock. Other tree species present include the calciphilic species, Eastern red cedar *(Juniperus virginiana)* and hackberry *(Celtis laevigata)*. The subcanopy and tall shrub layers are frequently dominated by twinberry, yaupon *(Ilex vomitoria)*, or Carolina laurelcherry. Saw palmetto is common in the drier portions of the hammock. Fern species are abundant in the maritime hammock, particularly on the margins of hydric hammocks and include: leatherleaf fern *(Rumohra adiantiformis)*, swamp fern *(Blechnum serrulatum)*, hairy maiden fern *(Thelypteris hisidula)*, interrupted maiden fern *(T. interrupta)*, golden polypody *(Phlebodium aurea)*, shoestring fern *(Vittaria lineata)*, and the invasive species Boston fern *(Nephrolepis exaltata)*.

Banana River maritime hammock is distinguished from maritime hammock on the Atlantic side of CCAFS by a highly diverse component of tropical species. Some of the tropical species are abundant, such as leatherleaf fern, which forms large stands in some wetter areas, and myrsine, wild coffee *(Psychotria nervosa)*, and marlberry *(Ardisia escallonioides)*, which are common throughout the hammocks. Some species such as limber caper *(Capparis flexuosa)*, graytwig *(Schoepfia chrysophylloides)*, and black ironwood *(Krugiodendron ferreum)* are found in only a few locations.

Banana River maritime hammock is also home to many introduced plant species that have persisted from earlier in the century when these sites supported homesteads and fruit groves. Some invasive fruit species observed include mango *(Mangifera indica)*, papaya *(Carica papaya)*, avocado *(Persea americana)*, guava *(Psidium guajava)*, strawberry guava *(P. cattleianum)*, banana *(Musa x paradisiaca)*, sour orange *(Citrus auranticum)*, sweet orange (*C. sinensis)*, and rose apple *(Syzygium jambos)*. Escaped invasive ornamentals include Mexican flame vine *(Senecio confusus)*, devil's tongue *(Sansevieria hyacinthoides)*, bamboo *(Arundo donax)*, and chandelier plant *(Kalanchoe tubiflora)*.

Two state-listed plant species occur in Banana River maritime hammock on CCAFS: satinleaf *(*Chrysophyllum oliviforme*)* and hand fern *(*Ophioglossum palmata*),* an epiphytic fern. No rare animals have been observed in these communities.

Hydric Hammock

Hydric hammock occurs west and down slope from the shell ridge of maritime hammock along the western side of CCAFS. Elevated areas within the hydric hammock also support patches of maritime hammock. Included within the hydric hammock are other small unseparated swamp communities, including a persimmon (*Diospyros virginiana*) -dominated basin swamp. In many areas, the hydric hammock directly borders the Banana River; however, it often grades into a sawgrass-willow *(Cladium jamaicense-Salix caroliniana)* or cattail *(Typha domingensis)* marsh. Hydric hammocks are very beautiful communities, with a distinctly tropical aspect to them. Cabbage palm, live oak, American elm *(Ulmus americana)*, and red mulberry dominate the canopy of hydric hammock on CCAFS. The wetter areas may have a complete canopy of cabbage palm. Some of the American elms are enormous trees with very large, winged buttresses. Tropical species dominate the shrub layer and include myrsine, twinberry, wild coffee, and white stopper *(Eugenia axillaris)*. Strangler fig (Ficus aurea) is found both freestanding and "strangling" cabbage palms. Pond apple occurs along ditches and the edges of the river. Ferns are abundant in many areas, including two epiphytic species: shoestring fern and resurrection fern *(Polypodium polypodioides)*. Other common ferns include leatherleaf fern, Boston fern, and hairy maiden fern. Unfortunately, Brazilian pepper is also common in the understory of even the intact hydric hammocks, having invaded from nearby disturbed areas.

No listed plants or animals have been identified in hydric hammock on CCAFS.

Wetlands and Floodplains

Wetlands are the transition zones between dry upland ecosystems and deeper aquatic habitats. Each wetland area is unique according to its surrounding geologic, hydrologic, and climatic conditions. Wetlands are key to maintaining the health of naturally watery places; they provide flood control, aquifer recharge, coastal protection, and act to help filter pollutants from the ecosystem. Wetlands often support a wide range of rare and endangered aquatic plants and wildlife, and humans have relied on wetlands as a source of food and recreation for centuries.

A floodplain is the lowland adjacent to a river, lake, or ocean. Floodplains are designated by the frequency of the flood that is large enough to cover them. Flood frequencies, such as the 100-year flood, are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur.

Within the two major categories of wetlands (estuarine and freshwater), several types of wetland environments are found within the proposed action areas on CCAFS. These include mangrove estuaries and shorelines, salt

marsh wetlands, freshwater wetlands, impoundments and drainage canals. Figure 3-2 illustrates the National Wetland Inventory (NWI) wetlands and 100-year floodplains, which includes some of the wetland communities listed below. Each wetland type is described separately due to their unique values.

Mangrove Wetlands

Estuarine wetlands dominated by woody cover are typically mangrove communities located on the fringes of the Banana River and adjacent impoundments. Several hard freezes experienced in Brevard County during the 1980's drastically reduced the extent of mangrove communities on CCAFS. Emergent grasses typical of salt marshes often succeed former mangrove-lined shorelines. Favorable weather conditions through the 1990s enabled the re-establishment of mangroves along the Banana River shoreline, although invasive species such as Brazilian pepper are now directly competing with the mangroves. Mangrove communities are very fragile and can easily be altered by dredging, flooding, impounding, and clearing. Mangrove leaf detritus is an important energy source within the complex marine food chain. Florida Statute 861.02 protects mangroves, and two species are listed as species of special concern by the State. The following shrubs and trees, including all three North American mangrove species, are found in this community: black mangrove *(Avicennia germinans)*, red mangrove *(Rhizophora mangle)*, white mangrove *(Languncularia racemosa)*, salt bush *(Baccharis halimifolia)*, and sea oxeye *(Borrichia frutescens)*. Three common herbs are also found in this community: black needle rush *(Juncus roemerianus)*, cordgrass *(Spartina bakeri)*, and salt grass.

Due to its riparian locations, species diversity within a mangrove habitat is widely varied. Use of mangrove communities on CCAFS by wading birds and migratory waterfowl is extensive but fish receive the majority of the energy flowing from this association. Associated bird, amphibian, and reptile species include the American coot, Anhinga, belted kingfisher, brown pelican, cattle egret, great blue heron, great, little blue heron, osprey, roseate spoonbill, snowy egret, tricolored heron, wood stork, Atlantic salt marsh snake, and the Florida east coast terrapin.

No rare plants are known from the estuarine communities. American alligators, ospreys, bald eagles, and northern harriers have been observed in the marshes and swamps.

Salt Marshes

These communities exist among the intertidal shorelines and tidal wetlands of the Indian River lagoon system throughout CCAFS. The majority of the riverfront of the Banana River along CCAFS has been disturbed by the construction of mosquito control ditches and dikes or construction of facilities by the USAF to support their programs. Some remnants of a salt marsh exist west of LC-40. These areas have been isolated from the waters of the Banana River and are experiencing a succession change to a freshwater marsh community. Salt marsh wetlands are dominated by non-woody vegetation

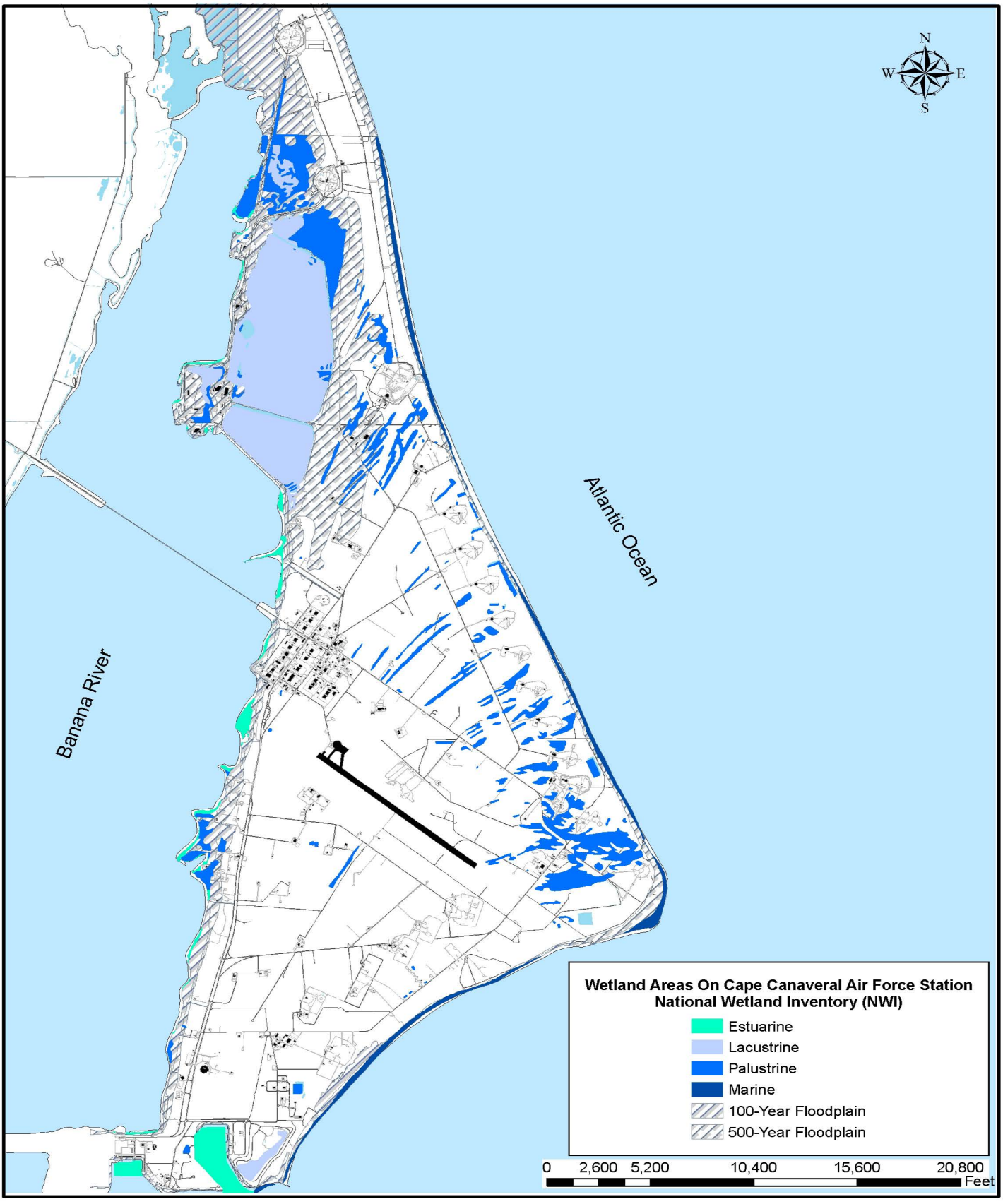


Figure 3-2: National Wetland Inventory (NWI) for CCAFS

such as black needle rush, cordgrass, glassworts *(Salicornia spp.)*, salt grass, and sea blites *(Suaeda spp.)*. Sea oxeye and swamp willow *(Salix caroliniana)* are common woody species.

Avian species using this habitat include the wading birds described earlier in mangrove wetlands, various migratory waterfowl (usually wintering ducks) and the white pelican. Common animals include the alligator, armadillo, feral hog, Florida east coast terrapin, white-tailed deer, marsh rabbit, opossum, raccoon, rice rat, and salt marsh snake.

Brackish Water Impoundments

There are four major brackish water impoundments located on CCAFS. The impoundments were created by construction of a power line access roadway across the tips of convoluted portions of the North Banana River shoreline. An additional impounded area exists between LC-40 and the LC-41 transporter roadways. This area appears to have originally existed as a salt marsh dominated by non-woody vegetation. Observations show cattails and some woody species are invading this habitat since the Banana River no longer influences it. Wading birds have been observed in this area, but the extent of utilization has not been determined.

Freshwater Wetlands

Freshwater wetlands located in the proposed action areas are interdunal swales, drainage canals, and watersheds that have undergone succession and are currently in the marsh stage. There are approximately 52 miles of drainage canals comprising 63 acres of surface water on CCAFS. Marsh-like conditions exist in some sections of the CCAFS drainage canal system and other low-lying areas associated with topographic undulations between relic dune ridges transecting CCAFS. Several of these marshy areas are temporary, resulting from seasonal variation in precipitation. The areas are periodically utilized by resident and migratory wildlife species but will not be cited specifically here due to their seasonal variability. Freshwater wetland plants observed on CCAFS include: beardgrass *(Andropogon spp.)*, bladderwort *(Utricularia spp.)*, common arrowhead *(Sagittaria lancifolia)*, common cattail *(Typha latifolia)*, common duckweed *(Lemna minor)*, Curtis' Reedgrass *(Calamovilfa curtissi)*, elodea *(Egeria densa)*, hydrilla *(Hydrilla verticillata)*, maidencane *(Panicum hemitomon)*, sawgrass *(Cladium jamaicense)*, spatterdock (yellow cow lily) *(Nuphar luteum)*, torpedo grass, and water pennywort *(Hydrocotyle umbellata)*.

Raccoons and red-winged blackbirds use the freshwater wetlands on CCAFS extensively. Raccoons appear to be primarily attracted by the large populations of leopard frogs inhabiting these environments. Red-winged blackbirds nest in the marsh vegetation and feeds on hatching insects emerging from marsh waters. Other species observed utilizing freshwater wetlands are white-tailed deer, marsh rabbit, rice rat, river otter, American coot, belted kingfisher, common moorhen, double-crested cormorant, great blue heron, great egret, little blue heron, marsh

hawk, snowy egret, tricolored heron, wood stork, alligator, Florida cooter, Florida water snake, red-eared slider, soft-shelled turtle, southern leopard frog, and water moccasin.

Threatened, Endangered and Sensitive Species

A large number of Federal and State listed species, as well as others species that are considered sensitive, utilize habitat on CCAFS. Listed and sensitive species that are known to be present on or near the boundaries of the Installation are presented in Tables 3-1 and 3-2. Known locations of sensitive species are depicted in Figure 3-3. Chapter 2 presents the Federal and State regulatory requirements and USAF policy for managing sensitive species, including T&E species.

Migratory Birds

This AF Base is home to numerous birds listed on the USFWS migratory bird list, all of which are protected at the Federal level by the MBTA. All but a few bird species (e.g., pigeons, European starlings, etc.) found on CCAFS are on this list.

PAFB

Invasive Species

Two invasive plant species predominate PAFB: Brazilian pepper and Australian pine. These species are most often found in undeveloped areas and on the margins of improved/semi-improved areas. Brazilian pepper is typically found as isolated individuals in dense clumps around buildings and roads, or as long rows around waterways on the south and west boundaries of PAFB. Australian pines grow singly or as small, dense groves along the coast of the Banana River on the west side of the Base, and around the southeastern end of the airfield. Two other species that are considered noxious weeds are present, but in small numbers - isolated melaleuca trees on the golf course, and isolated patches of torpedo grass around lagoons and ponds on the golf course. (Invasive Plant Species Control Plan for PAFB, 2004)

Native Vegetation Communities and Wildlife

Sand Dunes

Sand dunes on PAFB support a narrow strip of vegetation bordered by the Atlantic Ocean, State Route A1A, Base Housing, or areas of mowed grass. The flora of the dunes includes four major elements: common dune or coastal strand species such as sea oats, bitter panicum, beach sunflower *(Helianthus debilis)*, sea grape, and railroad vine; less common, State-listed dune species, beach star, inkberry *(Scaevola plumieri)*, and prickly pear cactus; native species on disturbed or open areas such as ragweed *(Ambrosia artemisiifolia)*, begger-ticks *(Bidens pilosa)*, and southern crabgrass (*Digitaria ciliaris)*; and introduced species such as sow thistle *(Sonchus asper)* and simpleleaf chastetree *(Vitex trifolia)*.

Wildlife

Various species of wildlife inhabit, utilize, or frequent PAFB. The Installation is located on a barrier island and these types of ecosystems are important natural areas that support many plants, animals, and natural communities.

Table 3-1: Status of Endangered and Threatened Plants on CCAFS

Scientific Name	Common Name	Requirement
		FDA[1]
Asclepias curtissii	Curtiss' milkweed	E
Chamaesyce cumulicola	Sand dune spurge	E
Chrysophyllum oliviforme	Satinleaf	T
Lantana depressa var. floridana	Florida lantana	E
Lechea cernua	Nodding pinweed	T
Myrcianthes fragrans	Nakedwood, Simpson's stopper	T
Ophioglossum palmatum(Cheiroglossa palmata)	Hand fern	E
Opuntia stricta	Shell mound prickly-pear cactus	T
Remirea maritime	Beach star	E
Scaevola plumieri	Scaevola, inkberry	T
Tournefortia gnaphalodes(Argusia gnaphalodes)	Sea lavender	E
Verbena maritime(Glandularia maritima)	Coastal vervain	E

1. Chapter 5B-40 FAC 2003
E= Endangered
T= Threatened

Table 3-2: Status of Threatened and Endangered, and Sensitive Animals Found on CCAFS

Common Name	Scientific Name	Status	
		USFWS[1]	FFWCC[2]
American Alligator	*Alligator mississippiensis*	T (S/A)	SSC
Loggerhead Seaturtle	*Caretta caretta*	T	T
Atlantic Green Sea Turtle	*Chelonia mydas*	E	E
Leatherback Turtle	*Dermochelys coriacea*	E	E
Gopher Tortoise	*Gopherus polyphemus*		SSC
Eastern Indigo Snake	*Drymarchon corais couperi*	T	T

Table 3-2: Status of Threatened and Endangered, and Sensitive Animals Found on CCAFS cont.

Common Name	Scientific Name	Status	
		USFWS[1]	FFWCC[2]
Florida Pine Snake	*Pituophis melanoleucus mugitus*		SSC
Roseate Spoonbill	*Ajaia ajaja*		SSC
Florida Scrub jay	*Aphelocoma coerelescens*	T	T
Piping Plover	*Charadrius melodus*	T	T
Little Blue Heron	*Egretta caerulea*		SSC
Reddish Egret	*Egretta rufescens*		SSC
Snowy Egret	*Egretta thula*		SSC
Tricolored Heron	*Egretta tricolor*		SSC
White Ibis	*Eudocimus albus*		SSC
Peregrine Falcon	*Falco peregrinus*		E
Southeastern American Kestrel	*Falco sparverius paulus*		T
American Oystercatcher	*Haematopus palliatus*		SSC
Bald Eagle	*Haliaeetus leucocephalus*	T	T
Wood Stork	*Mycteria Americana*	E	E
Brown Pelican	*Pelecanus occidentalis*		SSC
Black Skimmer	*Rynchops niger*		SSC
Least Tern	*Sterna antillarum*		T
Southeastern Beach Mouse	*Peromyscus polionotus niveiventris*	T	T
Florida Mouse	*Podomys floridanus*		SSC
Florida Manatee	*Trichechus manatus*	E	E

[1]USFWS
E=Endangered: species in danger of extinction throughout all or a significant portion of its range.
T=Threatened: species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
T(S/A)=Threatened due to similarity of appearance to a species which is federally listed such that enforcement personnel have difficulty in attempting to differentiate between the listed and unlisted species.
[2]FFWCC
SSC=Species of Special Concern

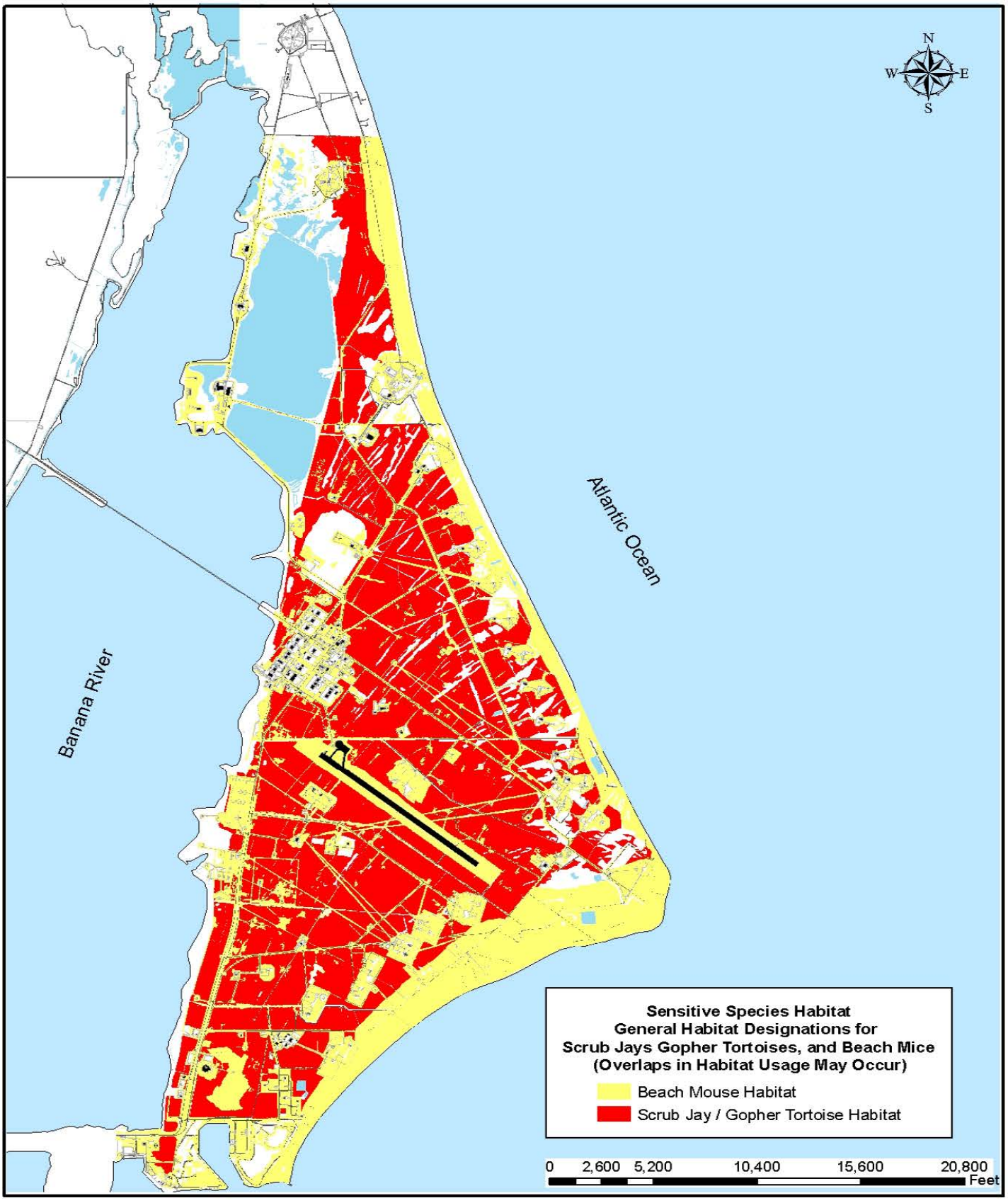


Figure 3-3: Scrub Jay, Gopher Tortoise, and Beach Mouse Habitat on CCAFS.

Barrier islands along the Atlantic coast are especially important for nesting sea turtles, populations of small mammals, and as foraging and loafing habitat for a variety of resident and migratory shorebirds, wading birds, and songbirds.

Wetlands and Floodplains

Wetlands, defined as supporting aquatic vegetation for a given period, are very limited at PAFB. Figure 3-4 illustrates NWI wetlands and 100-year floodplains. A few isolated areas intermittently support saltwater grasses. However, natural processes continually change these areas by filling them with sand or by removing sandbars and draining the areas.

Threatened, Endangered and Sensitive Species

No Federal-listed T&E plant species have been identified at PAFB. The following plants listed by the State of Florida have been observed on Base: beach star, inkberry, and prickly pear cactus. Black mangrove, red mangrove, and white mangrove stands occur along the Banana River shoreline and the edges of some canals.

There is no formally designated critical habitat on PAFB, as defined under Chapter 4 of the ESA. The current threatened, endangered, and sensitive species present on PAFB include: Florida manatee, American alligator, Atlantic loggerhead turtle, Atlantic green sea turtle, leatherback turtle, hawksbill turtle, gopher tortoise, Eastern indigo snake, roseate spoonbill, piping plover, little blue heron, reddish egret, snowy egret, tricolored heron, white ibis, southeastern American kestrel, Arctic peregrine falcon, American oystercatcher, bald eagle, wood stork, brown pelican, black skimmer, and least tern.

PAFB is located along one of the major migratory pathways for neotropical migrants that breed in eastern North America. Therefore, habitat on PAFB that is suitable for migrant birds is of conservation concern. During various other surveys conducted at PAFB in 1996, many neotropical migrants were observed using the dune habitat.

MTA

Invasive Species

Brazilian pepper comprises the majority of noxious weeds present on MTA. In addition, small populations of torpedo grass, mimosa, and thistles have been identified. (Invasive Plant Species Control Plan for CCAFS, 2004)

Native Vegetation and Wildlife

The natural communities on MTA are not of high quality due to extensive development (Figure 3-5). Alterations include direct disturbances such as airfield pavement, mowed antenna fields, roads, structures, and military exercise areas, and indirect disturbances such as the suppression of the natural fire regime and the modification of the hydrology. Occurrences of relatively higher quality mesic flatwoods and of depression marshes have been documented on MTA.

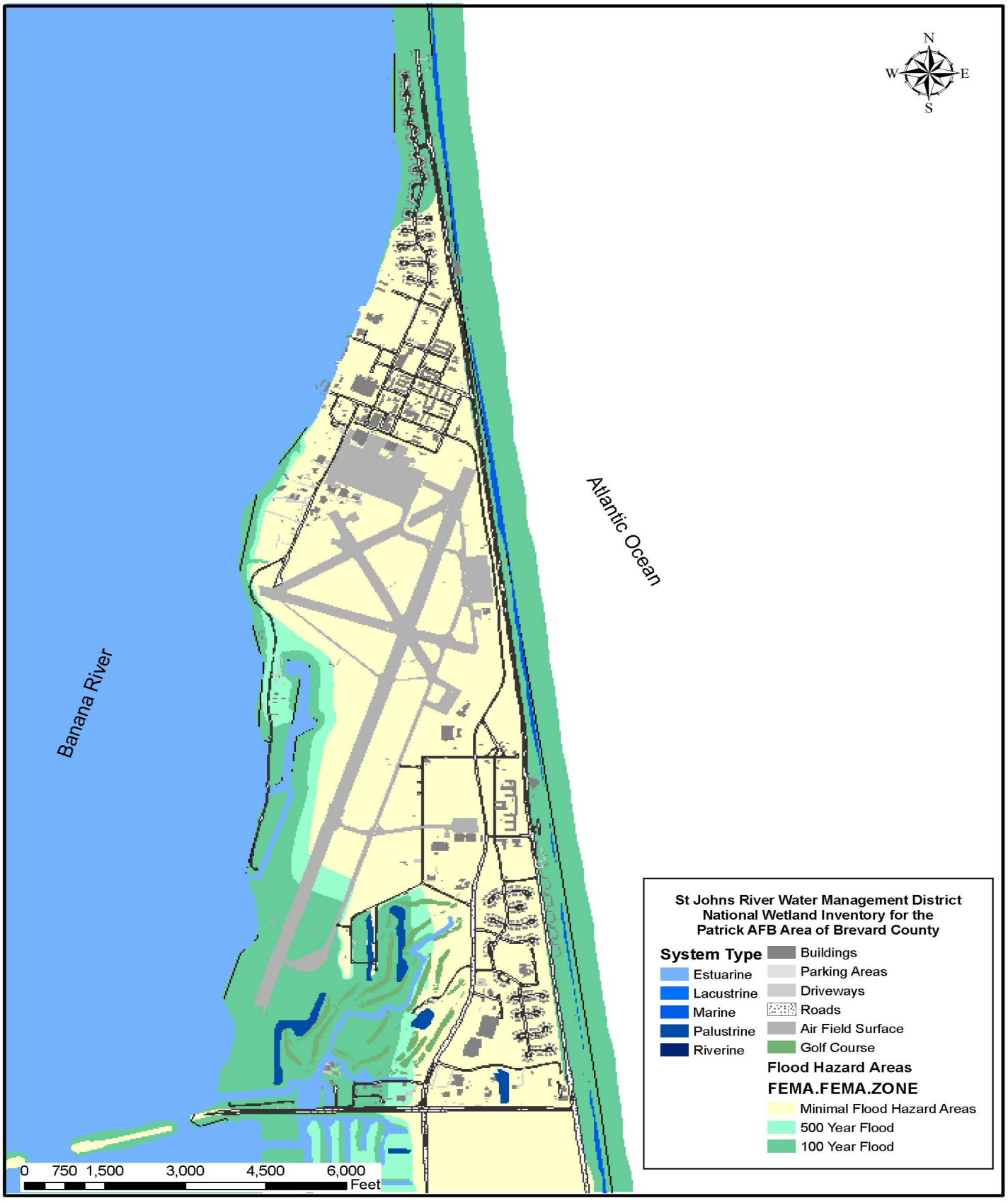


Figure 3-4: National Wetland Inventory for Patrick Air Force Base

Although MTA is surrounded by commercial and residential development, it provides available habitat for common wildlife species including migratory and resident songbirds, amphibians, reptiles, and mammals. Appendix B contains a list of the common animals observed on MTA.

Hydric Hammock

*An ar*ea dominated by cabbage palms occurs in the flatwoods near the center of the south boundary of MTA. This may have been hydric hammock prior to the digging of the adjacent Melbourne-Tillman Canal. The discontinuous canopy consists of dense clusters of widely scattered palms. Only rarely does a live oak, slash pine, or Hercules club appear among the palms. The noxious Brazilian pepper is an abundant shrub or small tree in this community. The ground cover is sparse in most areas with the herb wood sage *(Salvia riparia)*, being locally abundant, and the common terrestrial toothed orchid *(Habenaria odontopetala)*, occurring as scattered individuals. A small but healthy population of epiphytic hand fern *(Cheiroglossa palmata)* grows on cabbage palms in three locations within this area.

Small fragments of what may also have been a hydric hammock cover about one acre at the northern boundary in the northwest section. The fragments are situated between mesic flatwoods and a depression marsh. This hammock is divided in two by the perimeter security fence and patrol road. The larger and more diverse part is north of the fence. The closed canopy of mature live oak covers abundant cabbage palms of various stages. Three tropical shrub species are present here: twinberry is abundant north of the perimeter security fence, wild coffee is common, and wild lime *(Zanthoxylum fagara)* is rare.

Mesic Flatwoods

Mesic flatwoods make up most (about 200 acres) of the forested areas remaining on MTA. They have a younger mature to older mature slash pine canopy and a light to heavy saw palmetto *(Serenoa repens)* understory. The ground cover ranges from good to poor quality, reflecting past land clearing activities and fire suppression.

Flatwoods of good quality occur in the northeast corner, the extreme southeast corner, and the center of the western side. The largest area of approximately 20 acres borders Minton Road at the north end of the Annex, and has a canopy of mature slash pine. Younger pines, groups of cabbage palm, widely scattered laurel oak *(Quercus hemisphaerica)*, and live oak form the subcanopy. Dense thickets of saw palmetto covering large areas dominate the shrub stratum. In the openings between the palmettos, gallberry *(Ilex glabra)* and dwarf live oak *(Quercus minima)* are abundant and the ground cover consists of grasses such as wiregrass and broomgrass *(Andropogon virginicus)*. Muscadine grape vines cover the ground in some locations.

A tall thicket of dense saw palmetto dominates the vegetation in the southeast corner and western side. Small openings in the middle of these

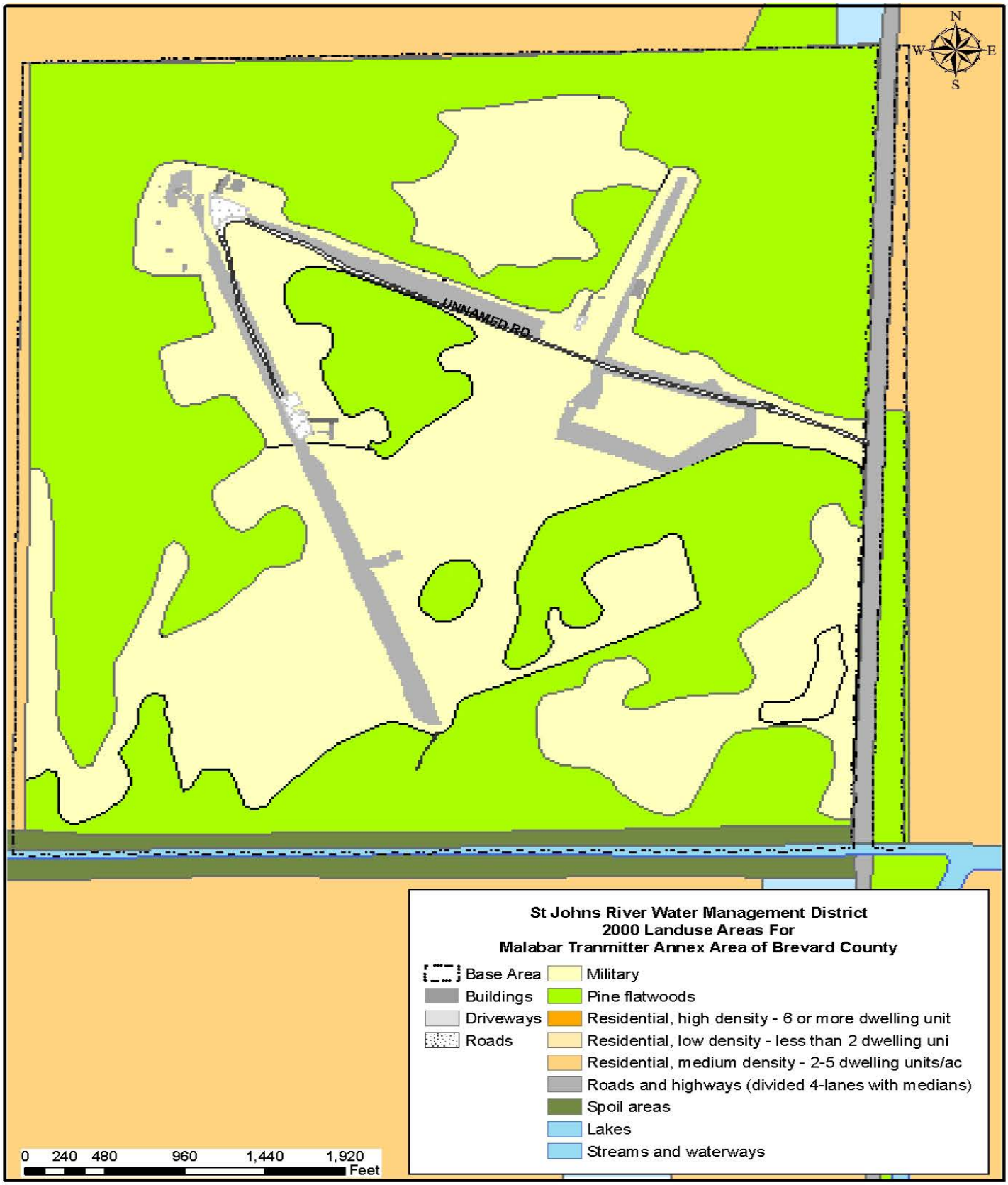


Figure 3-5: St Johns River Water Management District Land Use Map for the Malabar Transmitter Annex

areas have natural ground cover of wiregrass plus low shrubs of dwarf live oak and pawpaw *(Asimina reticulata)*. The slash pine *(Pinus elliottii)* canopy is very sparse with trees mainly restricted to the openings or the periphery.

Similar but less diverse flatwoods cover another 20 acres just south of the entrance road. Most of this section has dense saw palmetto. The other mesic flatwoods on MTA are poor quality since they lack a natural ground cover due to past land clearing. They generally have a canopy of young to mature pines and sparse saw palmetto understory.

Wet Flatwoods

Wet flatwoods occur (with included small depression marshes) on approximately 80 acres in the southeast corner of MTA. Their poor condition makes their exact boundaries hard to delineate. This community has experienced fire suppression and disturbances such as drainage, mowing, and land clearing.

The scattered slash pine canopy has mostly younger mature trees. The sparse shrub stratum contains occasional wax myrtle and cluster-leaf St. John's wort *(Hypericum cistifolium)*. The ground cover is fairly diverse including common carpetgrass *(Axonopus affinis)*, big carpetgrass *(Axonopus furcatus)*, coinwort *(Centella asiatica)*, bald-headed carphephorus *(Carphephorus carnosus)*, and pink sundew *(Drosera capillaris)*.

Wetlands and Floodplains

The natural communities at MTA are small remnants fragmented by human disturbances. The natural wetlands consist of depression marshes and wet flatwoods with scattered slash pine in the canopy. Figure 3-6 illustrates NWI wetlands. No 100-year floodplains are mapped on MTA.

Canals

Three canals are present on site. The deep Melbourne Tillman Canal borders the south boundary of the property and acts as the final destination of the water drained from the site by the two lesser conduits. They are filled with vegetation, primarily common cattail, primrose willow *(Ludwigia peruviana)*, Caroline willow *(Salix caroliniana)*, arrowhead, maidencane, and water pennywort. The narrower and shallower ditches are predominantly composed of pickerelweed *(Pontederia cordata)*, arrowhead, blue hysop *(Bacopa caroliniana)*, maidencane, and torpedo grass. The more numerous swales are shallower still and vary from having many to no wetland plant species. The wet swales generally support some of the following species: blue hysop, water hysop *(Bacopa monnieri)*, rush *(Juncus spp.)*, spikerush, water primrose *(Ludwigia repens)*, buttonweed *(Diodia virginiana)*, and water pennywort. Those in dry areas are frequently mowed and often dominated by bahia grass *(Paspalum notatum)*.

Depression Marsh

Small depression marshes are scattered around MTA. All have been adversely affected by drainage and fire

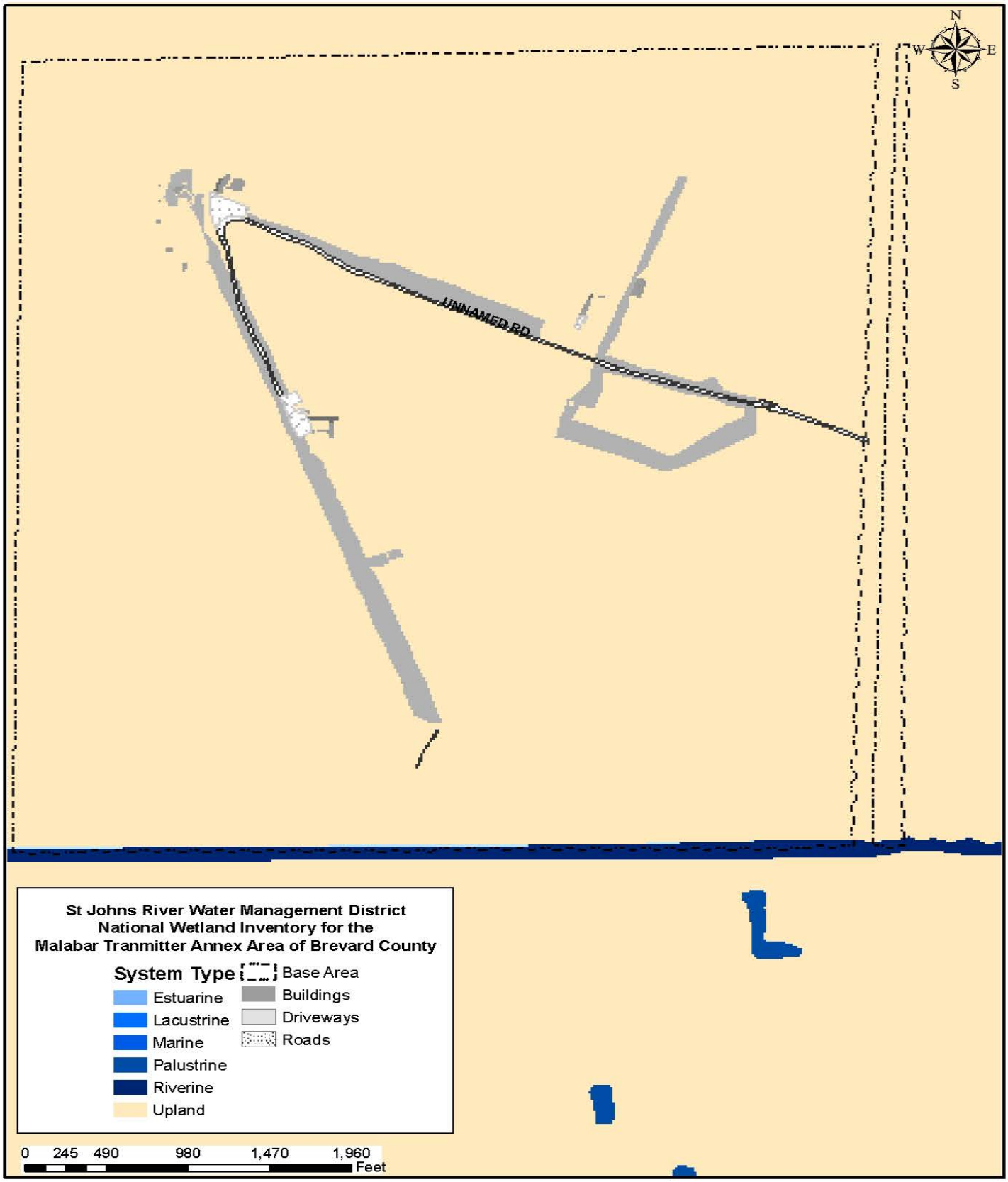


Figure 3-6: NWI wetlands for Malabar Transmitter Annex

suppression. Most hardly function as marshes and their presence is detected only because of their persisting wetland plant species.

Depression marsh covers approximately 1.5 total acres in the northeast quarter of the northwest quarter of MTA. These somewhat continuous shallow depressions form a mosaic with the prevalent mesic flatwoods. Dominant species growing here are St. John's wort, maidencane, pipewort *(Eriocaulon compressum)*, sugarcane plumegrass *(Erianthus giganteus)*, lanceleaf arrowhead, redroot *(Amaranthus retroflexus)*, beakrush, Virginia chain-fern *(Woodwardia virginia)*, and buttonbush *(Cephalanthus occidentalis)*. This marsh system has been given a marginal rank by FNAI due to its small size, lack of burning, and altered drainage.

A small isolated depression marsh of poor quality and less than 0.25 acre in size occurs west of the runway near the middle of MTA. Notable species include fireflag *(Thalia geniculata)*, sand cordgrass, lanceleaf arrowhead, redroot, and beakrush.

Several other small depression marshes are in the southeast corner of MTA within the wet flatwoods. The vegetation includes St. John's wort, maidencane, blue maidencane *(Amphicarpum muhlenbergianum)*, coinwort, pipewort, bloodroot *(Sanguinaria canadensis)*, mermaid weed *(Proserpinaca pectinata)*, batam-buttons *(Syngonanthus flavidulus)*, spikerush *(Eleocharis sp.)*, beakrush, yellow-eyed grass *(Xyris spp.)*, and bald-headed carphephorus. Young slash pines are invading this open area. Four other tiny wet depressions occur further south. These small remnants barely function as marshes and are of poor quality due to long-term drainage. Marsh indicator species found here include sawgrass, buttonbush, lanceleaf arrowhead, pickerelweed, and fireflag. Brazilian pepper is not yet a problem in the wetland areas but is widespread in nearby disturbed areas.

Threatened, Endangered and Sensitive Species

Only one rare plant species has been observed on MTA. A small but healthy population of the epiphytic hand fern *(Cheiroglossa palmata)*, State endangered, grows on cabbage palms in three locations.

Several other unusual plant species have been observed on MTA. A small population of orchid crested coco *(Eulophia alata)* was found on the southeast side of the intersection of the northeast-southwest and north-south runways. The orchids are approximately 30 feet from the mowed edge in an "island" of mesic flatwoods with many cabbage palms.

Three tropical shrub species are present in the maritime hammock at the north boundary. North of the perimeter security fence are abundant twinberry, common wild coffee *(Psychotria nervosa)*, and one plant of wild lime. Inside the fence at the northwest corner of the live oaks are a few twinberry and wild coffee on a low ridge.

As stated earlier only one species of special concern, the gopher tortoise, has been documented on MTA.

Currently, one Federal-listed species is found at MTA, the Eastern indigo snake. The indigo snake has been identified on MTA through a shed skin only. The shed skin of an Eastern indigo suggests that a remnant population may exist at MTA, although biologists performing surveys have observed no individuals. MTA has suitable habitat preferred by indigo snakes and the presence of gopher tortoise burrows provides denning sites for individuals that may be present.

JDTMA

This property is located in the southern part of Jonathan Dickinson State Park. Wetlands and 100-year floodplains have not been identified on this site.

Invasive Species

Brazilian pepper tree is the only invasive species that has been identified on JDTMA. (Invasive Plant Species Control Plan for CCAFS, 2004)

Native Vegetation Communities and Wildlife

Most (about 80%) of the property is developed. The remaining 20% is comprised of scrub "islands" typical of the rosemary scrub habitat. These scrub islands are vegetated primarily by the following dominant plants: scrub oak *(Quercus inopina)*, sand live oak *(Q. geminata)*, sand pine *(Pinus clausa)*, Florida rosemary *(Ceratiola ericoides)*, saw palmetto *(Serenoa repens)*, and wild blueberry *(Vaccinium spp.)*.

Fauna on JDMTA consists of wildlife normally associated with scrub communities, including raccoons, opossums, and occasionally a white-tailed deer that is able to get inside the fence.

Threatened, Endangered, and Sensitive Species

Florida perforate cladonia *(Cladonia perforata)* is the only listed plant found on JDMTA (Federal- and State-endangered). This species is restricted to high, well-drained sands of rosemary scrub. The JDMTA population is part of a larger population at Jonathan Dickinson State Park, occurring in mature rosemary scrub. At JDMTA, the vegetation is mostly overgrown with a closed canopy of sand pines and palmettos, which excludes perforate cladonia. Therefore, the lichen is limited almost entirely to the maintained open areas at the fence line and perimeter with exceptions of two small areas near the road at the south side of the site.

The threatened Florida scrub jay has been known to visit JDMTA, but has not been observed nesting within the Annex. Annex personnel have reported the presence of the gopher tortoise.

Geology, Soil and Water Resources

Physical resources of an area consist of the surface and subsurface soil and bedrock materials and their inherent properties, including geology and surface topography. Soils are typically described according to their complex types and physical characteristics. Discussions of geology include regional and site-specific geomorphic conditions and the general geological setting of an area.

Topography is the change of vertical relief (*i.e.*, elevation) over the surface of the area. The topography of an area

is generally the product of natural influences (*i.e.*, erosion, seismic activity, climatic conditions, and the underlying geologic materials), but can be influenced by human activity. A discussion of topography typically includes a description of surface elevations, slope, and distinct physiographic features (*i.e.*, mountains, ravines, and depressions).

CCAFS

Geology and Soil Resources

The topography of CCAFS consists of a series of relic dune ridges formed by wind and wave action, indicating that gradual beach deposits occurred throughout time. Higher naturally occurring elevations occur along the eastern portions of these areas, with a gentle slope to lower elevations toward the marshlands along the Banana River. Land surfaces are level to gently sloping with elevations that range from sea level to 15 feet above msl.

Four stratigraphic units can generally define the geology underlying these areas: the surficial sands, the Caloosahatchee Marl, the Hawthorn Formation and the limestone formations of the Floridian aquifer. The surficial sands immediately underlying the surface are marine deposits that typically extend to depths of approximately 10 to 30 feet below the surface. The Caloosahatchee Marl underlies the surficial sands and consists of sandy shell marl that extends to a depth of 70 feet below the surface. The Hawthorn Formation, which consists of sandy limestone and clays, underlies the Caloosahatchee Marl and is the regional confining unit for the Floridian aquifer. This formation is generally 80 to 120 feet thick, typically extending to a depth of approximately 180 feet below the surface. Beneath the Hawthorn Formation lie the limestone formations of the Floridian aquifer, which extend several thousand feet below the surface at CCAFS.

Bedrock ranges from a hard to dense limestone that is a principal part of one of the major Florida artesian aquifers, located 75-300 feet below the surface. It is overlain by sandy limestone, calcareous clay with fragments of shells, coquinoid limestone and unconsolidated and well-graded quartz sand. The surface is a mixture of permeable sand and shell materials. There are no rock outcrops on the Installation.

The soil survey of Brevard County, Florida, 1974, identifies eleven different soil types within CCAFS with the three most prominent soils comprising the Canaveral-Palm Beach-Welaka association (Figure 3-7). It is about 37 percent Canaveral soils, 17 percent Palm Beach soils, nine percent Welaka soils and 37 percent soils of minor extent. This association is made up of nearly level and gently sloping ridges interspersed with narrow wet sloughs that generally parallel the ridges and extends the entire length of the County along the coast near the Atlantic Ocean. The most prevalent type of soil is Canaveral Peninsula. Canaveral soils are on moderately low ridges and consist of a mixture of light-colored quartz sand grains and multicolored shell fragments. The major soils in this area are moderately well drained to excessively drained and sandy

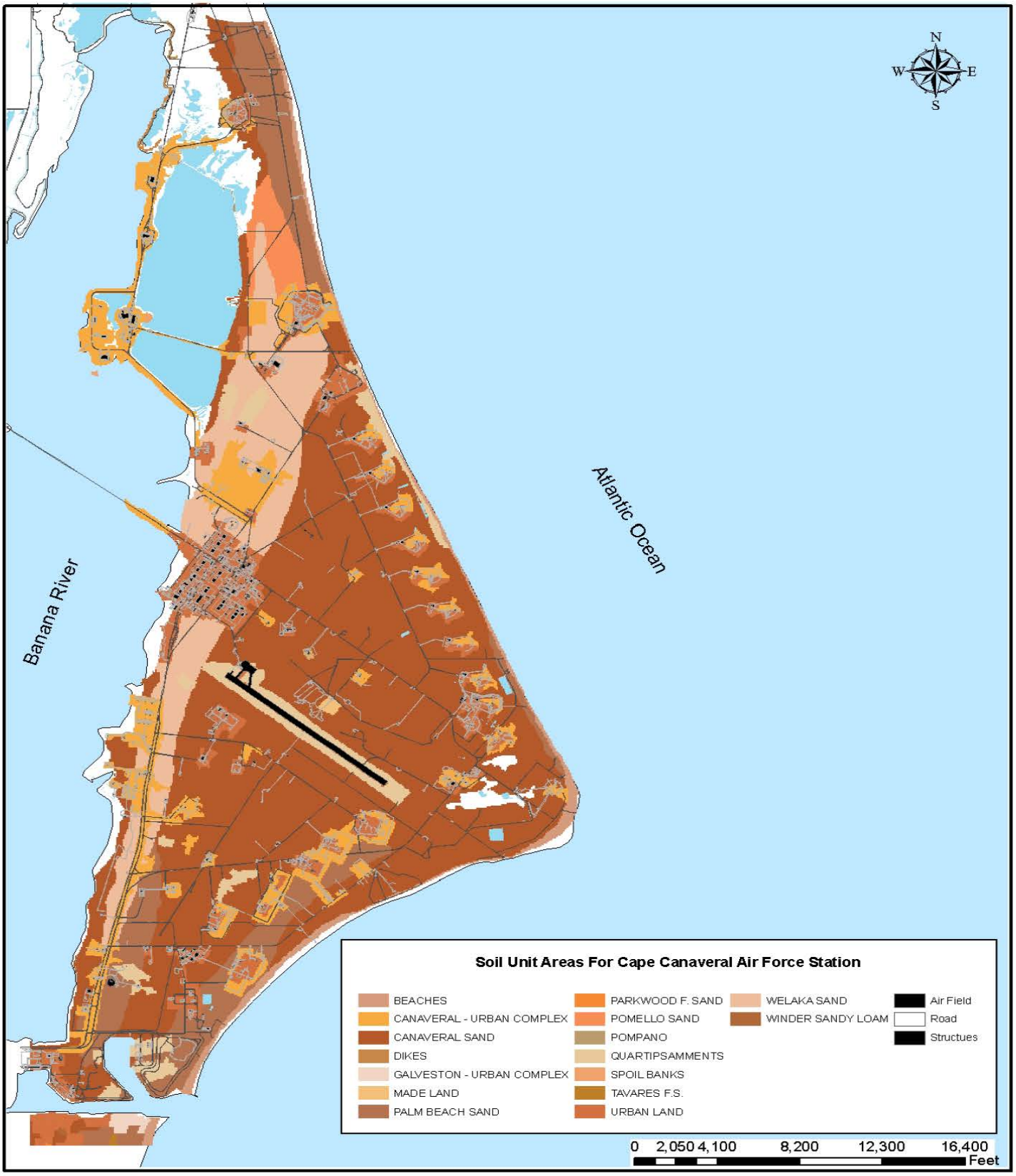


Figure 3-7: Brevard County Soil Survey for the Cape Canaveral AFS Area

throughout. The soils are exceptionally dry, even though the water table is often near the surface during rainy periods.

Palm Beach soils are similar to Canaveral soils, but are excessively drained. They occur on higher ridges, have a lower water table and are commonly in areas between Cape Canaveral and Melbourne Beach. Welaka soils are well-drained sandy soils and have a light-colored subsurface layer and yellowish subsoil. The subsoil extends to a depth of 40-60 inches. Below this is a mixture of quartz sand and shell fragments. The major soils in this association are droughty, even though in some areas the water table is near the surface during rainy periods.

Water Resources

The surficial and Floridian aquifer systems underlie CCAFS. The approximately 70-foot-thick surficial aquifer system, generally comprised of sand and marl, is unconfined. The water table in the aquifer is generally a few feet below the ground surface. The surficial aquifer is recharged by infiltration of precipitation through the thin vadose zone.

Cape Canaveral AFS is within the Florida Middle East Coast Basin and situated on a barrier island that separates the Banana River from the Atlantic Ocean. This basin contains three major bodies of water: the Banana River immediately to the west, Mosquito Lagoon to the north, and farther west, the Indian River, separated from the Banana River by Merritt Island. All three water bodies are estuarine lagoons, with circulation provided mainly by wind-induced currents.

There are approximately 52 miles of drainage canals comprising 63 acres of surface waters on CCAFS. Canals were constructed by the USAF to provide drainage of low-lying areas. The major canals of this system have certainly altered the hydrology on CCAFS but now offer habitat for numerous species of fish and wildlife.

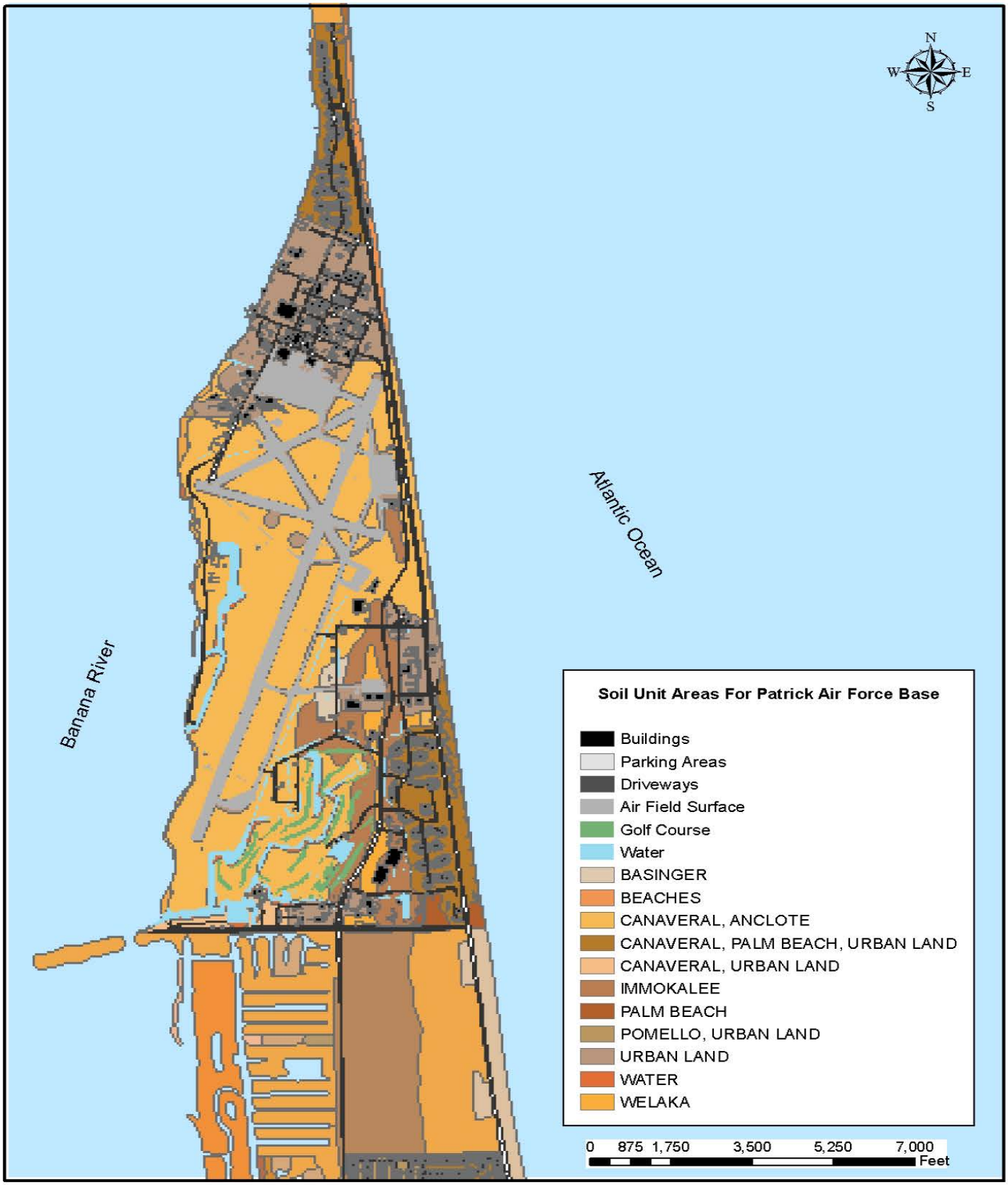
PAFB

Geology and Soil Resources

This Installation, like CCAFS to the north, is located on a barrier island. Barrier islands are linear islands of sand that parallel many gently sloping coastlines around the world (Johnson and Barbour, 1990). There is little topographic relief across PAFB, with elevations ranging from 0-6.1 meters above msl. The soil at PAFB is sandy to depths of 60 inches or more (USDA, 1974). Soil types and geology are similar to those found on CCAFS (Figures 3-8).

Water Resources

The major surface waters in the area are the Atlantic Ocean (which bounds PAFB on the east) and the Banana River (which bounds PAFB on the west). The water resources on PAFB include five man-made ponds totaling 31.3 acres. The Base also contains 4.1 miles of drainage ditches and 40.2 acres of canals. Most of the drainage ditches contain water throughout the year because they intersect the surficial aquifer. The canals are interconnected with the Banana River and are thus tidally influenced and brackish. Other than drainage ditches and stormwater



Fgure 3-8: Brevard County Soil Survey for Patrick Air Force Base

retention ponds, there are no surface water resources located on the north or south housing areas.

The Installation is underlain by both confined and unconfined aquifers. The hydrologic units (aquifers) underlying PAFB include the surficial aquifer; semi-artesian and artesian aquifers within the Caloosahatchee Marl, Tamiami Limestone, and Hawthorn Group; and the artesian Floridian aquifer. The surficial aquifer underlying PAFB is the major hydrostratigraphic system that can be influenced by Base operations. This system, consisting primarily of marine sands, shell fragments, and coquina limestone, extends approximately 50 feet below sea level. The water table is generally within five feet of the ground surface. The surficial groundwater flows primarily toward the Banana River. Low-levels of contaminants (e.g., VOC, petroleum hydrocarbons, and heavy metals) originating from PAFB IRP sites have been detected in surficial groundwaters at the Base.

Groundwater at PAFB occurs under unconfined (water table), semi-confined, and confined (artesian) conditions. The unconfined aquifer, composed of Holocene and Pleistocene age surficial deposits of marine sand, shell fragments, and sand conglomerate of the Anastasia Formation, is recharged by direct infiltration or rainfall. The generalized direction of groundwater flow in the surficial aquifer is westward, toward the Banana River. Localized flow in the surficial aquifer is from topographic highs (mounds, swells, dune ridges) toward surface water bodies (creeks, ponds, drainage canals).

MTA

Geology and Soil Resources

Land at MTA is generally level with very little natural undulations. Drainage ditches and swales with their associated spoil banks and a few soil stockpiles make up the majority of variations in topography at the Annex.

The Soil Survey of Brevard County, Florida, (USDA, 1974) identifies eight different soil types within MTA (Figure 3-9). Each individual soil type or soil association may display characteristics of the representative soil series. The soils identified at MTA include Eau Gallie sand; Eau Gallie Winder, and Felda soils; ponded Malabar, Holopaw and Pineda soils; Pineda sand; Quartzipsamments; smoothed Felda sand; Floridana sand; and Urban land.

Eau Gallie sand is a nearly level, poorly drained sandy soil in the flatwoods. These soils are mainly on broad, low ridges. Some are in sloughs and shallow ponds; all formed in beds of sandy and loamy marine sediments. Eau Gallie Winder and Felda soils, are mapped as 40% Eau Gallie soils, 20% Winder soils, 20% Felda soils and 20% other soils. One or more of these soils occupies at least 70% of any particular area, but the proportion varies from place to place. These soils are in shallow ponds and sloughs.

Felda soil is a nearly level, poorly drained sandy soil on broad low flats and in sloughs, depressions and poorly defined drainage-ways. Floridana sand is a nearly level, very poorly drained soil that has a surface layer of thick black sand. It is in broad areas on floodplains

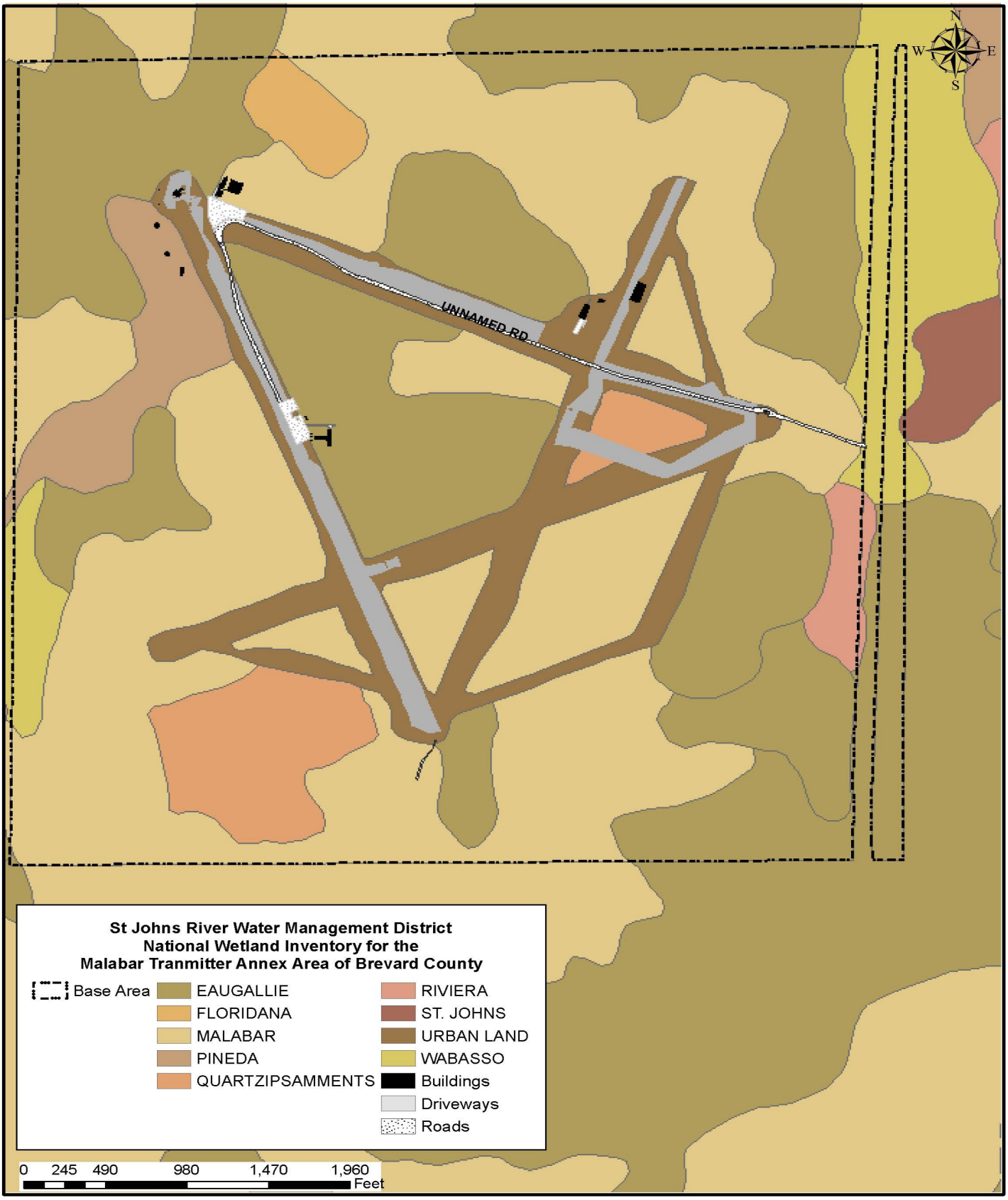


Figure 3-9: Brevard County Soil Survey for Malabar Transmitter Annex

and in small to large marshy depressions. The Malabar series consists of nearly level, poorly drained sandy soils. These soils are in broad low areas and in sloughs, low depressions, and poorly defined drainage-ways. Most areas in which this soil is found are in natural vegetation. The Pineda series consists of nearly level, poorly drained, sandy soils on broad hammocks and in low sloughs.

The Malabar, Holopaw, and Pineda soils unit is about 33% Malabar soils, 28% Holopaw soils, 20% Pineda soils, and 19% other soils. These nearly level, poorly drained soils are in an intricately interwoven pattern of sloughs, low depressions, and low ridges. Pineda sand is a nearly level poorly drained sandy soil on broad hammocks and in low sloughs.

Many areas are formed sloughs, marshes, or shallow ponds that have been filled with various soil materials to surrounding ground level or to elevations above natural ground level. Some areas were originally high ridges that have been excavated to below natural ground level and reworked. In a few places, soils have been reworked in place and not moved. These soils are poorly suited to most plants.

Geologic resources underlying MTA are similar to those previously described for CCAFS.

Water Resources

A network of swales and canals drain stormwater that ponds in low-lying areas of MTA. The existing runways are used for roads and none of the swales were constructed as stormwater management facilities. The soils at MTA are very permeable and the majority of stormwater that runs off the pavements percolate prior to reaching the nearest swale.

JDMTA

Geology and Soil Resources

Earlier in Florida's history, the sea level at JDMTA was much higher than at present and the coast was farther inland. Sand dunes formed along these ancient shorelines. These excessively well-drained relict dunes are the natural sites of the sand pine scrub community. This community, with its deep, loose sand, is typically an aquifer recharge area.

The sands on the scrub ridges are mostly the St. Lucie Series (USDA, 1974) (Figure 3-10). The St. Lucie Series consists of excessively drained deep, sandy soils occurring on nearly level to strongly sloping, dune-like ridges. A representative profile indicates the surface layer is gray sand about three inches thick. The next layer is approximately 57 inches of light gray sand, and then white sand to depths greater than 80 inches. Permeability is very rapid. Other sands in the area are the Orsino Series and Satellite Variant.

Geologic resources underlying JDMTA are similar to those previously described for CCAFS with the addition of the limestones of the Tamiami Formation overlying the Hawthorne Formation and underlying the Caloosahatchie Formation.

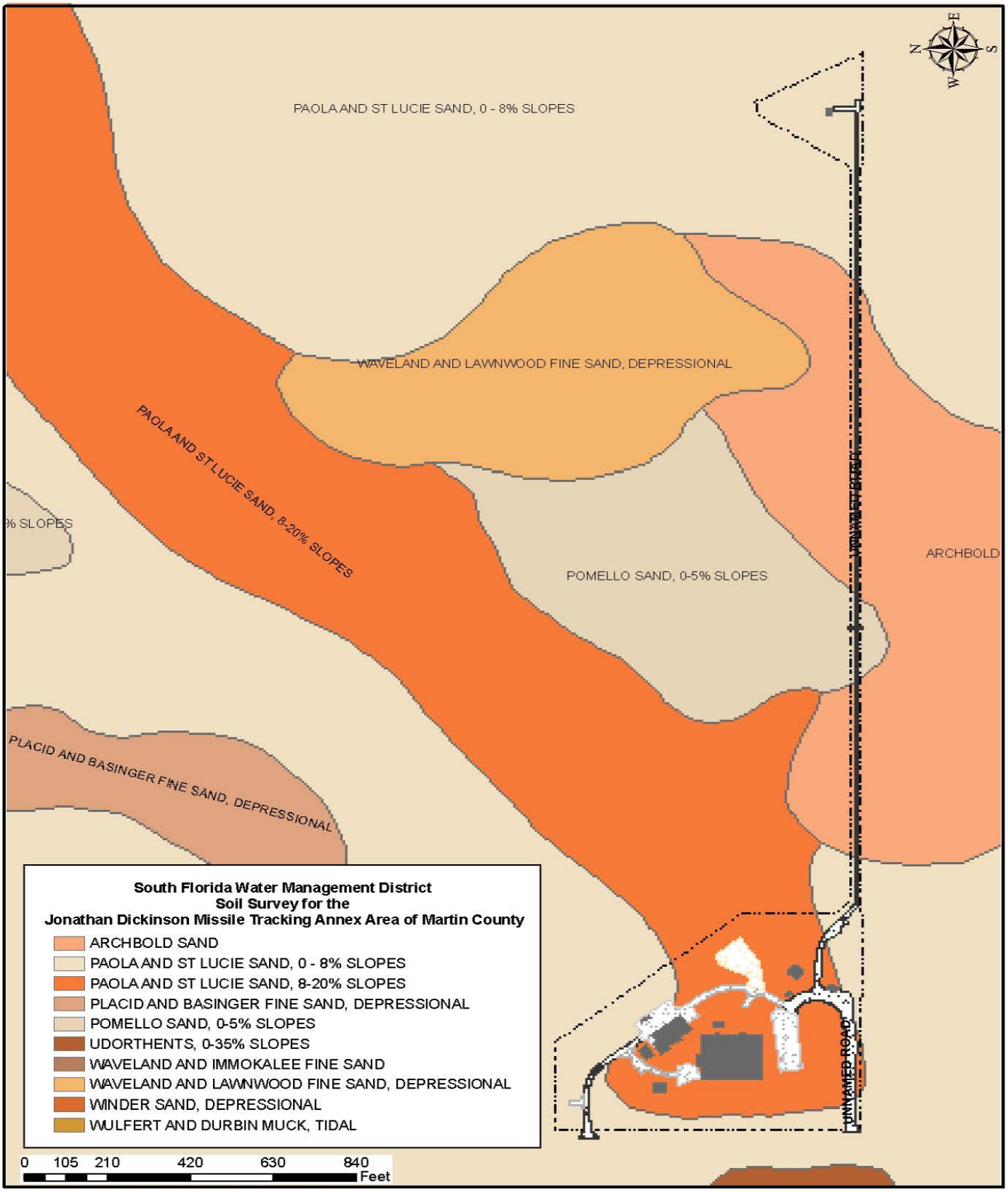


Figure 3-10: Martin County Soil Survey for the Jonathan Dickinson Missile Tracking Annex

Water Resources

There are no surface waters located in the immediate vicinity of the Annex.

Hazardous Materials and Hazardous Waste

CCAFS

An IRP at CCAFS and PAFB began in 1984 with a Phase I study. Problem areas were identified and record searches were conducted to determine the extent of necessary restoration actions. Since that time, 109 potential sites have been identified for investigation.

Follow-on studies at CCAFS have identified 69 sites with confirmed contamination and 51 Areas of Concern (AOC) with suspected contamination. As of August 2000:

- 49 AOCs have been approved for No Further Action (NFA);
- 2 AOCs currently undergoing investigation to determine need for additional action;
- 26 sites currently undergoing investigation/clean-up;
- 25 sites approved for NFA; and
- 18 sites in long term monitoring and/or under institutional controls.

PAFB

The IRP sites at PAFB include landfills, disposal sites, fire training areas, polychlorinated biphenyls sites, or specific facilities where contamination may have occurred. Since the IRP study was initiated in 1984 at PAFB, 30 contaminated sites and eight AOCs have been identified. All eight of the AOCs have been approved for NFA. Eighteen of the contaminated sites have been approved for NFA. One site is currently undergoing investigation. Eleven sites are in long-term monitoring (LTM), long-term operation (LTO) of a remedial system, or have land use controls required.

MTA

The 45SW IRP conducted work at MTA under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, i.e., Superfund) and the State petroleum program. Petroleum work was initiated in the 1992 timeframe and included the removal of two underground storage tanks and contaminated soil. A post-cleanup Contamination Assessment recommended NFA based on the discovery of no significant groundwater impacts. The FDEP concurred with the NFA in 1995. Soil removal was conducted concurrent with a RCRA Facility Investigation (RFI) in 2002. Based on the successful completion of this removal, the RFI concluded with a recommendation for NFA. Both FDEP and EPA approved this recommendation in 2002.

JDMTA

There have been no indications of a release prior to 1984 when the IRP began at the 45SW. Therefore, no IRP investigations have taken place at JDMTA.

Cultural Resources

Cultural resources can be generally divided into two broad categories: archaeological sites (either historic or prehistoric), and historic buildings or structures.

CCAFS

Archaeological Resources

Significant archaeological resources can be found on CCAFS. Several sites at CCAFS are related to human occupation by the Ais Indians that occurred approximately 3,500 years ago. The Ais Indian tribe no longer exists and the closest cultural affiliation is the Seminole Indian tribe. Numerous studies and excavations have been conducted at CCAFS to gather data and refine the boundaries of the archaeological sites at CCAFS. The most recent archaeological investigation was completed during the summer of 1999. Fifty-six archaeological sites have been identified, the vast majority of which are located along the Banana River. Eleven of the sites were determined to be eligible for listing on the NRHP. Five sites are known to contain human remains and are afforded additional protection under State and Federal regulations.

Historic Resources

As a result of the congressionally mandated Man In Space Alternatives Study conducted by the National Park Service, CCAFS was designated a National Historic Landmark District in 1984. National Historic Landmarks are buildings, sites, districts, structures, and objects that have been determined by the Secretary of the Interior to be nationally significant in American history and culture. In this case, the CCAFS National Historic Landmark District is comprised of six discontiguous properties:

- LC- 5/6 (first manned launch, NASA owned)
- LC- 14 (John Glenn, Mercury program)
- LC- 19 (Gemini Program)
- LC-26 (launch site of Explorer I, first U.S. satellite)
- LC- 34 (Apollo program)
- Old Mission Control Center (Facility 1385)

All of the properties above are listed on the NRHP. Although the LC-13 Mobile Service Tower is listed on the NRHP, the 45SW and the Florida State Historic Preservation Officer have consulted on the integrity of the facility and determined that it no longer maintains its historic integrity. A Memorandum of Agreement has been completed which allows the 45SW to alter, dismantle, demolish or remover this structure.

In addition to the National Historic Landmark District, the following properties at CCAFS have been determined to be eligible for listing on the NRHP:

- Original site of the Cape Canaveral Lighthouse
- LC-1/2 and LC-3/4 (first launch site at CCAFS)
- LC-9/10 (Navajo)

- LC-17 (Thor and Delta)
- LC-21/22 (Matador and Mace missiles)
- LC-31/32 (Minuteman and Challenger debris)
- Cape Canaveral Lighthouse

PAFB

There has been no systematic archaeological survey of PAFB and there are no recorded sites within the boundaries of the Base. A reconnaissance study conducted by the National Park Service in 1982 found that the two shorelines at PAFB were severely disturbed due to filing and paving, and that the remaining property at PAFB was either subject to extensive earth moving or was developed. The study concluded that the likelihood that significant sites were preserved was limited and no cultural resource survey was planned.

MTA

An archeological/cultural resource survey of MTA was conducted in 1995. Physical inspections were performed, as well as interviews with local inhabitants and a historic records search. No evidence was found to indicate the existence of any archaeological, historical, or cultural sites on MTA.

JDMTA

A survey performed in 1995 found no evidence of archaeological, historical, or cultural sites on JDMTA.

Chapter 4: Environmental Consequences

This Chapter describes the potential environmental impacts associated with the activities under the proposed action and the no action alternatives. Components of the affected environment that are of greater concern are described in greater detail.

Federal, State, and local environmental laws and regulations were reviewed to assist in determining thresholds for assessing environmental impacts in fulfillment of NEPA requirements. Permits that may need to be acquired and other requirements that may need to be satisfied prior to or during land clearing activities are presented in each resource section. Chapter 3 of AFI 32-7064, *Integrated Natural Resources Management*, requires compliance with State and local wetland protection laws and Chapter 7 requires the USAF to protect State-listed endangered, threatened or rare species, when possible. Proposed activities were evaluated to determine their potential to result in significant environmental consequences using an approach based on the interpretation of significance outlined in the CEQ regulations for implementing the procedural provisions of NEPA (40 CFR 1500-1508) and AFI 32-7061, *The Environmental Impact Analysis Process* (1995).

Guidelines established by the CEQ (40 CFR 1508.27) specify that significance should be determined in relationship to both context and intensity (i.e., severity). The assessment of potential impacts and the determination of their significance are based on the requirements in 40 CFR 1508.27. Three levels of impact can be identified:

- No Impact - No impact is predicted
- No Significant Impact - An impact is predicted, but the impact does not meet the intensity/context significance criteria for the specific resource
- Significant Impact - An impact is predicted that meets the intensity/context significance criteria for the specific resource

Factors contributing to the intensity or severity of the impact include the following:

- The degree to which the action affects public health or safety;
- Unique characteristics of the geographic area such as proximity to cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas;
- The degree to which effects of the action on the quality of the human environment are likely to be highly uncertain or controversial;
- The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration
- Whether the action is related to other actions with individually insignificant, but cumulatively significant impacts;
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed

or eligible for listing on the NRHP, or may cause loss or destruction of significant scientific or cultural resources;

- The degree to which the action may adversely affect a species that is proposed for listing or is listed as endangered or threatened or its habitat that has been determined to be critical to the continued survival and recovery of such species; and

- Whether the action threatens to violate Federal, state, or local law or requirements imposed for environmental protection.

Thresholds for determining impact significance are based on the applicable compliance standard. When feasible, these criteria correspond to Federal- or State-recognized criteria, and are determined using the associated standardized methods. In the absence of compliance standards, the thresholds are based upon Federal- or State-recommended guidance, professional standards, and/or best professional judgments.

Air Quality

Air Force Instruction 32-7040, *Air Quality*, identifies AF requirements for an air quality compliance program. The AF must achieve and maintain compliance with all applicable Federal, State, and local standards (Table 4-1) for air quality compliance.

Proposed Action Impacts

Land clearing, open burning of cleared vegetation, and prescribed burning activities would affect air quality through smoke emissions from burning activities, exhaust emissions from machinery used in land clearing, and the suspension of dust particles (i.e., particulate matter (PM)) during project activities. Smoke from fires is a complex mixture of carbon, tars, liquids and gases. The bulk of air pollutants generated by burning activities are PM, carbon monoxide (CO), and volatile organic compounds (VOCs). Nitrogen oxides (NOx) are also produced in relatively small quantities compared to other pollutants. Sulfur oxides (SOx) are produced in negligible quantities due to low elemental sulfur content of forest fuel. Clearing activities would produce fugitive PM (i.e., the suspension of particles) when disturbing soils. Project machinery would emit CO, NOx and SOx.

Minor increases in these pollutants would not be sufficient to cause a change in the NAAQS attainment status. Impacts on visibility resulting from smoke emissions would be localized and only last for the duration of the burn. Pile (i.e., open burning) and prescribed burning would be performed in accordance with the provisions of 62-256 and 5I-2 of the F.A.C., meeting applicable setback, time, weather, staffing, and notification requirements. Burn operations would be conducted during optimal smoke dispersion periods.

Florida law requires a permit to conduct open burning in the State. This authorization must be obtained from the Division of Forestry. The person responsible for conducting the burn must be in attendance at a location

Table 4-1: Other Air Quality Regulatory Requiements

Law or Rule	Permit/Action(s)	Requirement	Agency or Organization
Air Force Instruction (AFI) 32-7040	Estimate air emissions	Track quantity of vegetation burned and vehicle/equipment use and estimate air emissions for PAFB and CCAFS for inclusion in the Air Emissions Inventory (AEI).	United States Air Force (USAF)
Clean Air Act (CAA)	Title V air operating permit	Comply with existing Title V air operating permit.	U.S. Environmental Protection Agency (EPA), Florida Department of Environmental Protection (FDEP)
5I-2 and 62-256, Florida Administrative Code (FAC)	Burn permit and burn requirements	Contact Florida Division of Forestry (FDF) and local fire departments before burning and comply with setback, time, weather and staffing requirements.	FDF and FDEP
National Ambient Air Quality Standards (NAAQS) and Florida Ambient Air Quality Standards (FAAQS)	Ambient air quality maintenance	Implement measures to protect health and safety, property and minimize nuisances such as impaired visibility.	USEPA; FDEP

upwind from the fire for the entire period of the burn. The burn cannot be allowed to produce smoke, soot, odors, visible emissions, heat, flame, radiation or other conditions to such a degree as to create a nuisance. On the day of the burn, prior to setting the fire, coordinating agencies (Fire, Security and Safety Departments) and adjacent property owners would be notified.

When planning and conducting fires, the Prescribed Fire Manager and Burn Boss must exercise their responsibilities in a way that meets CAA standards (Public Law 95-95) and best serves the public interest. Fire stewardship emphasizes the immediate safety aspects of personnel conducting the burn; the health, safety, and property of others that may be directly affected by the fire; and the potential for off-site effects of smoke on public health and visibility. Fires produce varying quantities of smoke, an elusive by-product that can be a major concern; therefore, smoke management would be considered in every fire plan.

Both CCAFS and PAFB are currently designated as major sources of air pollution with active Title V Air Operating Permits. The current CCAFS and PAFB Title V Air Operating Permits would not need to be amended, as the impacts associated with the proposed action would be minor and are covered by the existing permits. Neither annex (*i.e.*, JDMTA and MTA) has significant air emission sources and therefore they are both exempt from air permit requirements.

Both CCAFS and PAFB quantify air emissions from all activities, including burn operations, vehicle emissions, and land clearing. The estimated emissions are entered into thier respective Air Emissions Inventories (AEIs) annually, in accordance with AFI 32-7040. Minor emissions from land clearing and burning operations would be estimated and included in subsequent AEIs. The annexes are not required to maintain AEIs because they do not have significant air emission sources.

No significant impacts are anticipated to air quality from implementation of the proposed action.

No Action Alternative

Under the no action alternative, no significant impact would be anticipated since there would be no changes to the existing land clearing methodologies.

Biological Resources

The AF is committed to the long-term management of all natural areas on its installations, as directed by AFI 32-7064, *Integrated Natural Resources Management*.

General Wildlife Benefits

There are many general benefits to biological resources from implementing the proposed action. Mechanical pretreatment to reduce fuel height followed by controlled burning is highly recommended for wildlife habitat management in southern forests, especially those considered fire sub-climax communities. If vegetation in these types of communities is not burned and/or mechanically removed, the vegetation communities evolve past their current composition, rendering the

habitat unsuitable for certain wildlife species indigenous to CCAFS. Wildlife species on CCAFS, which would benefit from the proposed action include white-tailed deer, squirrels, rabbits, gopher tortoise, eastern indigo snake, quail, doves, gopher tortoise, and the Florida scrub jay. Other beneficial results from this land management program include an increase in yield and quality of herbage, legumes, browse from hardwood sprouts, and the creation of openings for feeding, caching, and travel.

The convoluted edges of cleared areas would prevent sharp contrasts in vegetation heights that contribute to predation of small mammals and birds by hawks and other raptors. This method also creates more "edge effect" which is known to contribute to ecosystem biodiversity.

CCAFS

Invasive Species

Invasion opportunities after clearing activities would be reduced by avoiding disturbance of natural habitats and by replanting natural vegetation as quickly as possible after areas have been disturbed.

Brazilian Pepper

After treatment with herbicides, it may take several weeks before there is evidence that the tree has been controlled. Defoliation and the presence of termites is an indicator that the treatment has been successful. Maintaining natural fire regimes would help combat this invasive species.

Australian Pine

Manual removal of new or small infestations of seedlings, saplings, and young trees is effective. Applying a systemic herbicide to bark, cut stumps, or foliage would be effective for heavy infestations of Australian pine, followed by a second treatment for large specimens. Prescribed fire has been used for large infestations in fire-tolerant communities, but it would be most effective only in dense stands with sufficient dry fuel on the ground.

Cogon Grass

There is no single treatment that effectively eliminates cogon grass infestations. This species will not persist in areas that are frequently cultivated, so frequent tillage may be used for control. Although tillage and herbicides would provide some control and suppression of the grass, long-term eradication is seldom achieved. Mowing or burning will remove above-ground vegetation but opens the plant canopy for emergence of seedlings and new stems from rhizomes. An integrated approach that combines burning, tillage (mechanical disturbance), and chemical applications provides the best solution for cogon grass management.

Melaleuca

The frill and cut-stump techniques that would be utilized reduces effects on non-target native vegetation since treatment is applied one tree at a time. A stressful event such as girdling and herbicide application will cause the tree to release millions of seeds from their capsules. Performing a second

application ensures that the resulting seedlings are eliminated before they can produce viable seeds.

Native Vegetation Communities

Some of the proposed action clearing activities would extend for several miles (*e.g.*, LOS and powerline right-of-ways). These extensive linear features cross many vegetation communities and wetland habitats. The following is a summary of impacts to vegetation communities from these activities.

Beach Dunes

The landward side of beach dunes would be burned in order to promote the sprouting of herbaceous forage for wildlife, including the Federal- and State-threatened southeastern beach mouse. No land clearing would occur in beach dunes, as beach dunes are sparsely vegetated (i.e., they do not block visibility in LOS, etc.) and the removal of vegetation cover makes them susceptible to destabilization.

Coastal Grasslands

This habitat would not be targeted for burning or clearing. However, coastal grassland would be incidentally burned to control invasive species, such as cogon grass, or to reduce fuel loads. This decreases the potential for impacts to grasslands that may be caused by emergency vehicles that responding to fires caused by mission activities such as the destruction of explosive ordinance.

Coastal Strand

This community develops in the absence of natural disturbance and therefore would not be targeted for clearing or burning. Prescribed burning of this community would occur incidentally where this community intergrades with adjacent habitats such as oak scrub, or when fuel loads become dangerous.

Coastal Interdunal Swales

Land clearing of interdunal swales would occur when necessary to satisfy mission requirements such as when a LOS crosses an interdunal swale. This habitat would not be targeted for prescribed burning, although, since interdunal swales are interspersed with xeric hammock and other communities, they would be incidentally burned.

Scrub

Scrub is essentially a fire-maintained community, with hot, intense fires occurring every 20-80 years (FNAI and FDNR, 1990). The nature of fuels in scrub ensures that when fire occurs, they are catastrophic. Such hot fires completely remove the vegetation and sterilizes the soil in large areas, creating openings that support many important scrub species, including the Florida scrub jay. Prior to modern development, oak scrub communities on CCAFS burned regularly as a result of lightning-set fires. Since government acquisition in the late 1940's, and probably during the earlier homestead period, a policy of fire suppression has eliminated this influence on the landscape. As a result, oak scrub on CCAFS is overgrown, relatively homogeneous, and species depauperate, especially rosemary scrub. Numerous indicators of fire

suppression abound in the scrub: herb species diversity is low; grape vines drape the canopy; leaf litter is deep and continuous; saw palmettos have elongated erect trunks, and canopy coverage is nearly complete with few openings. In 2002, Schmalzer and Foster found in a post-burn study on CCAFS that native species dominated burned areas a year after initial treatment, with some Brazilian peppers sprouting on the edges. They also reported that mechanically cleared areas have more woody shrubs and less herbaceous species than areas that are cut and burned.

Xeric Hammock

Lack of fire has certainly played a role in the development of xeric hammock on CCAFS. Large expanses of grapevines, commonly draped across the canopy of scrub and xeric hammock on CCAFS, are evidence of fire suppression. The xeric hammock on CCAFS has not burned , at least since the mid 1950's. The large, mature oaks found in these areas indicate that this community may have burned less frequently than scrub.

For habitat restoration purposes, xeric hammock is now targeted for mechanical treatment and prescribed burning on CCAFS. Burning would reduce the stature of the live oak canopy and create more sandy openings, both of which meet the criteria for scrub jay habitat. Studies have shown that burning does not lead to a change in species composition and dominance in scrub; re-vegetation occurs as a result of root sprouting, which proceeds quickly and prevents establishment of new species (Schmalzer and Hinkle, 1987, 1992). It is unlikely that burning will convert xeric hammock to a typical multi-oak-species scrub.

Banana River Maritime Hammock

The Banana River maritime hammock is the site of a powerline right-of-way that extends the length of the west side of CCAFS. The right-of-way has destroyed large swaths of the maritime hammock opening the hammock to invasion by species such as Brazilian pepper, which thrive on disturbances. Australian pine has also formed monospecific stands in some hammock areas that are devoid of all but a few plant species. Removal of invasive species would allow native plants to recolonize maritime hammocks. Clearing and burning of Banana River maritime hammock is not part of the proposed action.

Hydric Hammock

The most critical management concern for hydric hammocks on CCAFS is the encroachment of Brazilian pepper in the understory. Brazilian pepper thickets are adjacent to nearly all the hydric hammock. Manual removal with hand tools only, or spot treatments with herbicides would be conducted. Brazilian pepper is most successful when disturbance opens up corridors for its invasion or removes the natural ground and shrub layers. Therefore, mechanical clearing is excluded from hydric hammocks. Fire is not used as a management tool in hydric hammocks because soils are usually

saturated and ground cover is not substantial enough to carry fire.

Wetlands and Floodplains

Several areas containing waters of the U.S. and waters of the State of Florida, including wetlands, could be impacted by land clearing activities. The primary method of preventing adverse impacts to these would be avoidance; however, any wetland vegetation that is obscuring a LOS located in a security clear zone or in a canal would be removed. When feasible, clearing would be completed with hand tools. If heavy equipment must be utilized in waters of the U.S., then a CWA Section 404 dredge and fill permit would be obtained from the USACOE. An environmental resources permit (ERP) would be required to address State regulation regarding dredging and filling of surface waters (including isolated and connected wetlands). All cut vegetation would be removed from wetlands and disposed in upland areas. Firebreaks would be established around these habitats to prevent "muck fires" (i.e., underground fires), as wetland soils have a high organic matter content. Muck fires can burn for days and surface in distant locations creating unexpected fire hazards to structures and wildlife.

Mangrove Wetlands

Mangrove communities are very fragile and can easily be altered by clearing and burning activities. Invasive species such as Brazilian pepper are now directly competing with mangroves for limited shoreline habitat. While prescribed burning and land clearing is not proposed in mangrove wetlands, heavy equipment access into certain areas would require mangrove trimming. In cases where trimming creates bare areas that could be colonized by invasive species, mangrove seedlings would be planted and monitored to assure recolonization. Invasive species would be removed when found. When practical, all trimming would comply with Florida's Mangrove Trimming and Preservation Act. Herbicides would not be applied directly to or adjacent to mangroves during trimming and subsequent removal of invasive species.

Salt Marshes and Brackish Water Impoundments

Clearing in these areas would be limited to pruning tall vegetation that obstructs LOS or is present in security clear zones, utility rights-of-way, and other areas that must be maintained. Planting suitable low-growing native species to ensure invasive species do not invade the cleared areas would mitigate the removal of native vegetation. Prescribed burning would not occur in these areas.

Canals

Canals would be periodically cleaned with a dragline to remove excessive emergent vegetation (*e.g.*, cattails) from the canals to permit unobstructed waterflow. This practice destroys some environmental attributes temporarily, but observations show habitat stabilization via growth of emergent vegetation from rhizomes (i.e., laterally spreading roots) and seed banks and utilization by wildlife usually occurs quickly after cleaning.

Threatened, Endangered and Sensitive Species

Many of the areas that would be cleared are known to support sensitive species such as the Florida perforate cladonia, gopher tortoise, eastern indigo snake, Florida scrub jay and southeastern beach mouse. Section 7 of the ESA requires Federal agencies to ensure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat. The USFWS was consulted to discuss actions that could affect Federal-listed and candidate T&E species, migratory birds, and their habitats. The Section 7 consultation letter and the USFWS concurrence can be found in Appendix C. In addition, Florida laws, including the FETSA, PNFFA and ESPA provide protection and require the wise management of State T&E species and special concern species. Chapter 7 of AFI 32-7064, *Integrated Natural Resources Management*, requires the USAF to protect State-listed endangered, threatened, or rare species, when possible. The 45SW recognizes the importance of State-listed and rare species and would make all practical attempts to protect and conserve these species and their habitats.

Threatened, Endangered and Sensitive Plant Species

Numerous T&E and otherwise sensitive plants occur in the proposed action areas. Clearing and burning would provide habitat for many of these species. Openings and edges in oak scrub, where oaks have been mechanically removed and bare sand is exposed, support a number of rare plants, underscoring the importance of vegetation management. Rare plant species found in clearings in scrub on CCAFS include Curtiss' milkweed, nodding pinweed, and sand-dune spurge. Disturbed areas and openings within the Atlantic maritime hammock are known to support coastal vervain and Florida lantana.

Threatened, Endangered and Sensitive Animal Species

American Alligator

The American alligator inhabits and reproduces in all CCAFS waters. Numerous sightings of juvenile alligators throughout CCAFS' drainage canal system occur every summer. Due to their ability to evade and tolerate occasional canal cleanings, it is anticipated that this species would not be adversely affected.

Gopher Tortoise and Eastern Indigo Snake

Prescribed burning and mechanized clearing would provide herbaceous growth for tortoise food. However, scrub restoration activities have the potential to directly impact species such as gopher tortoises and eastern indigo snakes. Indigo snakes are associated with gopher tortoises because they often use their burrows as refuges, possibly from temperature, desiccation, and predators.

When activities are scheduled near tortoise habitat, but individual burrows would not be disturbed, natural resource personnel will stake off the area that must be avoided and provide tortoise informational posters. Although

never observed on CCAFS, slow moving gopher tortoises could be run over by heavy equipment performing cutting activities. Concerns regarding heavy equipment collapsing and entombing them inside of their burrows have been dismissed based on studies by the FWCC (Joan Berish, pers. comm.).

When activities are likely to disturb gopher tortoise burrows, CCAFS biologists will relocate tortoises to other suitable areas on CCAFS. Biologists would move tortoises no more than one to two days prior to clearing so that tortoises can be moved back close to their original area. All tortoise relocation will be completed in accordance with the Gopher Tortoise Relocation Permit (WR01103), issued to the USAF. This permit, which was renewed 5 May 2004, allows natural resource managers to relocate up to 150 tortoises during a three-year period. Trapping is conducted by experienced personnel and in accordance with required State permits for these types of activities. Although rare, tortoises have been injured or killed during backhoe operations. If a tortoise is injured during relocation activities, it will transported immediately to a licensed local wildlife rehabilitator or veterinarian experienced in treating injured tortoises. If injured or killed, the FWCC will immediately be notified. Tortoises held overnight will be kept isolated from one another to prevent the spread of Upper Respiratory Tract Disease (URTD). Blood sampling will be conducted by experienced biologists and in accordance with FWCC guidelines. Animals will be handled briefly and gently to reduce harm or stress to the animal. The USAF is required to submit a report for each relocation project.

Most indigo snakes leave construction areas once activities begin and any encountered are to be left alone and permitted to leave on their own. The only time indigo snakes may be relocated is during relocation of gopher tortoises. In accordance with the USAF Gopher Tortoise Relocation Permit, no more than one indigo snake encountered may be relocated. Should additional specimens of this species be encountered, the capture operation is suspended and the FWCC office in Tallahassee contacted for instructions.

Florida Scrub Jay

The USFWS considers CCAFS a core scrub jay area and highly valuable to the recovery of the species, regardless of the scrub condition. Typically, any removal of vegetation would require compensation at a rate of 4:1 (four acres restored for every acre destroyed). However, the new methods of clearing evaluated in this PEA have been presented to the USFWS, who have approved of the methods and agreed to allow clearing in these areas without requiring the need to compensate with additional acreage. Some clearing may be restricted during the scrub jay nesting season, which runs from March 1st until June 30th, in those areas in which jays are known to be nesting. Close coordination with the 45 CES/CEVP would occur so that those areas can be identified and properly protected to prevent adverse impacts to this species.

The proposed action includes all of the following habitat enhancement activities, which are specified in the Scrub Jay Management Plan:

- Maintaining mowed grass areas along roads and facilities.
- Conducting periodic prescribed burns of oak scrub to prevent possible succession into a xeric hammock or having scrub reach a height unsuitable for scrub jays.
- Improving degraded habitat by mechanical clearing methods followed by burning.
- Conducting invasive vegetation control in areas that have been improved.

Sea Turtles

Three species of turtles have been documented to nest on CCAFS: loggerhead, green, and the leatherback. Sea turtle nests have been identified along the entire length of the CCAFS beach; therefore, the beach from mean low water to a line just behind the leading dune is considered protected habitat for all species of sea turtles. Direct impacts to sea turtles or their nesting habitat, primarily beaches, are not anticipated. However, research has demonstrated that females will avoid highly illuminated beaches and therefore postpone nesting (Witherington, 1992). Likewise, disorientation (loss of bearing) has caused hatchling mortality, as the confused hatchlings move towards artificial light sources and dunes instead of the ocean. In areas where vegetation removal occurs adjacent to beaches, artificial lighting effects would be assessed to determine if artificial lighting is anticipated to effect turtle nesting after vegetation removal. Research shows that various types of lights affect sea turtles to varying degrees, with Low Pressure Sodium (LPS) lamps (589-590 nanometers in wavelength) having the least affect on sea turtles. These types of lamps would be substituted for existing lamps if lighting is expected or observed to be a nuisance to sea turtle nesting activities. Alternately, artificial lighting may be controlled with another appropriate method as identified in 45SW Instruction 32-7001.

Southeastern Beach Mouse

Many of the proposed action work areas are located in habitat occupied by the threatened southeastern beach mouse. The USAF is currently renewing a programmatic Biological Opinion from the USFWS that allows incidental take of beach mice as a result of projects that would not involve permanent removal of habitat. It is probable that creating openings in dense habitats would not only create beach mouse habitat, but also create corridors in which this species could move between suitable habitats. Burning would promote the growth of herbaceous forage for this species.

Florida Manatee

Due to the nature of the activities conducted, and the proximity to the designated manatee critical habitat, the USAF will take particular consideration when working near the USAF turning basin, Trident Wharf, Poseidon Wharf, USAF Wharf, Banana River shoreline, and other areas where manatees are

known to feed on aquatic vegetation, such as in quiet canals that are at least 2 meters deep (USFWS, Living Document). Herbicides would not be utilized in areas known or suspected to support manatees.

Migratory Birds

Land clearing and burning activities would not be conducted during the main nesting season in areas where migratory bird nests are found, unless a critical need to assure mission requirements. Natural resource managers performing migratory bird nest/egg removal are permitted under Federal Fish and Wildlife Depredation Permit MB841530-0, as well as FWCC Migratory Bird Nest Permit WN99272. Transportation of live birds or eggs will be conducted in a manner that reduces harm or stress to the animal or egg involved. It is probable that some bird nests would be inadvertently destroyed during project activities. Despite the potential loss of an occasional nest, over-grown, fire-suppressed vegetation communities should be restored to its original oak scrub condition in order to benefit both migrant and resident bird species.

PAFB

Most activities on PAFB would be related to the removal of invasive species and clearing canals. Mechanical clearing would occur adjacent to the perimeter fence and around structures.

Invasive Species

Brazilian Pepper, Australian Pine, and Melaleuca

The effects of the proposed action on these species would be the same as previously discussed for CCAFS.

Torpedo Grass

Hand removal of torpedo grass is effective for small infestations. The cookie cutter system would clear all vegetation that it contacts creating channels up to 3 feet deep. This system opens up areas for nesting and bird access. Flail choppers would provide short-term clearing of herbaceous plants and young invasive woody plants. Most aquatic plant harvesting systems will cut and remove submersed plants to a depth of 5 to 7 feet.

Native Vegetation Communities

Beach dunes represent the only major native habitat where work could occur. The impacts would be the same as previously discussed for CCAFS.

Wetlands and Floodplains

Small intermittent wetlands and canals are the only wetland habitats on PAFB. The strategy outlined for CCAFS would be utilized to minimize impacts to these habitats. The treatment of invasive species would create opportunities for native species to recolonize wetland habitats.

Threatened, Endangered and Sensitive Species

Sensitive species that have been observed on PAFB include: Florida manatee, American alligator, loggerhead turtle, green sea turtle, leatherback turtle, hawksbill turtle, gopher tortoise, Eastern indigo snake, roseate spoonbill, piping plover, little blue heron, reddish egret, snowy egret, tricolored heron, white ibis,

southeastern American kestrel, Arctic peregrine falcon, American oystercatcher, bald eagle, wood stork, brown pelican, black skimmer, and least tern. Many common migratory birds also utilize PAFB.

No Federal-listed plant species have been identified on PAFB. State-listed dune species that have been identified are the beach star, inkberry, prickly pear cactus and spider lily.

The management of these species and their habitats during the proposed action activities would be the same as previously described for CCAFS; therefore, impacts and mitigation measures to reduce and where feasible eliminate impacts would be similar.

MTA

Invasive Species

Brazilian pepper and torpedo grass would be treated as part of proposed action activities. The effects to these species would be the same as previously summarized for CCAFS and PAFB.

Native Vegetation Communities and Wetlands

Clearing along the existing fence line and around facilities would occur for security purposes. Vegetation clearing could impact remnants of hydric hammocks, mesic flatwoods, wet flatwoods, and depressional marshes. The same mitigation strategy that would be utilized to protect wetlands at CCAFS would be applied at MTA.

Prescribed burning is proposed to control fuel loading, as the facility abuts residential neighborhoods. Prescribed burning would enhance all of the vegetation communities, which are fire dependant.

Threatened, Endangered and Sensitive Species

Habitat on MTA is not available for most rare species of plants due, in part, to the lack of burning in fire-adapted natural communities such as depression marshes and wet/mesic flatwoods. No Federal-listed and only one State-listed plant species has been observed on MTA, the epiphytic hand fern. Prescribed burning would promote the reestablishment of some rare plants and other native species. The gopher tortoise and Eastern indigo snake have been identified on MTA.

Protection of these species and their habitats during proposed action activities would be the same as previously described for CCAFS; therefore, impacts and mitigation measures to reduce and where feasible eliminate impacts would be similar.

JDMTA

Native Vegetation Communities

Most (about 80%) of the property is developed. The remaining 20% is comprised of scrub “islands” typical of the rosemary scrub habitat. Prescribed burning would improve the health of rosemary scrub. Clearing would occur adjacent to the perimeter security fence and around existing structures. Some rosemary scrub would be removed if necessary to maintain clear security zones.

Invasive Species

Brazilian pepper tree is the only invasive species that has been identified on JDTMA. The effects of treating this species would be the same as previously summarized for CCAFS.

Threatened, Endangered and Sensitive Species

Florida perforate cladonia is the only sensitive plant known to occur on JDMTA (Federal- and State-endangered). It can survive for some time under the canopy of sand pines, however, such situations are not stable in the long run, since fuel layers are typically continuous and fires kill entire populations. In contrast, on the bare soils of open sites, fuels are discontinuous allowing patches of lichen to survive unburned. Recruitment in this species is solely via vegetative fragmentation and post-fire expansion relies on unburned populations. Without active fire management and with a seed source from mature pines onsite, the vegetation at JDMTA is succeeding to a dense stand of sand pines and understory of palmetto and oaks. Under these conditions, litter accumulates too quickly for this lichen to overtop it and shade becomes too dense for its survival. Mechanical removal of oak scrub and sand pines that are encroaching on bare areas supporting this lichen, represents the best management option. Vehicular access would also be prohibited in areas that support this lichen. (Yahr, 2004)

The Florida scrub jay, gopher tortoise, and eastern indigo snake are known to or potentially occur on JDTMA. The management of these species and impacts to rosemary scrub would be the same as previously described for CCAFS.

No Action Alternative Impacts

Under the no action alternative, an environmentally sound programmatic method would not be implemented for land clearing activities. Under Section 7 of the ESA and in accordance with AFI 32-7064, *Integrated Natural Resource Management*, the USAF is required to protect, preserve, and aid in the recovery of Federal-listed T&E species, and whenever possible, State-listed T&E and rare species. The proposed action would create habitat for the Florida scrub jay and other species that utilized bare areas. If scrub areas were cleared without the creation of scrub jay habitat, mitigation would be required.

Furthermore, EO 13112 requires Federal agencies to “detect and respond rapidly to and control populations of invasive species in a cost effective and environmentally sound manner.” Invasive species such as torpedo grass would continue to cause the loss of wetland habitat for plants and animals that inhabit the area without a plan to control the species. Also, the lack of an environmentally sound land clearing methodology could result in adverse impacts to sea turtles due to exposure to lighting effects when vegetation is removed near nesting/ hatchling sites.

Geology, Soil and Water Resources

Air Force Instruction 32-7041, *Water Quality Compliance*, identifies essential AF actions to achieve and maintain compliance with the Clean Water Act, and other applicable Federal, State, and local water quality standards. It requires adherence to applicable State and local water quality standards when they are more stringent than Federal standards.

Proposed Action Impacts

Water resources in the proposed action areas include surface waters, groundwater, and wetlands. The proposed action would not utilize or discharge to ground or surface waters. Aquatic habitats, including wetlands, are addressed separately, under the biological resources section. Under the proposed action, a variety of methods would be employed to clear, control, and maintain the vegetation at the 45SW, including prescribed burning, mechanical cutting, and the application of herbicides. These actions have the potential to impact water resources and soils in the proposed action areas.

Herbicide Application

Four herbicides would be utilized to treat invasive species: Garlon 4™, Arsenal®, Roundup Pro® and Rodeo/ Aquamaster™. All of these are listed on the April 2004 Armed Forces Pest Management Board approved list for DLA/DSCR stockage, except Garlon 4™. Headquarters for the USAF Space Command/Civil Engineering (HQ AFSPC/CEVP) approved Garlon 4™ for use in January 2004. Aquatic environments would only be treated with Rodeo/Aquamaster™. The following is a general description of the effects of these herbicides on water and soil resources.

Garlon 4™ binds to soil particles and following rainfall tends to stay within 30 cm of the surface. There is little risk of the active ingredient, triclopyr, reaching groundwater, and it poses no significant environmental hazard due to leaching. In the soil, Garlon 4™ undergoes degradation by soil microorganisms (fungi and bacteria) in the presence of sunlight. Final degradation products are carbon monoxide, water, and organic acids. This herbicide is not approved for application in or adjacent to surface waters. If Garlon 4™ inadvertently reaches water it dissipates through a variety of environmental processes that collectively remove it very rapidly. It undergoes hydrolysis in water to form triclopyr acid, which breaks down through exposure to sunlight.

Arsenal® is effective at low application rates, thus putting less chemical burden on the environment. Since Arsenal® binds tightly to soil particles, it will not harm groundwater supplies. It is a specific herbicide. Therefore, many herbaceous species that are valuable food sources for wildlife remain unharmed and able to flourish due to the control of undesirable brush.

Roundup Pro® is effective and safe to use in upland environments. This herbicide is not approved for application in or adjacent to surface waters and has been found moderately toxic to some fish species (*e.g.*, bluegill sunfish). Glyphosate, the active ingredient, binds tightly to most soil types, and therefore

has an extremely low potential to move into groundwater. In soil and water, the active ingredient, glyphosate, degrades into aminomethylphosphonic acid and ultimately carbon dioxide, inorganic phosphate, and other naturally occurring compounds.

Rodeo/AquaMaster™ is effective and safe to use in drainage ditches, canals, wildlife habitat restoration and management areas, and similar sites, as it has no water restrictions. In soil and water, the active ingredient, glyphosate, degrades into aminomethylphosphonic acid and ultimately carbon dioxide, inorganic phosphate, and other naturally occurring compounds. A comprehensive ecotoxicological risk assessment concluded that glyphosate poses minimal risk to non-target species (Giesy et. al, 2000).

Mechanized Clearing and Prescribed Burning

Sinkholes are the primary geologic hazard in central Florida that develop when overlying soils collapse into existing cavities; however, CCAFS is not located in an active sinkhole area. Land clearing and burning activities would not change the physiography of the region, nor would it impact any unique geologic features or geologic features of unusual scientific value.

The potential for soil erosion and transport of sediment into surface waters exists when land is disturbed. Infiltration and percolation of rainfall would increase for a short period of time. This potential would be minimal and eliminated when erosion and infiltration rates return to background levels upon regrowth of surface plants. A water quality certification (as part of an ERP discussed previously) would be acquired from FDEP or the locally designated water district, for all work requiring a dredge and fill permit. A NPDES permit would be obtained for all proposed action activities that disturb more than one acre and have the potential to impact surface waters, except when the silviculture exemption applies.

Prior to and during land clearing and burning activities, erosion and sediment control measures designed to retain sediment on-site and to prevent violations of State water quality standards would be implemented. Any erosion or shoaling that could cause adverse impacts to water resources would be mitigated using the BMPs established by the Florida Division of Forestry and where applicable BMPs specified in the ERP and NPDES permit. Erosion and sediment control measures would be initiated, as soon as practicable, in disturbed portions of the site where land clearing activities have permanently ceased or are temporarily on hold for at least seven days. During land clearing activities, necessary measures shall be used to settle, filter, treat, or absorb silt-containing or pollutant-laden stormwater runoff in order to:

- limit the suspended solids to 50 mg/l or less during rainfall periods not exceeding the 10-year, 24-hour rainfall;
- maintain a pH of 6.0 to 8.5; and
- limit increases in turbidity to 29 NTUs above background levels in waters of the State.

Control measures shall consist of, at a minimum, filters, sediment traps, barriers, berms, or vegetative planting. Exposed or disturbed soil shall be protected as soon as possible to minimize silt and sediment laden runoff.

No Action Alternative Impacts

Under the no action alternative, there would be no changes to existing land clearing methods. No significant impacts would be anticipated since BMPs would be used to mitigate impacts to water resources and soils.

Hazardous Materials and Hazardous Waste

Proposed Action Impacts

Hazardous materials typically associated with land clearing activities, such as lubricants and fuels, would be used during the proposed action. Any hazardous waste would be identified, removed, and disposed of in accordance with current regulations. Although not anticipated, any additional hazardous materials/waste generated due to the implementation of the proposed action would be identified and removed in accordance with existing regulations.

Some of the canals and areas identified for land clearing activities may be contaminated by hazardous waste. To ensure potential contamination is not disturbed, the IRP Office at CCAFS would be consulted prior to scheduling any land clearing activities on IRP sites.

No Action Alternative Impacts

No significant impacts to hazardous materials and waste would occur from the no action alternative since no changes would occur.

Cultural Resources

Federal and USAF regulations require that the 45SW take into consideration the impact of its activities on cultural resources which have been determined to be or are considered eligible for listing on the National Register of Historic Places (NRHP). Specifically, the National Historic Preservation Act (NHPA) regulates actions at sites eligible for listing on the NRHP.

Proposed Action Impacts

In 1994, a Historic Properties Survey of CCAFS was published that delineates the boundaries of all known archaeological sites on the Installation. Some of the proposed work areas are known to contain archaeological sites. No archaeological resources are known to exist on PAFB, MTA or JDMTA.

The potential to unearth archeological resources during project activities does exist as some of the proposed work involves soil disturbances. Land clearing with heavy equipment would disturb soils, especially when clearing to mineral soils for firebreaks. Prescribed burning could heat, distort, and in some cases destroy archeological remains. In order to prevent these potential impacts, work within areas known to contain archeological resources would not generally occur. However, when the mission requires vegetation removal

near archeological sites, clearing would be completed with hand tools under the supervision of an archeologist familiar with the resources of concern. Prescribed burning is not proposed in areas that contain archeological resources.

No archaeological survey, despite an intense effort and excellent research sampling strategy, precludes the possibility that an archaeological site may be discovered during project activities. Federal cultural resource preservation statutes mandate that if artifacts become apparent during clearing or burning operations, work in the immediate vicinity of the cultural materials would cease and the Florida SHPO would be consulted through the 45SW CES. (Federal Register, Rules and Regulations, Dec. 4, 1995, Vol. 60, No. 232:62161, Section 10.5).

In order to preserve CCAFS' historical legacy, all work scheduled to occur adjacent to the historical facilities listed in Chapter 3 must be coordinated with the 45CES. As with all facilities, firebreaks would be established around historic structures. Manual tree felling would only be conduced near historic structures when there is no potential for damage to occur to historic facilities.

No Action Alternative Impacts

No significant impacts to cultural resources are anticipated as a result of the no action alternative. Mitigation measures would still be applied.

Conflicts with Federal, State, or Local Land Use Plans, Policies, and Controls

The proposed action would restore native habitats by reintroducing fire at natural intervals, and compensating for extensive periods of fire suppression by mechanically treating scrub habitats prior to and after prescribed burning events. The proposed action does not conflict with Federal, regional, State, or local land use plans, policies, or controls. Conversely, the proposed action contributes to the statewide and national goals of restoring native habitats in support of the recovery of impearled species that depend upon such habitats.

Energy Requirements and Conservation Potential

The level of energy required to support the proposed action would not be significantly greater than that utilized by the USAF and contractors to carry out current activities. Existing energy sources are considered adequate to meet the requirements of the proposed action.

Natural or Depletable Resource Requirements and Conservation Potential

Diesel and unleaded fuels and engine oil would be required to power project equipment such as bulldozers, roller/choppers, feller/bunchers, chainsaws, and trucks. Other than the use of vehicle fuels for project activities, the

proposed action requires no significant use of natural or depletable resources.

Irreversible or Irretrievable Commitment of Resources

Although the proposed action would result in some irreversible and irretrievable commitment of resources such as fuel and labor, this commitment of resources is not significantly different from that necessary to support current mission activities taking place on 45SW-managed lands.

Adverse Environmental Effects that Cannot be Avoided

Adverse environmental effects that cannot be avoided include temporary, intermittent emissions of fugitive dust and exhaust products; temporary displacement of wildlife during project activities due to noise; some destruction of existing upland vegetation; trimming and removal of wetland vegetation, and some sediment runoff into waterbodies. However, through implementation of the mitigation measures described within this document these effects would be reduced to a less than significant level.

Relationship Between Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

The proposed action to implement a new land clearing management methodology would ensure the creation and restoration of native habitats for several sensitive species, especially those that are fire dependant, while meeting critical mission requirements to have clear LOS, security zones, utility corridors, fire breaks, and other areas. In the long term, delisting of the Florida scrub jay and other species could occur as a result of the proposed action.

Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

The proposed action would not substantially affect human health or the environment and would not exclude persons from participation, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin.

Conditions Normally Requiring an Environmental Impact Statement

The potential impacts arising from land clearing activities were evaluated specifically in the context of the criteria for actions requiring an Environmental Impact Statement described in DOD Directive 6050.1*, Environmental Effects in the United States of Department of Defense Actions* (U.S. Department of Defense, 1979), and AFI 32-7061, *The Environmental Impact Analysis Process* (Air Force, 1995).

Specifically, the proposed project activities were evaluated for their potential to:

- significantly affect environmental quality or public health and safety;

- significantly affect historic or archaeological resources, public parks and recreation areas, wildlife refuge or wilderness areas, wild and scenic rivers, or aquifers;
- adversely affect properties listed or meeting the criteria for listing on the National Register or the National Registry of Natural Landmarks;
- significantly affect prime and unique farmlands, wetlands, ecologically or culturally important areas, or other areas of unique or critical environmental concern;
- result in significant and uncertain environmental effects or unique or unknown environmental risks;
- significantly affect a species or habitat listed or proposed for listing on the Federal and State lists of endangered or threatened species;
- establish a precedent for future actions;
- adversely interact with other actions resulting in cumulative environmental effects; and
- involve the use, transportation, storage, and disposal of hazardous or toxic materials that may have significant environmental impact.

The evaluation indicated that the proposed action for did not meet any of these criteria.

Mitigation Requirements

Mitigation is defined by the CEQ in 40CFR 1508 as one or more of the following actions related to the protection of the human environment:

- avoiding the impact altogether by not taking a certain action or parts of an action;
- minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or
- compensating for the impact by replacing or providing substitute resources or environments.

Table 4-2 below provides a summary of the mitigation measures contained in this document that have been incorporated into the proposed action (Preferred Alternative). More detail regarding mitigation measures is provided in the impacts discussion identified earlier in this chapter and in Table 2-1, Potential Regulatory Requirements.

Cumulative Impacts Summary

Cumulative impacts were considered for the proposed action and no action alternative. They would only occur to biological resources. If the no action alternative were selected, adverse cumulative impacts to biological resources would continue to occur. Specifically, sensitive and protected species (*e.g.*, Florida scrub jay and Curtiss' milkweed) that depend upon fire

disturbance regimes or anthropogenic disturbances (land manipulation with heavy equipment) would not benefit from the creation of early seral stage habitats (bare areas and low-lying scrub). In addition, invasive species would continue to out compete native species resulting in the additional loss of already endangered native vegetative communities. If the proposed action were selected, the converse would occur resulting in the expansion of sensitive species populations and their native habitats.

Table 4-2: Mitigation Measures Summary Matrix

Resource Category	Regulatory Driver	Potential/Known Impact(s)	Mitigation Type*	Mitigation Measure
Air Quality	National Ambient Air Quality Standards; Florida Ambient Air Quality Standards; 5I-2 and 62-256, Florida Administrative Code	Impaired visibility and respiration due to smoke production; loss/damaged structures due to fire	A, M	Comply with burn setback, time, weather and staffing requirements.
Biological Resources	AFI 32-7064, EO 11990	Degradation of wetlands from clearing	A, M	Clear with hand tools when practical; comply with CWA Sections 401 and 404 permits if heavy equipment use is required
Biological Resources	Mangrove Trimming and Preservation Act	Alteration of Mangrove communities	A, M	Use hand tools for trimming; plant bare areas with mangrove seedlings; avoid herbicide use adjacent to mangroves

*A=Avoidance, M=Minimization, C=Compensation

Table 4-2: Mitigation Measures Summary Matrix cont.

Resource Category	Regulatory Driver	Potential/Known Impact(s)	Mitigation Type*	Mitigation Measure
Biological Resources	Section 404, CWA	Removal of native vegetation in salt marshes and brackish water impoundments	A, C, M	Plant suitable low-growing native species; no prescribed burning in these areas; establish firebreaks around habitats
Biological Resources	Section 7, ESA	Mortality of gopher tortoise and eastern Indigo snake	A, M	Stake off areas of avoidance; relocations of tortoises and snakes
Biological Resources	Section 7, ESA	Loss of forage such as sea grasses for the Florida manatee	A	Avoid application of herbicides near known foraging sites
Biological Resources	Section 7, ESA	Shading of Florida perforate cladonia	A, M	Mechanical removal of scrub and sand pines that are encroaching on lichen habitat; limit vehicular access; establish firebreaks around lichen
Biological Resources	45SW Instruction 32-7001	Postpone nesting and disorientation of sea turtle hatchlings due to artificial lighting	M	Install LPS lamps in newly cleared areas or implement other protective measures identified in 45SW 32-7001

*A=Avoidance, M=Minimization, C=Compensation

Table 4-2: Mitigation Measures Summary Matrix cont.

Resource Category	Regulatory Driver	Potential/Known Impact(s)	Mitigation Type*	Mitigation Measure
Biological Resources	Migratory Bird Treaty Act (MBTA); EO 13186	Birds protected by the MBTA including the Florida scrub jay	A	Where possible, avoid work during nesting season in areas where nests are found or scrub jays are foraging
Cultural Resources	NHPA	Physical disturbance of archaeological sites	A	Use hand tools only in archeological area; coordinate activities with 45 CES; report any new archaeological discoveries and cease work
Cultural Resources	NHPA	Loss of or damage to historic structures from fires and tree-felling	A	Establish firebreaks around historic structures; limit manual tree felling.
Hazardous Materials/Waste	CERCLA	Disturbance of areas contaminated with hazardous waste resulting in greater dispersal of contaminants	A, M	Coordinate with Installation IRP office prior to land clearing on IRP sites
Soil Resources	Section 401, CWA	Erosion of soils	M	Implement erosion and sediment BMPs
Water Resources	Section 402, CWA	Siltation and pollution of surface waters	M	Obtain and comply with NPDES permit for activities that disturb >1 acre, except when the silviculture exemption applies

*A=Avoidance, M=Minimization, C=Compensation

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APPENDIX A
REQUEST FOR ENVIRONMENTAL IMPACT ANALYSIS
FORM 813

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REQUEST FOR ENVIRONMENTAL IMPACT ANALYSIS

Report Control Symbol
RCS: WON 10092645

INSTURCTIONS: *Section I to be completed by Proponent: Sections II and III to be completed by Environmental Planning Function. Continue on separate sheets as necessary. Reference appropriate item number(s).*

SECTION I - PROPONENT INFORMATION

1. TO *(Environmental Planning Function)*	2. FROM *(Proponent organization and functional address symbol)*	2a. TELEPHONE NO.
45 CES/CEV	45 CES/CEVP	853-6822

3. TITLE OF PROPOSED ACTION
Clear Lines of Sight and Security Clear Zones

4. PURPOSE AND NEED FOR ACTION *(Identify decisions to be made and need date)*

See page 2.

5. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES *(DOPAA) (Provide sufficient details for evaluation of the total action.)*

See page 2.

6. PROPONENT APPROVAL *(Name and Grade)*	6a. SIGNATURE	6b. DATE
Angy Chambers, GS-11	//Signed//	16-Apr-04

SECTION II - PRELIMINARY ENVIRONMENTAL SURVEY. *(Check appropriate box and describe potential environmental effects including cumulative effects.) (+ = positive effect; 0 = no effective; - = adverse effect; U = unknown effect)*	+	0	-	U
7. AIR INSTALLATION COMPATIBLE USE ZONE/LAND USE *(Noise, accident potential, encroachment, etc.)*	☐	☒	☐	☐
8. AIR QUALITY *(Emissions, attainment status, state implementation plan, etc.)*	☐	☒	☐	☐
9. WATER RESOURCES *(Quality, quantity, source, etc.)*	☐	☒	☐	☐
10. SAFETY AND OCCUPATIONAL HEALTH *(Asbestos/radiation/chemical exposure, explosives safety quantity-distance, etc.)*	☐	☒	☐	☐
11. HAZARDOUS MATERIALS/WASTE *(Use/storage/generation, solid waste, etc.)*	☐	☒	☐	☐
12. BIOLOGICAL RESOURCES *(Wetlands/floodplains, flora, fauna, etc.)*	☒	☐	☐	☐
13. CULTURAL RESOURCES *(Native American burial sites, archaeological, historical, etc.)*	☐	☒	☐	☐
14. GEOLOGY AND SOILS *(Topography, minerals, geothermal, Installation Restoration Program, seismicity, etc.)*	☐	☒	☐	☐
15. SOCIOECONOMIC *(Employment/population projections, school and local fiscal impacts, etc.)*	☐	☒	☐	☐
16. OTHER *(Potential impacts not addressed above.)*	☐	☒	☐	☐

SECTION III - ENVIRONMENTAL ANALYSIS DETERMINATION

17. ☒ PROPOSED ACTION QUALIFIES FOR CATAGORICAL EXCLUSION (CATEX) # A2.3.11; OR
☐ PROPOSED ACTION DOES NOT QUALIFY FOR A CATEX; FURTHER ENVIRONMENTAL ANAYLYSIS IS REQUIRED.

18. REMARKS

See page 5.

19. ENVIRONMENTAL PLANNING FUNCTION CERTIFICATION *(Name and Grade)*	19a. SIGNATURE	19b. DATE
E. ALEXANDER STOKES III, REM, GS-14 Chief, Environmental Flight		

4. Purpose and Need for Action The purpose of the action is to clear four lines of sight (LOS) and 14 security clear zones around various facilities on Cape Canaveral Air Force Station (CCAFS). The lines of sight are required to provide optical tracking data to Range Safety computers within the first minute after launch of space vehicles from CCAFS. Range Safety has a requirement to view the vehicle from the base of the pad up to approximately 15-18 seconds after the missile is launched. At this point, radar takes over the tracking process. The vehicle is optically tracked from the universal camera sites, which is the only source for tracking the vehicle until radar takes over. All optical data gathered from the sites are fed into the central computer that provides data to the Range Safety officer. If an emergency were to occur in the first 15-18 seconds after launch and the vehicle had to be destroyed, the optical tracking information provided to the central computer is the only source Range Safety has to determine the exact location of the vehicle. Additionally, engineering data is gathered with these cameras and utilized later to assess flight performance. The majority of the lines of sight are severely overgrown due to lack of maintenance over the past several years, therefore, rendering the sites ineffective until the vehicle has cleared the obstruction. One new line of sight is required for the new Delta IV vehicle launched from Space Launch Complex (SLC) 37. All other lines have been previously cleared and the work proposed for those are considered maintenance.

In accordance with Air Force Instruction (AFI) 31-101, the security clear zones are required around critical facilities to ensure security has an unobstructed view around the entire perimeter of the facility. Security regulations require a bare ground or mowed and maintained grassy area that contains no trees, landscape vegetation or variances in topography/grade, such as ditches, swales, holes, etc. The highest level of facility security requirements on CCAFS include: dual fencing, motion detectors, CCTV surveillance cameras, and three clear zones, between and on both sides of the two fences. These security areas have been previously cleared and the proposed are considered maintenance. There would be no new security zones established.

5. Description of Proposed Action and Alternatives

The following lines of sight are proposed to be cleared:

- **Universal Camera Site (UCS) 19 to SLC 17A – located off of Pier Road near the intersection of Pier Road and Phillips Parkway.**
- **UCS 23 to SLC 41 – located on ICBM Road between SLC 16 and SLC 19.**
- **UCS 23 to SLC 37B – See above.**
- **UCS 26 to SLC 17A – located on the east side of Phillips Parkway, across from Fuel Storage Area 1**

Guidelines have been established that address the methods in which lines of sight will be cleared. These guidelines have been developed to ensure mission capabilities, while enhancing habitat for numerous state and federally listed threatened and endangered species. In order to ensure the 45 Space Wing complies with these federal regulations, the following guidelines will be required for line of sight clearings at these four sites.

The clearing methodology described will create a corridor that will be easily maintainable and should minimize the need for last minute, “emergency”, line of sight clearing. Further, the clearing specifications will closely mimic various scrub components that, in combination, create habitat for numerous animal species on CCAFS.

Lines of sight will be cleared, re-established and/or maintained by creating a 100-foot wide bare ground strip in the center, with 50-foot wide strips on both sides where vegetation has been cut between 6 and 18 inches above grade. Dimensions for the widths of the three strips compromising the LOS are somewhat variable within the length of the LOS. It is preferred to have the edges of a LOS convoluted to prevent sharp contrasts in vegetation heights that may contribute to predation of small mammals and birds by hawks and other raptors. This method also creates more “edge effect” which is known to contribute to ecosystem biodiversity.

The 100-foot wide “bare ground” center strip will be cleared in a way that would prevent re-growth/re-sprouting/re-establishment of trees, woody shrubs and palmetto. Removal of all trees and their root systems will create a strip that can

be mowed and maintained without the use of heavy equipment and additional land clearing/vegetation removal. This will be accomplished by using bulldozers, front-end loaders with root rake attachments, chainsaws, feller-bunchers, V-blades, etc.

The 50-foot wide strips on either side of the "bare ground" center will be cut with equipment such as a Hydro-ax, Kershaw, V-blade, feller-buncher or similar type equipment. This action is being taken to preserve the root systems of existing scrub oaks in order to re-create Florida Scrub-jay nesting habitat adjacent to patches of bare ground, also an essential component of the bird's life cycle.

Vegetative debris resulting from clearing must be disposed in any one or more of the following methods:

1. Vegetative debris may be stacked in brush piles that would be burned after the material has dried sufficiently to facilitate ignition and burning. Care must be exercised to prevent brush piles from interfering with the function of the LOS. Piles established within the center must not exceed a height that could block the view of the SLC from the UCS. If piles are constructed to one side or the other of the centerline, they must not abut un-cut vegetation and must include an adequate firebreak between the pile and any un-cut trees. The 45 Civil Engineering Squadron, Environmental Flight, Conservation and Planning Element (45CES/CEVP) will be responsible for burning the brush piles after clearing has been accomplished.

2. As a supplement to the above method, the trunks and large branches of the oak trees can be cut into four-foot sections and palletized for sale as firewood.

3. Vegetative debris may be disposed by burning in a "burn box" or using a forced draft blower/trench burner. If this method is selected, a number of specific requirements must be employed. The 45CES/CEVP will provide additional information and requirements when this specific piece of equipment has been identified for LOS use.

4. Vegetative debris may be chipped or mulched on-site. The chips and/or mulch may be disposed on-site by spreading the material over the ground, without creating piles. This material must be small enough to not inhibit future mowing maintenance of the "bare ground" portion of the LOS. If the amount of chips/mulch cannot be spread effectively, the material may be removed and used at the CCAFS landfill for cover. Should this method of disposal become necessary, the 45CES/CEVP must be contacted to receive approval from the Florida Department of Environmental Protection (FDEP). Disposal in the CCAFS landfill will only be considered if all other options prove to be impractical.

5. Another option for disposal of vegetative debris and/or chips would be to transport the material to the Brevard County Landfill in Cocoa.

The following security clear zones are proposed to be cleared:

<u>30-Foot Clear Zone</u>

- Fuel Storage Area (FSA) 1 – exterior clear zone
- SLC 40 – exterior clear zone and area between fences
- Area 59 – east side of exterior clear zone
- Launch Operations Control Center (LOCC) – exterior clear zone
- Vehicle Integration Building (VIB) – exterior clear zone (west side)
- Solid Motor Assembly and Ready Facility (SMARF) – vegetation between fences
- Non Destruct Test Facility (X-ray Facility) – exterior clear zone · FSA 5 – clear zone
- Area 57 – clear zone
- Command Control Facility – clear zone
- Facility 60510 – rear of building clear zone

20-Foot Clear Zone

- **Security Boat Dock – clear area adjacent to boat dock**
- **South Boundary – clear area adjacent to river and base boundary fence**
- **SLC 36B – clear zone**

Security regulations require a bare ground or mowed and maintained grassy area that contains no trees, landscape vegetation or variances in topography/grade, such as ditches, swales, holes, etc. For the purposes of natural resource requirements for security clear zones, only the portion of a clear zone outside the exterior fence or building will be addressed. This would be the 20 or 30-foot wide bare ground or grassy "existing" clear zone and an additional ~50-foot wide "vegetated clear zone". Vegetation will be cut close to grade level and allowed to grow back to a height no greater than 1.5 meters. Research shows that scrub-jays prefer this scrub height and its proximity to acorn caching areas, typically open, sandy (bare) ground.

The first 20 or 30 feet outside the fence/facility will be cleared and grubbed as directed for the LOS projects, in accordance with Air Force security requirements. Within the adjacent 50 feet, vegetation will be cut to grade without eliminating the root systems of native vegetation; however, all Brazilian pepper bushes/trees encountered will be cut at ground level and immediately treated with an approved herbicide to prevent re-growth and/or spreading. Vegetative debris resulting from these clearing methods will be disposed as described in the LOS section of this document.

After initial development of the LOS and security clear zones, in accordance with these guidelines, periodic maintenance will be provided as described below.

Bare ground/mowed grassy areas: The 100-foot wide center portions of the LOS and 20/30 foot security clear zones will have all significant (greater than 2' in diameter) brush, trees, and root systems removed to accommodate routine maintenance. This maintenance will be accomplished by using mowers, plows and/or disc harrows pulled behind rubber-tired tractors.

Currently, it is believed that annual mowing will adequately maintain the LOS and clear zones while meeting the objectives of the scrub habitat restoration program. Maintenance mowing would only be conducted during the summer months in areas utilized by scrub-jays; therefore, all LOS maintenance activities will be coordinated with the 45CES/CEVP prior to scheduling and/or prioritizing the work. The 45CES/CEVP can identify areas that are not occupied by scrub-jays that could be maintained during nesting and caching seasons.

Vegetated side strips: The 50-foot wide side strip(s) will be cut and maintained using a Hydro-ax, Kershaw, roller chopper, or similar type equipment. The mechanically cut scrub vegetation will require maintenance on a 3-5 year schedule. Research shows that scrub-jays prefer scrub oaks in the 1-2 meter height range. One of the objectives of these strips is to provide potential jay nesting habitat immediately adjacent to the open bare ground/sandy/grassy center strip. Therefore, the side strips will be permitted to re-grow, and after initial cutting, they will be monitored to identify when maintenance cutting is warranted. Similar to the center strip of a LOS, maintenance of the side strips will occur during summer months to minimize potential impacts to fall/winter acorn caching/retrieval and spring nesting activity by scrub-jays. As stated previously, the 45 CES/CEVP will be contacted to coordinate this maintenance activity so all species utilizing these areas are adequately protected. This methodology will be monitored to ensure the process meets program objectives.

During all maintenance activities, extreme caution will be exercised to identify and eradicate invasive plant species, such as Brazilian pepper. When encountered, Brazilian pepper will be removed in a manner that eliminates the plant and its potential to re-sprout. These methods include cutting the tree at grade level and applying an approved herbicide to the stump, or pulling the plant, including the root system, out of the ground. Similar to scrub oaks and other scrub vegetation, Brazilian pepper can regenerate from the root system. Eliminating the viability of the root system prevents the spread of this invasive species. The resultant vegetative debris will be disposed as previously described in this document. Brazilian pepper trees seed in the winter months, typically November through April, but may seed longer. Restricting cutting to the non-seeding months minimizes the potential to facilitate the spread of Brazilian pepper during initial cutting or maintenance with heavy equipment.

ALTERNATIVES:

No Action – The no action alternative would preclude clearing of LOS and security clear zones. As explained earlier, the LOS are critical to provide optical tracking during launches. The majority of the lines of sight are severely overgrown due to lack of maintenance over the past several years, therefore, rendering the sites ineffective. Security clear zones are required to ensure proper resource protection. These clear zones ensure security visibility around the perimeter of critical facilities and also ensure protection of the facilities from wildfires.

Alternative Method of Vegetation Removal – There are numerous methods that could be employed to provide the needed clearing for both LOS and security clear zones; however, the proposed method is the environmentally preferred and would benefit both the mission and natural resources. The Air Force is required by Section 7 of the Endangered Species Act to protect and preserve threatened and endangered species and their habitat, on land under their control. The method described in the DOPAA will benefit the federally listed Florida Scrub-jay, as well as other scrub dependent species. Additionally, creation of habitat will prevent the requirement to provide compensation, as is typically required when removing vegetation from CCAFS. Similarly, Executive Order 13112, Invasive Species, requires Federal agencies to (Section 2. (2) (ii)) "detect and respond rapidly to and control populations of such species in a cost effective and environmentally sound manner".

18. Remarks

Many of the areas proposed to be cleared are known to support gopher tortoises, a State Listed Species of Special Concern. Any tortoises located in areas to be cleared to bare soil will require relocation prior to groundbreaking. In an effort to prevent adverse impacts associated with relocation of tortoises, 45 CES/CEVP biologists will move tortoises no more than one to two days prior to clearing so that tortoises can be moved back close to their original area. For example, as a line of sight is cleared, tortoises in areas along the portion of the LOS that hasn't yet been cleared would be relocated to that portion of the line of the sight that has already been cleared. Another option would be to relocate tortoises to those areas adjacent to the cleared portion; i.e., those areas that are to be cut and permitted to re-grow to a certain height.

The clearing specifications described above will closely mimic various scrub components that, in combination, create habitat for numerous species on CCAFS. Research shows that scrub-jays prefer a scrub height of 1.5 meters with open, sandy (bare) ground. The methods described above will create scrub-jay habitat that will directly benefit not only scrub-jays, but also other scrub dependent species. Additionally, much of the habitat on CCAFS is restricted to certain areas, with unsuitable scrub located between these areas. This makes it difficult for jays to disperse when leaving their territories and either joining other groups or establishing their own territory. Creating jay habitat along lines of sight may create corridors that will allow jays to easily disperse from their own territories.

The U. S. Fish and Wildlife Service (FWS) considers CCAFS a core scrub jay area and highly valuable to the recovery of the species, regardless of the scrub condition. Typically, any removal of vegetation would require compensation at a rate of 4:1 (four acres restored for ever acre destroyed). The new methods of clearing described here have been presented to FWS, who not only has approved of the methods but also has agreed to allow clearing in these areas without requiring the need to compensate. Some clearing may be restricted to outside scrub-jay nesting season, which runs 1 March – 30 June, in those areas in which jays are known to be nesting. Close coordination with the 45 CES/CEVP office will be required so that those areas can be identified and properly protected to prevent adverse impacts to this species.

Many of the lines of sight and/or security close zones are located in habitat occupied by the federally listed threatened beach mouse. The Air Force has a programmatic Biological Opinion that allows incidental take of beach mice as a result of projects that would not involve permanent removal of habitat, such as this. On the contrary, it is quite probable that the opening up of some of the lines of sight would not only create beach mouse habitat, but also create a corridor in which this species could use to move between suitable habitats. Additional FWS consultation will not be required for this project.

The proposed line of sight intersects several areas containing wetlands. The primary method of preventing adverse impacts to wetlands will be avoidance; however, any vegetation that is obscuring a line of sight or is located in a security clear zone will be removed. Areas located in wetlands must be hand cleared to avoid any type of disturbance from heavy equipment. Additionally, trimming of mangroves must be done in accordance with Florida Statute XXIX, Chapter 403, Part VII, Sections 403.932-933, Mangrove Trimming and Preservation Act.

Prior to and during construction, implement all erosion and sediment control measures (Best Management Practices) required to retain sediment on-site and to prevent violations of state water quality standards. Implement best management practices as necessary and correct any erosion or shoaling causing adverse impacts to water resources. Additionally, erosion and sediment control measures shall be initiated, as soon as practicable, in disturbed portions of the site where construction activities have permanently ceased or are temporarily on hold for at least seven days.

A National Pollutant Discharge Elimination System (NPDES) General Permit will not be required for this work since the proposed clearing is not related to a construction project. A phone conversation between 45 CES/CEVC and the Florida Department of Environmental Protection confirmed that this would not be required.

Prior to any digging, a Utility Locate/Excavation Permit will be required. To obtain an excavation permit, contact SGS Mission Support, Excavation Administrator, at 861-4453.

Remarks on this AF Form 813 apply only to the proposed actions as described, and not to additional work that may be required. Any change in scope of the project will require re-evaluation by the 45 CES/CEVP at 853-6822. Additionally, if the project is not initiated within one year of this environmental analysis, it will require re-evaluation.

An Environment Assessment (EA) for lines of sight was completed in January 1997. Due to the recent change in methodology in how lines of sight and other clearing projects will be accomplished, this EA is currently scheduled to be re-written in Fiscal Year 2004. This AF Form 813 covers those projects that are required to be accomplished prior to the EA being completed.

The proposed project will not significantly impact CCAFS environmental attributes and is actually expected to enhance habitat for several state and federally listed species on CCAFS; therefore, qualifies for Categorical Exclusion (CATEX) A2.3.11. This is defined in 32 CFR 989, Environmental Impact Analysis Process (EIAP), Appendix B, as “actions similar to other actions which have been determined to have an insignificant impact in a similar setting as established in an EIS or an EA resulting in a FONSI.” Reference Environmental Assessment for Proposed Construction and Maintenance of Instrumentation Lines of Sight on Cape Canaveral Air Force Station, FL, with a signed Finding of No Significant Impact (FONSI) dated 17 January 1997.

alc

19-Apr-04

APPENDIX B
WILDLIFE SPECIES IN THE PROPOSED ACTION AREAS

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Table B-1: Mammals Present on CCAFS

Common Name	*Scientific Name*
Opossum	*Didelphis virginiana*
Seminole Bat	*Lasiurus seminolus*
Yellow Bat	*Lasiurus intermedius*
Raccoon	*Procyon lotor*
River Otter	*Lutra canadensis*
Spotted Skunk	*Spilogale putorius*
Feral Cat	*Felis domesticus*
Bobcat	*Lynx rufus*
Gray Fox	*Urocyon cinereoargenteus*
Eastern Gray Squirrel	*Sciurus carolinensis*
Eastern Mole	*Scalopus aquaticus*
Least Shrew	*Cryptotis parva*
Short-tailed Shrew	*Blarina brevicauda*
Pocket Gopher	*Geomys pinetis*
Cotton Mouse	*Peromyscus gossypinus*
Florida Mouse	*Podomys floridanus*
Southeastern Beach Mouse	*Peromyscus polionotus viveiventris*
Cotton Rat	*Sigmodon hispidus*
Black Rat	*Rattus rattus*
Norway Rat	*Rattus norvegicus*
Round-tailed Muskrat	*Neofiber alleni*
Long-tailed Weasel	*Mustela frenata*
Eastern Cottontail Rabbit	*Sylvilagus floridanus*
Marsh Rabbit	*Sylvilagus palustris*
Feral Hog	*Sus scrofa*
White-tailed Deer	*Odocoileus virginianus*
Armadillo	*Dasypus novemcinctus*

Table B-2: Amphibians and Reptiles Present on CCAFS

Common Name	*Scientific Name*
Eastern Spadefoot Toad	*Scaphiopus holbrooki holbrooki*
Green Treefrog	*Hyla cinerea*
Squirrel Treefrog	*Hyla squirella*
Eastern Narrow-mouthed Toad	*Gastrophryne carolinensis*
Southern Leopard Frog	*Rana utricularis*
Gopher Frog	*Rana capito*
American Alligator	*Alligator mississippiensis*
Snapping Turtle	*Chelydra serpentina*
Striped Mud Turtle	*Kinosternon bauri*
Florida Box Turtle	*Terrapene carolina bauri*
Northern Diamondback Terrapin	*Malaclemys terrapin terrapin*
Florida Cooter	*Chrysemys floridana floridana*
Florida Red-bellied Turtle	*Chrysemys nelsoni*
Gopher Tortoise	*Gopherus polyphemus*
Green Sea Turtle	*Chelonia mydas*
Hawksbill Sea Turtle	*Eretmochelys imbricata*
Atlantic Loggerhead Sea Turtle	*Caretta caretta*
Kemp's Ridley Sea Turtle	*Lepidochelys kempi*
Leatherback Sea Turtle	*Dermochelys coriacea*
Florida Softshell	*Trionyx ferox*
Mediterranean Gecko	*Hemidactylus turcicus*
Green Anole	*Anolis carolinensis*
Brown Anole	*Anolis sagrei*
Six-lined Racerunner	*Cnemidophorus sexlineatus*
Broad-headed Skink	*Eumeces laticeps*
Eastern Garter Snake	*Thamnophis sirtalis sirtalis*

Table B-2: Amphibians and Reptiles Present on CCAFS cont.

Common Name	*Scientific Name*
Mangrove Salt Marsh Snake	*Nerodia clarkii compressicauda*
Southern Ringneck Snake	*Diadophis punctatus punctatus*
Black Racer	*Coluber constrictor*
Eastern Coachwhip	*Masticophis flagellum flagellum*
Rough Green Snake	*Opheodrys aestivus*
Eastern Indigo Snake	*Drymarchon couperi*
Corn Snake	*Elaphe guttata guttata*
Florida Pine Snake	*Pituophis melanoleucus mugitus*
Dusky Pygmy Rattlesnake	*Sistrurus miliarius barbouri*
Eastern Diamondback	*Crotalus adamanteus*
Eastern Coral Snake	*Micrurus fulvius fulvius*

Table B-3: Birds Present on CCAFS

Common Name	*Scientific Name*
Common Loon	*Gavia immer*
Pied-billed Grebe	*Podilymbus podiceps*
Greater Shearwater	*Puffinus griseus*
Audubon's Shearwater	*Puffinus lherminieri*
Magnificent Frigatebird	*Fregata magnificens*
White Pelican	*Pelecanus erythrorhynchos*
Brown Pelican	*Pelecanus occidentalis*
Northern Gannett	*Morus bassanus*
Anhinga	*Anhinga anhinga*
Double-crested Cormorant	*Phalacrocorax auritus*
Black-crowed Night Heron	*Nycticorax nycticorax*
Green Heron	*Butorides virescens*
Tricolored Heron	*Egretta tricolor*
Little Blue Heron	*Egretta caerulea*
Reddish Egret	*Egretta rufescens*
Cattle Egret	*Bubulcus ibis*
Snowy Egret	*Egretta thula*
Great Egret	*Ardea albus*
Great Blue Heron	*Ardea herodias*
Wood Stork	*Mycteria americana*
Glossy Ibis	*Plegadis falcinellus*
White Ibis	*Eudocimus albus*
Roseate Spoonbill	*Ajaia ajaja*
Snow Goose	*Chen caerulescens*
Mottled Duck	*Anas fulvigula*
Northern Pintail	*Anas acuta*

Table B-3: Birds Present on CCAFS cont.

Common Name	*Scientific Name*
Shoveler	*Anas clypeata*
Blue Winged Teal	*Anas discors*
Lesser Scaup	*Aythya affinis*
Common Eider	*Somateria mollissima*
Black Scoter	*Melanitta nigra*
Red-breasted Merganser	*Mergus serrator*
Clapper Rail	*Rallus longirostris*
Virginia Rail	*Rallus limicola*
Sora	*Porzana carolina*
Common Moorhen	*Gallinula chloropus*
American Coot	*Fulica americana*
American Oystercatcher	*Haematopus palliatus*
Black-necked Stilt	*Himantopus mexicanus*
Piping Plover	*Charadrius melodus*
Wilson's Plover	*Charadrius wilsonia*
Semipalmated Plover	*Charadrius semipalmatus*
Killdeer	*Charadrius vociferus*
Black-bellied Plover	*Pluvialis squatarola*
Marbled Godwit	*Limosa fedoa*
Willet	*Catoptrophorus semipalmatus*
Greater Yellowlegs	*Tringa melanoleuca*
Lesser Yellowlegs	*Tringa flavipes*
Solitary Sandpiper	*Tringa solitaria*
Spotted Sandpiper	*Actitis macularia*
Short-billed Dowitcher	*Limnodromus griseus*
Snipe	*Gallinago gallinago*

Table B-3: Birds Present on CCAFS cont.

Common Name	*Scientific Name*
Common Loon	*Gavia immer*
Pied-billed Grebe	*Podilymbus podiceps*
Greater Shearwater	*Puffinus griseus*
Audubon's Shearwater	*Puffinus lherminieri*
Magnificent Frigatebird	*Fregata magnificens*
White Pelican	*Pelecanus erythrorhynchos*
Brown Pelican	*Pelecanus occidentalis*
Northern Gannett	*Morus bassanus*
Anhinga	*Anhinga anhinga*
Double-crested Cormorant	*Phalacrocorax auritus*
Black-crowed Night Heron	*Nycticorax nycticorax*
Green Heron	*Butorides virescens*
Tricolored Heron	*Egretta tricolor*
Little Blue Heron	*Egretta caerulea*
Reddish Egret	*Egretta rufescens*
Cattle Egret	*Bubulcus ibis*
Snowy Egret	*Egretta thula*
Great Egret	*Ardea albus*
Great Blue Heron	*Ardea herodias*
Wood Stork	*Mycteria americana*
Glossy Ibis	*Plegadis falcinellus*
White Ibis	*Eudocimus albus*
Roseate Spoonbill	*Ajaia ajaja*
Snow Goose	*Chen caerulescens*
Mottled Duck	*Anas fulvigula*
Northern Pintail	*Anas acuta*

Table B-3: Birds Present on CCAFS cont.

Common Name	*Scientific Name*
Ruddy Turnstone	*Arenaria interpres*
Red Knot	*Calidris canutus*
Dunlin	*Calidris alpina*
Sanderling	*Calidris alba*
Western Sandpiper	*Calidris mauri*
Laughing Gull	*Larus atricilla*
Bonaparte's Gull	*Larus philadelphis*
Ring-billed Gull	*Larus celawarensis*
Herring Gull	*Larus argentatus*
Great Black-backed Gull	*Larus marinus*
Common Tern	*Sterna hirundo*
Forster's Tern	*Sterna forsteri*
Gull-billed Tern	*Sterna nilotica*
Least Tern	*Sterna antillarum*
Black Tern	*Chlidonias niger*
Royal Tern	*Sterna maxima*
Caspian Tern	*Sterna caspia*
Sooty Tern	*Sterna fuscata*
Black Skimmer	*Rynchops niger*
Turkey Vulture	*Cathartes aira*
Black Vulture	*Coragyps atratus*
Bald Eagle	*Haliaeetus leucocephalus*
Northern Harrier	*Circus cyaneus*
Mississippi Kite	*Ictinia mississippiensis*
Sharp-shinned Hawk	*Accipiter striatus*
Cooper's Hawk	*Accipiter cooperii*

Table B-3: Birds Present on CCAFS cont.

Common Name	*Scientific Name*
Red-shouldered Hawk	*Buteo lineatus*
Red-tailed Hawk	*Buteo jamaicensis*
Osprey	*Pandion haliaetus*
Southeastern American Kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
Peregrine Falcon	*Falco peregrinus*
Northern Bobwhite	*Colinus virginianus*
Rock Dove	*Columba livia*
Mourning Dove	*Zenaida macroura*
Eurasian Collared Dove	*Strptopelia decaocto*
Common Ground-Dove	*Columbina passerina*
Yellow-billed Cuckoo	*Coccyzus americanus*
Common Barn-Owl	*Tyto alba*
Great Horned Owl	*Bubo virginianus*
Barred Owl	*Strix varia*
Eastern Screech-Owl	*Otus asio*
Chuck-will's-widow	*Caprimulgus carolinensis*
Whip-poor-will	*Caprimulgus viciferus*
Common Nighthawk	*Chordeiles minor*
Chimney Swift	*Chaetura pelagica*
Belted Kingfisher	*Ceryl alcyon*
Red-bellied Woodpecker	*Melanerpes carolinus*
Northern Flicker	*Colaptes auratus*
Downy Woodpecker	*Picoides pubescens*
Pileated Woodpecker	*Dryocopus pileatus*
Eastern Kingbird	*Tyrannus tyrannus*

Table B-3: Birds Present on CCAFS cont.

Common Name	*Scientific Name*
Gray Kingbird	*Tyrannus dominicensis*
Western Kingbird	*Tyrannus verticalis*
Great-crested Flycatcher	*Myiarchus crinitus*
Eastern Wood-Pewee	*Contopus virens*
Eastern Phoebe	*Sayornis phoebe*
Tree Swallow	*Tachycineta bicolor*
Barn Swallow	*Hirundo rustica*
Florida Scrub Jay	*Aphelocoma coerulescens*
Blue Jay	*Cyaocitta cristata*
American Crow	*Corvus brachyrhynchos*
Fish Crow	*Corvus ossifragus*
House Wren	*Troglodytes aedon*
Carolina Wren	*Thryothorus ludovicianus*
Sedge Wren	*Cistothorus platensis*
Marsh Wren	*Cistothorus palustris*
Ruby-crowned Kinglet	*Regulus calendula*
Blue-gray Gnatcatcher	*Polioptila caerulea*
Veery	*Catharus fuscescens*
Hermit Thrush	*Catharus guttatus*
American Robin	*Turdus migratorius*
Loggerhead Shrike	*Lanius ludovicianus*
Gray Catbird	*Dumetella carolinensis*
Northern Mockingbird	*Mimus polyglottos*
Brown Thrasher	*Toxostoma rufum*
Cedar Waxwing	*Bombycilla cedrorum*
European Starling	*Sturnus vulgaris*

Table B-3: Birds Present on CCAFS cont.

Common Name	*Scientific Name*
White-eyed Vireo	*Vireo griseus*
Yellow-throated Vireo	*Vireo flavifrons*
Solitary Vireo	*Vireo solitarius*
Red-eyed Vireo	*Vireo olivaceus*
Pronthonotary Warbler	*Protonotaria citrea*
Blue-winged Warbler	*Vermivora pinus*
Orange-crowned Warbler	*Vermivora celata*
Nashville Warbler	*Vermivora ruficapilla*
Northern Parula	*Parula americana*
Black-and-white Warbler	*Mniotilta varia*
Black-throated Blue Warbler	*Dendroica caerulescens*
Blackburnian Warbler	*Dendroica fusca*
Chestnut-sided Warbler	*Dendroica pensylvanica*
Cape May Warbler	*Dendroica tigrina*
Yellow-rumped Warbler	*Dendroica coronata*
Black-throated Green Warbler	*Dendroica virens*
Prairie Warbler	*Dendroica discolor*
Blackpoll Warbler	*Dendroica stirata*
Pine Warbler	*Dendroica pinus*
Palm Warbler	*Dendroica palmarum*
Kentucky Warbler	*Oporornis formosus*
Hooded Warbler	*Wilsonia citrina*
Worm-eating Warbler	*Helmitheros vermivorus*
Ovenbird	*Seiurus aurocapillus*
Louisiana Waterthrush	*Seiurus motacilla*
Northern Waterthrush	*Seiurus noveboracensis*

Table B-3: Birds Present on CCAFS cont.

Common Name	*Scientific Name*
Common Yellowthroat	*Geothlypis trichas*
Yellow-breasted Chat	*Icteria virens*
American Redstart	*Setophaga ruticilla*
Rose-breasted Grosbeak	*Pheucticus ludovicianus*
Northern Cardinal	*Cardinalis cardinalis*
Blue Grosbeak	*Guiraca caerulea*
Indigo Bunting	*Passerina cyanea*
Painted Bunting	*Passerina ciris*
Eastern Towhee	*Pipilo erythrophthalmus*
Grasshopper Sparrow	*Ammodramus savannarum*
Savannah Sparrow	*Passerculus sandwichensis*
Bobolink	*Dolichonyx oryzivorus*
Red-winged Blackbird	*Agelaius phoeniceus*
Brown-headed Cowbird	*Molothrus ater*
Common Grackle	*Quiscalus quiscula*
Boat-tailed Grackle	*Quiscalus major*
Orchard Oriole	*Icterus spurius*
Summer Tanager	*Piranga rubra*
House Sparrow	*Passer domesticus*

Table B-4: Mammals Present on PAFB

Common Name	*Scientific Name*
Raccoon	*Procyon lotor*
Opossum	*Didelphis virginianus*
Rabbits	*Sylvilagus spp.*
House mouse	*Mus musculus*
Armadillo	*Dasypus novemcinctus*
Gray squirrel	*Sciurus carolinensis*

Table B-5: Amphibians and Reptiles Present on PAFB

Common Name	*Scientific Name*
Alligator	*Alligator mississippiensis*
Green tree frog	*Hyla cinerea*
Brown anole	*Anolis sagrei*
Corn snake	*Elaphe guttata guttata*
Northern black racer	*Coluber constrictor*
Florida cooter	*Chrysemys floridana*
Florida softshell	*Trionyx ferox*
Snapping turtle	*Chelydra serpentina*

Table B-6: Birds Present on PAFB

Common Name	*Scientific Name*
Pied-billed grebe	*Podilymbus podiceps*
American White pelican	*Pelecanus erythrorhynchos*
Double-crested cormorant	*Phalacrocorax auritus*
Anhinga	*Anhinga anhinga*
Great Blue Heron	*Ardea herodius*
Great egret	*Ardea albus*
Cattle egret	*Bubulcus ibis*
Green heron	*Butorides virescens*
Black-crowned night heron	*Nycticorax nycticorax*
Glossy ibis	*Plegadis falcinellus*
Mottled duck	*Anas fulvigula*
Mallard	*Anas platyrhynchos*
Blue-winged teal	*Anas discors*
Northern shoveler	*Anas clypeata*
American widgeon	*Anas americana*
Ring-necked duck	*Aythya collaris*
Lesser scaup	*Aythya affinis*
Common moorhen	*Gallinula chloropus*
American coot	*Fulica americana*
Black-bellied plover	*Pluvialis squatarola*
Semipalmated plover	*Charadrius semipalmatus*
Killdeer	*Charadrius vociferus*
Willet	*Catoptrophorus semipalmatus*
Spotted sandpiper	*Actitis macularia*
Whimbrel	*Numenius phaeopus*
Ruddy turnstone	*Arenaris interpres*

Table B-6: Birds Present on PAFB cont.

Common Name	*Scientific Name*
Sanderling	*Calidris alba*
Dunlin	*Calidris alpina*
Common snipe	*Gallinago gallinago*
Laughing gull	*Larus atricilla*
Bonaparte's gull	*Larus philadelphia*
Ring-billed gull	*Larus delawarensis*
Herring gull	*Larus argentatus*
Great black-backed gull	*Larus marinus*
Caspian tern	*Sterna caspia*
Royal tern	*Sterna maxima*
Sandwich tern	*Sterna sandvicensis*
Black tern	*Chilidonias niger*
Osprey	*Pandion haliaetus*
American redstart	*Setophaga ruticilla*
Magnolia warbler	*Dendroica magnolia*
Black-throated blue warbler	*Dendroica caerulescens*
Black-throated green warbler	*Dendroica virens*
Prairie warbler	*Dendroica discolor*
Yellow-rumped warbler	*Dendroica coronata*
Savannah sparrow	*Passerculus sandwichensis*

Table B-7: Mammals Present on MTA

Common Name	*Scientific Name*
White-tailed deer	*Odocoileus virginianus*
Gray squirrel	*Sciurus carolinensis*
Spotted skunk	*Spilogale putorius*
Otter	*Lutra Canadensis*
Armadillo	*Dasypus novemcinctus*
Bobcat	*Lynx rufus*
Raccoon	*Procyon lotor*
Rabbits	*Sylvilagus spp.*
Opossum	*Didelphis virginianus*

Table B-8: Amphibians and Reptiles Present on MTA

Common Name	*Scientific Name*
Green tree frog	*Hyla cinerea*
Greenhouse frog	*Eleutherodactylus planirostris*
Squirrel treefrog	*Hyla squirrela*
Leopard frog	*Rana utricularia*
Eastern spadefoot	*Scaphiopus holbrooki*
Southern toad	*Bufo terrestris*
Southeastern five-line skink	*Eumeces inexpectatus*
Ground Skink	*Scinella lateralis*
Six-lined racerunner	*Cnemidophorus sexlineatus*
Green anole	*Anolis carolinensis*
Brown anole	*Anolis sagrei*
Fence lizard	*Sceloporus undulatus*
Northern black racer	*Coluber constrictor*
Diamondback rattlesnake	*Crotalus adamanteus*
Eastern garter snake	*Thamnophis sirtalis*
Eastern indigo snake	*Drymarchon couperi*
Florida box turtle	*Terrapene carolina*
Gopher tortoise	*Gopherus polyphemus*

Table B-9: Birds Present on MTA and Relative Occurrence

Common Name	*Scientific Name*
Great egret	*Ardea albus*
Great blue heron	*Bubulcus ibis*
Cattle egret	*Ardea herodias*
Turkey vulture	*Cathartes aura*
Black vulture	*Coragyps atratus*
Osprey	*Pandion haliaetus*
Red-shouldered hawk	*Buteo lineatus*
Red-tailed hawk	*Buteo jamaicensis*
Killdeer	*Charadrius vociferous*
Common snipe	*Gallinago gallinago*
Barred owl	*Strix varis*
Chuck-will's-widow	*Caprimulgus carolinensis*
Common nighthawk	*Chordeiles minor*
Mourning dove	*Zenaida macroura*
Common ground dove	*Columbina passerina*
Northern flicker	*Colaptes auratus*
House wren	*Troglodytes aedon*
Carolina wren	*Thryothorus ludovicianus*
Blue-gray gnatcatcher	*Polioptila caerulea*
American robin	*Turdus migratorius*
Gray catbird	*Dumetella carolinensis*
Brown thrasher	*Toxostoma rufum*
Northern mockingbird	*Mimum polyglottis*
Cedar waxwing	*Bombycilla cedrorum*
White-eyed vireo	*Vireo griseus*
Solitary vireo	*Vireo solitarius*

Table B-9: Birds Present on MTA and Relative Occurrence cont.

Common Name	*Scientific Name*
Yellow-rumped warbler	*Dendroica coronata*
Palm warbler	*Dendroica palmarum*
Common yellowthroat	*Geothlypis trichas*
Pine warbler	*Dendroica pinus*
American redstart	*Setophaga ruticilla*
Ovenbird	*Seiurus aurocapillus*
Red-bellied woodpecker	*Melenerpes carolinus*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
Pileated woodpecker	*Dryocopus pileatus*
Great-crested flycatcher	*Myarchus crinitus*
Blue jay	*Cyanocitta cristata*
Fish crow	*Corvus ossifragus*
American crow	*Corrus brachyrhyachos*
European starling	*Sturnus vulgaris*
Common grackle	*Quiscalus quiacula*
Prairie warbler	*Dendroica dominica*
Northern parula	*Parula dominica*
Black-throated blue warbler	*Dendroica caerulescens*
Black-and-white warbler	*Mniotilta varia*
Blackburnian warbler	*Dendroica fusca*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Northern cardinal	*Cardinalis cardinalis*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Grasshopper sparrow	*Ammodrammus savannarum*

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APPENDIX C
SECTION 7 CONSULTATION WITH USFWS

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DEPARTMENT OF THE AIR FORCE
45TH SPACE WI

FWS Log No. 05-329

The proposed action is not likely to adversely affect resources protected by the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) This finding fulfills the requirements of the Act.

Don Palmer 11/23/04
Don Palmer Date
Acting Assistant Field Supervisor

MEMORANDUM FOR UNITED STATES DEPA
U. S. FISH AND WILDLI
ATTENTION: DON PALI
6620 SOUTHPOINT DRI
JACKSONVILLE FL 322

FROM: 45 CES/CEV
1224 Jupiter Street, MS 9125
Patrick AFB FL 32925-3343

SUBJECT: Request for Review of Programmatic Environmental Assessment for Land Clearing Activities at the 45th Space Wing, Florida

1. Attached is a Draft Programmatic Environmental Assessment (EA) for the above referenced project.

2. Please review the proposed project in accordance with Section 7 of the Endangered Species Act and provide a response to this office at your convenience. Point of contact for this subject is Ms. Angy Chambers at 321-853-6822 or E-mail angy.chambers@patrick.af.mil.

Robin L. Sutherland
ROBIN L. SUTHERLAND, GS-13
Chief, Environmental Planning

Attachment:
1. Draft EA

NOV - 3 2004

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APPENDIX D
DOCUMENT REVIEW COMMENTS

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Department of Environmental Protection

Jeb Bush
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Colleen M. Castille
Secretary

December 23, 2004

Ms. Angy Chambers
Department of the Air Force
45 CES/CEV
1224 Jupiter Street, MS 9125
Patrick AFB, FL 32925-3343

RE: Department of the Air Force – Programmatic Environmental Assessment for Land Clearing Activities at Cape Canaveral Air Force Station, Patrick Air Force Base, Malabar Transmitter Annex and Jonathan Dickinson Missile Tracking Annex – Brevard and Martin Counties, Florida.
SAI # FL200411030189C

Dear Ms. Chambers:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated a review of the above-referenced programmatic environmental assessment (PEA).

The Department (DEP) and St. Johns River Water Management District (SJRWMD) note that any proposed activities involving wetland dredge or fill or increased paving/impervious area are subject to the state's environmental resource permitting (ERP) requirements. ERP applicants must demonstrate that impacts to wetlands and other surface waters have been avoided or minimized to the greatest extent practicable. Cleared areas should be stabilized to minimize erosion and the cut vegetation should be stored, chipped, or mulched in upland areas. Please refer to the enclosed SJRWMD and DEP comments for further information.

Based on the information contained in the PEA and comments provided by our reviewing agencies, the state has determined that, at this stage, the proposed federal activities are consistent with the Florida Coastal Management Program (FCMP). The applicant must, however, address the concerns identified by the DEP and SJRWMD as described in the attached comments. All subsequent environmental documents must be reviewed to determine the project's continued consistency with the FCMP. The state's continued concurrence with the project will be based, in part, on the adequate resolution of any issues identified during this and subsequent reviews.

Thank you for the opportunity to review the PEA. If you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2161.

Sincerely,

Sally B. Mann

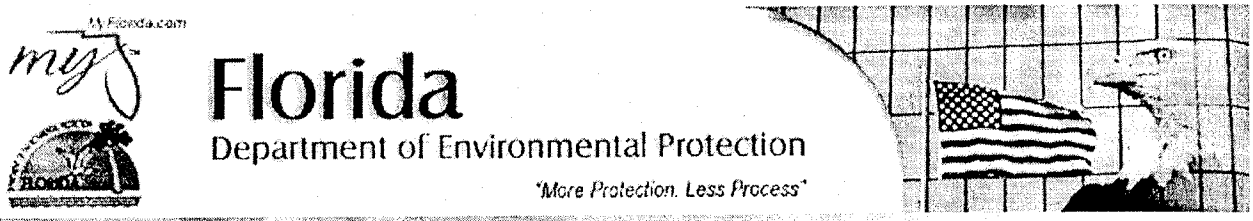
Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm

Enclosures

cc: Geoffrey Sample, SJRWMD

Florida State Clearinghouse



Florida
Department of Environmental Protection
"More Protection, Less Process"

Categories

Project Information	
Project:	FL200411030189C
Comments Due:	December 03, 2004
Letter Due:	January 02, 2005
Description:	DEPARTMENT OF THE AIR FORCE - PROGRAMMATIC ENVIRONMENTAL ASSESSMENT FOR LAND CLEARING ACTIVITIES AT CAPE CANAVERAL AIR FORCE STATION, PATRICK AIR FORCE BASE, MALABAR TRANSMITTER ANNEX AND JONATHAN DICKINSON MISSILE TRACKING ANNEX - BREVARD AND MARTIN COUNTIES, FLORIDA.
Keywords:	USAF - PEA FOR LAND CLEARING ACTIVITIES ON 4 AIR FORCE SITES - BREVARD/MARTIN
CFDA #:	12.200

Agency Comments:

ENVIRONMENTAL PROTECTION - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

As noted in the PEA, any proposed activities involving wetland dredge or fill or increased paving/impervious area are subject to the state's environmental resource permitting (ERP) requirements. Please contact the Department's NPDES Stormwater Section in Tallahassee for further information on NPDES permitting and the St. Johns River Water Management District (in Brevard County) and South Florida Water Management District (in Martin County) for further information on the ERP program.

FISH and WILDLIFE COMMISSION - FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

NO COMMENT BY ROBBIN TRINDELL ON 12/17/04

STATE - FLORIDA DEPARTMENT OF STATE

NO COMMENT

SOUTH FLORIDA WMD - SOUTH FLORIDA WATER MANAGEMENT DISTRICT

The Jonathan Dickinson Missile Tracking Annex site is the only site located within SFWMD boundaries. Since the proposed land clearing activities do not appear to involve any adverse wetland impacts, the SFWMD has no objections to the proposed land clearing activities.

ST. JOHNS RIVER WMD - ST. JOHNS RIVER WATER MANAGEMENT DISTRICT

The project includes land-clearing activities for line of sight, safety and habitat improvements. Sufficient information was not provided to determine the extent of potential impacts to wetlands, surface waters and aquatic and wetland dependent species. If impacts are proposed to wetlands or other surface waters an Environmental Resource Permit would be required from the District or FDEP. During the permitting process the applicant will need to demonstrate impacts to wetlands and other surface waters have been avoided or minimized to the greatest extent practicable. Unavoidable wetland impacts, both direct and secondary, will need to be mitigated. Prior to or during the permitting process, the applicant will also need to conduct wildlife surveys to determine if the project will result in adverse impacts to aquatic and wetland dependent species. The clearing should be designed to minimize direct and secondary impacts to listed species. Cleared areas would need to be stabilized to minimize erosion and the cut vegetation would need to be stored, chipped, or mulched in upland areas. Please contact Michelle Reiber, Supervising Regulatory Scientist, in the Palm Bay service center at (321) 676-6615 or mreiber@sjrwmd.com if there are any questions.

E. CENTRAL FL RPC - EAST CENTRAL FLORIDA REGIONAL PLANNING COUNCIL

The proposed project, as presented for review and when considered in its entirety, is consistent with the adopted Goals, Policies and Objectives of the East Central Florida Regional Planning Council.

TREASURE COAST RPC - TREASURE COAST REGIONAL PLANNING COUNCIL

The proposed project is not in conflict or inconsistent wit the Strategic Regional Policy Plan. The proposed project furthers Regional Goal 6.8 that calls for the protection of endangered and potentially endangered species.

DC

COUNTY: ALL
SCH-USAF-
2004-11299

DATE: 11/3/2004
COMMENTS DUE DATE: 12/3/2004
CLEARANCE DUE DATE: 1/2/2005
SAI#: FL200411030189C

MESSAGE:

STATE AGENCIES	WATER MNGMNT. DISTRICTS	OPB POLICY UNIT	RPCS & LOC GOVS
ENVIRONMENTAL PROTECTION	SOUTH FLORIDA WMD		
FISH and WILDLIFE COMMISSION	ST. JOHNS RIVER WMD		
X STATE			

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

X Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.

Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.

Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

DEPARTMENT OF THE AIR FORCE - PROGRAMMATIC ENVIRONMENTAL ASSESSMENT FOR LAND CLEARING ACTIVITIES AT CAPE CANAVERAL AIR FORCE STATION, PATRICK AIR FORCE BASE, MALABAR TRANSMITTER ANNEX AND JONATHAN DICKINSON MISSILE TRACKING ANNEX - BREVARD AND MARTIN COUNTIES, FLORIDA.

To: Florida State Clearinghouse

AGENCY CONTACT AND COORDINATOR (SCH)
3900 COMMONWEALTH BOULEVARD MS-47
TALLAHASSEE, FLORIDA 32399-3000
TELEPHONE: (850) 245-2161
FAX: (850) 245-2190

EO. 12372/NEPA
- ☑ No Comment
- ☐ Comment Attached
- ☐ Not Applicable

Federal Consistency
- ☑ No Comment/Consistent
- ☐ Consistent/Comments Attached
- ☐ Inconsistent/Comments Attached
- ☐ Not Applicable

From:
Division/Bureau: Division of Historical Resources / Bureau of Historic Preservation
Reviewer: S. EDWARDS
Date: 11-22-04
NHPA

Barbara E. Mattick
Deputy SHPO for Survey & Registration
11/24/04

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