FINAL DRAFT

Environmental Assessment

for the Installation of a Reclaimed Water Irrigation System Improvement Project

Tyndall Air Force Base

Bay County, Florida

May 2011

COVER SHEET

FINAL DRAFT ENVIRONMENTAL ASSESSMENT

FOR THE INSTALLATION OF A RECLAIMED WATER IRRIGATION SYSTEM

IMPROVEMENT PROJECT AT

TYNDALL AIR FORCE BASE, BAY COUNTY, FLORIDA

a. Responsible Agency: Department of the Air Force, Air Education and Training Command (AETC), 325th Fighter Wing, Tyndall Air Force Base (AFB), Florida

b. Proposed Action: The 325th Civil Engineer Squadron proposes to install a reclaimed water system for the base's 365-day irrigation areas. The reclaimed water irrigation system would allow the base to reduce its use of potable water for irrigation purposes, as well as utilize the excess capacity of tertiary-treated wastewater produced by the Military Point Regional Advanced Wastewater Treatment (AWT) Facility. The 365-day areas are those areas at Tyndall AFB that require irrigation on a routine basis and include Flag Park, Front Gate, Building 662, Washington Park, Building 647, football and track field, 1st Air Force (AFNORTH) building, and the 120-person dorm complex (four buildings). The proposed action includes installing irrigation pumps, controls, and reclaimed water lines from the AWT facility to the irrigation areas, as well as a one million gallon storage reservoir, as described in the Reclaimed Water System Design Study (Weston, 2010).

c. Written comments and inquiries regarding this document should be directed to: Mr. Jose J. Cintron, 325 CES/CEAN, 119 Alabama Ave, Stop 42, Tyndall AFB, Florida 32403; Phone number: (850) 283-4341; E-mail: jose.cintron@ tyndall.af.mil.

d. Report Designation: Final Draft Environmental Assessment (EA)

e. Abstract: This document supports the decision-making process, as part of the Environmental Impact Analysis Process program at Tyndall AFB, Florida, for the installation of a reclaimed water irrigation system improvement project at the base. The proposed action involves installing an eight inch transmission line from the existing AWT facility to the portion of the base where the 365-day irrigation areas are located. A one million gallon storage reservoir, irrigation pumps, controls, and reclaimed water distribution lines to the irrigation areas would be included. The transmission line, storage reservoir, and distribution lines, pumps and controls would provide a reclaimed water irrigation system that would use a majority of the AWT facility's excess capacity for the larger irrigation needs at the base. Currently, 40 percent (%) of the water purchased by the base is used for irrigation. The proposed action would reduce the base's need to use potable water for irrigation purposes and would support the federal water use reduction goals established in Executive Order 13514. These goals include reducing potable water use intensity by 26% by Fiscal Year (FY) 2020, using a FY 2007 baseline and targeting a 2% annual reduction. The proposed action would also support the Executive Order's non-numerical goal of conserving and protecting water resources by implementing water reuse strategies, which include the use of reclaimed water. Four different pipeline alignments from the AWT facility to the storage reservoir are evaluated as part of this Environmental Assessment (EA). These alignments form the four different action alternatives considered. A no action alternative is also evaluated.

f. Comment Due Date: 3 June 2011

g. Privacy Advisory: Draft – Still Pending Air Force Review

TABLE OF CONTENTS

LIST OF FIGURES.

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

AETC	Air Education and Training Command
AFB	Air Force Base
AFI	Air Force Instruction
AFNORTH	1st Air Force
ARPA	Archaeological Resources Protection Act
AWT	Advanced Wastewater Treatment
BLS	Below Land Surface
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
DNL	Day-Night Average Sound Level
DoD	Department of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EPA	United States Environmental Protection Agency
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FDEP	Florida Department of Environmental Protection
FDACS	Florida Department of Agriculture and Consumer Services
FNAI	Florida Natural Areas Inventory
FWC	Florida Fish and Wildlife Conservation Commission
FY	Fiscal Year
GPC	Gulf Power Company
GPM	Gallons per Minute
kV	Kilovolt
MGD	Million Gallons per Day
MFH	Military Family Housing
MMRP	Military Munitions Response Program
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act

NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
PSIG	Pounds per Square Inch Gauge
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
ROW	Right of Way
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

SECTION 1. PURPOSE OF AND NEED FOR THE PROPOSED ACTION

This section is divided into six parts: a statement of the purpose of and need for the proposed action, a description of the location of the proposed action, a description of the decision to be made and the decision-maker, an overview of the scope of the environmental review, identification of applicable regulatory requirements, and an introduction to the organization of the document. This section explains the purpose and need for action, which is part of the Environmental Impact Analysis Process (EIAP), and is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (Public Law 91-190); the President's Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] 1500-1508); 32 CFR Part 989 of the ElAP, published in the Federal Register on 15 Ju1y 1999 and amended in the Federal Register on 28 March 2001; Air Education and Training Command (AETC) Supplement 1 to 32 CFR Part 989, 6 June 2007; and the Air Force EIAP Desk Reference, May 1995.

1.1 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The Energy Policy Act of 2005 and Presidential Energy Executive Orders 13423, January 2007, and 13514, October 2009, establish water conservation measures and water use reduction goals for federal agencies, including Department of Defense (DoD) installations. Executive Order 13514, which expands on previously established measures and goals, targets reduction of potable water use intensity by 26 percent (%) by Fiscal Year (FY) 2020, with a FY 2007 baseline and a 2% annual reduction. Additionally, Executive Order 13514 includes the non-numerical goal of conserving and protecting water resources by implementing water reuse strategies, which include the use of reclaimed water. Currently, 40% of the water purchased by Tyndall Air Force Base (AFB) is used for irrigation. The proposed action would reduce the base's need to use potable water for irrigation purposes and would support the federal water use reduction goal established in Executive Order 13514. It would also protect local water resources through water reuse.

The majority of irrigation systems on Tyndall AFB use potable water supplied by Bay County Utilities. There are only two active wells at Tyndall AFB that are used or designed to be used for irrigation. They include the irrigation wells at the Youth Center and the 1st Air Force (AFNORTH) building. Since the use of potable water on landscape vegetation is not required by law, other options for irrigation are available. An acceptable irrigation substitute for potable water is to use reclaimed water, which is tertiary-treated water recovered from wastewater processing. This water meets the advanced water treatment standard but it still contains nutrients that are valuable to landscaping vegetation and turf. Reclaimed water use is beneficial for multiple reasons, including:

- Reduces use of potable water use for irrigation;
- Utilizes existing wastewater infrastructure and reduces the potential need for future expansions of the potable water infrastructure as demands increase;
- Reduces irrigation operational costs;
- Provides beneficial nutrients, such as nitrogen and phosphorous, that potable water lacks; and

- Protects local water resources through water reuse by reducing nutrient discharge to the Saint Andrew Bay estuary system.

Consistent with Executive Order 13514, the proposed action will help Tyndall AFB reduce its consumption of potable water, specifically its use of potable water for irrigation purposes. Additionally, the excess capacity of tertiary-treated reclaimed water that is currently being discharged directly to Saint Andrew Bay will be reused as the irrigation water source.

1.2 LOCATION OF THE PROPOSED ACTION

Tyndall AFB is located southeast of Panama City in Bay County, Florida. The installation is situated on a peninsula that is approximately 18 miles long and three miles wide. The peninsula is bordered by Saint Andrew Bay to the north and west and to the south by the Gulf of Mexico. Tyndall AFB is bisected by United States (U.S.) Highway 98, and comprises approximately 29,000 acres. **Figure 1-1** provides a site location map showing Tyndall AFB and the surrounding area. **Figure 1-1** is included at the end of Section 1.

Tertiary-treated reclaimed water from the Military Point Regional Advanced Wastewater Treatment (AWT) facility, located in the westernmost portion of Tyndall AFB, would be supplied to the 365-day irrigation areas via an eight inch transmission line (see **Figure 2-1**). The transmission line would run generally south and east to a storage reservoir that would be located near the base entrance gate on Illinois Avenue. From this location, a constant speed pump station with a hydropneumatic tank system would connect to distribution lines that would run to the irrigation areas. The distribution piping would generally be located in a loop around the irrigation areas, which include Flag Park, Front Gate, Building 662, Washington Park, Building 647, football and track field, AFNORTH building, and the 120-person dorm complex (four buildings). Individual building irrigation systems would be connected to the distribution piping.

1.3 DECISION TO BE MADE AND THE DECISION-MAKER

The primary decision that must be made by the Air Force is whether to construct the reclaimed water irrigation system improvements (i.e., to proceed with an action alternative) or to take no action (i.e., choose the no action alternative). If the Air Force decides to proceed with the system improvements, an additional decision to be made is to choose one of four transmission line alignment alternatives (i.e., action alternatives 1a, 1b, 2, and 3) for the reclaimed water supply pipeline route. Action alternatives 1a, 1b, 2, and 3, and the no action alternative are described in detail, assessed against established criteria, and evaluated in this Environmental Assessment (EA) document. The scope of the environmental review is described further in the following subsection.

1.4 SCOPE OF THE ENVIRONMENTAL REVIEW

The Air Force planning process includes an analysis of the potential environmental consequences created by a proposed action. This is summarized in the EA. The potential environmental impacts that could result from the implementation of the proposed action and reasonable alternatives, including the no action alternative, are identified, described, and

evaluated in the EA. For this proposed action and alternatives, the reasonably foreseeable environmental impacts would primarily result from the installation of the reclaimed water irrigation system transmission line. Resource issues discussed in the EA for the proposed action and alternatives include:

- Infrastructure and Utilities – Environmental effects from changes to sanitary sewer, potable water, reclaimed water, solid waste management, drainage, transportation, electricity, and natural gas.
- Hazardous Materials and Hazardous Waste – Potential effects on existing environmental sites and management practices for hazardous materials and hazardous wastes.
- Biological Resources – Potential effects on endangered species, protected habitats, wetlands, vegetation, or wildlife in the proposed project areas.
- Cultural Resources – Potential effects on archaeological sites, historic buildings/structures, or artifacts located in the proposed project areas.
- Land Use – Environmental effects from potential changes to land use or zoning.
- Water Resources – Potential effects on groundwater or surface water quality and quantity in the region.
- Air Quality – Potential effects on visibility, odor, and other factors of general air quality.
- Noise – Potential effects of noise intensity and related impacts.
- Earth Resources – Potential effects on the geology, topography, or soils in the proposed project areas.
- Socioeconomic Resources – Potential effects on socioeconomic resources in the proposed project areas.
- Environmental Justice – Disproportionate adverse effects on minority and low-income populations.

The environmental impacts concerning the above resource categories for the installation of the reclaimed water irrigation system occur within a limited geographical area on and immediately surrounding the project area. The geographical area is referred to in the EA as the region of influence (ROI). The EA analyzes the impacts associated with the action and no action alternatives.

The EA is issue-driven and concentrates on those resources that may be affected by the proposed action. Resources not affected by short- or long-term impacts will be included in the general discussions. The EA also considers cumulative impacts. A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the "…impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." The cumulative impacts of the proposed action and reasonable alternatives and impacts from other actions are considered for the ROI.

The proposed action is primarily a construction project involving additional utility connections and pipelines from the Bay County managed AWT facility and Tyndall AFB's 365-day irrigation areas. A one million gallon (approximately 1.6 acre) storage reservoir would also be constructed. The EA evaluates the reasonably foreseeable impacts from the installation of the transmission and distribution lines, the storage reservoir, and pumping system components, as well as the impacts from not implementing the system improvements. The potential environmental impacts evaluated in the EA are based on information currently available regarding the proposed action, as described in the Reclaimed Water System Design Study (Weston, 2010).

1.5 APPLICABLE REGULATORY REQUIREMENTS

Under the NEPA (42 United States Code [USC] 4321 et seq.), federal agencies are required to consider the environmental consequences of their proposed actions by using a systematic, interdisciplinary approach, thereby ensuring well-informed federal decisions. The CEQ was established under NEPA to implement and oversee federal policy in this process. To this end, the CEQ has issued regulations for *Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR 1500-1508). The DoD also published its DoD Instruction 4715.9, *Environmental Planning and Analysis*, outlining the DoD approach to fulfilling the NEPA and CEQ process requirements.

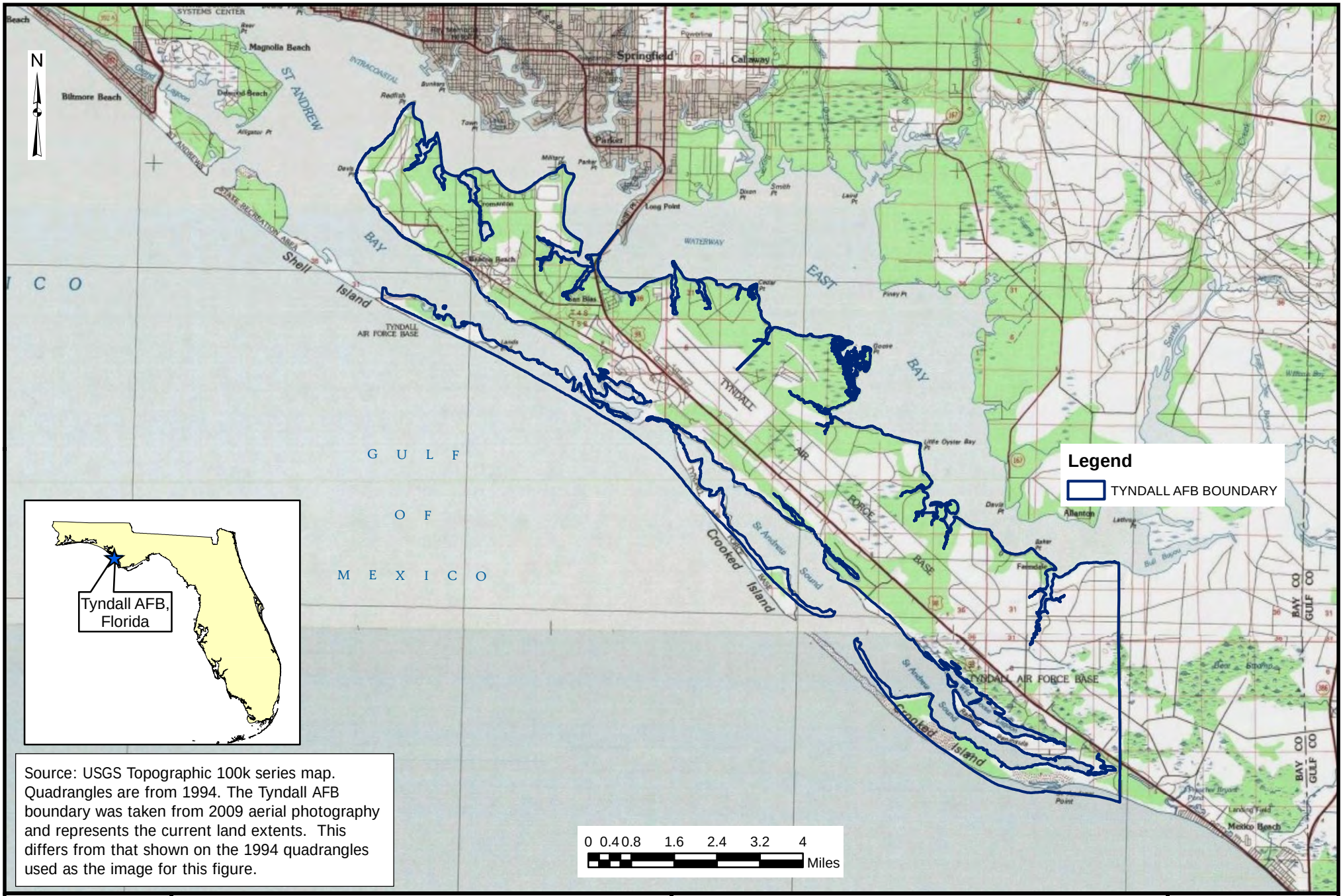
The NEPA requires federal agencies to consider the environmental effects of their proposed actions and reasonable alternatives, to include the no action alternative, as part of the decision-making process. The Air Force considers the potential environmental impacts identified during the EIAP in its decision-making process. The EA considers applicable laws and regulations, including but not limited to the following:

- Title 40, CFR, Parts 1500-1508
- Archaeological Resources Protection Act (ARPA) (16 USC 470aa-470mm)
- Clean Air Act (CAA) (42 USC 7401-7671q), as amended in 1990 (81 USC 7401 et seq.)
- Clean Water Act (CWA) (33 USC 1251 et seq.)
- Coastal Zone Management Act (CZMA) (Title 16, USC 1451 et seq.)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 9651c)
- Endangered Species Act (ESA) (16 USC 1531-1544)
- Fish and Wildlife Coordination Act (16 USC 661-667e)
- National Historic Preservation Act (NHPA) (16 USC 470 et seq.)
- Pollution Prevention Act (16 USC 470)
- Resource Conservation and Recovery Act (RCRA) (42 USC 6901-6992k)
- Rivers and Harbors Act (33 USC 401)
- Executive Order 11988, Floodplain Management, 24 May 1977 (42 Federal Register 26951)
- Executive Order 11990, Protection of Wetlands, 24 May 1977 (3 CFR)

- Executive Order 12372, Intergovernmental Review of Federal Programs, 1982 (3 CFR)
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 16 February 1994 (59 Federal Register 7629)
- Air Force Instruction (AFI) 32-7060, Interagency and Intergovernmental Coordination for Environmental Planning (IICEP)
- AFI 32-7064, Integrated Natural Resources Management, 17 September 2004
- AFI 32-7065, Cultural Resources Management Program, 1 June 2004

1.6 INTRODUCTION TO THE ORGANIZATION OF THE DOCUMENT

The EA is organized into six sections: Section 1 focuses on the purpose of and need for the proposed action. This includes a description of the purpose of and need for the proposed action, the location of the proposed action, decisions to be made and the decision-maker, a summary of the scope of the environmental review, and identification of applicable regulatory requirements. Section 2 of the EA focuses on the proposed action and alternatives. This includes a brief history of the formulation of alternatives, describes the alternatives eliminated from further consideration, provides a detailed description of the proposed action, describes the no action alternative, describes other action alternatives, identifies the preferred alternative, and addresses mitigation requirements. Section 3 describes the affected environment. This section includes a discussion of Tyndall AFB and focuses on the base's location, history, current mission, and the affected environment. Section 4 describes the environmental consequences associated with implementing the proposed action, including a discussion of the four action alternatives. The no action alternative is also discussed. Section 5 lists the individuals who prepared the EA for the Air Force. Section 6 identifies the individuals, organizations, and agencies contacted during preparation of the EA. Section 7 includes a list of references used as resources to develop the EA.



	Final Draft Environmental Assessment TYNDALL AFB LOCATION MAP	Tyndall Air Force Base (AFB) Environmental Assessment for Installation of a Reclaimed Water Irrigation System Improvement Project	FIGURE 1-1 MAY 2011

SECTION 2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This section is comprised of nine parts: an introduction, a brief history of the formulation of the alternatives, identification of alternatives eliminated from further consideration, a detailed description of the proposed action, a description of the no action alternative, other action alternatives within the ROI, comparison of environmental effects of all alternatives, identification of the preferred alternative, and mitigation requirements.

2.1 INTRODUCTION

The proposed action involves installing an eight inch diameter transmission line and a series of three to eight inch diameter distribution lines to supply reclaimed water from the AWT facility at Tyndall AFB to the base facilities that require a routine irrigation schedule. A one-million gallon storage reservoir would also be constructed as part of the project to provide a consistent supply of reclaimed water to the irrigation distribution system. The transmission line, storage reservoir, and distribution lines would provide a reclaimed water irrigation system that would use a majority of the AWT facility's excess capacity for the larger irrigation needs at the base.

Currently, 40% of the water purchased by the base is used for irrigation. The proposed action would reduce Tyndall AFB's need to use potable water for irrigation purposes by replacing its use with reclaimed water. This supports the federal water use reduction goal established in Executive Order 13514 to decrease potable water use intensity by 26% by FY 2020. The proposed action would also support the Executive Order's non-numerical goal of conserving and protecting water resources by implementing water reuse strategies, which include the use of reclaimed water.

2.2 HISTORY OF THE FORMULATION OF ALTERNATIVES

Tyndall AFB currently irrigates portions of the developed sections of the base to provide serviceable land used for training and recreational activities. The Florida climate and soils require maintenance of these areas, in the form of supplemental water and nutrients throughout the year. With the exception of the golf course and two other areas, irrigation systems on base currently use potable water. Reclaimed water is used for irrigation at the golf course and two wells are used to supply water for irrigation at the Youth Center and the AFNORTH building. Potable water, supplied by Bay County Utilities, is used for all other irrigation needs at the base, including the 365-day irrigation areas. The 365-day irrigation areas are watered on a routine basis, which is typically less than 365-days. The term is used to imply areas requiring routine watering. Since the base's irrigation practices were optimized, there are no areas receiving 365-day irrigation.

Other options for landscape irrigation are available at the base and the use of potable water on landscape vegetation is not required by law. An acceptable substitute for potable water is reclaimed water, which is already used for irrigation purposes at the golf course. Reclaimed water is tertiary-treated water recovered from wastewater processing that meets the water quality requirements established for irrigation (non-consumption) purposes. An additional advantage of

reclaimed water is it meets the advanced water treatment standards but still contains nutrients that are valuable to landscaping vegetation and turf.

Because reclaimed water does not undergo the expensive final treatment steps for potable water, reclaimed water is less expensive to produce. The current price of potable water in Bay County is more than eight times that of reclaimed water (Weston, 2010). The replacement of potable water with reclaimed water for irrigation would have the additional effect of reducing the cost of purchasing water by $1.45 per thousand gallons, an 89 percent cost savings per thousand gallons. This represents approximately $150,000 in cost savings per year based on calculations made in 2010. Additionally, use of reclaimed water will help reduce the need for future expansion of the potable water infrastructure as demand increases.

Tyndall AFB leases land to Bay County for the AWT facility, which is a Part III reclaimed water facility that produces an excess capacity of tertiary-treated wastewater. Currently, the base uses approximately 400,000 gallons per day on average, with a maximum of one million gallons per day (MGD) per the contract with Bay County, of reclaimed water from the facility to irrigate the base golf course (Pelican Point). The remaining reclaimed water (excess capacity) is discharged to the bay by Bay County under the county's National Pollution Discharge Elimination System (NPDES) permit. Use of the reclaimed water for irrigation is preferred over direct discharge to the bay because it reduces the amount of nutrients discharged into the Saint Andrew Bay estuary system.

The existing watering requirements and associated conceptual design were determined based on a survey of the existing irrigation systems, historical records and measurements of base potable water use, and sprinkler system manufacturer information on typical flow rates required for the sprinklers. Operational irrigation system components were identified, and current irrigation practices and schedules were obtained. Historical data for potable water indicated the irrigation systems actually use a maximum of 76 million gallons per year, which is the equivalent to 0.2 MGD. To allow for variable demand, a factor of 1.5 times the required capacity of 0.2 MGD was used to design the proposed system. This estimate equates to a total demand of 0.3 MGD. Utilizing this information, water demand patterns were developed for the proposed reclaimed water system (Weston, 2010).

A hydraulic model of the existing and proposed reclaimed water system was then developed using manufacturer product information and sprinkler system information collected during the survey. This process provided design criteria, such as pipe diameter (eight inches) and annual average daily flow of 0.3 MGD (208 gallons per minute [GPM]). Storage for irrigation water was also identified as a requirement to maintain a constant supply without fluctuation due to typical variable rates of wastewater inflow to the treatment plant. For the proposed action, a one million gallon lined storage reservoir (covering approximately one acre) was determined to be the most appropriate means of storage and provides the most aesthetic solution. This reservoir would be capable of holding more than three times the daily design flow. Storage tank options of similar size would not be possible under current funding and aesthetic requirements.

Given the topography at Tyndall AFB and the locations of the 365-day irrigation areas, the reservoir location near the main gate provides the only feasible location. The selected location of the storage reservoir is the best location because it needs to be located at a higher elevation than the distribution piping system and it needs to be close to the irrigation areas to reduce the need for pumps and increased electrical demand to irrigate. During the reclaimed water system design, three locations meeting these criteria were evaluated but the other two conflicted with

future development/land use plans. The selected location is at one of the highest elevations in the area and is in a location where no development is planned.

Based on hydraulic analysis of the reclaimed water system, the constant speed pump station at the storage reservoir would be designed for 1,250 GPM, or three 30 horsepower pumps rated for approximately 500 GPM at 130 total dynamic head. A 13,600 gallon hydro-pneumatic tank would be provided on the downstream side of the pump station to maintain constant pressure for the approximately 20,000 linear feet of distribution piping. The distribution piping would provide water to the individual irrigation systems at the 365-day irrigation areas. The transmission pipeline alignment alternatives and the distribution piping are shown on **Figure 2-1** and **Figure 2-2**, respectively. The figures are included at the end of Section 2.

While the location of the connection to the AWT facility, the tank location, the distribution piping locations, and the 365-day irrigation area locations are fixed, there are four potential alignments for the transmission (supply) pipeline from the AWT facility to the storage reservoir. These four alignments provide for the four proposed action alternatives that are evaluated in the EA. A no action alternative is also be evaluated. The action and no action alternatives are further described in the sections that follow.

2.3 IDENTIFICATION OF ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

During development of the EA, several alternatives were reviewed but were subsequently eliminated from further consideration due to the alternatives being infeasible or not meeting the project design requirements.

While there are two active irrigation wells at Tyndall AFB that are in use at the Youth Center and the AFNORTH building, the majority of irrigation systems on Tyndall AFB use potable water supplied by Bay County Utilities. An alternative that included installation of additional irrigation wells at the 365-day irrigation areas was considered, but eliminated because installation of new wells for irrigation purposes is strongly discouraged in Florida due to water conservation measures that have been implemented by the state. Because the use of an available source of reclaimed water is feasible, the irrigation well installation alternative was eliminated from further consideration.

Another alternative evaluated, but eliminated from further consideration included implementing zeroscaping on Tyndall AFB. This option, which would require a change in vegetation in the administrative/organizational area of the base, is not consistent with the requirements outlined in the base's landscaping plan. Turf grass and other plants are required to meet aesthetic criteria established by base leadership. Tyndall AFB has already implemented irrigation optimization procedures, which include watering at night, watering at less frequent intervals where appropriate (i.e., no longer 365-days, but rather on a routine basis), and changes that align with the Florida Turf Grass Association recommendations.

For the transmission pipeline, several alignments were considered and eliminated. The general alignment parameters included using existing easements and corridors where possible to reduce environmental impacts, re-routing when possible to minimize interferences with utilities and environmental resources, avoiding groundwater use restriction areas, avoiding Environmental Restoration Program (ERP) and Military Munitions Response Program (MMRP) sites, and avoiding operational range areas. Initial alignments that did not meet these parameters were

eliminated from further consideration. An alignment alternative that included crossing Pearl Bayou was evaluated, but found to be a technically difficult and expensive subaqueous crossing that did not provide additional benefit to the alternatives selected for further consideration in the EA.

To provide sufficient storage and ensure consistent supply of water for irrigation, a storage reservoir is proposed in the reclaimed water improvement project design. An alternative to the one million gallon reservoir was considered and eliminated. The alternative included use of an above ground storage tank, referred to as a Crom tank, rather than using the reservoir. However, the Crom tank does not meet the landscape plan expectations for the area of the base where the reclaimed water storage facility would be located. Additionally, estimated costs to construct the large Crom tank exceeded the reclaimed water improvement project budget.

2.4 DETAILED DESCRIPTION OF THE PROPOSED ACTION

The proposed action includes the installing a reclaimed water system that would provide reclaimed water, instead of the potable water currently used, to the base's 365-day irrigation areas. These areas include Flag Park, Front Gate, Building 662, Washington Park, Building 647, football and track field, AFNORTH building, and the 120-person dorm complex (four buildings). The proposed project includes installing irrigation pumps, controls, and reclaimed water lines to the irrigation areas. A 20,000 linear-foot, eight-inch diameter transmission pipeline would be used to convey reclaimed water from the existing AWT facility to a storage reservoir to be located near the base entrance on Illinois Avenue. As the location of the storage reservoir is highly visible to the public and near the Headquarters building, landscaping around the reservoir would need to be aesthetically pleasing and budgeted to be maintained. Additionally, the reservoir would need to be designed/landscaped to minimize wildlife hazards (i.e., bird air strike hazards). The reservoir would also need to be fenced to prevent children and terrestrial wildlife (e.g., alligators) from entering the reservoir. These design/landscaping considerations, as well as water quality considerations will be incorporated into the final design phase(s) of the proposed action. From the storage reservoir location, a constant speed pump station with a hydropneumatic tank system would provide reclaimed water to approximately 20,000 linear feet of distribution piping. The distribution piping, which includes three- to eight-inch diameter piping, would generally run in a loop around the 365-day irrigation areas. Individual existing building irrigation systems would be connected to the proposed distribution piping. In areas where there are restrictions on spray irrigation, alternative irrigation delivery methods, such as micro-drip irrigation in flower beds, would be recommended.

Four transmission pipeline alignment alternatives, proposed action alternatives 1a, 1b, 2 and 3, were developed during discussions with the Air Force staff and are based on the conceptual system design presented in the Reclaimed Water System Design Summary (Weston, 2010). Although the action is the same (i.e., the installation of the reclaimed water distribution system from the AWT facility to the storage reservoir), the four proposed action alternatives differ by the pipeline route (refer to **Figure 2-1**). For all four proposed action alternatives, the transmission (supply) pipeline would originate at the eastern side of the AWT facility and would extend south along Boy Scout Road to Sabre Drive. Regardless of the configuration further along the pipeline, the evaluation south along Boy Scout Road is the same for all four action alternatives.

2.4.1 PROPOSED ACTION ALTERNATIVES 1A AND 1B

Proposed action alternative 1a would initiate at the eastern side of the AWT facility. The pipeline would be installed on the west side along Boy Scout Road and would extend due south to Sabre Drive. At the intersection of Boy Scout Road and Sabre Drive, the pipeline would cross Sabre Drive and run east/southeast along the south side of Sabre Drive to a point approximately 2,000 feet east. At this point, the pipeline would turn south and cross a sparsely vegetated upland pine forest to Beacon Beach Road. At the intersection with Beacon Beach Road, the pipeline would extend east/southeast to Suwannee Road within the Right of Way (ROW) on the north side of Beacon Beach Road. At the intersection of Beacon Beach Road and Suwannee Road, the pipeline would continue in the northwest ROW along Suwannee Road and then turn northeast and terminate at the storage reservoir location (see **Figure 2-1**). The total length of the pipeline would be 23,240 feet (4.4 miles).

Alternative 1b is a slightly modified alignment of alternative 1a. Due to the potential of intersecting a nearby contaminated groundwater plume, a second alignment was considered that would avoid the groundwater plume. Action alternative 1b follows the same alignment as action alternative 1a until it reaches Beacon Beach Road. At the intersection with Beacon Beach Road, the pipeline would extend east/southeast to DeJarnette Road, where the alignment is redirected to the south side of Beacon Beach Road to avoid the ERP site (FR038) and its associated groundwater plume. The action alternative 1b alignment continues east/southeast along Beacon Beach Road to a point approximately 1200 feet west of Suwannee Road. The alignment then extends south for approximately 670 feet. At this point, the alignment turns due east/southeast and extends to the east side of Suwannee Road. The pipeline would continue in the southeast ROW along Suwannee Road and then turn northeast and terminate at the storage reservoir location. (see **Figure 2-1**). The total length of the pipeline would be 24,625 feet (4.7 miles).

2.4.2 PROPOSED ACTION ALTERNATIVE 2

Proposed action alternative 2 would initiate at the eastern side of the AWT facility. The pipeline would be installed on the west side along Boy Scout Road and would extend due south to the Gulf Power utility easement (located 400 feet north of the intersection of Boy Scout Road and Sabre Drive). At the intersection with the easement, the pipeline would extend east/southeast to Suwannee Road along the south side of the Gulf Power utility easement. At a point approximately 100 feet east of the intersection of the easement and Cleveland Avenue, the pipeline would turn to the south and extend to Suwannee Road. The pipeline would continue in the northwest ROW along Suwannee Road and then turn northeast and terminate at the storage reservoir location (see **Figure 2-1**). The total length of the pipeline would be 22,580 feet (4.3 miles). Note that this is the same alignment presented in the Reclaimed Water System Design Summary (Weston, 2010).

2.4.3 PROPOSED ACTION ALTERNATIVE 3

Proposed action alternative 3 would initiate at the eastern side of the AWT facility. The pipeline would be installed on the west side along Boy Scout Road and would extend due south to Sabre Drive. At the intersection of Boy Scout Road and Sabre Drive, the pipeline would run east/northeast along the north side of Sabre Drive to U.S. Highway 98. The pipeline would be installed on the north side of U.S. Highway 98 because the south side ROW is at capacity with existing utilities. A directional drill installation would be required to cross U.S. Highway 98. The pipeline would extend southeast to a point approximately 7,160 feet (1.4 miles), at which

the pipeline would turn south and cross the highway. A directional drill installation would be required to cross to the south side of U.S. Highway 98. After crossing the highway, the pipeline would terminate at the storage reservoir (see **Figure 2-1**). The total length of the pipeline would be 24,130 feet (4.6 miles).

2.5 DESCRIPTION OF THE NO ACTION ALTERNATIVE

Under the no action alternative, Tyndall AFB would not install the reclaimed water irrigation system. The base would still need to reduce or eliminate potable water use for irrigation to meet the Executive Order 13514 water use reduction goals. Without the installation of the reclaimed water system, these goals would be very difficult to meet and may require development of a new landscape plan, reduced irrigation schedule, and possibly limited use of training and recreational facilities if potable water is still needed for irrigation purposes. Several of these options were evaluated, but eliminated from consideration as alternatives because they are inconsistent with land use and irrigation requirements. As such, they would be undesirable. Additionally, the State of Florida strongly prefers use of reclaimed water for irrigation purposes over direct discharge to surface water bodies, such as Saint Andrew Bay. By using reclaimed water for irrigation, the reclaimed water is infiltrated onsite through the soil rather than released directly into a surface water body. Ideally, all reclaimed water would be infiltrated as surface water discharge is not ideal or recommended by the state. This is further supported by one of the non-numerical goals of Executive Order 13514 that focuses on implementing water reuse strategies, including the use of reclaimed water, to conserve and protect water resources.

2.6 DETAILED DESCRIPTION OF OTHER ACTION ALTERNATIVES

In addition to the proposed action, other actions within the ROI, including non-federal actions, are evaluated as part of the EA. At the time this document was prepared, there was no information regarding other actions planned within the ROI. This will be re-evaluated as the EA is reviewed and subsequent versions of the document are prepared in the event additional information becomes available.

2.7 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALL ALTERNATIVES

Based data collected, mapping resources reviewed, and visual surveys conducted by Tyndall AFB and by PIKA/Pirnie for this EA and the Amphibian, Reptile, and Bat Survey in 2010, there are wetlands and protected species locations that have been identified along the four supply pipeline alignment alternatives. The only protected species known to inhabit the alignment areas is the gopher tortoise (*Gopherus polyphemus*). However, because the Eastern indigo snake (*Drymarchon corais couperi*) is dependent on the gopher tortoise, it should be assumed to inhabit the areas where gopher tortoises are found.

There are three wetland crossings associated with Boy Scout Road, which are part of all proposed action alternatives. However, these impacts can be avoided by directional drill installation or by using the elevated road bed/shoulder as the installation point. This section of the route is the same for all four action alternatives. Provided directional drilling or the elevated road bed/shoulder is used for installation during construction, installation of the pipeline along Boy Scout Road would not have a significant impact on wetlands. Evaluation of recommended and/or required agency involvement, permit requirements, and recommended and/or required

mitigation measures for the various pipeline installation options are discussed in Section 4 of the EA.

To eliminate the spread of Japanese climbing fern, it is recommended that areas within the construction corridor along Boy Scout Road where this species has been identified be treated with herbicide and its presence be eliminated (and confirmed as such) before construction activities begin. Tyndall AFB Natural Resource personnel should be coordinated with and would be responsible for performing the herbicide application in accordance with Tyndall AFB HAZMAT office standard operating procedures.

Action alternatives 1a and 1b would traverse an area of recently planted pine trees. This is an area of upland habitat and has a low potential for the occurrence of gopher tortoises. No burrows were observed along the proposed corridor at the time of the visual survey in October 2010. Additionally, timber losses would be minimized in this area since the trees along the alignment are small (i.e., less than 100 trees were four inches in diameter at breast height). Alternative 1a would also travel through an area with known groundwater restrictions due to arsenic contamination, as well as border the Beacon Beach Landfill (LF003), with localized areas of the groundwater that have metals concentrations exceeding regulatory standards. Alternative 1a also traverses past the former Beacon Beach Gunnery Range (FR038), surface and subsurface soils are contaminated with arsenic, lead and PAHs and arsenic and antimony exceeding regulatory standards in the localized groundwater. Groundwater can be as shallow as two feet in the area. If the supply pipeline was installed along this alignment and groundwater contact in these contaminated areas was anticipated, extensive coordination with regulatory agency staff will be needed to get consensus on an acceptable installation procedure. The coordination with the regulatory agency may also be time intensive and may potentially delay the project. However, the supply pipeline is small diameter and installation may be able to be done so that contact with groundwater during construction is avoided (e.g., such as directional boring or mounding over the pipeline instead of subsurface installation) or by modifying the alignment route to avoid the areas with groundwater contamination, as is the case with action alternative 1b. Detailed analysis of these potential issues is performed in Section 3 and Section 4 of the EA.

Based on the visual survey, there is a small pond, a stream crossing, and three herbaceous wetlands within the Gulf Power Easement portion of the action alternative 2 alignment. Cogon grass (*Imperata cylindrica*), an invasive, non-native species, is also located in some areas within the utility easement. Tyndall AFB is actively trying to eliminate the cogon grass through the base's invasive species management program. The construction corridor, along this alignment within the utility easement, would need to be established such that it would avoid areas where the cogon grass has been identified. Three gopher tortoise burrows have also been observed within the utility easement portion of the alignment. As such, either establishing a buffer of at least 25 feet around each burrow or obtaining a relocation permit would be needed if the construction corridor was located in areas were the burrows were identified. As a preferred measure, the construction corridor would be established such that it would avoid areas where burrows had been identified. Avoidance of wetlands, invasive species, and gopher tortoise locations within the Gulf Power utility easement may not be possible without multiple directional drilling installations, routing changes or additional permit requirements. Additional details regarding evaluation of wetlands, invasive species, and threatened and endangered species within the Gulf Power utility easement and recommended avoidance measures are presented in Sections 3 and 4 of the EA. The alignment for action alternative 2 would also pass through ERP and MMRP sites (identified as FR038 and SR170) that have on-going environmental investigation and/or restoration activities underway. If the supply pipeline was

installed along this alignment, extensive coordination with regulatory agency staff will be needed to get consensus on an acceptable installation procedure. Coordination with the regulatory agency may also be time intensive and may potentially delay the project. Detailed analysis of these potential issues is included in Sections 3 and 4 of the EA.

Action alternative 3 would travel along established ROWs of major roads. There are wetlands along Sabre Drive between Boy Scout Road and U.S. Highway 98. This path along Sabre Drive also borders the Beacon Beach Landfill (LF003), but does not cross the site. Two additional wetlands are located along the section of U.S. Highway 98 where the pipeline would traverse. Directional drilling would be required to cross U.S. Highway 98, as well as are recommended in areas with wetlands. Additionally, this alignment would require installation of the pipeline in utility easements that are outside of the Tyndall AFB installation fenceline.

The distribution pipeline which receives water after the reservoir would be located within existing maintained ROWs in a developed section of the base; therefore, no impacts to wetlands or protected species are anticipated. Since biological resources (wetlands and protected species) and hazardous materials/hazardous waste (ERP and MMRP sites) have been initially identified as potential issues that required further evaluation in the EA, they have been highlighted in this section. It should be noted that all of the resource issues identified in Section 1.4 are considered, evaluated, and discussed in detail in Sections 3 and 4 of the EA. Based on the initial evaluation conducted for the EA, infrastructure and utilities, cultural resources, land use, water resources, air quality, noise, earth resources socioeconomic resources, and minority populations would not be negatively impacted by the proposed action. **Table 2-1**, on the following page, summarizes the anticipated impacts by action alternative.

Table 2-1. Comparison of Alternative Impacts

Resources	Alternatives				
	1a	1b	2	3	No Action
Aircraft Operations					
Noise	√ T	√ T	√ T	√ T	
Air Quality	√ T	√ T	√ T	√ T	
Safety and Occupational Health					
Geology					
Topography					
Soils					
Surface Water	√	√	√	√	√
Groundwater	√	√	√	√	√
Sanitary Sewer					
Potable Water	√	√	√	√	√
Solid Waste Management					
Drainage					
Transportation Systems	√ T	√ T	√ T	√ T	
Electricity					
Natural Gas					
Hazardous Materials					
Hazardous Wastes	√ T		√ T		
Vegetation	√ PM	√ PM	√ PM	√ T	
Wildlife					
Threatened and Endangered Species			√ TM		
Wetlands	√ TM	√ TM	√ TM	√ TM	
Floodplains	√ TM	√ TM	√ TM	√ TM	
Historical Resources					
Archeological Resources					
Socioeconomic Resources	√	√	√	√	

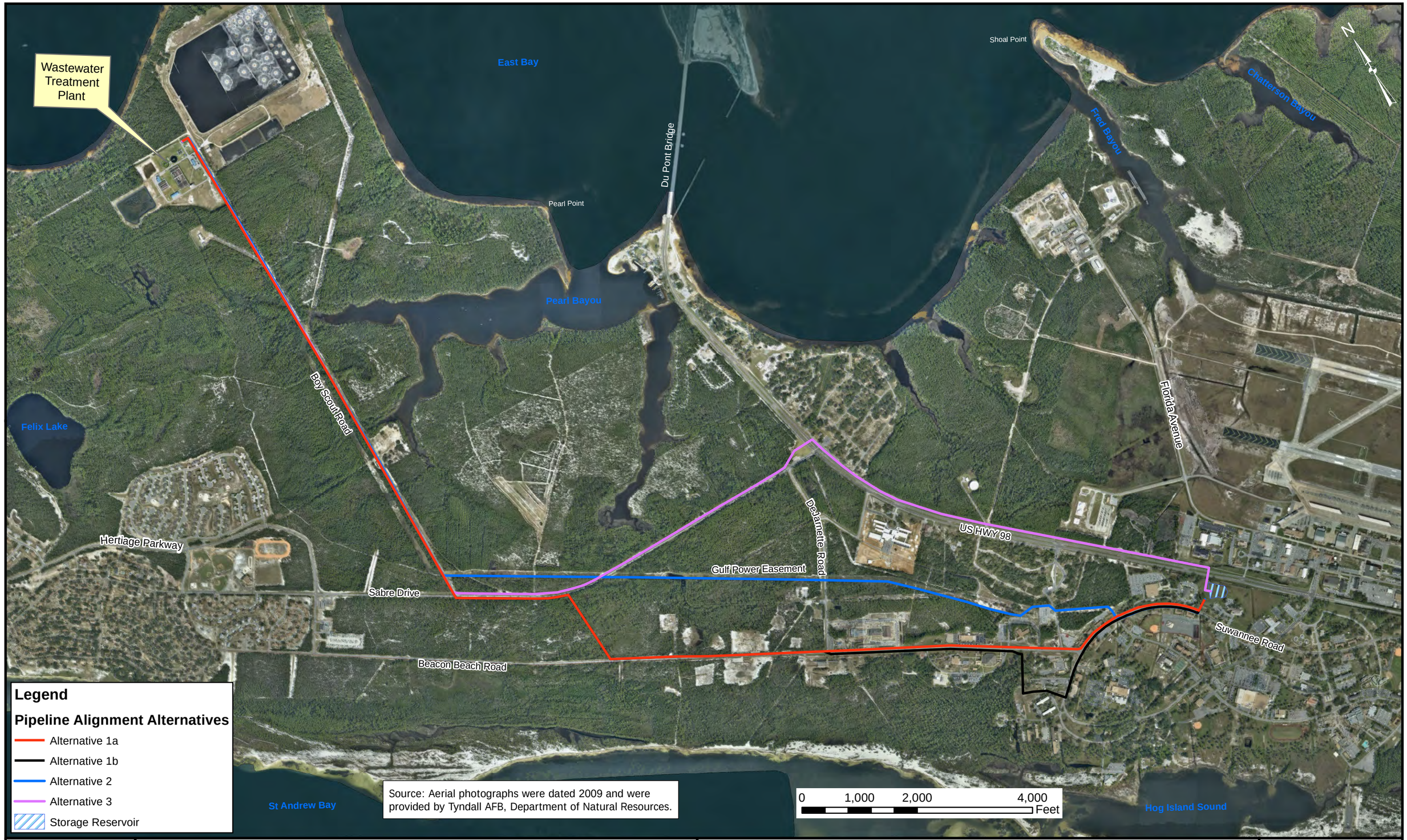
√	Positive Impact on Resource
√	Negative Impact on Resource
P	PERMANENT AND UNAVOIDABLE IMPACT
T	TEMPORARY IMPACT
M	MITIGATED IMPACT

2.8 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

Based on the evaluation performed for the EA, the preferred action is selection of action alternative 3. Action alternative 3 allows Tyndall AFB to utilize existing reclaimed water resources to meet the water use reduction goals established in Executive Order 13514 while minimizing environmental effects associated with the proposed action. This action alternative has the least impacts on natural resources and avoids ERP and MMRP sites and areas with associated groundwater contamination/restrictions. Action alternative 3 would also support the Executive Order's non-numerical goal of conserving and protecting water resources by implementing water reuse strategies that include the use of reclaimed water.

2.9 MITIGATION REQUIREMENTS MATRIX

Because the preferred action alternative 3 can be designed to avoid wetland impacts by utilizing directional drilling technologies for pipeline installation, natural resource impacts, ERP and MMRP sites, including areas with groundwater restrictions, no mitigation should be necessary. Although no protected species were observed in the alignment corridor, species-specific surveys have not been performed. The potential need for species-specific surveys is addressed in Section 3.3.9 of the EA.



Final Draft Environmental Assessment

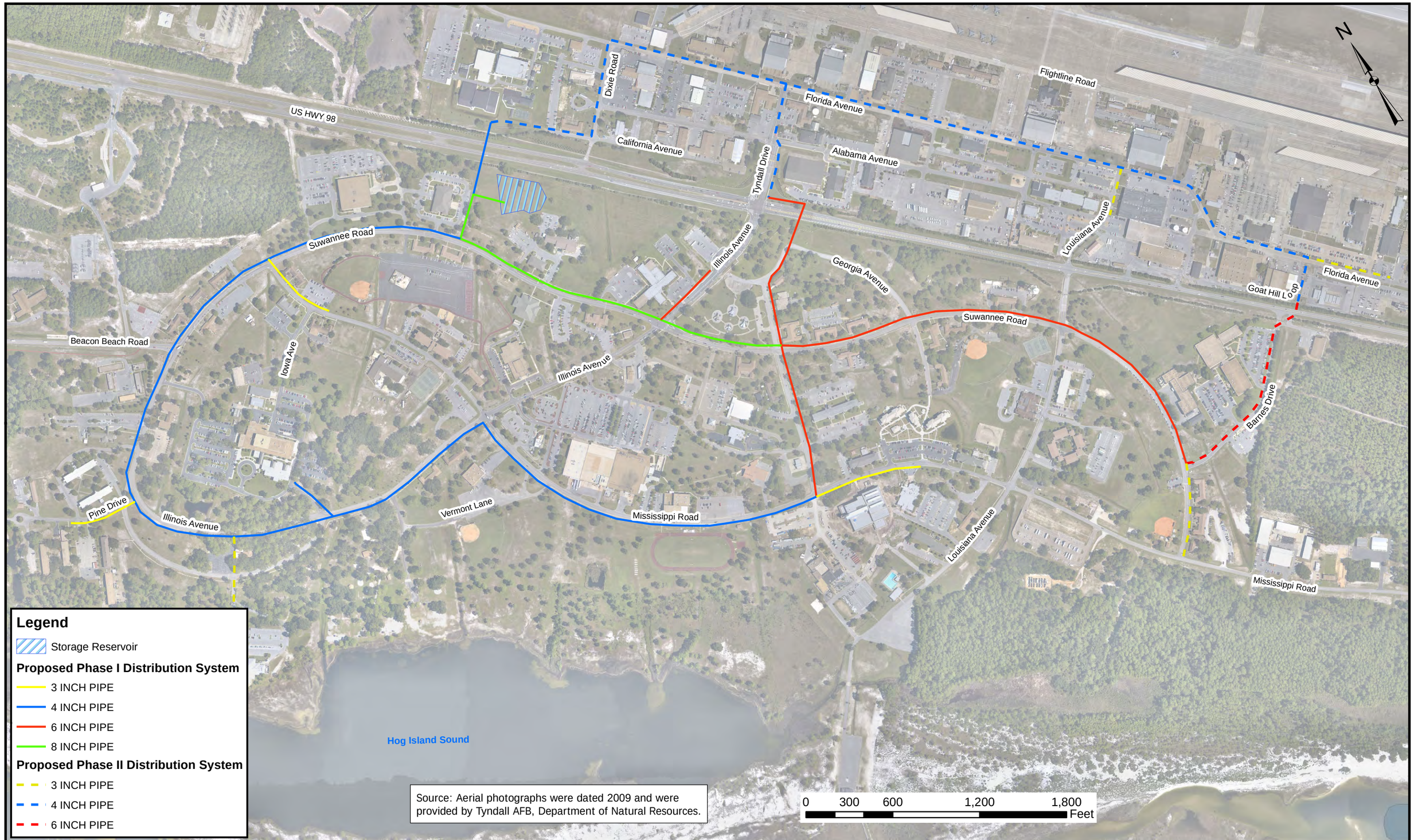
RECLAIMED WATER SUPPLY PIPELINE ALIGNMENT ALTERNATIVES MAP

Tyndall Air Force Base (AFB)

Environmental Assessment for Installation of a Reclaimed Water Irrigation System Improvement Project

FIGURE 2-1

MAY 2011



Final Draft Environmental Assessment

PROPOSED STORAGE RESERVOIR AND DISTRIBUTION SYSTEM MAP

Tyndall Air Force Base (AFB)

Environmental Assessment for Installation of a Reclaimed Water Irrigation System Improvement Project

FIGURE 2-2

MAY 2011

SECTION 3. AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This section presents the existing environment or baseline conditions for the biophysical resources that could potentially be affected by the implementation of the proposed action. This section is organized by individual resources, and includes descriptions of both the biological and physical portions of the ecosystems potentially impacted by the proposed action. Information is presented in this Section to the level of detail necessary to support the conclusions made in Section 4, Environmental Consequences.

3.2 INSTALLATION LOCATION, HISTORY, AND CURRENT MISSION

Located in Bay County in the Florida panhandle, Tyndall AFB is approximately eleven travel miles southeast of Panama City. Tyndall AFB is located on a peninsula and encompasses more than 29,000 acres situated between the Gulf of Mexico and Saint Andrew Bay (see **Figure 1-1**). The base is about eighteen miles long, three miles wide and is surrounded by water on the north, west, and south. The base's transient barrier islands, Crooked Island West and East, form Saint Andrew Sound and Shell Island acts as a Gulf barrier island, which separates the Gulf of Mexico from Saint Andrew Bay.

Originally named Tyndall Field, the base commenced operations on 6 December 1941 to support gunnery training for World War II. After a three month closure in 1946, Tyndall Field became Tyndall AFB as part of the Tactical Air Command's Air University. In September 1950, the base was designated as the U.S. Air Force Pilot Instructor School in the Air Training Command unit. The mission at Tyndall AFB changed again when it became part of the Air Defense Command in September of 1957, and it remained the mission until October 1979 when the base was reassigned to the Tactical Air Command. The current host mission began in July 1981 with the activation of the 325th Fighter Wing under the AETC.

Although Tyndall AFB is an AETC base, other major associate units also maintain organizations at the base. These tenant organizations include: AFNORTH; Air Force Civil Engineer Support Agency; Air Force Research Laboratory; 16th Electronic Warfare Squadron, Detachment 1; 372nd Training Squadron, Detachment 4; 702nd Computer Systems Squadron and System Support Facility; 823rd Red Horse Squadron, Detachment 1; Airey Non-Commissioned Officer's Academy; and 53rd Weapons Evaluation Group.

3.3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

Tyndall AFB has 531 buildings that comprise 4,251,341 square feet of residential, commercial, and office space. Military Family Housing (MFH) has been privatized and the base no longer owns the homes. Other base residential buildings accommodate permanent base residents, students, and visiting personnel. Based on 2010 data, Tyndall AFB's permanent population includes approximately 4,930 military personnel, 874 civilian personnel, and 1,548 contract personnel. Tyndall AFB provides approximately 596 facilities on base with potable water through 305,842 linear feet of pipe, including the housing area at Shoal Point. The 325th Civil Engineer Squadron has been responsible for operating the water distribution system within Tyndall AFB. This system is currently in the process of being privatized by Gulf Coast Electric Cooperative. At several of the facilities, potable water is used for landscape irrigation in addition to water needs within or at the facility.

3.3.1 AIRCRAFT OPERATIONS

Tyndall AFB hosts the 325th Fighter Wing, which includes a squadron of F/A-22 Raptor aircraft. The 325th Fighter Wing trains pilots to fly the F/A-22 Raptor aircraft. Four new facilities have been constructed to support this mission. By 2012, the 325th Fighter Wing will have two squadrons flying the F/A-22 aircraft. There is also a squadron of F4 Phantom aircraft used as full scale drones.

3.3.2 NOISE

Airfield operations are the primary sources of noise at Tyndall AFB. Other noise sources include vehicular traffic, training activities, and intermittent construction. During periods of no flying activity, noise results primarily from ground traffic movement, occasional construction, and similar sources. This noise is comparable to sounds that occur in typical communities. It is during periods of aircraft ground or flight activity that the noise environment changes. Existing noise levels are typical of an urban residential area near a major airport.

The noise guidelines established for land use planning at Tyndall AFB are essentially the same as those published by the Federal Interagency Committee on Urban Noise in the June 1980 publication, *Guidelines for Considering Noise in Land-Use Planning and Control*. Based on these guidelines, the maximum acceptable noise level for most residential land uses is considered to be 65 decibels per Day-Night Average Sound Level (DNL).

The most noise-sensitive areas within Tyndall AFB are the military housing neighborhoods of Felix Lake, Wood Manor, Redfish Point, Bay View, and Shoal Point. The waters of Saint Andrew Bay and East Bay provide a natural noise buffer for the off-base communities that surround the Tyndall AFB peninsula and, therefore, construction noise will not be considered for other than local project areas.

3.3.3 AIR QUALITY

The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) pursuant to Sections 109 and 301(a) of the CAA. These standards, expressed in micrograms per cubic meter ($\mu g/m^3$), establish safe concentration levels for each "criteria" pollutant. NAAQS have been set for six criteria pollutants: carbon monoxide; nitrogen dioxide; ozone; sulfur oxides, measured as sulfur dioxide; lead; and two types of particulate matter: particulate matter less than or equal to 10 microns in aerodynamic diameter and particulate matter less than or equal to 2.5 microns in aerodynamic diameter.

The CAA divides the U.S. into attainment and nonattainment areas, usually by county or Metropolitan Statistical Area. Areas not meeting NAAQS are designated nonattainment for the specific pollutant. Bay County and, therefore, Tyndall AFB, is currently designated as an attainment area (meets the EPA air quality standards for all criteria pollutants [60 Federal Register 62748, December 7, 1995]). A Conformity determination is not required since Bay County is designated as "attainment." (U.S. Air Force, 2003).

Tyndall AFB operates under a minor air operation permit issued by the State of Florida in 2010. The following five sources of air emissions at Tyndall AFB are regulated under this permit: paint booths (seven separate units), fuel fill stands (aircraft refueler truck fill), jet engine testing (hush houses and engine shop), bulk fuel storage tanks (Areas 400 and 6000), and boilers (all units greater than 1.0 million British thermal units per hour).

3.3.4 SAFETY AND OCCUPATIONAL HEALTH

The proposed action will require workers to be exposed to typical construction issues (e.g., heat, solar radiation, wildlife, etc.) in Florida. All the alternatives will also require working in and around heavy machinery. Alternatives 1a, 1b and 2 will require some tree removal operations. Alternative 2 also traverses ERP and MMRP sites with known contamination issues in soil and groundwater, including metals and polyaromatic hydrocarbons. Special OSHA requirements, including HAZWOPER 40-hr training would be required to work in these areas.

3.3.5 EARTH RESOURCES

3.3.5.1 Geology

Tyndall AFB is underlain by unconsolidated depositional sands and clayey sands to approximately 110 feet below land surface (bls). This material is moderately permeable and is underlain by the Intracoastal Formation which is primarily composed of fossils, quartz sand, and calcium carbonate grains cemented by crystalline calcite and clay.. The Intracoastal Formation The upper portion of this formation is relatively impermeable, while the lower portion is highly permeable and extends down to approximately 330 feet bls. The Intracoastal Formation is underlain by highly permeable limestone that extends below 600 feet bls in some areas.

3.3.5.2 Topography

Tyndall AFB is located within the East Gulf Coastal Plain physiographic province, which in general is relatively topographically flat, as shown in **Figure 3-1**. Elevations range from sea level along the coastline to approximately 30 feet above mean sea level along a ridge that generally runs the length of the peninsula following U.S. Highway 98. This ridge divides the base into the Beach Dunes and Wave-Cut Bluffs physiographic region to the west and the Flatwoods Forest physiographic region to the east.

3.3.5.3 Soils

The base's coastal environment consists of sand dunes, beaches, bayous, and tidal marshes. The interior portions of the base consist of moderately well drained, gently sloping uplands, poorly drained flatwoods, and wetlands. The base soils are characteristically sandy, acidic, and moderately to highly permeable. General soil associations and detailed soil types at Tyndall AFB have been identified by the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) Soil Survey for Bay County, Florida (USDA, 1984). Based on the NRCS SSURGO soil map prepared for Bay County, five general soil associations, each consisting of numerous detailed soil types, are present at Tyndall AFB. The five major soil associations at Tyndall AFB are described below:

- Kureb-Resota-Mandarin: This soil association occurs on the sandy ridges throughout the northernmost part of the base and on the barrier islands. It includes soils that are nearly level to gently sloping; somewhat poorly drained to poorly drained; and sandy to a depth of 80 inches or more with some having organic stained sandy layers.
- Hurricane-Chipley-Albany: This soil association occurs in the flatwoods of the southeastern part of the base and includes soils of both upland and wetland habitats. Soils within this association are nearly level to gently sloping; somewhat poorly drained; and sandy throughout or sandy to a depth of 40 inches or more and loamy below.
- Pottsburg-Leon-Rutlege: This soil association occurs in the lower flatwoods that cover much of the base peninsula. It includes soils that are nearly level; poorly drained or very

poorly drained; and sandy to a depth of 80 inches or more with some having organic stained layers.

- Rutlege-Allanton-Pickney: This soil association occurs in depressional areas and poorly defined drainageways in the southernmost part of the base. It includes soils that are nearly level or depressional; poorly drained or very poorly drained; and sandy to a depth of 80 inches or more with some having organic sandy layers.
- Bayvi-Diregо: This soil association occurs in the tidal marshes along East Bay in the east central part of the base. It includes soils that are nearly level; very poorly drained; and sandy to a depth of 80 inches or more or organic to a depth of 14 to 50 inches and sandy below.

The proposed action alternative alignments pass through the soil types listed in **Table 3-1** below. The soil types are also illustrated on **Figure 3-2**.

Table 3-1. Project Area Soil Types

Soil Map Symbol	Soil Type Name	Soil Association	Drainage Class	Alternative
13	Leon sand	Kureb-Resota-Mandarin	Poorly drained	1a, 1b, 2, 3
22	Pamlico-Dorovan complex	Pottsburg-Leon-Rutlege	Very poorly drained	1a, 1b, 2, 3
25	Hurricane sand	Hurricane-Chipley-Albany	Somewhat poorly drained	1a, 1b, 2, 3
27	Mandarin sand	Kureb-Resota-Mandarin	Somewhat poorly drained	1a, 1b, 2, 3
28	Allanton sand	Rutlege-Allanton-Pickney	Very poorly drained	1a, 1b, 2, 3
29	Rutlege sand	Rutlege-Allanton-Pickney	Very poorly drained	2, 3
30	Pottsburg sand	Hurricane-Chipley-Albany	Poorly drained	1a, 1b
40	Arents, 0 to 5 percent slopes	Urban Land	Somewhat poorly drained	3
42	Resota fine sand, 0 to 5 percent slopes	Kureb-Resota-Mandarin	Moderately well drained	1a, 1b, 2, 3

3.3.6 WATER RESOURCES

3.3.6.1 Surface Water

Tyndall AFB is located in the Saint Andrew Bay watershed, part of the Choctawhatchee River Basin. The surface water bodies that surround the Tyndall AFB peninsula are Saint Andrew Bay, East Bay, Saint Andrew Sound, and the Gulf of Mexico. These systems are hydrologically connected to Choctawhatchee Bay to the west and the Apalachicola River Basin to the east, via the Intracoastal Waterway. Numerous tidal bayous exist along the northern coastline of Tyndall AFB. The southern coastline, with the recently combined Shell Island and Crooked Island West, form a barrier island system with Crooked Island East that separates the inhabited portions of Tyndall AFB from the open waters of the Gulf of Mexico.

The coastline is dominated by estuarine habitats, but Tyndall AFB has many freshwater lakes and wetland habitats. Some were artificially created, while others, such as coastal dune lakes, developed naturally as a result of coastal land processes. There are some 45 intra-dune

waterbodies. Salinities and water levels of some of these systems vary dramatically. According to habitat mapping developed through the Department of Natural Resources (U.S. Air Force, 2010), there are approximately 66 small fresh waterbodies on the base. They are generally smaller than two acres and shallow (< five feet deep). The largest natural lake on Tyndall AFB is the inland freshwater Felix Lake covering 33 acres.

In general, water drains northward in areas north of U.S. Highway 98 and southward in areas south of U.S. Highway 98.

3.3.6.2 Groundwater

There are three groundwater aquifers that underlie Tyndall AFB. From land surface, the closest source of groundwater is the surficial aquifer. The surficial aquifer is composed of unconsolidated, poorly compacted, siliciclastic deposits and ranges in thickness from 50 to 100 feet bls. Depths to surficial groundwater at the base range from at land surface in wetlands to 15 feet bls in the upland sandy scrub. The surficial aquifer is not used as a source of potable water at the base. In surficial aquifers, the groundwater continuously moves along the hydraulic gradient from areas of recharge to places of discharge, which at Tyndall AFB are the surrounding bays and Gulf of Mexico. The surficial aquifer is recharged locally and fluctuates with the water-table in response to drought or rainfall.

The Intermediate Confining Unit is a low permeability layer that separates the surficial aquifer from the deeper Floridan Aquifer. This confining unit consists primarily of fine-grained siliciclastic deposits interlain with carbonate strata. At Tyndall AFB, the Intermediate Confining Unit ranges in thickness from approximately 200 to 250 feet. The Floridan Aquifer consists primarily of limestone and dolomite and is approximately 1,100 feet in thickness. The upper portions of the Floridan Aquifer provide potable water for most of the Florida Panhandle. Some of the potable water used by Tyndall AFB is pumped from the Floridan Aquifer using permitted wells. Water from these wells is filtered and chlorinated prior to use. Most of the potable that is used by the base is supplied by Bay County Utilities, which uses Deer Point Lake as its main source.

3.3.7 INFRASTRUCTURE / UTILITIES

The following sections regarding utilities are based on the information provided in the Final Infrastructure Investment Plan for Tyndall AFB. The plan is part of the Air Force Utilities Sustainment, Restoration and Modernization Program and provides an assessment of the future maintenance and modifications (U.S. Air Force, 2007).

3.3.7.1 Sanitary Sewer

Tyndall AFB provides wastewater services for the 531 buildings on-base. The wastewater collection system consist of building sewers, laterals, mains, manholes, cleanouts, lift stations, oil water separators, grease traps, and septic tanks. The majority of the wastewater collection system infrastructure dates from the original construction of the base in the 1940s and 1950s, although it has periodically been upgraded and expanded. There are 80 wastewater lift stations in use to convey wastewater from the buildings on base to the Bay County AWT facility located in the northernmost portion of the base. About 70 lift stations are primarily used to service individual buildings or small groups of buildings. All sewage on base, except for the housing areas, is collected and discharged to Lift Station 1722, which is located at the old wastewater treatment plant in the south central part of the base. This facility has been abandoned, except for the lift station and two clarifiers used for emergency overflows. A force main that flows northwest from Mexico Beach, which is not owned by Tyndall AFB, also ties into Lift Station

1722. Lift Station 1722 pumps directly to the Bay County AWT facility. Housing sewage is collected through Lift Station 2873; it ties into the force main from Lift Station 1722 and pumps to the Bay County AWT facility.

No hydraulic capacity study has been performed for the wastewater collection system, nor is there flow or run-time monitoring of the primary lift stations. It is therefore difficult to determine if the capacity of the collection system or lift stations is adequate for incoming flows. Based on the low number of reported overflows, it is assumed for the purpose of this evaluation described in this EA that the capacity for the current level of occupation is adequate.

3.3.7.2 Potable Water

Tyndall AFB purchases potable water from Bay County. Bay County's water supply comes from Deer Point Lake, a 5,000 acre impoundment of the Saint Andrew North Bay system. In addition to the Bay County supply, Tyndall AFB has 27 wells; four are used for emergency potable water backup; six for irrigation purposes; and six are used for potable water and 11 other water supply wells at various buildings located in isolated locations on the base. These isolated locations are greater than one mile from the project area and include the Alert Area, Ammo Area, Wright Lab, and Silver Flag. The depths of these wells connect to the Floridian Aquifer and range from 440 feet to 693 feet bls.

According to the Infrastructure Investment Plan, potable water from Bay County enters the base through a 16-inch pipeline that runs across the Dupont Bridge. The water then flows to a five-million-gallon ground-level storage tank and booster pump station that is operated and maintained by Bay County; the pump station was constructed by Bay County on property the Air Force leases from the County. Water from the five-million-gallon tank is pumped through a County-owned transmission main to Tyndall AFB and eastward to Mexico Beach. The base taps into Bay County's 16-inch line at three locations along U.S. Highway 98. The water flows directly into the Tyndall AFB's water distribution system through pressure-reducing valves and into two of the base's elevated water storage tanks. Tyndall AFB does not provide any treatment to the water received from Bay County. Primary and secondary standards are the responsibility of Bay County.

The Tyndall AFB elevated water storage tanks provide operational flexibility during the peak-flow demand periods exerted on the system, equalizing system pressure, and providing emergency storage capacity. The elevated tanks hold 250,000 gallons (Facility 733) and 150,000 gallons (Facility 2892), respectively. Tyndall AFB's total water storage capacity is approximately 400,000 gallons.

Fire demand requirements for specific facilities are supported by three additional storage tanks and pump stations with a total capacity of 791,000 gallons (Tank 236 – 500,000 gallons, Tanks 502 – 246,000 gallons, Tank 9754 – 35,000 gallons). Water for these tanks is provided through the water distribution system.

Emergency requirements are supported by two wells with a pumping capacity of 600 gpm each (Well 2 - Facility 722, and Well 3 - Facility 652). The base has standby chlorine gas to disinfect the well water if the emergency water source is used.

The construction of the Tyndall AFB water distribution system began in May 1941. The 1940s water system infrastructure has periodically been upgraded and expanded to handle increased system demands. Today, Tyndall AFB water distribution system supplies water for residential, industrial, and fire-fighting purposes. It serves a population of approximately 8,000. The capacity for the designed population and emergency fire use has been accounted for in the upgraded water system. By eliminating potable water as an irrigation source, the proposed action

will return 40% of the designed capacity to the system and, thus, ensure availability of potable water through the system for future uses.

3.3.7.3 Solid Waste Management

The following factors were considered in evaluating potential impacts to solid waste management: (1) the degree to which the proposed action could affect the existing solid waste management program at Tyndall AFB and (2) the capacity of the area landfills. While construction associated with the proposed action will generate a limited amount of solid waste during the actual construction of the reclaimed water irrigation system, this waste will not significantly increase the amount of solid waste generated at the base or stress the existing waste disposal operations at Tyndall AFB. Following construction, the proposed action will not generate solid waste. Additionally, the longevity of existing landfill resources is estimated to be eighty years under current conditions, which includes an estimated eight million people visiting Bay County each year. The proposed action is not anticipated to have a significant impact on the lifespan of the current landfill operations in the county.

3.3.7.4 Drainage

In general, water drains northward in areas north of U.S. Highway 98 and southward in areas south of U.S Highway 98. The same generally holds true on the west side of the base. The base's stormwater system consists primarily of roadside ditches in undeveloped areas and underground piping in developed areas. Based on the 2004 Tyndall AFB General Plan, surface drainage is adequate in most parts of the base due to the high permeability of the soils.

3.3.7.5 Transportation Systems

The roads on Tyndall AFB are primarily base owned systems, with the exception of the 18.3 miles of U.S. Highway 98 that cross through the base. There are over 56 miles of paved roads and 81 miles of unpaved roads. The paved systems carry all commuter vehicles on and off base. All Alternatives are planned to be within the road easement for the predominant length of the project (**Table 3-2**). In the short term, there would be construction delays to localized traffic for each Alternative. In the long term, there would be no lasting effects on traffic patterns or road systems.

Table 3-2. Transportation System Usage and Crossings

	Alignment Total Length (feet)	Length of alignment NOT along Road corridor	Length of alignment along Road corridor	Number of Road Crossings
Alternative 1a	23,355	1,350	22,005	4 - Base Roads
Alternative 1b	24,630	2,938	21,692	4 - Base Roads
Alternative 2	22,580	11,935	10,645	5 - Base Roads
Alternative 3	24,130	519	23,611	2- US HWY Crossings 2- Base roads

3.3.7.6 Electricity / Natural Gas

Electricity

Tyndall AFB purchases electricity from Gulf Power Company (GPC). The power is delivered through a GPC-owned electrical substation on the west end of the base, at Military Point. Power enters the GPC substation by two 46-kilovolt (kV) lines that were installed in 1961. The GPC substation steps the voltage down to the 12.47-kV distribution level. Each 46-kV line is capable of carrying 25 megawatts and feeds two separate 20-megavolt-ampere transformers. The existing electrical system infrastructure at Tyndall AFB was initially installed in the 1940s, 1950s, and 1960s. Although major renovation, restoration, and modernization projects took place throughout the last 40 years; the electrical system will need additional renovation projects within the next five years to replace aging components.

GPC supplies adequate power to support the electricity demands of the base. The electric source provides adequate power to the base (U.S. Air Force, 2007) and no new projects have been recommended to increase or improve the supply of power to the base. The construction is predominantly overhead using wood poles. All the base-owned feeders are operated as radial feeders. The base's 12.47-kV electrical distribution system consists of approximately 159 wire miles of primary conductor with approximately 95% overhead and 5% underground in conduit.

Alternative 1 is proposed to use the existing Gulf Power Easement (i.e., power transmission line ROW) between Boy Scout Road and Suwannee Road. The use of the Gulf Power Easement will require a transmission encroachment agreement from Gulf Power Company. According to Mr. Stan Sexton with Gulf Power Company, via personal communication, the design and placement within easement would need to be approved by Ms. Peggy Wilson, Senior Transmission Right of Way Specialist, using the appropriate application.

Natural Gas

Peoples Gas, a division of TECO Energy Inc., provides odorized natural gas to Tyndall AFB through a pipeline that enters the base along the Du Pont Bridge. A regulator station reduces the pressure from 120 pounds per square inch gauge (psig) to 55 psig before distributing the natural gas through the distribution system to base facilities. The Tyndall AFB natural gas distribution system consists of approximately 24 miles of buried piping, ranging in size from 0.75-inch service laterals to 6-inch gas mains. Natural gas is distributed to approximately 218 facilities (some facilities have more than one connection), not including the housing facilities. The system is mostly looped, allowing gas to back-feed from different directions. The system was originally installed in the 1950s and 1960s. The Main Base's facilities are provided with natural gas at 55 psig. Each facility's service regulator further reduces the pressure from 8 to 12 inches of water or to the pressure required to meet specific equipment requirements within the facility. The housing area is supplied through a metering station located on the south side of Sabre Drive at U.S. Highway 98.

3.3.8 HAZARDOUS MATERIALS AND WASTES

3.3.8.1 Hazardous Materials

Hazardous materials will be not be utilized in significant amounts to cause environmental hazards or impact environmental resources.

3.3.8.2 Hazardous Waste

The process of producing reclaimed water will not generate hazardous waste. However, the generation of hazardous waste could occur during the construction process. Some of the alternatives may require the excavation of contaminated soil or dewatering of contaminated groundwater. This would only occur along the portions of the alignment routes that traverse ERP and MMRP sites. The types of hazardous waste and contaminated media associated with the ERP and MMRP sites are discussed in Section 3.3.8.3. Alternatives 1b and 3 do not cross through the ERP or MMRP site boundaries; alternatives 1a and 2 do cross through portions of ERP and/or MMRP sites. Waste generated from construction activities (e.g., trenching for pipe installation) within the ERP and MMRP sites will require disposal in accordance with Tyndall AFB hazardous waste disposal protocol under CERCLA.

3.3.8.3 Environmental Restoration Program and Military Munitions Response Program

There are six ERP sites within project area where the reclaimed water supply pipeline alternatives are located, three are inactive (LF002, LF011, and OT035) and three are active (FR038, LF001, and LF003). There are also four MMRP sites within this part of the project area (Combat Arms Training Facility, Skeet Range, Stationary Target Range and Tower Range). Refer to **Figure 3-3** for the locations of these sites relative to the project area. The following subsections briefly describe these ERP and MMRP sites, as well as, describing the known soil and/groundwater contaminants per site.

The Beacon Beach Skeet Range (FR038) is a former World War II era shotgun skeet range used for training Army Air Corps gunners from 1943 to pre-1964. The primary chemicals of concern (COCs) at the site (associated with historic skeet shooting activities) are lead shot and polycyclic aromatic hydrocarbons (PAHs) associated with the clay target fragments. However, arsenic and antimony were also detected in groundwater above screening criteria. Lead exceeded risk-based screening criteria in both surface water and sediment. Arsenic and antimony were detected in groundwater samples above risk-based screening criteria. Lastly, arsenic, lead and PAHs were detected in soils at the site above residential soil risk-based screening criteria.

Wherry Landfill (LF001), which operated from 1943 to 1948, was used for disposal of general refuse and mess hall wastes that were deposited in open trenches and backfilled according to standard acceptable practice at the time. Constituents of concern include dieldrin and aldrin in the soils and manganese in the groundwater.

Sabre Drive Landfill (LF002) was used to dispose of general refuse between 1943 and 1965. The site is inactive and has been officially closed with no restrictions. The base will continue to monitor groundwater for the near future. Beacon Beach Road Landfill (LF003) is a 40-acre site bounded to the north by Sabre Drive, to the east and west by woodlands, and to the south by Beacon Beach Road. The site was open from 1952 to 1965, and used for disposal of general refuse that was deposited in an open trench and backfilled. Constituents of concern are lead in the groundwater and arsenic in the soil. Boy Scout Road Yard Trash Disposal Area (LF011) was used to dispose of yard waste and tree debris between 1980 and 1996. The 27.2 acre site is inactive and has been officially closed with no restrictions.

The Bay County Wastewater Treatment Lagoon (OT035) was a 32-mgd aerated lagoon treatment facility located near Military Point on Tyndall AFB. This facility began treatment of Southwest Forest Products paper mill waste in August 1974; it was re-designated as a regional treatment plant with Tyndall AFB sending wastewater there in 1984.

The Stationary Target Range (SR-170) was a small arms gunnery target training facility operated from 1941 to 1946. It is currently an open site being addressed under the MMRP at Tyndall AFB. The contaminant of concern is lead associated with the lead shot located in the surface soils and surrounding road beds. Overshot areas have been identified during the visual survey and the southern boundary of the site is thought to be contiguous with FR038.

The Gulf Power Substation on Tyndall AFB has been the focus of an arsenic groundwater plume since August 1992. The results of a remedial investigation showed that the arsenic plume extends in a fan shape approximately 1,000 feet off site, south/southwest from the source area in the surficial aquifer.

The above descriptions detail the existing conditions at each site in the vicinity of the proposed project. These sites contain contamination that may have a direct impact on worker safety and environmental resources.

Alternatives 1b and 3 do not go through these sites; however, action alternative 1a traverses the FR038 site boundary and the nearby arsenic groundwater plume. Construction within this groundwater plume would require disposal of the arsenic contaminated groundwater associated with dewatering the excavation trench for the pipeline.

Excavation within the FR038 site would potentially produce soils containing elevated levels of arsenic, lead and PAHs. Groundwater in the area contains elevated levels of antimony and arsenic.

Alternative 2 traverses the SR170 site as well as the northeast portion of FR038. Construction of the pipeline within these sites would potentially produce soils contaminated with arsenic, lead and PAHs. Should groundwater be encountered during construction, elevated levels of antimony and/or arsenic could be present.

For the distribution system piping, there are several sites that are nearby the proposed alignments for Phase I and Phase II. Because existing utility easements will be utilized for this small diameter piping, impacts are not anticipated from the nearby sites. Information has been included since the sites area located nearby.

BX Service Station (SS019) is associated with historic leaking and overfilling of underground storage tanks (USTs). The former UST pit housed tanks that stored unleaded and leaded gasoline and was operational from 1948 to 1983. In 1983, the former USTs were closed in place and three new 10,000-gallon capacity USTs were installed in a separate tank pit located east of the – dispenser island used until early 2010. These tanks were removed and replaced in a tank pit located south of the dispenser island and are currently in use. The site was originally contaminated with BTEX constituents within the soil and groundwater. However, the site has undergone remedial efforts to remove these constituents from the groundwater (in 2004) and the contaminated soils were removed (in 2007) for off-site disposal. The site is being monitored and is scheduled to be closed with land use controls and restrictions.

The SS020/SS026 Study Area refers to the west-central portion of the flightline side of Tyndall AFB. The SS026 Study Area is comprised of four individual sites (SS026, SS015, SS020, and SA150) that have a combined groundwater plume. The SS026 Study Area is generally bound by U.S. Highway 98 to the southwest, Louisiana Avenue to the southeast, and the flightline to the northeast. Activities within this portion of the base have included general vehicle maintenance, repair, bodywork, washing, and fuel distribution (Site SS026), former petroleum, oils and lubricants (POL) Area B fuel supply for the flightline (Site SS015), former POL Area C and

former hazardous waste storage area (Site SS020), and POL Compliance Site Building (Site SA150). Constituents of concern in surface and subsurface soils are polyaromatic hydrocarbons (PAHs), pesticides, BTEX compounds, lead and total petroleum hydrocarbons (TPH). Benzene, total xylenes, trichloroethene, cis-1,2-dichloroethene, and metals are the constituents of concern in groundwater. The land consists mainly of urban open grass and concrete. Previous environmental restoration activities at Site SS015 are being conducted under the Florida Petroleum Regulations (Florida Administrative Code, Chapter 62-770), but that area has been reclassified under the CERCLA program. The rest of Study Area SS026 has been conducted in accordance with CERCLA regulations. Planned land use controls and institutional controls are designed to eliminate exposure pathways.

Several other petroleum, oil, lubricant contaminated sites (which have historically been addressed under the Compliance Restoration Program are located near the distribution piping routes. These sites include the following: OW217, PL-C511, TA/AS-C534, TU204, TU205, TU207, TU/US-C527, C-150, C-235, C-540, C-560, and C-571. These sites involve potential or confirmed releases associated with the storage of petroleum products, oils, or lubricants.

3.3.9 BIOLOGICAL RESOURCES

3.3.9.1 Vegetation

At the beginning of the 19th century, the dominant habitats at what is now Tyndall AFB, were longleaf pine flatwoods, sandhills, and savannahs (U.S. Air Force, 2006). Longleaf pine communities are dependent on frequent growing-season fires for their propagation and habitat composition. In communities where wildfires occurred infrequently, longleaf pine has been replaced by slash pine as the dominant canopy species, and a thick shrub layer of palmetto and gallberry out compete the wiregrass species as ground cover.

Due to large timber operations at Tyndall AFB and in Bay County, the forests on and adjacent to the base have been harvested on multiple occasions. In 1960, reforestation activities were begun on a large scale to get the forest resource into production, and extensive commercial plantations of slash, longleaf, and sand pine were established throughout the base.

Most of Tyndall AFB's land has been cleared of native vegetation. In general, uplands have been converted to slash pine commercial plantations, and uplands with deep, sandy soils have been planted with sand pine, the species that naturally occurs as secondary growth on these sites in the absence of fire and with a lack of longleaf pine seed source. Uplands with native longleaf pines have been identified and these areas are being enhanced by additional plantings to enhance these longleaf communities.

For the EA, the Florida Land Use, Cover and Forms Classification System (FLUCCS) was used to describe natural communities at Tyndall AFB. The FLUCCS land use designations are summarized in **Table 3-3** and illustrated on **Figure 3-4** for reference. This system was utilized because it enables a more accurate differentiation of Tyndall AFB habitats and provides a more detailed means for analysis of natural communities and associated potential natural resource impacts. This land use classification system is also routinely used by federal and state agencies as part of natural resource reviews. Currently, the project area consists of the following habitats: herbaceous dry prairie, forested pine-mesic oak, xeric oak, live oak, hardwoods, conifer plantations, lakes, bay and titi swamps, slash pine swamp forest, and freshwater marshes. Transportation corridors, utilities and associated facilities, buildings and housing are also located within the project area. Refer to **Figure 3-4** for the natural communities and land uses in the project area.

Table 3-3. FLUCCS Land Uses within the Pipeline Corridors

FLUCCS Code	Land Use description	Land Use Group
1210	Fixed Single Family Units	Residential
3100	Herbaceous (Dry Prairie)	Herbaceous (Dry Prairie)
4140	Pine - Mesic Oak	Upland Coniferous Forests
4210	Xeric Oak	Upland Hardwood Forests
4270	Live Oak	Upland Hardwood Forests
4360	Pine and Hardwoods	Upland Hardwood Forests
4410	Coniferous Plantations	Tree Plantations
5240	Lakes less than 10 acres	Lakes
6110	Bay Swamps	Wetland Hardwood Forests
6140	Titi Swamps	Wetland Hardwood Forests
6270	Slash Pine Swamp Forest	Wetland Coniferous Forests
6410	Freshwater Marshes	Wetland Vegetated Non-Forested
8110	Airports	Transportation
8142	Roads and Highways	Transportation
8330	Water Supply Plants	Utilities
8341	Sewage Treatment	Utilities

Each alternative utilizes the road easements for the majority of the alignment. The below ground installation within the road easements, where trees are not present, is why the majority of the impacts are only temporary to the herbaceous ground cover or shrubs. Alternatives 1a and 1b traverse a planted pine forest and would incur losses to trees along this section. In reviewing the aerial photography along the alignment for alternatives 1a and 1b, it appears that there would be fewer than 50 trees within the alignment that would require removal. That figure could increase with changes to the alignment and corridor width. Alternative 2 traverses the Gulf Power Easement and would incur some tree impacts along the margins of the easement ROW; however, fewer than 20 are expected at this level of design. Alternative 3 is within the road easement and prior cleared land near U.S. Highway 98 and therefore it is not anticipated to permanently impact vegetation.

3.3.9.2 Wildlife

Tyndall AFB has a diverse game and non-game animal population. Large, unfragmented and diverse habitats allow for a large wildlife population. The principal game and non-game species include bob-white quail, gray squirrels, marsh rabbits, mourning dove, old field mice, white-tail deer, wild turkeys, black bear and wood ducks. Availability to diverse aquatic systems also provide for healthy game fish populations such as; tarpon, snook, trout, largemouth bass, catfish and sunfish species.

3.3.9.3 Threatened and Endangered Species

A total of 20 taxa of plants and 31 taxa of listed animals are known to inhabit or use the immediate surroundings of Tyndall AFB. This includes eleven species of reptiles, fourteen species of birds, one species of fish, and four species of mammals. For the purposes of this EA, a federally listed plant or animal is a species listed as endangered, threatened, or a species of management concern by the U.S. Fish and Wildlife Service (USFWS); or state listed as endangered, threatened or species of special concern plant species by the Florida Department of Agriculture and Consumer Services (FDACS) or animal species by the Florida Fish and Wildlife Conservation Commission (FWC); or a species of concern by the Florida Natural Areas Inventory (FNAI).

Species of concern within the project area are the gopher tortoise, eastern indigo snake, Florida black bear, and Gulf Coast lupine. The only protected species known to inhabit the alignment corridor is the gopher tortoise (*Gopherus polyphemus*). The gopher tortoise is a terrestrial turtle that is listed as threatened in the state of Florida (F.A.C. Chapter 68A-27). This rule states that gopher tortoises must be relocated before any land clearing or development takes place, and property owners must obtain permits from the Florida Fish and Wildlife Conservation Commission before they can move them. Although the FWS currently only lists the gopher tortoise population in the state of Mississippi as threatened, the FWS is currently reviewing the listed status of the gopher tortoise in other states, including Florida, due to a concern over habitat loss. Conservation issues for the Gopher tortoises are performed through the FWC which issues permits to Authorized Gopher Tortoise Agents to manage conservation elements and other gopher tortoise issues. Coordination for the gopher tortoise will be necessary with FWC following the established guidelines, this process should commence approximately nine months prior to construction. Tyndall Division of Natural Resources currently is part of the Department of Defense Candidate Conservation Agreement for the gopher tortoise (DOD 2010). No coordination is necessary with USFWS for the gopher tortoise because it is not currently federally listed. Instead, The Candidate Conservation Agreement (CCA) will serve as the vehicle to coordinate and implement proactive, non-regulatory management actions to protect gopher tortoise habitat and current populations. Ultimately, the CCA will prevent the need for USFWS listing of the species. The Division of Natural Resources provided the historical mapping of known occurrences of endangered species. Florida Authorized Gopher Tortoise Agents with the PIKA\Pirnie team have surveyed for tortoise burrows and other species along the proposed routes and supplied the observations. The gopher tortoise has been historically found on Tyndall AFB property (**Figure 3-5**) in areas dominated by sandy soils and open tree canopy. The tortoise prefers to excavate burrows in the loose sandy soils throughout Florida's upland sandhills, scrub, scrubby flatwoods, xeric hammocks, coastal strand, and ruderal habitats (Ashton and Ashton, 2008). Some tortoises will excavate multiple burrows, usually two per adult, and so estimates of impacted tortoises by projects usually estimate the number of tortoises by dividing the number of burrows in half. Alternative 2 is the only alternative with known gopher tortoise impacts. Three active adult burrows were located along the power transmission corridor west of DeJardine Road. Given their distribution and differing burrow diameters, it is estimated that there are three tortoises using these burrows. Suitable habitat exists throughout the project area and could be used to provide temporary housing for displaced tortoises during construction of the project.

The Eastern indigo snake (*Drymarchon corais couperi*), a federally threatened species, is a large glossy black snake that can reach lengths of 7.9 feet and 2 inches wide. The indigo snake spends much of it's life underground in either gopher tortoise burrows or in prey burrows, thus surveys for this species commonly will not locate the snakes, even when known individuals inhabit the survey area (Ashton, 2008). Because it is dependent on the gopher tortoise for shelter against low temperatures, it should be assumed to inhabit the areas where gopher tortoises are found. Given the difficulty to locate this species, the USFWS has protection protocols that will be required when the project is under construction (refer to Appendix C).

Preliminary species surveys have been performed but the project corridor will need to be surveyed for protected species prior to commencement of permit actions. Contractors will need specific training in the recognition of the indigo snake and how to avoid conflicts with black bears prior to commencement of the project construction.

3.3.9.4 Wetlands

Wetlands comprise about 40% of Tyndall AFB land. Approximately 100 types of wetlands have been mapped on Tyndall AFB by the National Wetlands Inventory. These wetland types have

been combined into three basic groups: Palustrine, Forested; Aquatic/Emergent; and Estuarine, with the most predominant being Palustrine, Forested. The FNAI (September 1994) also provides detailed information regarding natural areas and the most important natural community types on Tyndall AFB. This information was updated in 2010 for Tyndall AFB as part of the Survey of Amphibians, Reptiles and Bats (PIKA/Pirnie, 2011). For the survey, the base was divided into different areas representing various habitat types, including wetlands, using FLUCCS land uses designations based on remote sensing and field observations. The wetlands habitats are shown on **Figure 3-6** and are based on the updated FLUCCS land use designations, which are shown on **Figure 3-4**.

Table 3-4 summarizes the results of the wetland impact analysis for each of the alignment alternatives. The potential wetland impacts were estimated using an overlay analysis along each alignment corridor length and presumed corridor width where the alignment alternatives overlap the identified wetland habitats. The estimated acreages shown in the table represent the potential impacts to wetland habitats if standard excavated trenching techniques are used during installation of the supply pipeline. The paragraphs that follow provide a detailed description of the wetland crossings for each alternative alignment and a description of the estimated wetland impacts.

Wetland crossing A2-4, as further explained below, includes an impounded stream. Trenching would not be feasible in this location due to the presence of an impoundment structure (i.e., an earthen dam). As such, the supply pipeline would need to be installed beneath the impoundment at this crossing using directional boring techniques. Because directional boring would facilitate installing the pipeline beneath the water body without disturbing the vegetation or bottom of the impoundment, permitting agencies would not consider the use of this subaqueous technique (i.e., directional drilling) as creating an impact on the wetland habitat. Thus, use of directional drilling to install the pipeline beneath the impoundment does not create wetland impacts (as indicated in the table).

Table 3-4. Wetland Crossings and Estimated Impacts for the Reclaimed Water Supply Pipeline Alignment Corridors

Wetland Crossing ID	Installation method	Linear Crossing (feet)	Corridor Width (feet)	Crossing Acreage
A1-1	Trench	100	10	0.023
A1-2	Trench	25	10	0.006
A1-3	Trench	75	10	0.017
A1a-4	Trench	25	10	0.006
	total	225		0.052
A1b-1*	Trench	100	10	0.023
A1b-2**	Trench	25	10	0.006
A1b-3***	Trench	75	10	0.017
A1b-4	Trench	55	10	0.013
A1b-5	Trench	25	10	0.006
	total	280		0.064
A2-1*	Trench	100	10	0.023
A2-2**	Trench	25	10	0.006
A2-3***	Trench	75	10	0.017
A2-4 Impoundment	Directional Bore	265	0	0.000
A2-4 Wetland marsh	Trench	485	15	0.167
A2-5	Trench	445	10	0.102
A2-6	Trench	272	10	0.062
	total	1667		0.378
A3-1*	Trench	100	10	0.023
A3-2**	Trench	25	10	0.006
A3-3***	Trench	75	10	0.017
A3-4	Trench	100	10	0.023
A3-5	Trench	100	10	0.023
A3-6	Trench	100	10	0.023
A3-7	Trench	100	10	0.023
	total	600		0.138
* Represents the same crossings as A1-1				
** Represents the same crossings as A1-2				
*** Represents the same crossings as A1-3				

All of the action alternatives share one segment in common that extends from the AWT facility south along Boy Scout Road to the Gulf Power Easement. This segment contains three wetland crossings, which have existing culverts under the road. Each wetland extends upstream from the unnamed creeks of Pearl Bayou and connects to the slash pine and bay swamps located west of Boy Scout Road. Wetland crossing A1-1 (see **Figure 3-6**) is approximately 100 feet across and contains a culverted stream within the maintained easement of the road. Wetland crossings A1-2 and A1-3 are approximately 25 and 75 feet wide, respectively (see **Figure 3-6**). These crossings equate to approximately 0.05 acres of wetland impacts if typical trenching installation methods are used, assuming a ten-foot-wide construction corridor (refer to **Table 3-4** for individual wetland crossing impact calculations).

Alternative 1a has four wetland crossings, including the three Boy Scout Road crossings described previously. The fourth wetland crossing (A1a-4) is on the north side of Beacon Beach Road and includes an intermittent stream that flows south to Hog Island Sound. This crossing on the north side of the road is approximately 25 feet across. Including all four crossings, the total estimated acreage of wetland impacts for action alternative 1a is 0.052 acres.

Alternative 1b has five wetland crossings, including the three Boy Scout Road crossings. The fourth wetland crossing (A1b-4) is on the south side of Beacon Beach Road and includes the same intermittent stream described for wetland crossing A1a-4 that flows south to Hog Island Sound. This crossing on the south side of the road is approximately 55 feet across. The fifth wetland crossing (A1b-5) is at the intermittent stream/stormwater conveyance that is located west of the Sand Dollar Motel. This crossing is approximately 25 feet across. Together, the total estimated acreage of wetland impacts for action alternative 1b is 0.064 acres.

Alternative 2 has six wetland crossings, including the three Boy Scout Road crossings. The remaining three crossings are located along the Gulf Power Easement west of DeJarnette Road. Wetland crossing A2-4 involves an impounded stream located within the Gulf Power Easement and the herbaceous freshwater marsh that lies on either side of the impounded stream. The impounded stream is approximately five feet deep. The alternative 2 alignment crosses the impounded stream (impoundment) for approximately 265 linear feet. The associated wetlands (wetland marsh) add an additional 485 feet to the crossing. Typical trenching installation methods could be used for the wetland marsh crossing, but directional drilling methods would be needed for the impoundment crossing. To accommodate the directional drilling equipment and trenching slope requirements in the wetland marsh, a fifteen-foot-wide construction corridor was assumed and it is estimated that the combined crossing would result in approximately 0.167 acres of wetland impacts. Wetland crossings A2-5 and A2-6 include herbaceous freshwater marshes that are contiguous with a large forested bay swamp on the south side of the Gulf Power Easement. Wetland crossing A2-5 is approximately 445 feet in length and wetland crossing A2-6 is approximately 272 feet. Total wetland impacts for action alternative 2 are estimated at 0.378 acres.

Alternative 3 has seven wetland crossings, including the three Boy Scout Road crossings. The other four crossings are located along the utility ROWs that follow Sabre Drive and U.S. Highway 98. Wetland crossings A3-4 and A3-5 are located on the south side of Sabre Drive east of the Gulf Power Easement. Both crossings are approximately 100 feet in length and involve culverted streams. These streams flow north and west, respectively, and connect with Pearl Bayou. Wetland crossing A3-6, which is located on the north side of U.S. Highway 98, is approximately 100 feet across. It consists of a culverted stream that flows northeast to an unnamed bayou and then northwest into East Bay. Wetland crossing A3-7 is located on the north side of U.S. Highway 98 east of wetland crossing A3-6. The culverted stream at wetland crossing A3-7 flow south under U.S. Highway 98 and connects the stormwater conveyances on the flightline side of the base north of U.S. Highway 98 with a stormwater retention pond

located on the south side of U.S. Highway 98. This crossing is approximately 100 feet in length. Total wetland impacts for action alternative 3 are estimated at 0.138 acres.

As noted previously, wetland impacts associated with installing the reclaimed water supply pipleline were estimated based on use of excavated trenching technologies. While directional drilling is more costly than standard excavated trenching, directional drilling is often the preferred construction technique, where feasible, because it results in no impacts to wetland habitats. If trenching techniques are used, as assumed to determine the total estimated wetland impacts described above, permitting and mitigation requirements will also need to be met. The permitting and mitigation requirements can be costly and time consuming. The additional construction costs associated with directional drilling technologies will be off-set because this subaqueous installation method avoids the need for permitting and mitigation. Thus, if directional drilling technologies were used for all wetland crossings, the supply pipeline would be installed using techniques that result in no impacts to wetland habitat. This option is preferred because it avoids impacts to wetland resources and eliminates the need for permitting and mitigation measures.

3.3.9.5 Floodplains

The portions of Tyndall AFB that have been mapped as 100-year floodplains according to Federal Emergency Management Agency Flood Insurance Rate Maps are shown on **Figure 3-7**. Much of the area mapped as 100-year floodplain exists along the coastline and is prone to flooding as a result of heavy tidal surges that occur during strong storms. Many parts of the base outside the mapped 100-year floodplain areas are also prone to tidal surge flooding. The Boy Scout Road corridor has three crossings of the 100-year floodplain, mapped as A and AE (see **Figure 3-7**). All alternatives would need to cross these areas along Boy Scout Road. These impacts would be within an existing easement and would not require removing trees within the floodplain areas. In places where the installation of the pipeline would be in herbaceous habitat, excavated ground would need to be replaced to original grade and re-vegetated. Erosion control measures, required by Florida statute, would need to be installed to eliminate deposition into natural water bodies and habitats.

3.3.10 CULTURAL RESOURCES

3.3.10.1 Historical Resources

The Department of Natural Resources at Tyndall AFB has identified eleven historical sites on the base property. Although none of these sites are located within the four action alternative corridors, procedures for the unplanned discovery during construction activities will need to be utilized (U.S. Air Force, 2010), if encountered during construction.

3.3.10.2 Archaeological Resources

The peninsula where Tyndall AFB is located has been an active home for many communities. As of 2010, the Department of Natural Resources has identified 98 archeological sites. Not all of the sites are currently mapped within the GIS data and, therefore, a definitive review has not been completed.

Procedures for the unplanned discovery during construction activities will need to be utilized (U.S. Air Force, 2010).

3.3.11 SOCIOECONOMIC RESOURCES

Bay County, in which Tyndall AFB is located, has a population of approximately 164,767 people. Seven incorporated municipalities are located in the county. Panama City (population 36,400) is the largest. Between Tyndall AFB and Panama City are the communities of Springfield (population 8,800), Callaway (population 14,200), and Parker (population 4,600). Lynn Haven (population 12,451) is north of Panama City. Panama City Beach (population 7,700), the site of beachfront hotels and other tourist-oriented businesses, is west of Panama City. East of Tyndall AFB, although not bordering it, is Mexico Beach (population 1,000).

Bay County's economic base is comprised of military, tourism, lumbering trades, services, manufacturing, construction, and commercial fishing. The largest contributors to the county economic base are Tyndall AFB and the Naval Support Activity Panama City. Tyndall AFB contributes significantly through its direct employment and purchases from local businesses. Total annual estimated economic impact in the communities within a 50-mile radius of Tyndall AFB is $473 million. Excluding retirees, the annual military payroll is $140 million, and the annual civilian payroll is $43 million. In addition, the base has contracts with local entities totaling $65 million annually. Due to recent deployment of the 325th Fighter Wing and the reassignment of the two squadrons of F-15 Strike Eagle aircraft, that economic influence has been reduced. However, with the future addition of another squadron of F-22 Raptors and the additional of the mission to support the Navy gunnery training by supplying drone target aircraft, that impact to the local economy is thought to be mitigated. The construction of the proposed action will be a further increase in civilian jobs, even though they are temporary construction jobs.

3.3.12 LAND USE COMPATIBILITY

In general, the proposed action is compatible with the existing and future land uses at Tyndall AFB where the project is planned. For reference, current land uses are illustrated on **Figure 3-4** using FLUCCS land use designations. These designations, however, are more useful for natural resource planning as they are primarily used to describe natural communities. The majority of the reclaimed water supply pipeline and distribution lines will be installed within existing utility easements. This is the case for the entire alignment associated with action alternative 2, action alternative 3, and the distribution system lines. For action alternatives 1a, and 1b, the supply pipeline would cross an area of planed pine trees where utilities have not been installed previously. To facilitate installation of the pipeline using either of these alignments, a small number of trees would need to be removed. However, this area could be re-planted and installation of the pipeline in this area would not result in a permanent change in land use. The storage reservoir would be constructed in an area that is currently a grassy field within an area of the base that is used for administrative/organization purposes.

Land use planning at Tyndall AFB is done using a system of fifteen land use categories described in the General Plan. The land use categories include: water; airfield; airfield pavements; airfield operations and maintenance; industrial; administrative/organization; training; community (commercial); community (service); medical; housing (accompanied); housing (unaccompanied); outdoor recreation; open space; and constrained open space. These land use designations differ from the FLUCCS designations; they describe land uses based on the activities that occur in an area. Utilities, such as potable water, sewer, irrigation, and reclaimed water pipelines and storage tanks/reservoirs are not specifically designated. Rather, these utilities are considered infrastructure and are designated the same as the land uses they cross or support. As such, land use designation changes are not anticipated.

N

Wastewater Treatment Plant

East Bay

Du Pont Bridge

Shoal Point

Fred Bayou

Pearl Point

Pearl Bayou

Florida Avenue

Boy Scout Road

Hertiage Parkway

Sabre Drive

Beacon Beach Road

Dejarnette Road

Gulf Power Easement

US HWY 98

Suwannee Road

Sewage Treatme
Emergency O

St Andrew Bay

Hog Island Sound

Legend

Major contours (10 feet intervals)

Elevation (feet)

- 31 - 36
- 25 - 30
- 21 - 24
- 17 - 20
- 13 - 16
- 9 - 12
- 5 - 8
- 1 - 4
- -1 - 0

Pipeline Alignment Alternatives

- Alternative 1a
- Alternative 1b
- Alternative 2
- Alternative 3

Storage and Distribution System

- Proposed Phase I Distribution System
- Proposed Phase II Distribution System
- Storage Reservoir

Source: Elevations were developed using topographic contours (2 foot intervals) from LIDAR data, Florida Department of Emergency Management, 2009.

0 1,000 2,000 4,000 Feet

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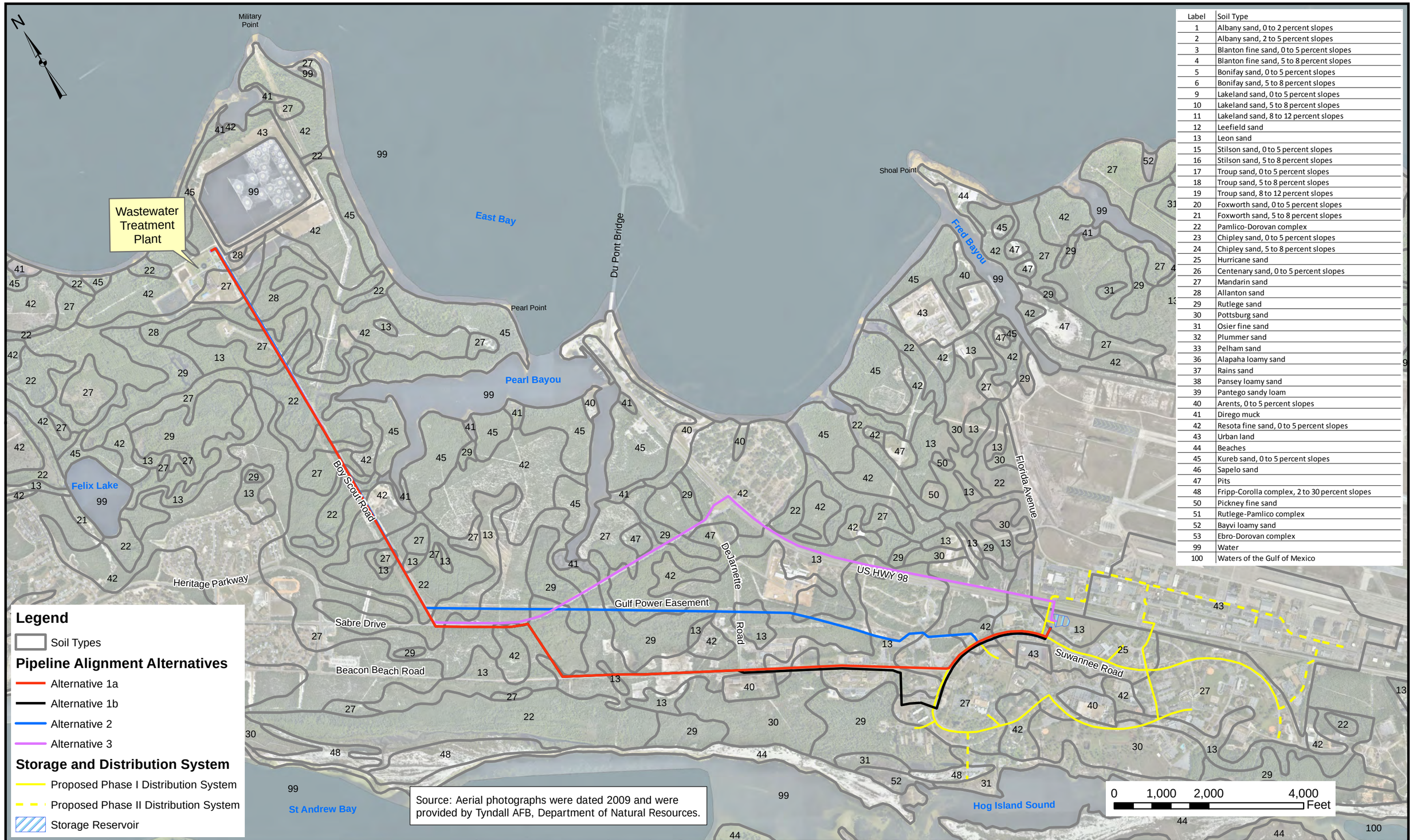
TOPOGRAPHIC MAP

Tyndall Air Force Base (AFB)

Environmental Assessment for Installation of a Reclaimed Water Irrigation System Improvement Project

FIGURE 3-1

MAY 2011



Label	Soil Type
1	Albany sand, 0 to 2 percent slopes
2	Albany sand, 2 to 5 percent slopes
3	Blanton fine sand, 0 to 5 percent slopes
4	Blanton fine sand, 5 to 8 percent slopes
5	Bonifay sand, 0 to 5 percent slopes
6	Bonifay sand, 5 to 8 percent slopes
9	Lakeland sand, 0 to 5 percent slopes
10	Lakeland sand, 5 to 8 percent slopes
11	Lakeland sand, 8 to 12 percent slopes
12	Leefield sand
13	Leon sand
15	Stilson sand, 0 to 5 percent slopes
16	Stilson sand, 5 to 8 percent slopes
17	Troup sand, 0 to 5 percent slopes
18	Troup sand, 5 to 8 percent slopes
19	Troup sand, 8 to 12 percent slopes
20	Foxworth sand, 0 to 5 percent slopes
21	Foxworth sand, 5 to 8 percent slopes
22	Pamlico-Dorovan complex
23	Chipley sand, 0 to 5 percent slopes
24	Chipley sand, 5 to 8 percent slopes
25	Hurricane sand
26	Centenary sand, 0 to 5 percent slopes
27	Mandarin sand
28	Allanton sand
29	Rutlege sand
30	Pottsburg sand
31	Osier fine sand
32	Plummer sand
33	Pelham sand
36	Alapaha loamy sand
37	Rains sand
38	Pansey loamy sand
39	Pantego sandy loam
40	Arents, 0 to 5 percent slopes
41	Direго muck
42	Resota fine sand, 0 to 5 percent slopes
43	Urban land
44	Beaches
45	Kureb sand, 0 to 5 percent slopes
46	Sapelo sand
47	Pits
48	Fripp-Corolla complex, 2 to 30 percent slopes
50	Pickney fine sand
51	Rutlege-Pamlico complex
52	Bayvi loamy sand
53	Ebro-Dorovan complex
99	Water
100	Waters of the Gulf of Mexico

Legend

Soil Types

Pipeline Alignment Alternatives

- Alternative 1a
- Alternative 1b
- Alternative 2
- Alternative 3

Storage and Distribution System

- Proposed Phase I Distribution System
- Proposed Phase II Distribution System
- Storage Reservoir

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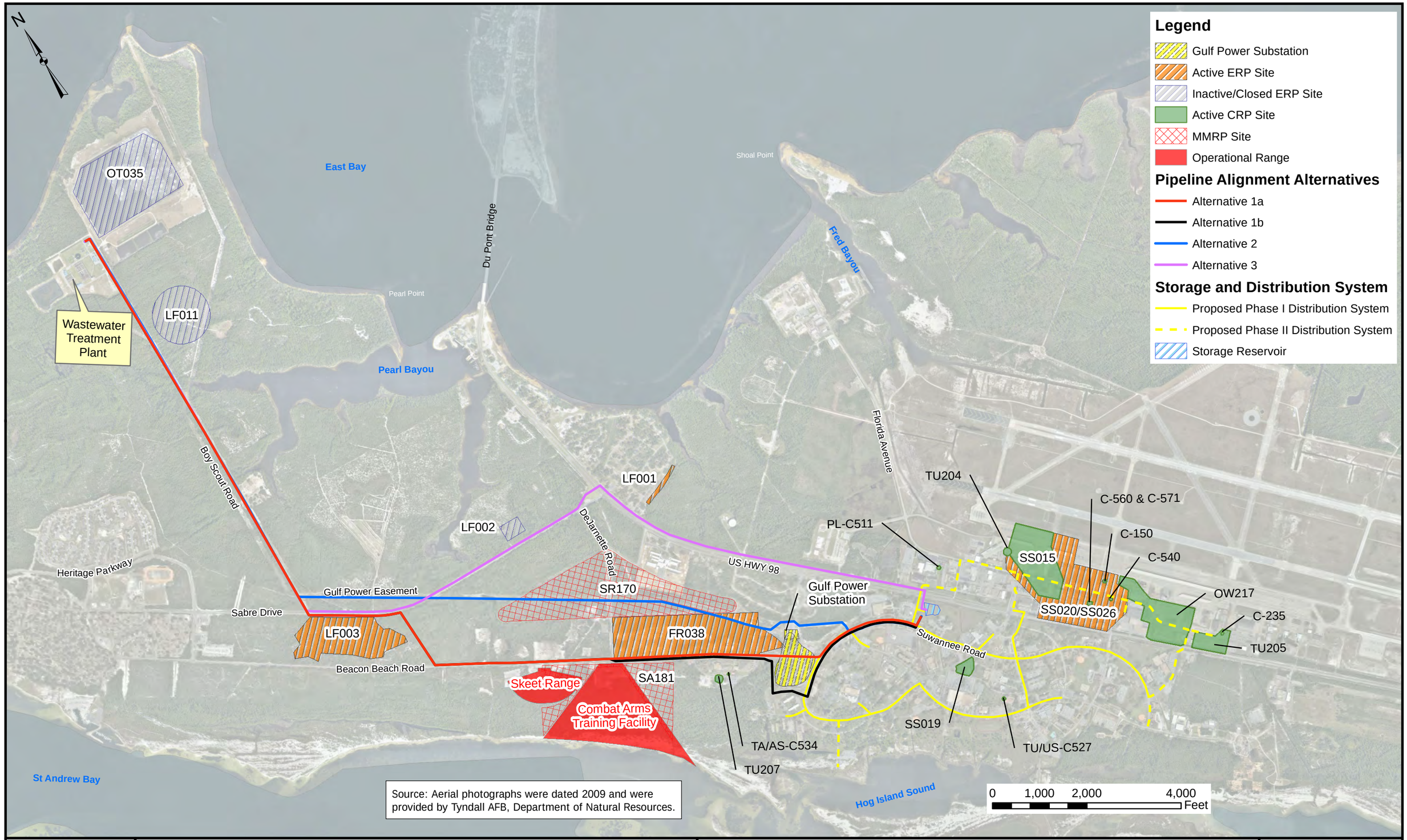
SOILS (SSURGO) MAP

Tyndall Air Force Base (AFB)

Environmental Assessment for Installation of a Reclaimed Water Irrigation System Improvement Project

FIGURE 3-2

MAY 2011



Source: Aerial photographs were dated 2009 and were provided by Tyndall AFB, Department of Natural Resources.

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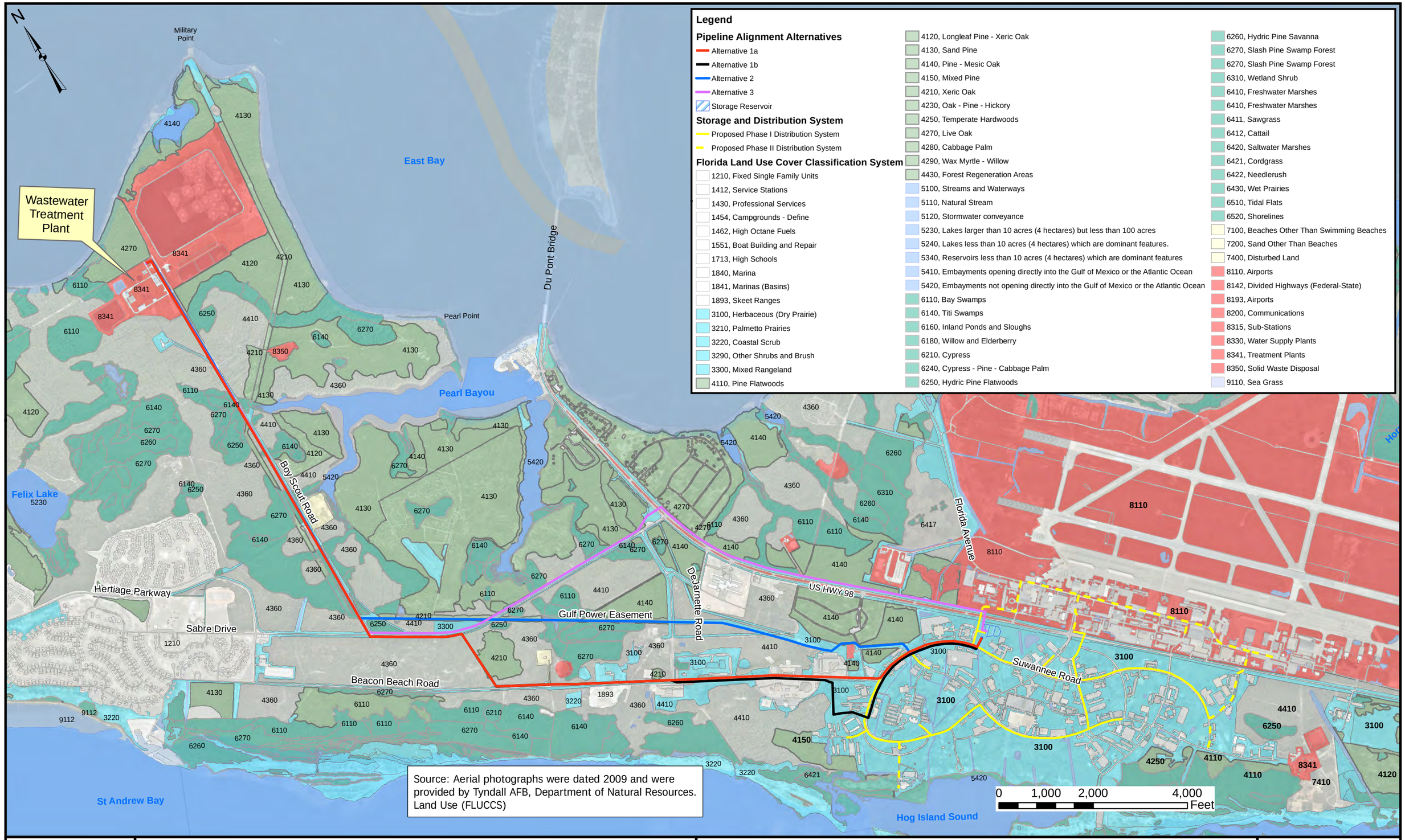
ENVIRONMENTAL RESTORATION, MUNITIONS RESPONSE AND OPERATIONAL RANGE MAP

Tyndall Air Force Base (AFB)
Environmental Assessment for Installation of a Reclaimed Water Irrigation System Improvement Project

FIGURE 3-3
MAY 2011



Source: Aerial photographs were dated 2009 and were provided by Tyndall AFB, Department of Natural Resources. Land Use (FLUCCS)

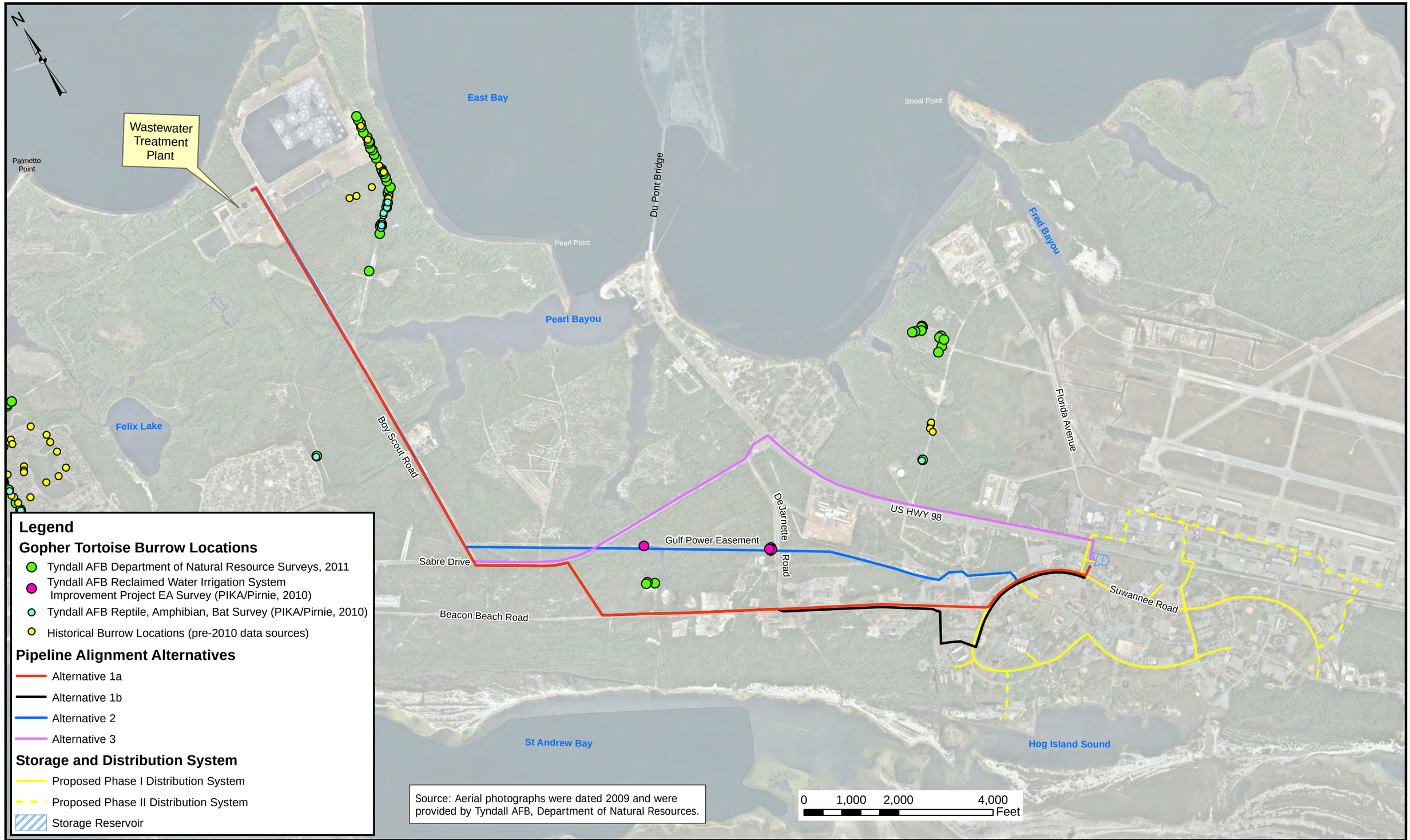
Legend

Pipeline Alignment Alternatives
- Alternative 1a
- Alternative 1b
- Alternative 2
- Alternative 3
- Storage Reservoir

Storage and Distribution System
- Proposed Phase I Distribution System
- Proposed Phase II Distribution System

Florida Land Use Cover Classification System
- 1210, Fixed Single Family Units
- 1412, Service Stations
- 1430, Professional Services
- 1454, Campgrounds - Define
- 1462, High Octane Fuels
- 1551, Boat Building and Repair
- 1713, High Schools
- 1840, Marina
- 1841, Marinas (Basins)
- 1893, Skeet Ranges
- 3100, Herbaceous (Dry Prairie)
- 3210, Palmetto Prairies
- 3220, Coastal Scrub
- 3290, Other Shrubs and Brush
- 3300, Mixed Rangeland
- 4110, Pine Flatwoods
- 4120, Longleaf Pine - Xeric Oak
- 4130, Sand Pine
- 4140, Pine - Mesic Oak
- 4150, Mixed Pine
- 4210, Xeric Oak
- 4230, Oak - Pine - Hickory
- 4250, Temperate Hardwoods
- 4270, Live Oak
- 4280, Cabbage Palm
- 4290, Wax Myrtle - Willow
- 4430, Forest Regeneration Areas
- 5100, Streams and Waterways
- 5110, Natural Stream
- 5120, Stormwater conveyance
- 5230, Lakes larger than 10 acres (4 hectares) but less than 100 acres
- 5240, Lakes less than 10 acres (4 hectares) which are dominant features.
- 5340, Reservoirs less than 10 acres (4 hectares) which are dominant features
- 5410, Embayments opening directly into the Gulf of Mexico or the Atlantic Ocean
- 5420, Embayments not opening directly into the Gulf of Mexico or the Atlantic Ocean
- 6110, Bay Swamps
- 6140, Titi Swamps
- 6160, Inland Ponds and Sloughs
- 6180, Willow and Elderberry
- 6210, Cypress
- 6240, Cypress - Pine - Cabbage Palm
- 6250, Hydric Pine Flatwoods
- 6260, Hydric Pine Savanna
- 6270, Slash Pine Swamp Forest
- 6270, Slash Pine Swamp Forest
- 6310, Wetland Shrub
- 6410, Freshwater Marshes
- 6410, Freshwater Marshes
- 6411, Sawgrass
- 6412, Cattail
- 6420, Saltwater Marshes
- 6421, Cordgrass
- 6422, Needlerush
- 6430, Wet Prairies
- 6510, Tidal Flats
- 6520, Shorelines
- 7100, Beaches Other Than Swimming Beaches
- 7200, Sand Other Than Beaches
- 7400, Disturbed Land
- 8110, Airports
- 8142, Divided Highways (Federal-State)
- 8193, Airports
- 8200, Communications
- 8315, Sub-Stations
- 8330, Water Supply Plants
- 8341, Treatment Plants
- 8350, Solid Waste Disposal
- 9110, Sea Grass

	Final Draft Environmental Assessment LAND USE (FLUCCS) MAP	Tyndall Air Force Base (AFB) Environmental Assessment for Installation of a Reclaimed Water Irrigation System Improvement Project	FIGURE 3-4 MAY 2011



	Final Draft Environmental Assessment GOPHER TORTOISE BURROW LOCATION MAP	Tyndall Air Force Base (AFB) Environmental Assessment for Installation of a Reclaimed Water Irrigation System Improvement Project	FIGURE 3-5 MAY 2011

Wetland Crossing ID	Installation method	Linear Crossing (feet)	Corridor Width (feet)	Crossing Acreage
A1-1	Trench	100	10	0.023
A1-2	Trench	25	10	0.006
A1-3	Trench	75	10	0.017
A1a-4	Trench	25	10	0.006
	total	225		0.052
A1b-1*	Trench	100	10	0.023
A1b-2**	Trench	25	10	0.006
A1b-3***	Trench	75	10	0.017
A1b-4	Trench	55	10	0.013
A1b-5	Trench	25	10	0.006
	total	280		0.064
A2-1*	Trench	100	10	0.023
A2-2**	Trench	25	10	0.006
A2-3***	Trench	75	10	0.017
A2-4 Impoundment	Directional Bore	265	10	0.000
A2-4 wetland marsh	Trench	485	15	0.167
A2-5	Trench	445	10	0.102
A2-6	Trench	272	10	0.062
	total	1667		0.378
A3-1*	Trench	100	10	0.023
A3-2**	Trench	25	10	0.006
A3-3***	Trench	75	10	0.017
A3-4	Trench	100	10	0.023
A3-5	Trench	100	10	0.023
A3-6	Trench	100	10	0.023
A3-7	Trench	100	10	0.023
	total	600		0.138

* Represents the same crossings as A1-1

** Represents the same crossings as A1-2

*** Represents the same crossings as A1-3

Source : Aerial photographs were dated 2009 and were provided by Tyndall AFB, Department of Natural Resources.

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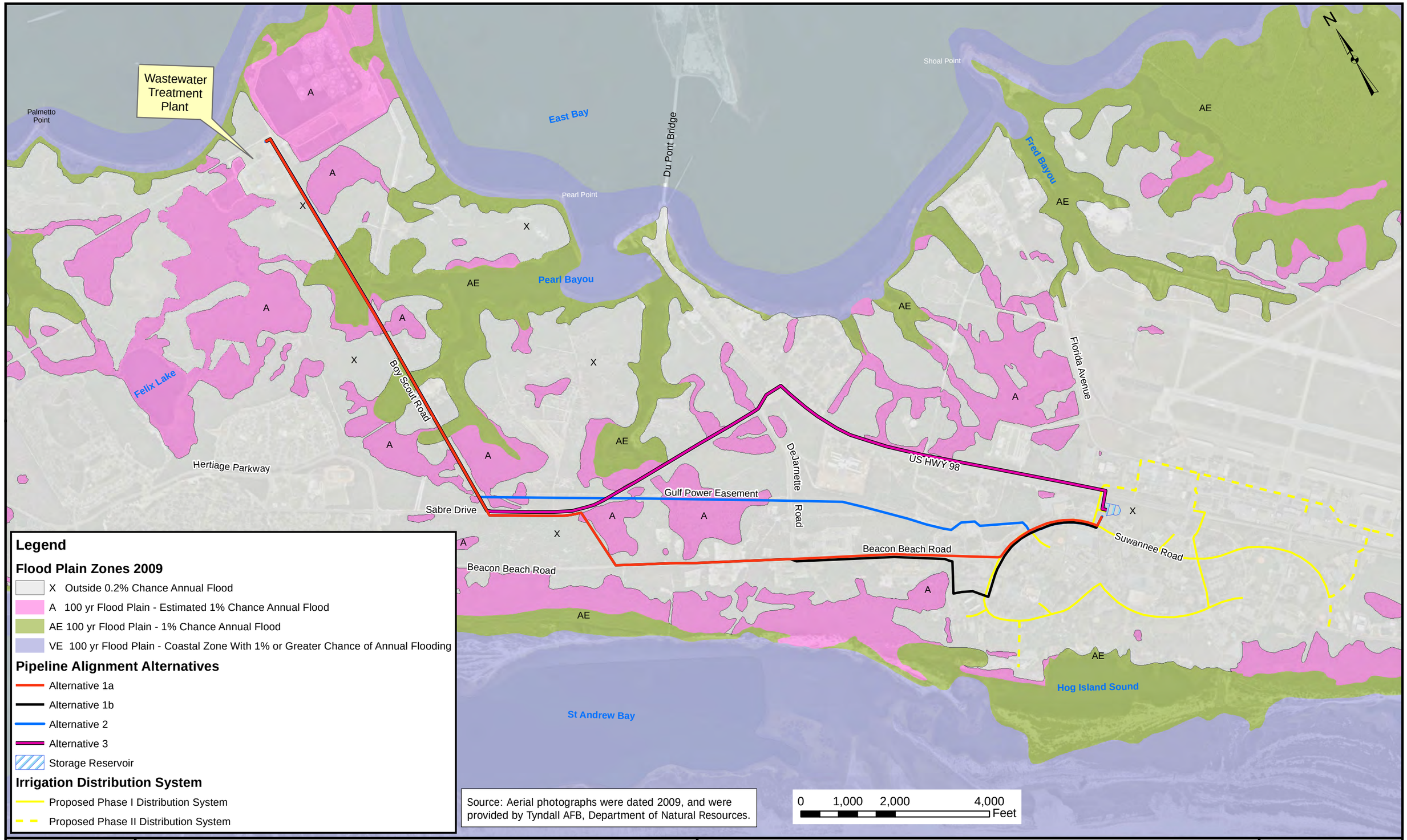
WETLAND CROSSING LOCATION MAP

Tyndall Air Force Base (AFB)

Environmental Assessment for Installation of a Reclaimed Water Irrigation System Improvement Project

FIGURE 3-6

MAY 2011



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FLOODPLAIN LOCATION MAP

Tyndall Air Force Base (AFB)

Environmental Assessment for Installation of a Reclaimed Water Irrigation System Improvement Project

FIGURE 3-7

MAY 2011

SECTION 4. ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter describes potential impacts that could occur if the proposed action is implemented by Tyndall AFB. Additionally, potential impacts are addressed for the no action alternative. Any resultant irreversible or irretrievable resource commitments are noted. Criteria used to evaluate potential impacts are discussed at the beginning of each resource area.

4.2 CHANGE IN CURRENT MISSION

The proposed action is not part of a change in the current mission but does support Executive Order 13514 to reduce the use of potable water.

4.3 DESCRIPTION OF THE EFFECTS OF ALL ALTERNATIVES ON THE AFFECTED ENVIRONMENT

4.3.1 AIRCRAFT OPERATIONS

Aircraft operations at Tyndall AFB will be unaffected by the installation of the reclaimed water pipeline. Thorough design of the storage reservoir will attempt to reduce its possible usage by bird species, therefore, no increase in bird strike hazards is anticipated in the air operational area due to the project. Under the no action alternative, there would be no change in the baseline conditions regarding aircraft operations.

4.3.2 NOISE

Noise would be associated with the type of construction activity involved in the installation of the pipeline. Heavy equipment would be used to clear and prepare the construction sites, and to construct any one of the action alternatives. Restrictions on construction activity and the location of the project will serve to mitigate the impacts of noise on the surrounding environment. For these reasons, the project will not have a significant effect on the surrounding environment.

Under the no action alternative, there would be no change in the baseline conditions regarding noise.

4.3.3 AIR QUALITY

Air quality will only be affected during construction from small amounts of dust and heavy equipment exhaust. These releases will be deminimus and cause no significant effect on air quality. Additional analysis of conformity is not warranted because of Bay County's designation as in "attainment," meaning that air quality measurements are below the regulatory criteria.

Under the no action alternative, there would be no change in the baseline conditions regarding air quality.

4.3.4 SAFETY AND OCCUPATIONAL HEALTH

Action alternative 1b does not impact any areas with known contamination issues. Neither does action alternative 3. For action alternatives 1a and 2, safety and occupational health would be affected since a portion of the pipeline alignments would need to cross through known areas of soil and groundwater contamination. Impacts, such as the need for increased safety and occupational health awareness and OSHA-required HAZWOPER training and documentation for construction workers, could be mitigated if construction techniques were used that eliminated contact with either contaminated soil or groundwater. Using a mounded pipeline installation, where soil is mounded on top of the pipe to provide the required cover versus burying the pipe, could be used as a possible technique to avoid contaminated areas along the action alternative 1a and 2 alignments. There will be no significant impact to health and safety plans due to the proposed alignment or installation of the storage reservoir. The distribution system piping will be installed within existing utility easements and know areas of soil and groundwater contamination should not be encountered. Under the no action alternative, there would be no change in the baseline conditions regarding safety and occupational health.

4.3.5 EARTH RESOURCES

4.3.5.1 Geology

Geology will remain substantially unchanged by all of the proposed action alternatives and by the no action alternative.

4.3.5.2 Topography

The reclaimed water pipeline will be installed below land surface and the grade replaced to original state. The only change to topography will be in the area of the storage reservoir. The one-million gallon (approximately 1.6 acres) reservoir will be constructed to form an isolated reclaimed water storage area that will not have a surface water connection. Stormwater (rainfall) collected in the reservoir will be distributed to the same storm watershed. There will be no change in the potential for erosion. As such, none of the action alternatives or the no action alternative will have a significant impact on topography, except for the immediate area where the reservoir is constructed.

4.3.5.3 Soils

The reclaimed water pipeline will be installed below land surface, but soil type will not be significantly modified within the project area. The distribution area, where the reclaimed water is to be used as irrigation, will receive consistent amounts of nutrients within the reclaimed water and will thus require less soil enhancement minerals and fertilizers to achieve the landscape goals. Under the no action alternative, there would be no change in the baseline conditions regarding soils.

4.3.6 WATER RESOURCES

4.3.6.1 Surface Water

The proposed action will cross numerous streams and stormwater features. All crossings will need to be made with subaqueous installations and employ standard erosion control measures to minimize possible impacts to surface water habitats. All construction areas within the crossing vicinity will need to be re-vegetated and ground surface replaced to original grade to prevent

erosion. The reclaimed water storage reservoir will be constructed in uplands and will be isolated from surrounding stormwater features. Under the no action alternative, there would be no change in the baseline conditions regarding surface water.

4.3.6.2 Groundwater

The pipeline will be installed below land surface and in some areas will be in contact with the groundwater. Directional bore installation of the pipeline at wetland crossing locations will be in direct contact with groundwater. No hazardous materials will be in contact with groundwater resources and the installation process will not extract or use groundwater for any purposes. Realignment around groundwater contaminated areas, as in action alternative 1b and 3, would eliminate exposure of surface resources to contaminated groundwater. Under the no action alternative, there would be long-term impacts to groundwater with the continued pumping and use of potable water for irrigation purposes.

4.3.7 INFRASTRUCTURE / UTILITIES

4.3.7.1 Sanitary Sewer

Although the reclaim water use project will not have any effect on the sanitary sewer collection system, the proposed action will reclaim water from the incoming collection system. This will reduce the resulting discharge amount from the AWT facility. The reclaimed water will utilize a large portion of the current AWT facility's discharge and will use it to apply to landscaping instead of directly discharging to the Saint Andrew Bay. Under the no action alternative, there would be no change in the baseline condition for the sanitary sewer. However, there would be long-term impacts regarding use of reclaimed water for irrigation and the resulting benefits of this application.

4.3.7.2 Potable Water

The use of reclaimed water for irrigation at Tyndall AFB will decrease the use of potable water by 40% and subsequently allow the County to reduce its withdrawals from the Deer Point Lake. This adds capacity to the County's potable water supply and reduces the need for additional expansion of the water supply resources. The increase in available potable water capacity will also assist emergency backup plans instead of relying on backup wells. Under the no action alternative, there would be long-term impacts to potable water supplies with the continued use of potable water for irrigation purposes.

4.3.7.3 Solid Waste Management

The proposed action will have no significant impact on Tyndall AFB's solid waste management operations. During construction activities, only minor amounts of solid waste would be generated and it is not anticipated to tax the current solid waste management operations. Under the no action alternative, there would be no change in the baseline conditions for solid waste.

4.3.7.4 Drainage

Drainage on the base will not be adversely impacted by the installation of the pipeline or storage reservoir. The storage reservoir will be isolated from the stormwater system and the contents distributed through the irrigation system where it will most likely be absorbed by landscaping, other vegetation, and soil. This will also reduce the load on the stormwater system by the amount of rainfall that falls into the one-million gallon (1.6 acre) storage reservoir. Under the no action alternative, there would be no change in the baseline conditions for drainage.

4.3.7.5 Transportation Systems

Transportation systems will be temporarily impacted by the construction activities in the easements of associated roads. Alternatives 1a and 1b will have the fewest major road crossings and use easements for the majority their length. Alternative 2 traverses the base in the Gulf Power transmission ROW and would have the least effect on traffic. Alternative 2 has the fewest linear feet along transportation corridors and five road crossings of base-owned roads. Alternative 3 is almost exclusively in road easements, but has two crossing of U.S. highway 98 and two other base-owned roads. Alternative 3 would also incur minor delays to U.S. Highway 98 traffic during construction along the highway. The U.S. Highway crossings would need to be directional drilled due to their width and heavy traffic flows. Under the no action alternative, there would be no change in the baseline conditions for transportation systems.

4.3.7.6 Electricity / Natural Gas

The proposed action will not adversely impact the electrical or natural gas utilities. The alignments have been designed to avoid interferences with these utilities wherever possible. The use of the easements with the electrical system is proposed for the main power transmission ROW for alternative 2; however, it will not impact or impede the existing structures already in place. Although a proposed alternative is designed to use this ROW, an easement design and agreement must be certified by Gulf Power prior to federal or state project permit applications can be approved. Under the no action alternative, there would be no change in the baseline conditions for electricity and natural gas.

4.3.8 HAZARDOUS MATERIALS AND WASTES

4.3.8.1 Hazardous Materials

The project installation and reclaimed water production process do not use significant amounts of hazardous materials. The project does not pose an environmental risk of contamination from hazardous materials.

4.3.8.2 Hazardous Waste

The process of producing reclaimed water will not generate hazardous waste. However, the generation of hazardous waste could occur during the construction process. Some of the alternatives may require the excavation of contaminated soil or dewatering of contaminated groundwater. This would only occur in the ERP and MMRP sites. The type of hazardous waste and media are discussed in Section 3.3.8.3. Alternatives 1b and 3 do not impact any of the ERP or MMRP boundaries. Waste generated from the construction within the ERP and MMRP sites will require disposal in accordance with CERCLA and Tyndall AFB hazardous waste disposal protocols.

4.3.8.3 Environmental Restoration Program and Military Munitions Response Program

Action alternative 1b uses an easement along Beacon Beach Road that is adjacent to ERP and MMRP sites, but does not cross into the site boundaries. However, action alternative 1a does cross the southern boundary of FR038 and the associated arsenic groundwater plume. As such, environmental impacts associated with these sites can be expected for this alternative. If contaminated soil and groundwater cannot be avoided during construction, this alignment could

prove a challenge. Extensive coordination with EPA and FDEP will be required and may potentially delay the project schedule. Action alternative 2 traverses two of the ERP and MMRP sites and will require agency approval for the installation of the pipeline in surface soils that are known to contain lead and other metals. Action alternative 3 will not impact nor be impacted by the ERP or MMRP sites and, like action alternative 1b, is not located in any areas with known soil and/or groundwater contamination. Under the no action alternative, there would be no change in the baseline conditions for the ERP and/or MMRP.

4.3.9 BIOLOGICAL RESOURCES

4.3.9.1 Vegetation

Action alternatives 1a, 1b and 2 will require the removal of forest trees to be replaced by a maintained herbaceous habitat. Action alternatives 1a and 1b will require removal of approximately 50 planted pine trees. Action alternative 2 will require the removal of approximately 20 mixed trees, from oaks to planted pines, to align the pipeline along the power transmission ROW. Action alternative 3 does not require tree removal. Action alternatives 1a and 1b will impact tree resources however mitigation for this loss can be performed in the form of natural systems planting elsewhere on the base, perhaps in the form of long leaf pine and wiregrass plantings to support endangered species such as the gopher tortoise. Under the no action alternative, there would be no change in the baseline conditions for vegetation.

4.3.9.2 Wildlife

The wildlife on Tyndall AFB is abundant due to the availability of habitat. Wildlife may be temporarily displaced from the alignments during construction; however, there are abundant alternative habitat resources for wildlife. The wildlife value to the roadside easements is minimal. Action alternatives 1a, 1b and 2 also use other areas such as the planted pine area and the Gulf Power Easement. Although they offer good wildlife habitat, they are adjacent to large naturalized areas for wildlife use. Under the no action alternative, there would be no change in the baseline conditions for wildlife.

4.3.9.3 Threatened and Endangered Species

Action alternatives 1a, 1b and 3 have no known listed species within the proposed corridors. These alignments would not significantly impact listed species. Action alternative 2 will impact gopher tortoise burrows and will need to enter into coordination with FWC to permit the excavation and temporary exclusion of these individuals. A permit to relocate fewer than ten tortoises could be obtained within 90 days and permit fees are less than $1,000. Although an excavation of the tortoises can be stressful on the tortoises in the short term, Florida relocation requirements dictate that tortoises are given biometric and health assessments prior to being released into approved recipient habitats. Impacts to the tortoises and habitat are temporary due to the underground installation of the pipeline. The eastern indigo snake, a commensal species of the gopher tortoise, is assumed to be within the same habitats as the tortoise. As mitigation and protective measures, the USACE requires the implementation of the USFWS construction protective measures that consists of instructing and posting information about the eastern indigo snake. The area has no known observations of the eastern indigo snake, but will require implementation of the USFWS protection measures due to the presence of gopher tortoise burrows. Agency coordination would not be required until the project is permitted. Under the no action alternative, there would be no change in the baseline conditions for threatened and endangered species.

4.3.9.4 Wetlands

The storage reservoir and distribution system portions of this project do not impact wetland resources. Both will be constructed in upland maintained habitats and have no direct means of impacting wetland resources. The alignment alternatives (action alternatives), however, have multiple wetland crossings, as discussed in Section 3.3.9.4. The results of the wetland crossing analysis and estimated total acreage of wetland impacts, if excavated trenching technologies are used for installation of the reclaimed water supply pipeline, are summarized below:

- Action alternative 1a has four wetland crossings with the total acreage of wetland impacts estimated at 0.052 acres. This alternative results in the least amount of wetland impacts.
- Action alternative 1b has five wetland crossings with the total acreage of wetland impacts estimated at 0.064 acres.
- Action alternative 2 has six wetland crossings with the total acreage of wetland impacts estimated at 0.378 acres. This alternative results in the greatest amount of wetland impacts. The alignment crosses an impounded stream (impoundment) where directional drilling methods would be needed; the direction drilling does not result in wetland impacts as discussed in Section 3.3.9.4. Typical excavated trenching installation methods could be used for the wetland marsh area adjacent to the impoundment and the other wetland crossings; using this installation method accounts for the wetland impacts noted for this alternative.
- Action alternative 3 has seven wetland crossings with the total acreage of wetland impacts estimated at 0.138 acres.

With the exception of the impounded stream crossing associated with action alternative 2, the wetland crossings for the action alternatives could be accomplished using standard excavated trenching technologies. Installation of the reclaimed water supply pipeline using excavated trenching methods will result in the wetland impacts described above. Restoration of the crossings will be required; this will involve restoring the grade, stream bottom, and vegetation at each crossing where excavation takes place. A USACE nationwide permit could be used for permitting the project since the total estimated wetland impacts for the alternatives, which range from 0.052 to 0.378 acres, are below the nationwide permit threshold of 0.5 acres of wetland impacts for up to 10 miles of pipeline. For reference, the action alternatives include 4.3 to 4.7 miles of pipeline, depending on the alignment. Use of the nationwide permit would be subject to approval by USACE and FDEP, and agency field visits would be necessary to verify crossing installation methods are appropriate for each location. In addition, FDEP would require individual Environmental Resource Permits and specific mitigation compensation for wetland and stream impacts.

Because it is a goal of the Air Force to have "no net loss of wetland habitat" whenever possible, installation of the reclaimed water supply pipeline could be done using directional drilling techniques instead of standard excavated trenching techniques to avoid impacts to wetland resources. This construction method is preferred since it supports the Air Force's goal of "no net wetland loss." Because directional drilling (i.e., installation of the reclaimed water supply pipeline using directional borings) would facilitate installing the pipeline beneath the water body without disturbing the vegetation or stream bottom, permitting agencies would not consider the use of this subaqueous technique as creating an impact on the wetland habitat. Thus, use of directional drilling to install the pipeline would not result in wetland impacts. This type of installation is covered under a regional permit, as promulgated through the Joint Environmental Resource Permit System for the USACE and FDEP, and would only require coordination prior to project commencement. The additional construction costs associated with directional drilling technologies will be off-set because project specific permits would not be required and no

mitigation would be needed. Thus, this option for installation of the pipeline, irrespective of the alignment selected, is preferred because it avoids impacts to wetland resources and eliminates the need for permitting and mitigation measures.

Under the no action alternative, there would be no change in the baseline conditions for wetlands.

4.3.9.5 Floodplains

All action alternatives will need to cross the 100-year floodplain. For each of the action alternatives, the impacts will be within existing easements and will not result in removal of trees within the floodplain areas.

The installation of the reclaimed water supply pipeline will be in herbaceous habitat and the impacts to these habitats will be temporary as the ground level will be replaced to original grade and re-vegetated. Erosion control measures, required by Florida statute, will minimize erosion and eliminate impacts due to sediment deposition in the floodplains.

Construction of the storage reservoir and installation of the distribution piping to the irrigation areas will not be in or cross the 100-year floodplain. As such, no impacts to floodplains are anticipated for the reservoir or distribution piping. Under the no action alternative, there would be no change in the baseline conditions for floodplains.

4.3.10 CULTURAL RESOURCES

4.3.10.1 Historical Resources

There are no listed historic sites located along any of the action alternative routes. As such, the action alternatives will have no significant impact on the historical resources at Tyndall AFB.

Under the no action alternative, there would be no change in the baseline conditions for historical resources.

4.3.10.2 Archaeological Resources

There are no known archaeological sites along the proposed alignments; however, a final spatial evaluation has not been completed. The Tyndall Integrated Cultural Resource Management Plan contains standard operating procedures that must be implemented for base construction projects. In the event of an accidental find during construction, work will cease until the cultural resource manger can make an inspection of the site.

Under the no action alternative, there would be no change in the baseline conditions for archaeological resources.

4.3.11 SOCIOECONOMIC RESOURCES

This proposed action will provide a temporary benefit to the socioeconomic resources of the county. This project will provide temporary jobs in construction. It will also increase the availability of potable water resources and, thus, prolong any additional withdrawal project that would require capital improvement funds.

Under the no action alternative, there would be socioeconomic impacts as no additional jobs would be created.

4.3.12 LAND USE COMPATIBILITY

The proposed action is generally compatible with the existing and future land uses described in the General Plan for Tyndall AFB. Utilities, such as the reclaimed water irrigations system components associated with the proposed action (i.e., the reclaimed water distribution pipeline, storage reservoir, and distribution system), are not given specific land use designations. Rather, utilities are considered infrastructure and are designated the same as the land uses they cross or support. For the action alternatives and distribution system piping, no change in land use would be needed since the alignments follow either existing utility corridors or, as is the case with action alternatives 1a and 1b, cross a small area of planted pine that could be re-vegetated to avoid a land use change. The storage reservoir would be constructed in a location that is currently a grassy field in the administrative/organization area of the base. Because the storage reservoir is part of the utility infrastructure needed for the reclaimed water system that supports the administrative/organization use, it will not require a separate designation or land use change. As such, land use changes are not anticipated as a result of the proposed action.

Under the no action alternative, there would be no change in land use.

4.4 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

Action alternatives 1a, 1b and 2 will have permanent impacts to the tree resources by requiring the removal trees along short sections of the alignment. Tree impacts will be mitigated by plantings of native long leaf pine and wiregrass habitat. Action alternative 3 will not impact trees since it primarily runs along existing roadway easements. All alternatives will incur temporary impacts to the floodplain during the construction process. However, impacts will be mitigated by implementation of a sediment and erosion plan, excavation areas will be graded to original topography and re-vegetated to eliminate sedimentation impacts. The action alternatives 1a, 1b and 3 will have no significant impact on listed species. Action alternative 2 will impact listed species unless special precautions are taken to either avoid or relocate species such as the gopher tortoise. The project will need to have definitive surveys for the gopher tortoise and have the FWS indigo snake protection measures implemented prior to project commencement. There will be temporary deminimus impacts to noise and air quality due to heavy construction vehicles noise, exhaust and dust.

4.5 COMPATIBILITY OF THE PROPOSED ACTION AND ALTERNATIVE WITH THE OBJECTIVES OF FEDERAL, REGIONAL, STATE, AND LOCAL LAND USE PLANS, POLICIES AND CONTROLS

The proposed action, including the preferred reclaimed water supply pipeline alignment - action alternative 3, compatible with the objectives of federal, regional, state, and local land use plans, policies, and controls. Specifically, the use of reclaimed water for irrigation purposes, rather than potable water, is consistent with federal, regional, state, and local policies and regulations. For example, the proposed action would reduce the base's need to use potable water for irrigation and would support the federal water use reduction goals established in Executive Order 13514. It would also protect local water resources through water reuse.

For the supply pipeline alignment route, action alternative 3 is the preferred option. This alignment follows existing roadways and would be constructed in existing utility easements. It has the straightest run of piping and the least amount of piping not in existing right of ways. Additionally, impacts to the base mission are minimized due to pipeline construction activities

being located away from the "core" of base activities (i.e., Beacon Beach, DeJarnette, and Suwannee Roads). There are also no impacts to or from ERP or MMRP sites along this alignment. Action alternative 3 also has the least impact on natural resources, including planted pine and threatened and endangered species. While this action alternative has the most wetland crossings, the crossings are shorter in distance than other action alternatives and, thus, there are less liner feet of crossing. Directional borings will be needed for the two U.S. Highway 98 crossings and use of directional drilling for the wetland crossing would avoid permitting and mitigation efforts. For these reasons, action alternative 3 is the most compatible of the pipeline alignment option as it relates to federal, regional, state, and local land use plans, policies, and controls.

The reclaimed water that would be supplied by implementing the proposed action and preferred alternative would enhance the landscape where irrigation is required. The land use in the area of the project where the storage reservoir and distribution piping would be located is general administrative/organization, with some areas used for training and recreational activities. Landscaping is use to improve the aesthetics and enhance the usability of these areas at the base. The Florida climate and soils require maintenance of these areas, in the form of supplemental water and nutrients throughout the year. Using reclaimed water for irrigation would not only provide water, but would also supply necessary nutrient to the vegetation. This reuse would keep the nutrients from being directly discharged to nearby waterways, such as St. Andrew Bay. This is another example of the proposed action's compatibility with land use plans, policies, and controls, including the base's General Plan.

4.6 RELATIONSHIP BETWEEN THE SHORT-TERM USE OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

This section evaluates the short-term use of the environment for the proposed action compared to the long-term productivity derived from implementing the proposed action. The relationship between short-term uses of the environment and enhancement of long-term productivity has been analyzed. The impacts are depicted to show the beneficial uses of the environment in the long-term and/or uses that pose a long-term risk to human health or safety.

The installation of the reclaimed water irrigation system primarily utilizes previously developed utility easements, existing ROWs, and established roadway corridors on Tyndall AFB property. A conversion from planted pine to a more herbaceous habitat would occur for action alternatives 1a and 1b. This would eventually occur with the harvest of the planted pines, which would not be related to the proposed action. The harvest, if it occurred in conjunction with the proposed action, would aid in the conversion to a linear easement for the pipeline. The conversion for the pipeline would, however, prohibit replacement of trees within the easement, which would occur following pine tree harvesting not associated with the proposed action.

Alternative 2 would permanently convert forest resources to shrub scrub habitat as a portion would be constructed within the Gulf Power ROW. This conversion has already taken place where the powerline has been constructed.

The long-term project benefits include the reduced discharge of nutrients to Saint Andrew Bay, reduced water withdrawals, reduced use of potable water, reduced need for soil enhancements and fertilizers on a portion of the base, and the proposed action would provide a consistent irrigation source. Furthermore, the short-term use of the environment is outweighed by the long-term environmental productivity associated with implementing the proposed action. Under the No Action Alternative, these benefits would not be realized as there would be no change in the baseline conditions.

4.7 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible and irretrievable resource commitments are related to the use of non-renewable resources and the effects that the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action.

Construction of the proposed action will result in short term increases to noise and air emissions. Construction would also use materials (e.g., plastic, concrete, metal) and energy (e.g., fuel, electricity) that would be irretrievably lost. The construction would temporarily impair traffic and the irrigation pumps would permanently increase electricity consumption and use of lubricants. These increases would be considered minor and would result in only a minor loss of resources. This loss would be offset by the benefits of the decreased potable water consumption, reduction of wastewater discharge and nutrient loading of Saint Andrew Bay, and include creation of temporary construction jobs.

Significant irreversible and irretrievable commitments of resources will not occur under the no-action alternative. However, there would be no change in the baseline conditions, which would result in increased nutrient and wastewater discharges, increased potable water consumption resulting in increased water withdrawals for the Bay County reservoir, and no creation of construction jobs. The proposed action's benefits, both short-term and long-term outweigh the commitment of resources to undertake the project.

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The following is a list of the agencies, companies, and individuals contacted during preparation of the EA:

- Florida Fish and Wildlife Conservation Commission, Mr. Rick McCann, Telephone Communication, Confirm coordination requirements for the Air Force, FWC, and FFWCC.

- Gulf Power Company, Mr. Stan Sexton, Telephone Communication, Confirm coordination requirements for the Air Force and Gulf Power Company regarding the design and placement of the reclaimed water pipeline within existing Gulf Power Easement.

- Panama City Utility Department, Telephone Communication, Confirm utility availability and water supply.

SECTION 7. LIST OF REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Public Health Assessment, Tyndall Air Force Base, Panama City, Bay County, Florida. ATSDR, Division of Health Assessment and Consultation, Federal Facilities Branch. July 24, 2000. http://www.atsdr.cdc.gov/ hac/pha/PHA.asp?docid=243&pg=4#appa

Archaeological Resources Protection Act of 1979 (ARPA). 2002. 16 USC §§ 470aa-470mm (2002).

Ashton, R. E., and P. S. Ashton. 2008. *The Natural History and Management of the Gopher Tortoise, Gopherus polyphemus (Daudin)*. Ashton Biodiversity Research & Preservation Institute. Krieger Publishing Company. Malabar, Florida. 275 pp.

Blackwell, B. F., and L. M. Schafer, 2006. *Bird Use Of Stormwater Management Ponds: Design Considerations Relative To Decreasing Strikes With Aircraft*. From Abstracts of the Proceedings of the 8th Bird Strike Committee USA/Canada Annual Meeting, 21-24 August 2006, St. Louis, Missouri USA. (www.birdstrike.org).

Clean Air Act (CAA). 1970. CAA and its amendments, including the Clean Air Act Amendments (CAAA) of 1990. 42 USC 7401-7671q. Regulation: 40 CFR 50-88 as amended 31 January 2003.

Clean Water Act (CWA). 1977. (Formerly known as the Federal Water Pollution Control Act). 33 USC 1251 et seq. Public Law No. 107–303, as amended 27 November 2002.

Coastal Zone Management Act (CZMA). 1972. 16 USC 1451 et seq.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). 42 USC 9651(c).

Council on Environmental Quality (CEQ) Regulations, *Implementing the Procedural Provisions of the National Environmental Policy Act*. 1978. 42 USC 4371 et seq. (40 CFR 1500-1508).

Department of Defense (DoD). 1996. DoD Instruction 4715.9, *Environmental Planning and Analysis*, 3 May 1996.

Endangered Species Act (ESA). 1973. 16 USC 1531-1544, 87 Stat. 884.

Energy Policy Act. 2005. Public Law 109-58. 8 August 2005.

Executive Order 11988, Floodplain Management. 1977. 42 FR 26951. 24 May 1977.

Executive Order 11990, Protection of Wetlands. 1977. 3 CFR, 1977 Comp., p. 121, unless otherwise noted. 42 FR 26961. 24 May 1977.

Executive Order 12372, Intergovernmental Review of Federal Programs. 1982. 3 CFR, 1982 Comp., p. 197. 47 FR 30959.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. 1994. 59 FR 7629. 16 February 1994.

Executive Order 13327, Federal Real Property Asset Management. 2004. 40 USC §121(a). 6 February 2004.

Executive Order 13423, Strengthening Federal Environmental, Energy, and Transportation Management. 2007. 24 January 2007.

Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance. 2009. 5 October 2009.

Federal Property and Administrative Services Act (FPASA). 1949. 41 USC 251.

Fish and Wildlife Coordination Act. 1934. 16 USC §661-667e.

Florida Administrative Code (F.A.C.) Chapter 68A-27.004 "Designation of Threatened Species; Prohibitions; Permits."

Florida Department of Transportation (FDOT). 1999. *Florida Land Use, Cover and Forms Classification System.* Florida Department of Transportation, Surveying and Mapping Office, Geographic Mapping Section. January 1999. Third Edition. 95 pp.

Florida Statutes. *Capital Improvement Elements Plan*. Section 187.201(18).

National Environmental Policy Act (NEPA). 1969. 42 USC 4321 et seq.

National Historic Preservation Act (NHPA). 1966. 16 USC 470 et seq. Public Law No. 89-665, as amended through 2000.

National Defense Authorization Act (NDAA) for Fiscal Year 2008. Section 2843, Public Law No. 110-181.Pollution Prevention Act. 1990. 16 USC 470. Public Law No. 107–377, as amended 31 December 2002.

PIKA/Pirnie JV, LLC. 2011. *Final Report for the Survey of Amphibians, Reptiles, and Bats at Tyndall AFB, Florida*. April 2011.

Resource Conservation and Recovery Act (RCRA). 1976. 42 USC §§6901-6992k or 40 CFR pts. 239-282.

Rivers and Harbors Act. 1899. 33 USC 401.

Scott, T.M. 1992. *A Geologic Overview of Florida.* State of Florida Natural Resources, Division of Resource Management, Florida Geologic Survey.UF00001048. 80 pp.

U.S. Air Force. 2003. *United States Air Force Conformity Guide*. Prepared by Albert E. Smith, Environmental Assessment Division, Argonne National Laboratory, Argonne, Ill., and Frank Castaneda, III, HQ AFCEE/ECC, Brooks City-Base, Texas. Page 7 of 91.

U.S. Air Force. 2004. Air Force Instruction (AFI) 32-7064, *Integrated Natural Resources Management.* 17 September 2004.

U.S. Air Force. 2004b. AFI 32-7065, *Cultural Resources Management Program.* 1 June 2004.

U.S. Air Force. 2004c. United States Air Force, General Plan, Tyndall Air Force Base, Florida. August 2004. pp.215.

U.S. Air Force. 2006. *Integrated Cultural Resource Management Plan*. May 2006. pp. 197.

U.S. Air Force. 2007. *Infrastructure Investment Plan; USAF Utilities Sustainment, Restoration and Modernization Program; Tyndall AFB, Florida*: Final. Contract no. F08637-03-D-6999-0005. April 2007.

U.S. Air Force. 2010. *Integrated Cultural Resource Management Plan*. May 2010. pp. 197.

U.S. Air Force. 2011. *Tyndall Air Force Base General Plan.* Component Plan Overview Figures 4.19 – 4.22.

U.S. Code of Federal Regulations. Title 40. Parts 1500-1508.

Weston Solutions Inc. 2010. *Reclaimed Water System Design Summary, Tyndall AFB.* August 2, 2010. 9 pp.

APPENDIX A: List of Species for Tyndall AFB

Appendix A: Table of Listed Species for Tyndall AFB

Common Name	*Species Name*	State Status	Federal Status	Habitat Description
MAMMALS				
Choctawatchee Beach Mouse	*Peromyscus polionotus allophyrs*	E CH	E	Barrier Island
St. Andrews Beach Mouse	*Peromyscus polionotus peninsularis*	E CH	E	Barrier Island
West Indian Manatee	*Trichechus manatus*	E	E	Marine
Florida Black Bear	*Ursus americanus floridanus*	ce	T	Swamps, forested areas
Common Name	***Species Name***	**State Status**	**Federal Status**	**Habitat Description**
BIRDS				
Snowy Plover	*Charadrius alexandrinus tenuirostris*	T	ce	Barrier Islands
Piping Plover	*Charadrius melodus*	T	T CH	Barrier Islands
Little Blue Heron	*Egretta caerulea*	SSC		Marshes, ponds, lakes
Reddish Egret	*Egretta rufescens*	SSC		Brackish marsh, shallow coastline
Snowy Egret	*Egretta thula*	SSC		Marshes, lakes, ponds, shallow coastline
Tricolor Heron	*Egretta tricolor*	SSC		Marshes, ponds
White Ibis	*Eudocimus albus*	SSC		Marshes, lakes
Peregrine Falcon	*Falco peregrinus tundrius*	E	ce	Open habitats
Southeastern American Kestrel	*Falco sparverius paulus*	T	ce	Open, partly open habitat
American Oystercatcher	*Haematopus palliates*	SSC		Shoreline
Bald Eagle	*Haliaeetus leucocephalus*		BGEPA	Coastline, lakes
Brown Pelican	*Pelecanus occidentalis*	SSC		Barrier Island, bays
Red-cockaded Woodpecker	*Picoides borealis*	SSC	E	Mature Pine Forests
Black Skimmer	*Rhychops niger*	SSC		Shoreline
Least Tern	*Sterna antillarum*	T		Barrier Island, shoreline
Common Name	***Species Name***	**State Status**	**Federal Status**	**Habitat Description**
REPTILES (Aquatic)				
American alligator	*Alligator mississippiensis*	SSC	SAT in South Florida	ESTUARINE: tidal marsh LACUSTRINE: river floodplain lake, swamp lake RIVERINE: alluvial stream, blackwater stream
Loggerhead turtle	*Caretta caretta*	T	T	TERRESTRIAL: sandy beaches; nesting
Green turtle	*Chelonia mydas*	E	E	TERRESTRIAL: sandy beaches; nesting
Leatherback turtle	*Dermochelys coriacea*	E	E	TERRESTRIAL: sandy beaches; nesting
Hawksbill turtle	*Eretmochelys imbricata imbricata*	E	E	MARINE: open water; no nesting
Kemp's ridley turtle	*Lepidochelys kempii*	E	E	TERRESTRIAL: sandy beaches; nesting
Alligator snapping turtle	*Macroclemys temminckii*	SSC		ESTUARINE: tidal marsh LACUSTRINE: river floodplain lake, swamp lake RIVERINE: alluvial stream, blackwater stream
REPTILES (Terrestrial)				
Eastern indigo snake	*Drymarchon corais couperi*	T	T	ESTUARINE: tidal swamp PALUSTRINE: hydric hammock, wet flatwoods TERRESTRIAL: mesic flatwoods, upland pine forest, sandhills, scrub, scrubby flatwoods, rockland hammock, ruderal
Gopher tortoise	*Gopherus polyphemus*	T	Under review	TERRESTRIAL: sandhills, scrub, scrubby flatwoods, xeric hammocks, coastal strand, ruderal

1

2

3 Appendix A: Table of Listed Species for Tyndall AFB (continued)

4

APPENDIX A. Listed Species from Tyndall AFB and Surrounding County.

Common Name	*Species Name*	State Status	Federal Status	Habitat Description
MAMMALS				
Choctawatchee Beach Mouse	*Peromyscus polionotus allophyrs*	E CH	E	Barrier Island
St. Andrews Beach Mouse	*Peromyscus polionotus peninsularis*	E CH	E	Barrier Island
West Indian Manatee	*Trichechus manatus*	E	E	Marine
Florida Black Bear	*Ursus americanus floridanus*	ce	T	Swamps, forested areas
Common Name	***Species Name***	**State Status**	**Federal Status**	**Habitat Description**
BIRDS				
Snowy Plover	*Charadrius alexandrinus tenuirostris*	T	ce	Barrier Islands
Piping Plover	*Charadrius melodus*	T	T CH	Barrier Islands
Little Blue Heron	*Egretta caerulea*	SSC		Marshes, ponds, lakes
Reddish Egret	*Egretta rufescens*	SSC		Brackish marsh, shallow coastline
Snowy Egret	*Egretta thula*	SSC		Marshes, lakes, ponds, shallow coastline
Tricolor Heron	*Egretta tricolor*	SSC		Marshes, ponds
White Ibis	*Eudocimus albus*	SSC		Marshes, lakes
Peregrine Falcon	*Falco peregrinus tundrius*	E	ce	Open habitats
Southeastern American Kestrel	*Falco sparverius paulus*	T	ce	Open, partly open habitat
American Oystercatcher	*Haematopus palliates*	SSC		Shoreline
Bald Eagle	*Haliaeetus leucocephalus*		BGEPA	Coastline, lakes
Brown Pelican	*Pelecanus occidentalis*	SSC		Barrier Island, bays
Red-cockaded Woodpecker	*Picoides borealis*	SSC	E	Mature Pine Forests
Black Skimmer	*Rhychops niger*	SSC		Shoreline
Least Tern	*Sterna antillarum*	T		Barrier Island, shoreline
Common Name	***Species Name***	**State Status**	**Federal Status**	**Habitat Description**
REPTILES (Aquatic)				
American alligator	*Alligator mississippiensis*	SSC	SAT in South Florida	ESTUARINE: tidal marsh LACUSTRINE: river floodplain lake, swamp lake RIVERINE: alluvial stream, blackwater stream
Loggerhead turtle	*Caretta caretta*	T	T	TERRESTRIAL: sandy beaches; nesting
Green turtle	*Chelonia mydas*	E	E	TERRESTRIAL: sandy beaches; nesting
Leatherback turtle	*Dermochelys coriacea*	E	E	TERRESTRIAL: sandy beaches; nesting
Hawksbill turtle	*Eretmochelys imbricata imbricata*	E	E	MARINE: open water; no nesting
Kemp's ridley turtle	*Lepidochelys kempii*	E	E	TERRESTRIAL: sandy beaches; nesting
Alligator snapping turtle	*Macroclemys temminckii*	SSC		ESTUARINE: tidal marsh LACUSTRINE: river floodplain lake, swamp lake RIVERINE: alluvial stream, blackwater stream
REPTILES (Terrestrial)				
Eastern indigo snake	*Drymarchon corais couperi*	T	T	ESTUARINE: tidal swamp PALUSTRINE: hydric hammock, wet flatwoods TERRESTRIAL: mesic flatwoods, upland pine forest, sandhills, scrub, scrubby flatwoods, rockland hammock, ruderal
Gopher tortoise	*Gopherus polyphemus*	T	Under review	TERRESTRIAL: sandhills, scrub, scrubby flatwoods, xeric hammocks, coastal strand, ruderal
Mole Snake	*Lampropeltis calligaster*	C S2		TERRESTRIAL: pineland, hardwood hammocks, sandhill, prairies, and agricultural fields
Florida pine snake	*Pituophis melanoleucus mugitus*	SSC	ce	LACUSTRINE: ruderal, sandhill upland lake TERRESTRIAL: sandhill, scrubby flatwoods, xeric hammock, ruderal

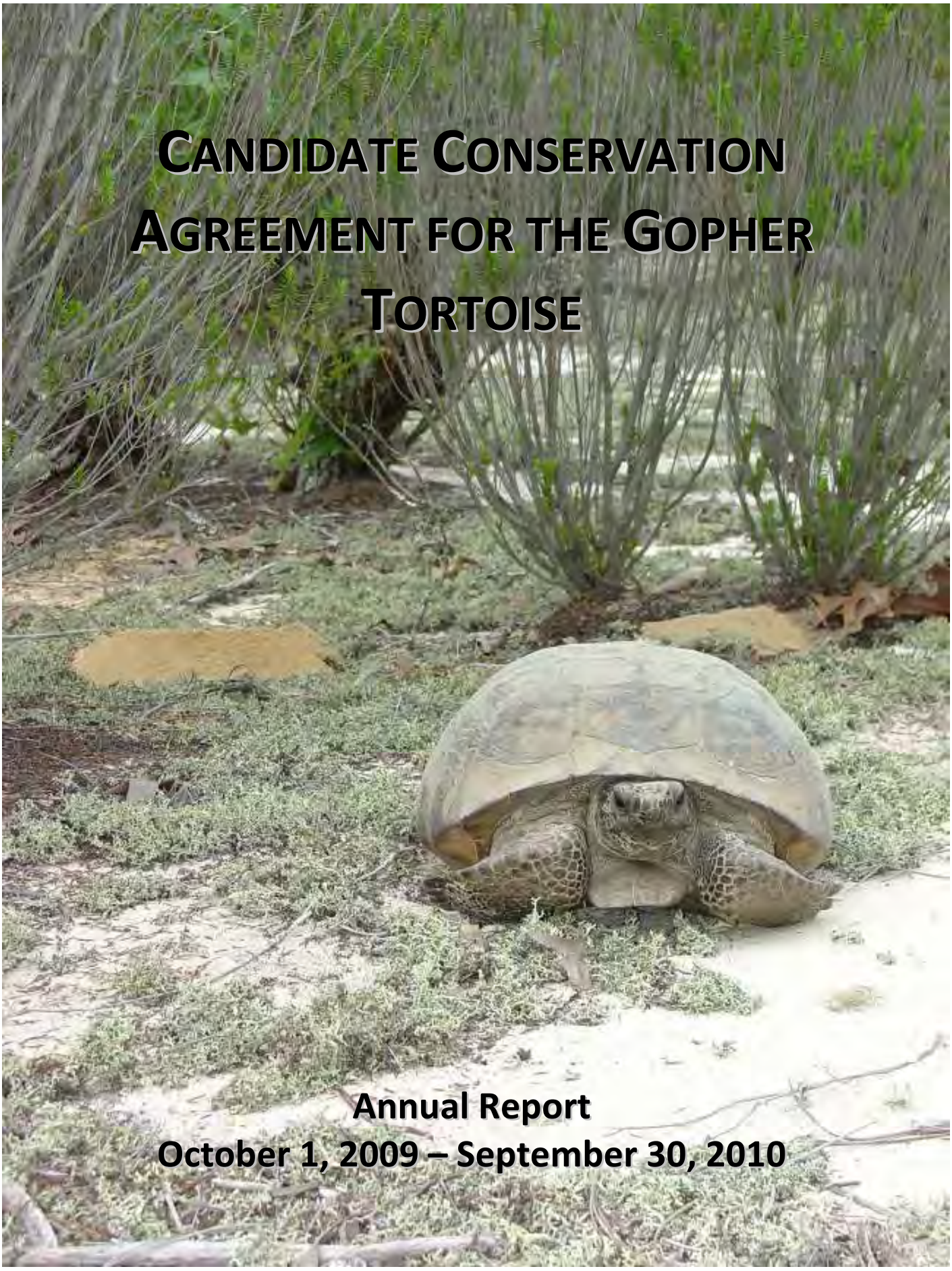
Common Name	*Species Name*	State Status	Federal Status	Habitat Description
AMPHIBIANS				
Reticulated flatwoods salamander	*Ambystoma bishopi*	SSC	E CH	PALUSTRINE: wet flatwoods, dome swamp, basin swamp, ruderal TERRESTRIAL: mesic flatwoods (reproduces in ephemeral wetlands within this community)
Gopher frog	*Rana capito*	SSC	ce	TERRESTRIAL: sandhill, scrub, scrubby flatwoods, xeric hammock (reproduces in ephemeral wetlands within these communities)

Common Name	*Species Name*	State Status	Federal Status	Habitat Description
FISH				
Gulf sturgeon	*Acipenser oxyryinchus desotoi*	SSC	T CH	Marine, Large Rivers

Common Name	*Species Name*	State Status	Federal Status	Habitat Description
Plants				
Southern Milkweed	*Asclepias viridula*	ce	T	Wet prairie
Godfrey's Golden Aster	*Chrysopsis godfreyi*	ce	E	Dunes
Dew Thread Sundew	*Drosera filiformis*		E	Wet prairie
Spoon-leafed Sundew	*Drosera intermedia*		T	Wet prairie
Henry's Spider Lily	*Hymenocallis henryae*	ce	E	Cypress stringers
Thick-leaved Water Willow	*Justicia crassifolia*	ce	E	Wet prairie
Southern Red Lily	*Lilium catesbaei*		T	Wet prairie
Gulf Coast Lupine	*Lupinus westianus*		T	Scrub, dunes
Bog Tupelo	*Nyssa ursine*	ce		Wet prairie
Giant Water Dropwort	*Oxypolis greenmanii*		E	Wet prairie, ditches
Apalachicola Dragonhead	*Physostegia godfreyi*		T	Wet prairie
Violet-flowered Butterwort	*Pinguicula ionantha*	T	E	Cypress domes
Chapman's Butterwort	*Pinguicula planifolia*	ce	T	Wet prairie
Large-leaved Jointweed	*Polygonella macrophylia*	ce	T	Scrub
White-flowered Wild Petunia	*Ruellia noctiflora*		E	Wet prairie
White-Top pitcher plant	*Sarracenia luecophylla*		E	Wet prairie, bogs
Parrot pitcher plant	*Sarracenia psittacina*		T	Wet prairie, bogs
Decumbent pitcher plant	*Sarracenia purpurea*		T	Wet prairie, bogs
Chapman's Crownbeard	*Verbesina chapmanii*		T	Wet prairie
Drummond's Yellow-eyed Grass	*Xyris drummondii*	ce		Wet prairie, flatwoods
Quillwort Yellow-eyed Grass	*Xyris isoetifolia*	ce	E	Wet prairie
Karst Pond Yellow-eyed Grass	*Xyris longisepala*		E	Upland lake margin
Harper's Yellow-eyed Grass	*Xyris scabrifolia*		T	Wet prairie

E	endangered
SSC	species of special concern
T	threatened
ce	consideration encouraged
CH	critical habitat designated
SAT	Species Listed because of Similar Appearance to endangered species
BGEPA	Bald and Golden Eagle Protection Act

APPENDIX B: Gopher Tortoise Candidate Conservation Agreement



Candidate Conservation Agreement for the Gopher Tortoise

Annual Report
October 1, 2009 – September 30, 2010

TABLE OF CONTENTS

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INTRODUCTION

The gopher tortoise (*Gopherus polyphemus*) is endemic to the southeastern United States and has been in population decline in recent years. While the tortoise is federally-listed under the ESA in the western portion of its range, it is currently a candidate species for listing in the eastern portion. In 2006, the United States Fish and Wildlife Service received a petition to federally list the species throughout its non-listed range which includes Florida, Georgia, Alabama, and parts of South Carolina. As a response to the listing petition, stakeholders representing the four states' fish and wildlife agencies, branches of the Department of Defense, and related non-profit organizations drafted and executed a Candidate Conservation Agreement (CCA).

The purpose of the CCA is to address species management and conservation throughout the gopher tortoise's non-federal listed range. State and federal representatives from Florida, Georgia, Alabama, and South Carolina formed a partnership to develop a Candidate Conservation Agreement (CCA) for the gopher tortoise. The goal of the CCA is to organize a cooperative range-wide approach to gopher tortoise management and conservation in its eastern range. The CCA allows the signing parties to leverage knowledge and funding within a common conservation approach and framework. The CCA is voluntary and flexible in nature so that various conservation and management actions can be agreed to and implemented at different levels by the signing parties.

Established under the CCA, the Gopher Tortoise Team (GTT) is charged with implementation of the Agreement. The position of Chair rotates alphabetically among the four states' wildlife agencies, starting with Alabama in the first year of implementation, followed by Florida, Georgia, and South Carolina. Georgia currently serves as Chair of this team through June 30, 2011. The Chair's responsibilities include organizing the annual meeting of the parties and compiling the annual report required under the CCA.

In June 2010, the second annual meeting of the GTT was held at Florida's Nokuse Plantation/E. O. Wilson Biophilia Center. Twenty-five participants representing the thirteen parties attended the two-day meeting. During the meeting, parties presented conservation programs and actions currently being implemented by each agency. The meeting provided a great opportunity to meet all the representatives and establish a future work plan for the reporting requirement.

Comprehensive reports were to be submitted by one representative from each party by December 1, 2010. It is important to note that not every section of the report is applicable to every party. Parties with no information appropriate to a particular section have indicated this with "not applicable, or none during this reporting period." Reports were submitted by each party's point of contact and compiled by the Chair with minimal edits.

SECTION I EXECUTIVE SUMMARY

ARMY

The Army has gopher tortoises on five installations within the eastern portion of the gopher tortoise range: Fort Rucker, AL; Camp Blanding, FL; Fort Benning, GA; Fort Gordon, GA; and Fort Stewart, GA. All installations include conservation of the gopher tortoise in their Integrated Natural Resource Management Plans. These long range plans provide for the protection and enhancement of habitat and the conservation of gopher tortoises. The area of habitat or potential habitat on these installations is estimated at over 161,000 acres. The Army conducted GT management actions on over 100,000 acres including 81,000 acres of prescribed burning in FY 10. Partial surveys were conducted on Fort Stewart, Fort Benning and Fort Gordon in FY 10. Army installations relocated over 170 tortoises in FY 10. Education, outreach, and research continued in FY 10.

Fort Rucker, AL
Following the mapping of gopher tortoise habitat in 2008, management continued as normal for gopher tortoises on Fort Rucker. There was an increase in growing season burns. Forest management activities beneficial to gopher tortoises such as thinning, timber stand improvement, and invasive species control continued during 2009.

Fort Gordon, GA
In FY10 the Fort Gordon Natural Resources Branch maintained or improved 16,798 acres of habitat for the gopher tortoise through timber thinning, herbicide spraying, and prescribed fire. Population surveys were conducted on a portion of the installation and resulted in a population estimation of 203 tortoises for the area surveyed. A health assessment was also conducted, evaluating 9 tortoises for the presence of URTD (results unavailable at time of report).

Fort Benning, GA
Fort Benning's main objectives for FY10 were the relocation of gopher tortoises that were located within the construction footprints of many of the BRAC/Army Transformation projects on the installation. Fort Benning has been working with The Nature Conservancy and Auburn University to relocate these tortoises on and off of Fort Benning. Fort Benning moved 98 tortoises to Army Compatible Use Buffer property adjacent to the installation during this past year. This ACUB tract had recently been purchased and restored by removing an old slash pine plantation and planting Longleaf pine.

Fort Stewart, GA
Fort Stewart conducted a baseline survey in 2009 with a population estimate of 2,129 (excluding hatchlings and juveniles) in 3 regions on Fort Stewart. In 2010, Region 1 was surveyed with a population estimate of 1,354. Region 2 will be surveyed during 2011. Three hundred (300) acres of mid-story growth were reduced to improve GT habitat by mechanical and single stem herbicide application. 400 acres were delineated for future improvement

including site restoration, thinning, mechanical mowing, and single stem herbicide application. A total of 101 head-started gopher tortoises were released on Fort Stewart on June 11, 2010; 65 released into improved habitat improved in Training Area F13. An additional 35 GTs were released in various locations on the western half of the installation. The tortoises are being monitored for retention rate. The head-started tortoises were raised by Georgia Southern University.

Note: The Florida National Guard (FLARNG) and Camp Blanding is not a signatory to the Gopher Tortoise Candidate Conservation Agreement, therefore the Army's report will not include specific information about Camp Blanding. Camp Blanding has a proactive program to conserve the GT on Camp Blanding. Currently, the FLARNG and Camp Blanding are pursuing a Memorandum of Understanding with the US Fish and Wildlife Service to further the conservation of the GT on FLARNG lands.

NAVY

The US Navy has six installations within the eastern range of the Gopher Tortoise (GT). Naval Support Activity Panama City does not support a GT population and Naval Station Mayport supports a very small GT population. The four installations with significant GT populations include NSB Kings Bay in southeastern Georgia, NAS Jacksonville in northeastern Florida, and NAS Whiting Field and NAS Pensacola in the western Florida panhandle. NAS Whiting Field also has lands in southern Alabama. Each installation has an active and current Integrated Natural Resources Management Plan (INRMP). This report summarizes GT management activities for the six installations within the eastern range of the GT populations from the timeframe October 1, 2009 to September 30, 2010. During this reporting period, the Navy managed over 12,000 acres of tortoise habitat, prescribed burned 1,288 acres, reduced encroaching brush on 100 acres, treated 63 acres of invasive species, and eliminated 83 feral hogs and 9 coyotes. Surveys were conducted at all six installations and documented 1,104 burrows with approximately 775 burrows determined to be “active”- - up from 685 active burrows reported in 2009. Subsamples of active burrows were camera scoped yielding an occupancy rate from 41% to 68% (percent of sample variable by installation). Scoping indicated an estimated population of 512 individuals, up from the 2009 estimate of 428. Issues with disease and predation were determined to be absent, minimal, or managed. There was one translocation conducted which involved moving a tortoise from an urban area to natural habitat. There were no gains or losses of habitat, but some improvement modifications were made involving grounds maintenance which were implemented to better identify and protect burrows. Additional improvement included restoration of 100 acres to longleaf pine and 50 acres of understory control by mechanical means in longleaf pine. Community outreach consisted of continued distribution of brochures, posters, and informational signage. No regulations, laws, or policies were changed or implemented, and there were no deviations or additions regarding the CCA Agency Conservation Strategy. Individual installation activities are reported in the following sections where appropriate. Navy GT management addresses the five Listing Factors identified in

section 4 (a) (1) of the Endangered Species Act - - Listing Factor One (present or threatened destruction, modification, or curtailment of the species' habitat or range), Listing Factor Two (overutilization for commercial, recreational, scientific, or education purposes), Listing Factor Three (predation or disease), Listing Factor Four (existing regulatory mechanisms), and Listing Factor Five (other manmade or natural factors affecting the species' continued existence). Navy GT management provided a net benefit to the species and its habitat with regard to all five Listing Factors. No adverse actions were identified in reference to the five Listing Factors for GT populations or habitat on Navy lands.

AIR FORCE

The US Air Force has a number of installations (or associated installation facilities) within the eastern range of the Gopher Tortoise (GT) that have identified GT populations: Avon Park Air Force Range, FL; Eglin AFB, FL; MacDill AFB, FL; the 45th Space Wing, FL (includes Patrick AFB, Cape Canaveral AFS, Malabar Tracking Annex, and Jonathan Dickinson Missile Tracking Annex); Tyndall AFB, FL and Moody AFB, GA. Each installation has an active Integrated Natural Resources Management Plan (INRMP). This report summarizes GT management activities for these installations from October 1, 2009 thru September 30, 2010. During this FY 10 reporting period, the US Air Force:

- Managed over 441,000 acres of estimated gopher tortoise habitat without a designated protection status (over 85 % on Eglin AFB).
- Over 9,000 acres of gopher tortoise habitat were restored or improved.
- Prescribed burned over 135,000 acres.
- 3,426 acres of invasive species treated/eradicated
- Surveys conducted at most installations identified active and inactive burrows.
- Eglin AFB had seven on-site gopher tortoise relocations and Patrick AFB, FL, was involved in 47 relocations during FY 10 to unprotected lands.
- Research surveys were conducted at Avon Park Air Force Range, FL and; at Moody AFB, GA - where surveillance for upper respiratory tract disease (URTD) and other physiological parameters were continued through the FY 10 reporting period.
- Two installations reported a permanent loss of land/habitat (Eglin = 330 acres; and Patrick = 118 acres) due to expanded military mission-related requirements.
- Avon Park Air Force Range held three briefings during FY 10 for incoming military units and contractors on identification and avoidance of threatened, endangered and sensitive species including gopher tortoise and their burrows; Eglin conducted a two-hour threatened and endangered species class which included a section on gopher tortoises; Patrick and its associated installations provided various natural resource presentations to different groups during FY 10 (details under VIII. B); and Moody AFB, GA did a presentation in Feb 2010 at the "Georgia Chapter of the Wildlife Society" meeting at Valdosta State University.

USAF INSTALLATION OVERVIEW

Avon Park Air Force Range, FL

Consists of approximately 107,000 acres in Highlands and Polk counties in peninsular Florida. Plant communities include mainly pine flatwoods, oak scrub, pine plantations, dry prairie, oak hammocks, marshes, swamps, and cutthroat seeps. Gopher tortoises are most often observed in oak scrub and pine flatwoods. A three year baseline survey is currently underway to obtain population size, density, and basic demographic information.

Eglin AFB, FL

From October 1, 2009 to September 30, 2010, Eglin implemented habitat management activities such as prescribed fire and mid-story and understory improvement. Surveys were primarily conducted in areas where development would be occurring, however, some surveys took place on undisturbed acreage in order to document population size. Very little monitoring was conducted for previously known burrows.

MacDill AFB, FL

MacDill AFB is a relatively small base (5,638 acres) surrounded by the waters of Tampa Bay on three sides and dense industrial and residential development on its northern side. The base supports only a small gopher tortoise population, roughly 100 tortoises, spread across several colonies throughout the airfield and pine forest areas. Including the airfield and pine forest areas there is roughly 1,500 acres of suitable gopher tortoise habitat on base. The installation has made a concerted effort to protect and improve gopher tortoise habitat on the installation, particularly in the forested areas. They spent DoD annual O&M funding to improve habitat areas through removal of dense exotic understory vegetation. MacDill also works with the base Plans and Programs office to avoid construction in gopher tortoise areas. In FY10 the installation worked with the Planning office to find a suitable alternative site for the proposed Civil Engineering and Security Forces Storage Yards which were initially proposed for construction in an area inhabited by gopher tortoises.

Patrick AFB, FL

The 45th Space Wing (45 SW) consists of four major installations and several smaller annexes. The four major installations: Cape Canaveral Air Force Station, Patrick Air Force Base, Malabar Tracking Annex, and Jonathan Dickinson Missile Tracking Annex, are the only properties within the 45 SW on which gopher tortoises are known to be present. Total area of all four properties is approximately 18,385 acres, of which roughly 6,200 is considered suitable gopher tortoise habitat. Cape Canaveral Air Force Station (CCAFS) has, by far, the largest population of gopher tortoises of the four sites; approximately 95% of gopher tortoises at 45 SW properties are found at CCAFS. A population survey has not been completed for all of the sites; therefore, an accurate population estimate is not available at this time. Management of gopher tortoise habitat is accomplished through mechanical cutting and controlled burning, as well as through the treatment/removal of invasive vegetation. Gopher tortoise relocations are conducted to

support various construction projects. Information pertaining to these activities is presented in this annual report.

Tyndall AFB, FL

Gopher tortoises are known from both the east and west units of the installation (roughly 400 occupied acres). These areas are known from incidental field observations and past surveys either in support of missions or for general biological information. Acres of potential habitat have been identified this year through a contract, and will guide field surveys next year. Longleaf pine restoration and frequent prescribed fire are used, which benefit suitable tortoise habitat. An installation-wide census is still needed, along with the status of each occupied area and an accurate population estimate.

Moody AFB, GA

Moody AFB is located 10 miles northeast of the City of Valdosta in Lowndes and Lanier counties in south-central Georgia. Comprising approximately 11,000 acres of federally owned land, the installation includes the main base (5,039 acres), the adjacent Grand Bay Range (5,874 acres), and the Grassy Pond Recreational Annex (489 acres), located 25 miles southwest of the main base. There are approximately 1,000 acres of gopher tortoise habitat located on the installation. Gopher tortoise management is accomplished through projects identified in the Moody AFB Integrated Natural Resources Management Plan with concurrence by the Georgia Department of Natural Resources and the U.S. Fish and Wildlife Service. Current projects include: seasonal monitoring and surveys of known gopher tortoise populations; disease surveillance for Upper Respiratory Tract Disease; gopher tortoise movement studies in relation to military activities; gopher tortoise mark-recapture population demography study; habitat improvement/restoration through burning, chemical release, and mechanical means.

UNITED STATES MARINE CORPS

The Marine Corps has two installations that have/may have gopher tortoises and conduct some management. Marine Corps Support Facility Blount Island (MCSF Blount Island), located in Jacksonville, FL, has 15 acres of gopher tortoise habitat. In July 2010 a burrow survey identified 63 active burrows, 15 inactive burrows, and 22 abandoned burrows. Though, the Marine Corps is evaluating the possibility of relocating all gopher tortoises to a site off of the installation. If this occurs, MCSF Blount Island will need to be moved from the Gopher Tortoise CCA. Marine Corps Logistics Base Albany (MCLB Albany), located in Albany, GA, has 1,400 acres of potential gopher tortoise habitat and utilizes prescribed fire to maintain and enhance this habitat. No burrow surveys have been conducted to determine if gopher tortoise are actually present on MCLB Albany.

UNITED STATES FOREST SERVICE

Gopher tortoises occur in both Covington and Escambia counties of Conecuh National Forest. Conecuh's gopher tortoise population is likely the largest in Alabama. The gopher tortoise and its burrows are protected on Conecuh National Forest by a Supervisor's Closure Order that bans the gassing of burrows and by timber sale specifications requiring protection of burrows. Management activities conducted for the restoration and maintenance of native fire ecosystems that support gopher tortoise include: timber thinning in mature longleaf stands, timber harvest to restore native over-story species (longleaf), prescribed fire, chemical treatment and eradication of cogongrass, trapping and removal of feral hogs, native grass seed collection and propagation for future restoration needs, and educational efforts through outreach and interpretation.

The National Forests in Florida's management activities for the maintenance/restoration of gopher tortoise habitat for FY10 include: Timber thinning in mature longleaf stands, prescribe fire, non-native invasive species eradication, mechanical mowing of mid-story vegetation, road restoration activities, gopher tortoise surveys, land enclosures via electric fence to prevent hog disturbance, seed collection and planting, fire line restoration, specific hog hunt in gopher tortoise areas, and education efforts through signage in strategic locations in the forests. The Apalachicola National Forest is serving as a research recipient site for the gopher tortoise and is in the process of receiving translocated gopher tortoises.

UNITED STATES FISH AND WILDLIFE SERVICE

Gopher tortoise conservation measures were reported for 21 National Wildlife Refuges within the unlisted range of the tortoise. All reported acreage below is the cumulative total of occupied and potential gopher tortoise habitat and habitat that was not categorized. A total of about 44,000 acres was permanently protected while nearly 49,000 acres were protected short-term during 2010. About 3,200 acres of tortoise habitat were unprotected and nearly 650 acres were managed but not protected. About 12,000 acres of gopher tortoise habitat was restored, improved, or maintained in 2010. Almost 30,000 acres of tortoise habitat was burned. One half acre of gopher tortoise habitat was acquired by the Refuge system in 2010. Twenty six tortoises were translocated within Refuge property during 2010.

All land management activities reported on Refuge property in 2010 resulted in the protection, management, and/or enhancement of about 182,500 acres of gopher tortoise habitat. Without these actions some of this acreage would have been susceptible to destruction (for those properties that were unprotected prior to Refuge encumbrance) and degradation (for those properties that were not previously managed). The cumulative benefits of protecting and managing gopher tortoise habitat on Refuge property precluded the loss or degradation of habitat. As a result of these conservation actions, about 182,500 acres of gopher tortoise habitat was not at risk of present or threatened destruction, modification, or curtailment which

is one of the threats the Fish and Wildlife Service evaluates when considering whether to list a species or, in some instances, when it reviews recovery actions to determine if a species has met its recovery criterion to eliminate this threat.

ALABAMA

Gopher tortoise occurs in the coastal plain of Alabama in 16 counties. Populations in two counties in the western portion of its Alabama range are listed as "threatened" by the U.S. Fish and Wildlife Service. Tortoises east of the Mobile and Tombigbee Rivers are currently unlisted but protected by state regulation from killing, taking, or possession. Overall the gopher tortoise is considered a P2 species or species of high conservation concern in the state.

While unlisted in most of the state, Alabama Department of Conservation and Natural Resources (ADCNR) supports efforts and actions aimed to preclude such action including continued funding through its Landowner Incentive Program to assist private landowners with longleaf pine habitat improvement and management, land acquisition by the State Lands Division Forever Wild program and management of current its longleaf holdings, and the continued management of longleaf pine habitats on state owned wildlife management and community hunting areas. In addition, a new regulation prohibiting the practice of gassing animal burrows has been enacted.

At this time ADCNR has no staff or budget dedicated to gopher tortoise conservation, but as identified in the Department's Alabama Comprehensive Wildlife Conservation Strategy, longleaf pine restoration is identified as a priority which aids tortoises in the long term.

As such, the Department will continue to actively fund and support research and habitat acquisition and management which continue to aid the gopher tortoise.

FLORIDA

The gopher tortoise in Florida is a state threatened species. The Gopher Tortoise Management Plan was approved in September 2007. The overarching conservation goal of the management plan is to restore and maintain secure, viable populations of gopher tortoises throughout the species' current range in Florida by addressing habitat loss. Specific objectives include increasing the amount of protected habitat; conducting appropriate vegetation management to maintain gopher tortoise habitat (e.g. prescribed burning); restocking tortoises to protected, managed, suitable habitats where densities are low; and decreasing tortoise mortality on lands proposed for development. Each objective provides benchmarks and measurements against which progress toward the plan's goal can be assessed. A suite of conservation actions is proposed for the plan's first five-year cycle. The extensive conservation actions outlined in the plan fall under the following broad categories: permitting, local government coordination, law enforcement, habitat preservation and management, population and disease management,

landowner incentives, monitoring and research, and public awareness.

Originally approved in April 2008, the Gopher Tortoise Permitting Guidelines were revised based on stakeholder and staff input and approved by FWC's Commission in June 2010. The guidelines include new permit options such as the Burrow and Structure Safety permit, a Research Recipient Site permit, and the Disturbed Site permit. The FWC continues to work with stakeholders to discuss any new challenges and work together toward possible solutions throughout the implementation of the Gopher Tortoise Management Plan. The continued participation of stakeholders is important to the long-term conservation of the species.

This report includes activities that benefit gopher tortoise conservation on nearly 112,000 acres of habitat throughout Florida. Specific accomplishments in implementing the management plan within the reporting timeframe are included in the sections that follow. In all, gopher tortoise conservation efforts in Florida are making significant progress. Much of the progress in prescribed fire and habitat management is made possible through partnerships with cities, counties, non-profit conservation organizations, and other state agencies.

During the reporting timeframe, close to 53,000 acres of gopher tortoise habitat were managed and restored either mechanically, chemically, by eradicating exotic plants, or through prescribed burning. Progress has also been made in protecting additional acres of habitat on private lands through the gopher tortoise recipient site permit program. Approximately 2,000 additional acres are now protected and being managed for gopher tortoises. One significant change from that last reporting cycle is the acres of habitat lost due to development. Since new development in Florida has slowed to a near standstill, approximately 5,500 acres of habitat were permanently impacted by development as compared to last year (30,000 acres).

Significant progress has been made in research with the publication of a long-anticipated study of URTD in May 2010. Further study results on the genetics of Florida tortoises were compiled, and a manuscript is forthcoming. Additional research is well underway, and future results will be included in the next reporting cycle. More educational materials have been developed and distributed, including a teacher's curriculum on gopher tortoises.

New permits were approved and implemented, and Florida's new imperiled species rule was approved and is currently being implemented.

Florida served as Chair of the Gopher Tortoise Team (GTT) for most of this reporting cycle and led the 1st annual reporting effort. The Florida representative attended and presented the first annual report results at the May 2010 SERPPAS Principals' meeting in Mobile, Alabama. Additional participation at the SERPPAS Steering Committee meetings also occurred during this reporting cycle. Georgia took the helm as Chair in July 2010.

Florida also hosted the 2nd annual meeting of the GTT under the Gopher Tortoise Candidate Conservation Agreement at Nokuse Plantation/E.O. Wilson Biophilia Center in Bruce, Florida.

The two-day meeting included updates from the CCA parties, a discussion on improving reporting information in future reports, and a field tour of the gopher tortoise habitat restoration activities completed and currently underway at Nokuse Plantation. One highlight of this field tour was viewing temporary enclosure (soft release) methods and results on the ground. New information gathered from various studies on temporary enclosures was shared with the group.

GEORGIA

The State of Georgia permanently protects 31,692 acres of tortoise habitat on Wildlife Management Areas, Natural Areas, Public Fishing Areas, State Parks, and Historic Sites. Land management beneficial to the gopher tortoise on these properties included prescribed burning of 15,686 acres, thinning or clear-cutting of 3,059 acres of off-site planted pines, removal of invasive exotic plants from 10 acres, and planting longleaf pine on 872 acres. Additionally, through a the Multistate Sandhills Ecological Restoration Project (funded by a Competitive State Wildlife Grant), Georgia DNR assisted private landowners with prescribed burns totaling 10,210 acres and longleaf pine plantings totaling 480 acres. Either through acquisition or conservation easements, DNR protected 5,765 acres of tortoise habitat during the reporting period. Georgia DNR contracted gopher tortoise surveys and population estimates, using line transect distance sampling (LTDS), on 18 total sites, including 3 state-owned sites. Research conducted or funded by DNR included studies at Reed Bingham State Park related to the head-starting efforts there: Predatory behavior and patterns of armadillos during the gopher nesting season, and; Behavior of head-started hatchling gopher tortoises. A Candidate Conservation Agreement with Assurances developed for the eventual repatriation of gopher tortoises at Plant Vogtle, Burke County remains under USFWS review. Numerous publications, website materials, workshops, and events aimed at increasing awareness for gopher tortoise conservation among both professionals and the general public were produced and/or conducted during the past year.

Georgia began serving as Chair of the Gopher Tortoise Team (GTT) during the latter part of the reporting period and will be replaced by South Carolina later in 2011.

SOUTH CAROLINA

During the 2010 calendar year SCDNR conducted land management and population management activities at the Aiken Gopher Tortoise Heritage Preserve in Aiken County, South Carolina. The goals of these actions were to restore and maintain gopher tortoise habitat and enhance the native gopher tortoise population occurring on this preserve. Land management activities included prescribed burning and vegetation control using both herbicides and mechanical means. Gopher tortoise population management focused on the translocation of new tortoises to the preserve, using temporary holding pens, and the monitoring of their movements post release from holding pens. In addition reproduction within the translocated population was also monitored.

Additional activities focused on gopher tortoise conservation included the development of a statewide conservation plan for the species, revision of an existing management plan for another gopher tortoise preserve and several public awareness and outreach projects.

POARCH BAND OF CREEK INDIANS

See Appendix I.

AMERICAN FOREST FOUNDATION

The American Forest Foundation (AFF) has been involved in the CCA since its inception in 2008. From October 1, 2009 through September 30, 2010 AFF has been working to increase the number of landowners involved with and engaged in imperiled species conservation, including the gopher tortoise.

This work has been facilitated by the distribution of the Pine Ecosystem Conservation Handbook for the Gopher Tortoise: A guide for family forest owners in Alabama, Florida and Georgia along with Conservation Awareness Signs for those landowners that have made a commitment to improving gopher tortoise habitat on their property. In addition to the handbooks and signs, AFF, the World Resources Institute (WRI), and Longleaf Alliance (LLA) have been working to develop and implement a market-based habitat crediting system for the gopher tortoise and associated species on family woodlands in portions of Georgia and Alabama. The incentive-based framework approach will complement other efforts in the region to help preclude the need to federally list and ultimately recover the eastern population of the gopher tortoise. A habitat-centric and proactive approach, focusing on mitigation before listing occurs provides numerous benefits and increases the overall likelihood of program success.

This new approach will hopefully generate new income streams for private landowners so their lands remain as well-managed forests, providing valuable ecosystem services and timber products. A working group of stakeholders has been consulted throughout the entire process and the framework incorporates monitoring, evaluation and adaptation protocols and builds upon previous and forthcoming USFWS species and habitat mitigation guidance. Supplementary to all this work, AFF has been holding field days to increase landowner awareness of the plight of the gopher tortoise and the availability of programs to help landowners improve conservation on their lands.

LONGLEAF ALLIANCE

The Alliance continued to conduct workshops, field days, and academies where gopher tortoise conservation is a curriculum component. In addition, work continued with the American Foundation and the World Resources Institute toward development and testing of a habitat crediting system for sandhill habitats with the aim of rewarding landowner for maintaining and enhancing gopher tortoise habitat through a credit trading system. Finally, the Alliance acted as the General Contractor for the Alabama Forestry Commission in expending American Recovery and Reinvestment Act (ARRA) funds on publicly owned lands in Alabama, restoring longleaf ecosystems on more than two thousand acres of state forests to better habitat conditions for gopher tortoises and encouraging expansion and growth of existing populations. Acreages reported below are on those lands.

SECTION II PROPERTIES OR AREA COVERED

This section provides background information on the acreage of land owned and/or managed by the various signatory agencies and organizations and occupied by gopher tortoises or suitable gopher tortoise habitat. Acreages are broken down based on their relative protected statuses.

ARMY

a) Total estimated acreage of permanently protected tortoise habitat (either by public ownership or by easement): Not applicable, or none during this reporting period.

b) Total estimated acreage of short-term protected tortoise habitat (either by public ownership or by easement): Not applicable, or none during this reporting period.

c) Total estimated acreage of unprotected tortoise habitat: Not applicable, or none during this reporting period.

d) Total estimated acreage tortoise habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise:
Fort Benning: 62, 699
Fort Gordon: 35,277
Fort Rucker: 49,066
Fort Stewart: 14,302
Army Total: 161,244

NAVY

a) Total estimated acreage of permanently protected tortoise habitat (either by public ownership or by easement): Not applicable, or none during this reporting period.

b) Total estimated acreage of short-term protected tortoise habitat (either by public ownership or by easement): Not applicable, or none during this reporting period.

c) Total estimated acreage of unprotected tortoise habitat: Not applicable, or none during this reporting period.

d) Total estimated acreage tortoise habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: 12140. Installation subtotals include: NSB King's Bay 5,000, NAS Jacksonville 776, NAS Whiting Field 4,384, NAS Pensacola 1,978, and NS Mayport 2.

AIR FORCE

a) Total estimated acreage of permanently protected tortoise habitat (either by public ownership or by easement):
Patrick AFB, FL: 101
Avon Park Air Force Range, Eglin AFB, FL, MacDill AFB, FL, Tyndall AFB, FL Moody AFB, GA: None, or not applicable during this reporting period.

b) Total estimated acreage of short-term protected tortoise habitat (either by public ownership or by easement): None, or not applicable during this reporting period.

c) Total estimated acreage of unprotected tortoise habitat:
Patrick AFB, FL: approx. 6,200
Avon Park Air Force Range, Eglin AFB, FL, MacDill AFB, FL, Tyndall AFB, FL, Moody AFB, GA: None, or not applicable during this reporting period.

d) Total estimated acreage tortoise habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise:
Avon Park Air Force Range: 50,410
Eglin AFB, FL: has 384,500 acres of potential habitat – which includes: 237,762 acres of natural sandhills; 74,351 acres of pine plantation; 36,704 acres of cleared vegetated areas (test areas); 13,025 acres of mesic flatwoods; 11,602 acres of upland pine; 6,060 acres of urban habitat; 2,563 acres of wet flatwoods; 2,432 acres of xeric flatwoods (Note: No overall change from 1st Annual Report)
MacDill AFB, FL: 550 acres of pine flatwoods habitat and 1,000 acres of mowed airfield
Patrick AFB, FL: None, or not applicable during this reporting period.
Tyndall AFB, FL: GIS modeling with field review has identified 15,303 acres of potential gopher tortoise habitat, split into the following categories: Highest Potential: 1,517 acres, Medium Potential: 8,678 acres, Fair Potential: 2,265 acres, and Little Potential: 2,843 acres.
Moody AFB, GA: 946

UNITED STATES MARINE CORPS

a) Total estimated acreage of permanently protected tortoise habitat (either by public ownership or by easement): Not applicable, or none during this reporting period.

b) Total estimated acreage of short-term protected tortoise habitat (either by public ownership or by easement): Not applicable, or none during this reporting period.

c) Total estimated acreage of unprotected tortoise habitat: Not applicable, or none during this reporting period.

d) Total estimated acreage tortoise habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise:
MCSF Blount Island: 15
MCLB Albany: 1,400

UNITED STATES FOREST SERVICE

a) Total estimated acreage of permanently protected tortoise habitat (either by public ownership or by easement):
Conecuh National Forest, AL: 84,000
Apalachicola, Osceola, and Ocala National Forests, FL: 283,516

b) Total estimated acreage of short-term protected tortoise habitat (either by public ownership or by easement): Not applicable, or none during this reporting period.

c) Total estimated acreage of unprotected tortoise habitat: Not applicable, or none during this reporting period.

d) Total estimated acreage tortoise habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

UNITED STATES FISH AND WILDLIFE SERVICE

a) Total estimated acreage of permanently protected tortoise habitat (either by public ownership or by easement): 44,268 (2,000 occupied, 2,450 potential, balance undetermined).*

b) Total estimated acreage of short-term protected tortoise habitat (either by public ownership or by easement): 49,147 (2,000 occupied, 2,450 potential, balance undetermined).*

c) Total estimated acreage of unprotected tortoise habitat: 3,200 (0 occupied, 1,100 potential, balance undetermined).*

d) Total estimated acreage tortoise habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: 644 (644 undetermined).*

* = *Tortoise habitat may be reported as Occupied (Habitat known to be occupied by tortoises as determined by surveys/censuses) or Potential (Habitat which may or may not harbor tortoises [no survey or census has been conducted], but has suitable conditions for inhabitation).*

ALABAMA

a) Total estimated acreage of permanently protected tortoise habitat (either by public ownership or by easement): Using the report generated by Hoctor and Beyeler the estimated acreage of occupied and potential tortoise habitat on conservation land in Alabama is 142,065 acres. (Hoctor, T. and Beyeler, S. 2010. Regional Gopher Tortoise Potential Habitat Model Report. University of Florida Center for Landscape and Conservation Planning. April 30, 2010.)

b) Total estimated acreage of short-term protected tortoise habitat (either by public ownership or by easement): Not applicable, or none during this reporting period.

c) Total estimated acreage of unprotected tortoise habitat: From Hoctor and Beyeler, an estimated 4,444,371 acres of occupied and potential tortoise habitat under private ownership in Alabama.

d) Total estimated acreage tortoise habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

FLORIDA

a) Total estimated acreage of permanently protected tortoise habitat (either by public ownership or by easement): 4,486.14

Acreage reported below is not the total acreage of the properties, but the acreage of land within those properties that had reportable activities. The lands listed below reflect gopher tortoise recipient sites protected under a perpetual conservation easement newly permitted within the reporting period.

Long-term Protected Recipient Sites

Recipient Site Name	County	Acreage	Gopher tortoise habitat acres
Longbranch Crossing	Clay	293.05	210.76
Northwest Hackletrap	Glades	1165.4	510.55
C. Herman Beville Ranch	Sumter	890	492.37

Local Government Properties	Manager (County)	Gopher tortoise habitat acres
Alachua Fairgrounds	Alachua	56
Telegraph Creek	Lee	1459
Daniels Preserve	Lee	105
Sabal Bluff	Lake	38.5
Railhead Scrub	Collier	53.1
Barr Hammock	Alachua	220
Indrio Savannahs	St. Lucie	240
Flowing Waters	Lake	63.9
Lake Proctor Wilderness Area	Seminole	475
Upper Pithlachascottee River Preserve	Pasco	53
Lake Lizzie Conservation Area	Osceola	509

Data reported includes additional areas maintained or restored by Central Florida Ecosystem Support and the Northeast Florida Resource Management Partnership (a partnership of FWC, The Nature Conservancy, and the Florida Fire Strike Team). Their work was conducted at the following sites:

- Ordway-Swisher Biological Station
- Faver-Dykes State Park
- Bayard Conservation Area
- Etoniah Creek State Forest
- Black Creek Ravines Conservation Area
- Rock Springs Run State Reserve
- Heart Island Conservation Area
- River Rise State Park
- Longleaf Flatwoods Reserve
- Highlands Hammock State Park
- Saddle Blanket Lakes Preserve
- Catfish Creek Preserve
- Stokes Landing Conservation Area
- Archbold Biological Station

- Kissimmee Prairie State Preserve

b) Total estimated acreage of short-term protected tortoise habitat (either by public ownership or by easement): 106,418.3

Acreage reported is not the total acreage of the properties, but the acreage of gopher tortoise habitat acres within those properties.

FWC-managed lands

Name of Property	Manager	Gopher tortoise habitat acres
Box-R WMA	FWC	459.2
Joe Budd WMA	FWC	5213.5
L. Kirk Edwards WEA	FWC	0.4
Ft White Mitigation Park	FWC	1030.3
Andrews WMA	FWC	699.4
Big Bend WMA	FWC	1319.4
Half Moon WMA	FWC	728.1
Guana River WMA	FWC	1363.9
Three Lakes WMA	FWC	21992.8
Triple N Ranch WMA	FWC	7574.6
Salt Lake WMA	FWC	223.9
Split Oak Mitigation Ranch	FWC	563.1
Tosohatchee WMA	FWC	3540.7
Caravelle Ranch WMA	FWC	2064.9
Chassahowitzka WMA	FWC	6632.1
Chinsegut WEA	FWC	742.8
Perry Oldenberg Mitigation Park	FWC	303.6
Fred C Babcock/Cecil M Webb WMA	FWC	38703.9
Hilochee WMA	FWC	1118.6
Lake Wales Ridge WEA	FWC	5810.8
Bullfrog Creek Mitigation Park	FWC	513.9
Hickey Creek Mitigation Park	FWC	401.4
Moody Branch Mitigation Park	FWC	372.9
Platt Branch Mitigation Park	FWC	1080.4
Fisheating Creek WMA	FWC	1944.1
Watermelon Pond Mitigation Park	FWC	489
Apalachee WMA	FWC	1236.9

Short-term Protected Recipient Sites

Recipient Site Name	County	Acreage	Gopher tortoise habitat acres
Nokuse Plantation Black Creek	Walton	995	439
The Woods	Lafayette	701.8	301.3
Lake Louisa State Park	Lake	42.5	42.44
Total Gopher tortoise acreage			782.74

c) Total estimated acreage of unprotected tortoise habitat: Not applicable, or none during this reporting period.

d) Total estimated acreage tortoise habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise.

Research Recipient Sites

Recipient Site Name	County	Acreage	Gopher tortoise habitat acres
Apalachicola National Forest - Munson Sandhills	Leon	869	869

GEORGIA

a) Total estimated acreage of permanently protected tortoise habitat (either by public ownership or by easement): The State permanently protects 30,889 acres of tortoise habitat on Wildlife Management Areas, Natural Areas, Public Fishing Areas, State Parks, and Historic Sites. The table below breaks down the acreages by property. All state lands harboring tortoises are considered permanently protected. At this time we do not have information on protected tortoise habitat on private lands with conservation easements.

Site	acreage	suitable tortoise acres
Altamaha WMA	29,300	64
Bagby SP	742	82
Ballard Tract WMA	5700	840
Big Hammock WMA/NA	6900	140
Bullard Creek WMA	9331	1140
Chickasawhatchee WMA	19700	4200
Crooked River SP	511	195
Dixon Memorial WMA	35559	500
Dodge County PFA	445	110

Doerun Pitcher Plant Bog NA	600	300
Elmodel WMA	1600	200
Evans County PFA	400	30
Fall Line Sandhills NA	1576	1488
Flat Tub WMA	3597	740
Flint River WMA	2300	600
General Coffee SP	1428	564
George L. Smith SP	1666	380
Georgia Veterans SP	1474	388
Grand Bay WMA	8700	250
Griffin Ridge WMA	5600	645
Horse Creek WMA	8100	875
Howfyl-Broadfield State Historic Site	1264	200
Kolomoki Mounds SP	1297	185
Laura Walker SP	659	150
Little Ocmulgee SP	1290	332
Mayhaw WMA	4700	250
McDuffie PFA	600	40
Moody Forest NA	4455	1206
Ocmulgee WMA	11,700	600
Ohoopee Dunes NA	2500	1342
Paradise PFA	1300	100
Penholoway Swamp WMA	4565	500
Reed Bingham SP	1622	233
River Creek WMA	2793	1310
Seminole SP	776	300
Silver Lake WMA	8506	5000
Townsend WMA	24400	3263
Tuckahoe WMA	15100	250
Yuchi WMA	7800	2700
TOTAL	240,556	31,692

b) Total estimated acreage of short-term protected tortoise habitat (either by public ownership or by easement): Not applicable, or none during this reporting period.

c) Total estimated acreage of unprotected tortoise habitat: Not applicable, or none during this reporting period.

d) Total estimated acreage tortoise habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

SOUTH CAROLINA

a) Total estimated acreage of permanently protected tortoise habitat (either by public ownership or by easement):
Aiken Gopher Tortoise Heritage Preserve (AGTHP) – 1,622
Tillman Sandridge Heritage Preserve (TSR) - 1,437

b) Total estimated acreage of short-term protected tortoise habitat (either by public ownership or by easement): Not applicable, or none during this reporting period.

c) Total estimated acreage of unprotected tortoise habitat: Not applicable, or none during this reporting period.

d) Total estimated acreage tortoise habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

POARCH BAND OF CREEK INDIANS

a) Total estimated acreage of permanently protected tortoise habitat (either by public ownership or by easement): ~ 1

b) Total estimated acreage of short-term protected tortoise habitat (either by public ownership or by easement): ~1

c) Total estimated acreage of unprotected tortoise habitat: Not applicable, or none during this reporting period.

d) Total estimated acreage tortoise habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

AMERICAN FOREST FOUNDATION

a) Total estimated acreage of permanently protected tortoise habitat (either by public ownership or by easement): Not applicable, or none during this reporting period.

b) Total estimated acreage of short-term protected tortoise habitat (either by public ownership or by easement): Not applicable, or none during this reporting period.

c) Total estimated acreage of unprotected tortoise habitat: Not applicable, or none during this reporting period.

d) Total estimated acreage tortoise habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

LONGLEAF ALLIANCE

a) Total estimated acreage of permanently protected tortoise habitat (either by public ownership or by easement): Not applicable, or none during this reporting period.

b) Total estimated acreage of short-term protected tortoise habitat (either by public ownership or by easement): Not applicable, or none during this reporting period.

c) Total estimated acreage of unprotected tortoise habitat: Not applicable, or none during this reporting period.

d) Total estimated acreage tortoise habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

SECTION III LAND MANAGEMENT

This section provides information on the amount of land owned or managed by the various signatory agencies and organizations that was burned, thinned, planted, chemically treated, or otherwise managed to the benefit of gopher tortoises during the reporting period.

ARMY

a) Acres of gopher tortoise habitat restored or improved:
Fort Benning: 926
Fort Gordon: 10,033
Fort Rucker: 30
Fort Stewart: 300
Army Total: 11,989

b) Acres of gopher tortoise habitat maintained:
Fort Benning: 62,699
Fort Gordon: 6,765
Fort Rucker: 522
Fort Stewart: 14,302
Army Total: 84,290 s

c) Acres of gopher tortoise habitat burned:
Fort Benning: 53,227
Fort Gordon: 13,893
Fort Rucker: 5,665
Fort Stewart: 8,946
Army Total: 81,731

i. Acres burned during dormant season:
Fort Benning: 26,244
Fort Gordon: 11,264
Fort Rucker: 3,349
Fort Stewart: 1,518
Army Total: 42,375

ii. Acres burned during growing season:
Fort Benning: 26,983
Fort Gordon: 2,629
Fort Rucker: 2,316
Fort Stewart: 7 ,428
Army Total: 39,356

d) Other land management activities (chemical/mechanical treatment):
Fort Benning: 3,450
Fort Gordon: 919
Fort Rucker: 300
Fort Stewart: 300
Army Total: 4,969

e) Acres of invasive species treated/eradicated (include invasive plant/animal type):
Fort Benning: 200 (kudzu)
Fort Rucker: 6.8
Army Total: 206.8

NAVY

a) Acres of gopher tortoise habitat restored or improved: 100 (NAS Jacksonville 50 and NSB King's Bay 50).

b) Acres of gopher tortoise habitat maintained: (*see paragraphs c, d, and e below*).

c) Acres of gopher tortoise habitat burned: 1,288 (NSB King's Bay 1050, NAS Pensacola 160, NAS Whiting Field 78).

i. Acres burned during dormant season: 1,110 (NSB King's Bay 1050, NAS Whiting Field 60).

ii. Acres burned during growing season: 178 (NAS Pensacola 160, NAS Whiting Field 18).

d) Other land management activities (chemical/mechanical treatment): 147 acres of mechanical brush cutting in forest areas, clear zones, and military mission edge areas at NAS Pensacola).

e) Acres of invasive species treated/eradicated (include invasive plant/animal type): 63 acres of cogon grass controlled (NAS Whiting Field 43 and NAS Pensacola 20); 83 feral hogs eliminated (NSB King's Bay 70 and NAS Whiting Field 13); and 9 coyotes eliminated at NAS Pensacola.

AIR FORCE

a) Acres of gopher tortoise habitat restored or improved:
Eglin AFB, FL: 8,601 acres total improved – 1,983 acres of oak and sandpine fuelwood removal, 4,978 acres of sand pine timber stand improvement (sandpine cut and left in place), and 1,640 acres of herbicide application (primarily to control

oak mid-story). All of these land management activities are designed with the goal of improving sandhills habitat conditions for all species associated with this natural community. These operations open the canopy, allow for better longleaf pine regeneration, and permit the reintroduction of fire; the exclusion of which resulted in the unnatural abundance of oaks and sand pine.
Patrick AFB, FL: 647
Tyndall AFB, FL: Ecosystem restoration efforts benefiting gopher tortoises include roller drum chopping 420 acres of former sand pine plantation. Hand planting with longleaf pine seedlings is scheduled for next year.
Avon Park Air Force Range, Moody AFB, GA, MacDill AFB, FL: Not applicable, or none during this reporting period.

b) Acres of gopher tortoise habitat maintained:
Eglin AFB, FL: The vast majority of the acreage listed in *II(d)* above is maintained in a suitable condition for occupation by gopher tortoises. This includes test area acreage. Test area maintenance is moving away from roller drum chopping and towards the one time application of herbicides to control oak sprouting, with the use of repeated prescribed fire for long term vegetation control. This method will improve forage and make it even more suitable for gopher tortoises.
Patrick AFB, FL: 659
Avon Park Air Force Range, MacDill AFB, FL, Moody AFB, GA, Tyndall AFB, FL: Not applicable, or none during this reporting period.

c) Acres of gopher tortoise habitat burned:
Avon Park Air Force Range: 16,767
Eglin AFB, FL: 113,158
MacDill AFB, FL: Not applicable, or none during this reporting period.
Patrick AFB, FL: 659
Tyndall AFB, FL: 4,600
Moody AFB, GA: 108

i. Acres burned during dormant season:
Avon Park Air Force Range: 2,449
Eglin AFB, FL: 92,923
MacDill AFB, FL: Not applicable, or none during this reporting period.
Patrick AFB, FL: 266
Tyndall AFB, FL: 4,600
Moody AFB, GA: 108

ii. Acres burned during growing season:
Avon Park Air Force Range: 14,318
Eglin AFB, FL: 20,235
Patrick AFB, FL: 393

MacDill AFB, FL Moody AFB, GA, Tyndall AFB, FL: Not applicable, or none during this reporting period.

d) Other land management activities (chemical/mechanical treatment):
Avon Park Air Force Range: Acres of invasive species treated/eradicated (include invasive plant/animal type) 100 acres treated for cogon grass; 120 acres treated for a variety of other species including tropical soda apple, air potato, Japanese and Old World climbing fern, Brazilian pepper, and downy rose myrtle; for a total of 220 acres.
Eglin AFB, FL: *See subsection III.a above*
MacDill AFB, FL: 250
Moody AFB, GA: 208
Patrick AFB, FL, Tyndall AFB, FL: Not applicable, or none during this reporting period.

e) Acres of invasive species treated/eradicated (include invasive plant/animal type):
Avon Park Air Force Range: 220 acres treated for exotic plants (*see d above*). Feral hog control has been underway, primarily to control damage to Sensitive, Threatened, and Endangered plant habitats. Hog rooting permanently alters the soil structure upon which these plants rely. 828 hogs removed from APAFR between January 2009 and September 2010. Rooting of sensitive plant sites has been noticeably reduced. Effects on gopher tortoise are also presumed to be beneficial.
Eglin AFB, FL: An estimated 600 acres was surveyed and treated for various species including Cogon Grass, Torpedo Grass, Chinese Tallow, Chinaberry, Chinese Privet and Japanese Climbing Fern. A total of 300 feral hogs were trapped and removed.
MacDill AFB, FL: In FY10, the base: (1) treated invasive species such as Brazilian pepper, lead tree, cogan grass, and melaleuca in Quadrants 1, 2, 3A, and 4 (1,900 acres total) which included approximately 800 acres of pine forested areas (Cost: $82,900); performed mechanical clearing of invasive tree species (primarily Brazilian pepper) across 28 acres of forested land ($70,000); and eradicated grape vine across 40 acres of forested community ($7,500).
Patrick AFB, FL: Approx. 825 acres of Brazilian pepper/cogon grass treated/eradicated; 69 feral hogs removed.
Tyndall AFB, FL: Cogon grass and torpedo grass was treated in 60 acres. Tyndall participates in a feral hog and coyote control program which reduces predation on the gopher tortoises. This is done through the BASH program and also through a USDA contract.
Moody AFB, GA: 1 acre (Japanese Climbing Fern)

UNITED STATES MARINE CORPS

a) Acres of gopher tortoise habitat restored or improved: Not applicable, or none during this reporting period.

b) Acres of gopher tortoise habitat maintained:

MCSF Blount Island: 15
MCLB Albany: 1,400

c) Acres of gopher tortoise habitat burned:

   i. Acres burned during dormant season: MCLB Albany – 450-500 burned winter 2010

   ii. Acres burned during growing season: Not applicable, or none during this reporting period.

d) Other land management activities (chemical/mechanical treatment): MCSF Blount Island – continued mowing delineated gopher tortoise habitat area near Pond B

e) Acres of invasive species treated/eradicated (include invasive plant/animal type): MCSF Blount Island – continued removal of shrubs/nuisance trees at the edge of the tree canopy and removal of invasive tree saplings remaining after mowing occurs

UNITED STATES FOREST SERVICE

Conecuh National Forest, AL

a) Acres of gopher tortoise habitat restored or improved: 17,560

b) Acres of gopher tortoise habitat maintained: 332

c) Acres of gopher tortoise habitat burned:

   i. Acres burned during dormant season: 17,122

   ii. Acres burned during growing season: 438

d) Other land management activities (chemical/mechanical treatment): *See e below*

e) Acres of invasive species treated/eradicated species: Cogon grass acres 25, feral hog 100

Apalachicola, Osceola, and Ocala National Forests, FL

a) Acres of gopher tortoise habitat restored or improved: 2,966

b) Acres of gopher tortoise habitat maintained: 866

c) Acres of gopher tortoise habitat burned:

   i. Acres burned during dormant season: 20,000

ii. Acres burned during growing season: 25,204

d) Other land management activities (chemical/mechanical treatment): 200

e) Acres of invasive species treated/eradicated species: Feral hog 220

UNITED STATES FISH AND WILDLIFE SERVICE

a) Acres of gopher tortoise habitat restored or improved: 6,170 (0 acres occupied, 1,000 acres potential, balance undetermined).

b) Acres of gopher tortoise habitat maintained: 5,773 (250 acres occupied, 0 acres potential, balance undetermined).

c) Acres of gopher tortoise habitat burned.

i. Acres burned during dormant season: 19,771 (0 acres occupied, 200 acres potential, balance undetermined).

ii. Acres burned during growing season: 10,190 (10,190 acres undetermined).

d) Other land management activities (chemical/mechanical treatment): Not applicable, or none during this reporting period.

e) Acres of invasive species treated/eradicated (include invasive plant/animal type): 684 (all undetermined).

ALABAMA

a) Acres of gopher tortoise habitat restored or improved: During the report period, a total of 1,206 acres of habitat managed to potentially benefit gopher tortoises through the Landowner Incentive Program (LIP) resulting in the planting of 398,007 longleaf seedlings within eight counties of the unlisted range of the gopher tortoise. Habitat will be managed to maintain the quality and health of established longleaf stands.

506 acres longleaf pine planting project on Barbour Wildlife Management Area.

550 acres longleaf pine planting project on Fred T. Stimpson Community Hunting Area.

b) Acres of gopher tortoise habitat maintained: Not applicable, or none during this reporting period.

c) Acres of gopher tortoise habitat burned:

   i. Acres burned during dormant season: Not applicable, or none during this reporting period

   ii. Acres burned during growing season: Not applicable, or none during this reporting period

d) Other land management activities (chemical/mechanical treatment): Not applicable, or none during this reporting period.

e) Acres of invasive species treated/eradicated (include invasive plant/animal type): Not applicable, or none during this reporting period.

FLORIDA

a) Acres of gopher tortoise habitat restored or improved: Acreage reported is not the total acreage of the properties, but the acreage of land within those properties that had reportable activities. Note: affected habitat area may exceed total habitat acres since multiple treatments and activities may be applied to the same acreage.

FWC Managed Land	24,467.0
Local Government Managed	920.6
TOTAL acres	25,388.6

Name of Property	Manager	Gopher tortoise habitat managed (ac.)
Box-R WMA	FWC	0.38
Joe Budd WMA	FWC	92.12
L. Kirk Edwards WEA	FWC	287.99
Ft White Mitigation Park	FWC	312.54
Andrews WMA	FWC	0.49
Big Bend WMA	FWC	1377.40
Half Moon WMA	FWC	1574.65
Guana River WMA	FWC	247.88
Three Lakes WMA	FWC	7277.92
Triple N Ranch WMA	FWC	267.75
Salt Lake WMA	FWC	355.26
Split Oak Mitigation Ranch	FWC	171.57
Tosohatchee WMA	FWC	7.04

Caravelle Ranch WMA	FWC	195.18
Chassahowitzka WMA	FWC	2622.15
Chinsegut WEA	FWC	3020.17
Perry Oldenberg Mitigation Park	FWC	288.00
Fred C. Babcock/Cecil M. Webb WMA	FWC	2667.73
Hilochee WMA	FWC	657.47
Lake Wales Ridge WEA	FWC	842.93
Bullfrog Creek Mitigation Park	FWC	14.39
Hickey Creek Mitigation Park	FWC	28.54
Moody Branch Mitigation Park	FWC	31.37
Platt Branch Mitigation Park	FWC	13.62
Fisheating Creek WMA	FWC	0.12
Watermelon Pond Mitigation Park	FWC	5.75
Apalachee WMA	FWC	2106.56
SUB-TOTAL		24,466.98
Alachua Fairgrounds	Alachua	56.00
Telegraph Creek	Lee	100.00
Daniels Preserve	Lee	163.00
Sabal Bluff	Lake	38.50
County	Collier	53.10
Barr Hammock	Alachua	45.00
Indrio Savannahs	St. Lucie	100.00
Flowing Waters	Lake	30.20
Lake Proctor Wilderness Area	Seminole	117.00
Upper Pithlachascottee River Preserve	Pasco	121.00
Lake Lizzie Conservation Area	Osceola	96.80
SUB-TOTAL		920.60
TOTAL		25387.58

b) Acres of gopher tortoise habitat maintained (see above)

c) Acres of gopher tortoise habitat burned: 27,588.47

i. Acres burned during dormant season: 12,426.25

ii. Acres burned during growing season : 15,162.21

Area Name	Area manager	Prescribed Fire-Dormant Season	Prescribed Fire-Growing Season	Total acres by property
Box-R WMA	FWC	0.38	0	0.38
Joe Budd WMA	FWC	73.82	16.45	90.28
L. Kirk Edwards WEA	FWC	205.87	38.63	244.51
Ft White Mitigation Park	FWC	0	162.84	162.84
Big Bend WMA	FWC	235.2	862.77	1097.96
Half Moon WMA	FWC	466.88	565.85	1032.73
Guana River WMA	FWC	53.82	83.14	136.96
Three Lakes WMA	FWC	1354.54	4954.54	6309.08
Triple N Ranch WMA	FWC	40.29	224.81	265.1
Salt Lake WMA	FWC	6.03	216.58	222.61
Split Oak Mitigation Ranch	FWC	0	171.57	171.57
Tosohatchee WMA	FWC	0	6.7	6.7
Caravelle Ranch WMA	FWC	12.89	176.58	189.47
Chassahowitzka WMA	FWC	1212.79	913.15	2125.94
Chinsegut WEA	FWC	105.28	0	105.28
Perry Oldenberg Mitigation Park	FWC	0	69.04	69.04
Fred C. Babcock/Cecil M. Webb WMA	FWC	2146.59	374.97	2521.56
Hilochee WMA	FWC	249.09	79.86	328.95
Lake Wales Ridge WEA	FWC	73.41	433.82	507.23
Bullfrog Creek Mitigation Park	FWC	0	14.39	14.39
Moody Branch Mitigation Park	FWC	31.37	0	31.37
Platt Branch Mitigation Park	FWC	13.62	0	13.62
Apalachee WMA	FWC	984.38	373.52	1357.9
Upper Pithlachascottee River Preserve	Pasco County	53	0	53
Lake Lizzie Conservation Area	Osceola County	48	0	48
Lake Louise SP	DEP	296	0	296
Lake Wales Ridge SF	DOF	605	1047	1652
Lake Wales Ridge WEA	DOF	0	427	427
Tiger Creek	TNC	220	335	555
Highlands Hammock SP	DEP	130	673	803
Archbold Biological Station	ABS	60	654	714
Saddle Blanket Lakes Preserve	TNC	0	90	90
Kissimmee Prairie	DEP	0	2003	2003

Catfish Creek Preserve	DEP	0	194	194
Bayard CA	SJRWMD	534	0	534
Wekiwa Springs SP	DEP	5	0	5
Heart Island	SJRWMD	180	0	180
Faver-Dykes SP	DEP	589	0	589
Pumpkin Hill Preserve	DEP	3	0	3
Washington Oaks Garden SP	DEP	71	0	71
Etoniah Crek SF	DOF	318	0	318
Ordway-Swisher Biological Station	Univ. of FL	1185	0	1185
Rock Springs Run SR	DEP	107	0	107
River Rise SP	DEP	147	0	147
Barr Hammock Preserve	ACDPS	28	0	28
Longleaf Flatwoods Reserve	SJRWMD	147	0	147
Ewel Tract	Private	25	0	25
Cecil Field	City of Jacksonville	64	0	64
Stephen Foster Cultural Center	DEP	26	0	26
Morningside Nature Center	City of Gainesville	13	0	13
Black Creek Ravines CA	SJRWMD	125	0	125
Dudley Farm Historic SP	DEP	30	0	30
Stokes Landing CA	SJRWMD	110	0	110
Dunn's Creek	DEP	41	0	41
TOTALS		12426.25	15162.21	27588.47

d) Other land management activities (chemical/mechanical treatment): 5,661.62

e) Acres of invasive species treated/eradicated: 1,846.65

GEORGIA

Acreages given below for various land management activities include all habitats within burn and stand units of state lands harboring tortoises, but undoubtedly include habitats, such as embedded wetlands, not suitable or occupied by tortoises.

a) Acres of gopher tortoise habitat restored or improved: *See c and d below.*

b) Acres of gopher tortoise habitat maintained: *See c and d below.*

c) Acres of gopher tortoise habitat burned:

i. Acres burned during dormant season: 14,326. The table below breaks down the acreages by property.*

Big Hammock NA	310
Black Creek NA	80
Bullard Creek WMA	1800
Chickasawhatchee WMA	1600
General Coffee SP	55
Doerun NA	20
Flint River WMA	800
Laura Walker SP	40
Little Ocmulgee SP	50
Moody Forest NA	326
Ocmulgee WMA	1000
Ohoopee Dunes NA	1055
River Creek WMA	500
Seminole WMA	935
Silver Lake WMA	4405
Yuchi WMA	1350
TOTAL	14,326

* - Our burn data do not break down acreages by habitat. As a result, the acreages given here unfortunately over-estimate tortoise habitat burned by including all habitats within burn units.

ii. 1,360 acres of state lands harboring gopher tortoises were burned during the growing season. The table below breaks down the acreages by property.*

Black Creek NA	295
Doerun NA	75
Little Ocmulgee SP	40
Moody Forest NA	700
Seminole SP	100
Silver Lake WMA	150
TOTAL	1360

* - Our burn data do not break down acreages by habitat. As a result, the acreages given here unfortunately over-estimate tortoise habitat burned by including all habitats within burn units.

d) Other land management activities (chemical/mechanical treatment)*

2,633 acres of state lands harboring gopher tortoises were thinned of off-site pines and 426 acres were clearcut. Additionally, 872 acres of longleaf pine were planted on state lands harboring gopher tortoises. The tables below breaks down the acreages by property.*

	Thin	Clearcut
Bagby SP	56	26
Chickasawhatchee WMA	1279	149
Flint River WMA	108	
Georgia Veterans SP	72	51
Penholoway Swamp WMA	470	
River Creek WMA	102	
Silver Lake WMA	218	
Townsend WMA		200
Tuckahoe WMA	328	
TOTAL	2633	426

* - Our timber data do not break down acreages by habitat. As a result, the acreages given here unfortunately over-estimate tortoise habitat thinned or clearcut by including all upland habitats within timber sales.

	Acres of longleaf pine planted
Black Creek NA	20
Chickasawhatchee WMA	77
Fall Line Sandhills NA	300
Flint River WMA	50
Kolomoki SP	37
Ocmulgee WMA	60
Penholoway WMA	90
Silver Lake WMA	75
Yuchi WMA	163
TOTAL	872

e) Acres of invasive species treated/eradicated (include invasive plant/animal type): Non-native sand pine was removed from 5 acres of tortoise habitat on Black Creek Natural Area. Non-native Chinese Privet was treated with herbicide on five acres of tortoise habitat at Little Ocmulgee State Park.

Additionally, through a the Multistate Sandhills Ecological Restoration Project (funded by a Competitive State Wildlife Grant), Georgia DNR assisted private landowners with prescribed burns totaling 10,210 acres and longleaf pine plantings totaling 480 acres.

SOUTH CAROLINA

a) Acres of gopher tortoise habitat restored or improved: 1,400

b) Acres of gopher tortoise habitat maintained: 1,400

c) Acres of gopher tortoise habitat burned: 1,400

   i. Acres burned during dormant season: Not applicable, or none during this reporting period.

   ii. Acres burned during growing season: 500

d) Other land management activities (chemical/mechanical treatment): 700

e) Acres of invasive species treated/eradicated (include invasive plant/animal type): Not applicable, or none during this reporting period.

POARCH BAND OF CREEK INDIANS

a) Acres of gopher tortoise habitat restored or improved: ~1

b) Acres of gopher tortoise habitat maintained: ~1

c) Acres of gopher tortoise habitat burned: ~1

   i. Acres burned during dormant season:

   ii. Acres burned during growing season:

d) Other land management activities (chemical/mechanical treatment): Chemical and mechanical treatment used.

e) Acres of invasive species treated/eradicated (include invasive plant/animal type): 100

AMERICAN FOREST FOUNDATION

a) Acres of gopher tortoise habitat restored or improved: Not applicable, or none during this reporting period.

b) Acres of gopher tortoise habitat maintained: Not applicable, or none during this reporting period.

c) Acres of gopher tortoise habitat burned:

    i. Acres burned during dormant season: Not applicable, or none during this reporting period.

    ii. Acres burned during growing season: Not applicable, or none during this reporting period.

d) Other land management activities (chemical/mechanical treatment): Not applicable, or none during this reporting period.

e) Acres of invasive species treated/eradicated (include invasive plant/animal type): Not applicable, or none during this reporting period.

LONGLEAF ALLIANCE

a) Acres of gopher tortoise habitat restored or improved : 2,160

b) Acres of gopher tortoise habitat maintained: Not applicable, or none during this reporting period.

c) Acres of gopher tortoise habitat burned:

    i. Acres burned during dormant season: 1,600

    ii. Acres burned during growing season: 200

d) Other land management activities (chemical/mechanical treatment): 2,160 (Mechanical and Chemical)

e) Acres of invasive species treated/eradicated (include invasive plant/animal type): Cogon Grass - 340

SECTION IV SURVEYS AND INVENTORY

This section provides information on the amount of land owned or managed by the various signatory agencies and organizations that was surveyed for the presence of gopher tortoises, inventoried to determine estimated or actual number of tortoises present, and monitored for evaluating population trends during the reporting period.

ARMY

a) Survey date(s) and results by property (active and inactive burrows):
Fort Benning: 3,437 acres were survey in FY 10 (May 10 – Sep 10) – 3,095 burrows located – 1,333 active; 858 inactive; 904 abandoned
Fort Gordon: 17,905 acres were surveyed in FY 10 (Dec 09 – Mar 10) - 88 burrows useable and 54 not useable.
Fort Rucker: No surveys conducted in FY 10
Fort Stewart: Region 1 of the installation was surveyed and the estimated population is 1,354 (adults and sub-adults)

b) Population trends

i. Monitoring (date, property/location, results): *See above Section IVa*.

ii. Disease and die-offs (date, property/location, cause if known, number of deaths): Not applicable, or none during this reporting period.

iii. Permitted takes (property/location, number of takes permitted): Not applicable, or none during this reporting period.

NAVY

a) Survey date(s) and results by property (active and inactive burrows): Surveys for all six installations continued in 2010 and were conducted throughout the year during all seasons. Each installation used a different survey source which included the Florida Areas Natural Inventory, The Nature Conservancy, University of Georgia, Gulf South Research Corporation, Navy biologists, and the Student Conservation Association. An additional survey is scheduled for NAS Whiting Field in 2011 by University of Georgia, Savannah River Ecology Laboratory. A summary of the survey results indicated 775 active burrows on Navy lands (NSB King's Bay 228, NAS Pensacola 220, NAS Jacksonville 181, NAS Whiting Field 139, and NS Mayport 7.) In addition to GT surveys, NSB King's Bay completed a base-wide eastern indigo snake survey which involved specific investigations of 432 GT burrows, active and inactive.

b) Population trends

i. Monitoring (date, property/location, results): Monitoring occurred at all six installations during 2010. Specific surveys including camera scoping were conducted at three installations. Population estimates indicate 512 tortoises present on Navy properties collectively. This is up from a population estimate of 428 in 2009, but this may be due to increased surveying. Population estimates at the installations at the end of September 2010 were NSB King's Bay 135, NAS Whiting Field 139, NAS Pensacola 120, NAS Jacksonville 115, and NS Mayport 3.

ii. Disease and die-offs (date, property/location, cause if known, number of deaths): No reports of mortality except by NSB Kings Bay where there was one confirmed road kill.

iii. Permitted takes (property/location, number of takes permitted): Not applicable, or none this reporting period.

AIR FORCE

a) Survey date(s) and results by property (active and inactive burrows):
Avon Park Air Force Range: (NOTE: The following information was delivered December, 2009 too late for the FY 09 (Initial) GT CCA Annual Report). Oct. 2008 through Sept. 2009. 999 burrows detected. 356 abandoned. 127 active. 516 possibly active. Scrub habitat randomly surveyed: 360 acres. Estimated tortoise population in Scrub = 1,429. Pine plantations/Flatwoods randomly surveyed: 457 acres. Estimated tortoise population in Plantations/Flatwoods = 5,361. Source: Population survey and monitoring of the gopher tortoise (*Gopherus polyphemus*) at Avon Park Air Force Range. Annual report. October 2008 – September 2009. Authors: Betsie Rothermel and Traci Castellon. Archbold Biological Station, Lake Placid, FL. In addition, the following information was developed for the period of October, 2009 through November 2010. Data was re-analyzed using the density of active burrow only since scoping with burrow camera apparatus experienced significant problems. Estimates of 1414 tortoise for scrub habitat and 2759 tortoise for flatwoods/plantation were obtained assuming each active burrow was occupied by one tortoise. The estimate for scrub is close to that obtained by burrow scoping. The estimate of 5361 for flatwoods/plantation from last year's report is an over –estimate of that population segment. In order to obtain better information on tortoise home range, reproduction, survivorship, mortality, fecundity, and behavior two reference sites have been established in scrub and flatwoods. Gopher tortoise are being captured, radio tagged, and monitored to obtain this information. Source: Population survey and monitoring of the gopher tortoise (*Gopherus polyphemus*) at Avon Park Air Force Range. Annual report. October 2009 – November 2010. Authors: Betsie Rothermel and Traci Castellon. Archbold Biological Station, Lake Placid, FL.

Eglin AFB, FL: From Oct. 1, 2009 through Sept. 30, 2010, 1,335 acres were surveyed. From these surveys and incidental sightings we documented 124 new active burrows, 28 new inactive burrows, and five new abandoned burrows.
MacDill AFB, FL: None
Patrick AFB, FL: (Cape Canaveral Air Force Station area) - eight surveys conducted in support of projects as described below: 11/3/09: Clearing of Airfield Clear Zone (East End) – six active, nine inactive, six tortoises relocated; 11/19/10: North Phillips Parkway Water Line Installation – two active, three inactive, one tortoise relocated; one burrow marked for avoidance; 12/16/10: MOCC Antenna Field Antenna Removal – two inactive, six active, no tortoises relocated; all burrows marked for avoidance; 12/16/09, 1/20/10, 2/5/10, 2/12/10, 2/12/10: Clear of Airfield Clear Zone (West End) – 32 active, 155 inactive, 32 tortoises relocated; 1/26/10: Re-contour Airfield Ditches – three active, four inactive, three tortoises relocated; 1/27/10: SLC 37 Security Upgrades (Fenceline) – zero active, eight inactive, zero tortoises relocated; 6/23/10: Construct Transporter Road – two active, six inactive, one tortoise relocated; 9/22/10: Construct Satellite Operations Support Facility – four active, two inactive, four tortoises relocated
Tyndall AFB, FL: Previous survey data from 1999 shows 43 active burrows, 55 inactive burrows. The survey method and coverage area is unknown. An additional 25 active burrows and one inactive burrow were located this year through incidental observations and during environmental review for projects. More thorough surveys are planned for next year.
Moody AFB, GA: Pedestrian surveys of suitable gopher tortoise habitat are conducted annually to identify new gopher tortoise burrows. All known burrows are marked in the field with semi-permanent markers, measured to determine occupant size class, and GPS'd for incorporation into the installation Geographic Information System (GIS) database. The activity of each burrow is collected annually and is used for making tortoise population estimates. Concurrent with gopher tortoise surveys, installation personnel conduct visual searches for eastern indigo snakes by searching burrow entrances and aprons for indigo snake skin sheds. As of 30 September 2010, there were 319 marked gopher tortoise burrows in seven colonies on the installation: Colony 71st (87 burrows), Colony CP (39 burrows), Colony AR (8 burrows), Colony BR (18 burrows), Colony BF (13 burrows), and Colony CS (154 burrows).

b) Population trends

i. Monitoring (date, property/location, results):
Eglin AFB, FL: Over the course of the year we revisited 27 old burrows. Of these, 2 were active that remained active, one changed from active to inactive, 9 went from active to abandoned or not present, and 15 went from inactive to abandoned or not present.: Not applicable, or none

during this reporting period.: Not applicable, or none during this reporting period.
Tyndall AFB, FL: Unknown population status. Burrows along forestry roads are marked to prevent vehicle traffic. Two tortoises were hit by vehicles on paved roads, with one mortality.
Moody AFB, GA: Gopher tortoise monitoring occurs on Moody AFB and Grand Bay Range from March through October annually. Gopher tortoises are captured and marked with subcutaneous and external radio frequency identification (RFID) tags and movements are monitored via a set of 20 continuous RFID readers placed on selected burrows in the largest gopher tortoise colonies. Additionally, 2 gopher tortoises are currently fitted with radio transmitters and tortoise locations are obtained 2-3 times weekly during the monitoring season (March through October). Data from these movement studies is used to determine home range, foraging habitat, and behavioral changes due to military training and other installation activities.
Avon Park Air Force Range, MacDill AFB, FL, Patrick AFB, FL: Not applicable, or none during this reporting period.

ii. Disease and die-offs (date, property/location, cause if known, number of deaths): Not applicable, or none during this reporting period.

iii. Permitted takes (property/location, number of takes permitted): Not applicable, or none during this reporting period.

UNITED STATES MARINE CORPS

a) Survey date(s) and results by property (active and inactive burrows): MCSF Blount Island – July 2010 (report finalized October 2010) showing 63 active burrows, 15 inactive burrows, and 22 abandoned burrows

b) Population trends

i. Monitoring (date, property/location, results): *See "a" above*

ii. Disease and die-offs (date, property/location, cause if known, number of deaths): Not applicable, or none during this reporting period.

iii. Permitted takes (property/location, number of takes permitted): Not applicable, or none during this reporting period.

UNITED STATES FOREST SERVICE

a) Survey date(s) and results by property (active and inactive burrows):
Project – "A Survey of Gopher Tortoise (*Gopherus polyphemus*) Burrows on Key Properties in Alabama": Gopher Tortoises are a keystone species of the southeastern Coastal Plains. Protection of this species through habitat conservation and restoration of longleaf pine forests will be vital to retaining the many sensitive species of this forest type and in preventing the need to list the Gopher Tortoise for protection under the Endangered Species Act throughout its geographic range. This project is designed to survey key state and federal properties in south Alabama to determine the current distribution of Gopher Tortoises and to create a model of carrying capacity for the species. The results of this project will be comprehensive maps of burrows on three properties; a model that uses soil type, over-story vegetation structure, and understory vegetation cover to predict density of Gopher Tortoise burrows; and an assessment of where on these three properties conservation banks for Gopher Tortoises might be established. Craig Guyer, AU. October 2008 – September 2011. 400 acres surveyed on Florida national forests. No burrows reported.

b) Population trends

i. Monitoring (date, property/location, results): Not applicable, or none during this reporting period.

ii. Disease and die-offs (date, property/location, cause if known, number of deaths): Not applicable, or none during this reporting period.

iii. Permitted takes (property/location, number of takes permitted): Not applicable, or none during this reporting period.

UNITED STATES FISH AND WILDLIFE SERVICE

a) Survey date(s) and results by property (active and inactive burrows):
Ding Darling NWR: Gavin site (12/2009): 12 active, 1 inactive
Sanibel-Captiva Supplement (10/2009)
Frannie Preserve: 59 active, 13 inactive
Johnston Preserve: 49 active, 8 inactive
Dayton Preserve: 0 active, 1 inactive
Walker Preserve: 14 active, 4 inactive
Wulfert: 48 active, 13 inactive
Eufaula NWR, Kimbrel tract (250 acres;date unknown): 30 active
Archie Carr NWR (2 acres; 7/2010): 11 active

Pelican Island NWR (5/2010): 1 active
Okeefenokee NWR (10/2010)
Compartment 3 (26 acres): 73 active, 35 inactive
Mizell Road (45 acres): 31 active, 16 inactive

b) Population trends

i. Monitoring (date, property/location, results): Not applicable, or none during this reporting period.

ii. Disease and die-offs (date, property/location, cause if known, number of deaths): Not applicable, or none during this reporting period.

iii. Permitted takes (property/location, number of takes permitted): Not applicable, or none during this reporting period.

ALABAMA

a) Survey date(s) and results by property (active and inactive burrows): Not applicable, or none during this reporting period.

b) Population trends

i. Monitoring (date, property/location, results): From a State Wildlife Grant awarded to Dr. Craig Guyer of Auburn University awarded October 2008 with work continuing into 2011 an estimate of the number of tortoises to have historically occurred on three properties and in Alabama's ancestral landscape (See study description in "Research" section):
Conecuh National Forest: 27,669
Geneva State Forest: 2,876
Perdido River-- Longeaf Hills Tract: 4,208
Alabama Total: 2,149,379

ii. Disease and die-offs (date, property/location, cause if known, number of deaths): Not applicable, or none during this reporting period.

iii. Permitted takes (property/location, number of takes permitted): Not applicable, or none during this reporting period.

FLORIDA

a) Survey date(s) and results by property (active and inactive burrows):

- During FY 2009-2010, Apalachee Wildlife Management Area in Jackson County received funding to support restoration of approximately 400 acres of sandhill natural communities with an estimated 1.16 tortoises per acre.
- Surveys and monitoring continued May-July 2010 on the Carter Tract of Econfina Creek WMA in Washington County—a 2,200 acre tract with nearly 1,200 acres of sandhill uplands containing 378 total burrows with 96 (25%) classified as active or possibly active.
- FWC continued a multi-year comprehensive burrow survey of 200,000 acres of Blackwater WMA in Okaloosa and Santa Rosa Counties. The land is managed by Florida Department of Agriculture and Consumer Services (FDACS) and is divided into FDACS-defined management compartments that more readily mirror their reporting process and translate into management actions. Across three surveyed management units, FWC found over 2,000 burrows and surveyed more than 1,500 acres of suitable gopher tortoise habitat.
- Surveys were conducted on a 350 acre sandhill restoration area of the Spring Creek Unit of the Big Bend WMA in Taylor County, resulting in 0.31 tortoises per acre. This estimate indicates that the current population is less than the population density observed on sandhill habitat in good condition and will provide a baseline for assessing population response to habitat enhancement in the future.
- A survey of Jennings State Forest WMA in Clay and Duval Counties yielded 830 burrows, of which 651 were active or inactive (78%) and 179 (22%) were abandoned. The estimated gopher tortoise population is 400, which is an increase of 48% over the 2005 population estimate of 271.
- Surveys are conducted on all sites permitted for relocation and on the recipient site property. Information on these survey results is only included for the recipient site since the relocation site is assumed developed and all tortoises relocated. The following are survey results from surveys conducted during the reporting period:

Gopher tortoise recipient sites

Recipient Site Name	Survey date	Gopher tortoise acres surveyed	Survey results (density)
Northwest Hackletrap	1/11/2010	150 (29% of 510.55 ac.)	.07 tortoises/acre
The Woods	1/25/2010	75.25 (25% of 301 ac.)	.03 tortoises/acre
Lake Louisa State Park	6/4/2010	6.4 (15% of 42 ac.)	.54 tortoises/acre

Recipient site surveys (in process or permitted after the CCA reporting time frame)

Recipient Site Name	Survey date	Gopher tortoise acres surveyed	Survey results (density)
Allen Broussard Conservancy	8/6/2010	40 (100% of 40 ac.)	.2 tortoises/acre

Withlacoochee Bay Trail (Felburn Trailhead)	7/29/2010	53 (100% of 53 ac.)	.2 tortoises/acre
PSC Gopher Ranch, Eight Mile Still Road	12/9/2009	55.7 (100% of 55.7 ac.)	.2 tortoises/acre
Chinquapin Farm	1/28/2010	31.9 (15.9% of 200 ac.)	1.88 tortoises/acre
Hatchineha Ranch Conservation Bank	2/3/2010	17.6 (16.7% of 105 ac.)	.9 tortoises/acre

b) Population trends

i. Monitoring (date, property/location, results):
- Completion of a 10-year monitoring effort (Jennings Forest Wildlife Management Area) in Clay and Duval Counties yielded 830 burrows, of which 651 were active or inactive (78%) and 179 (22%) were abandoned. The estimated gopher tortoise population is 400, which is an increase of 48% over the 2005 population estimate of 271.
- Initiation of another monitoring effort (Guana River WMA) to evaluate the effects of land management practices and gopher tortoise populations in sandhill and coastal scrub.

ii. Disease and die-offs (date, property/location, cause if known, number of deaths): Not applicable, or none during this reporting period.

iii. Permitted takes (property/location, number of takes permitted): Not applicable, or none during this reporting period.

GEORGIA

a) Survey date(s) and results by property (active and inactive burrows): Georgia DNR contracted the Jones Ecological Research Center to survey and estimate gopher tortoise population sizes (using line transect distance sampling: LTDS) on 18 total sites, including 3 state-owned sites (Reed Bingham SP, Townsend WMA - Murf Tract, Townsend WMA - Ballard Tract). Surveys began November 2010, after this year's reporting period ended.

b) Population trends

i. Monitoring: Not applicable, or none during this reporting period.

ii. Disease and die-offs: Not applicable, or none during this reporting period.

iii. Permitted takes: Not applicable, or none during this reporting period.

SOUTH CAROLINA

a) Survey date(s) and results by property (active and inactive burrows): 13 new burrows were created on a GTHP in 2010 by translocated tortoises.

b) Population trends

i. Monitoring (date, property/location, results): 13 translocated tortoises were radio-tracked 1-3 times weekly.

ii. Disease and die-offs (date, property/location, cause if known, number of deaths): Not applicable, or none during this reporting period.

iii. Permitted takes (property/location, number of takes permitted): Not applicable, or none during this reporting period.

POARCH BAND OF CREEK INDIANS

a) Survey date(s) and results by property (active and inactive burrows): Approximately once every three months.

b) Population trends

i. Monitoring (date, property/location, results): Not applicable, or none during this reporting period.

ii. Disease and die-offs (date, property/location, cause if known, number of deaths): Not applicable, or none during this reporting period.

iii. Permitted takes (property/location, number of takes permitted): Not applicable, or none during this reporting period.

AMERICAN FOREST FOUNDATION

a) Survey date(s) and results by property (active and inactive burrows): Not applicable, or none during this reporting period.

b) Population trends

i. Monitoring (date, property/location, results): Not applicable, or none during this reporting period.

ii. Disease and die-offs (date, property/location, cause if known, number of deaths): Not applicable, or none during this reporting period.

iii. Permitted takes (property/location, number of takes permitted): Not applicable, or none during this reporting period.

LONGLEAF ALLIANCE

a) Survey date(s) and results by property (active and inactive burrows): Not applicable, or none during this reporting period.

b) Population trends

i. Monitoring (date, property/location, results): Not applicable, or none during this reporting period.

ii. Disease and die-offs (date, property/location, cause if known, number of deaths): Not applicable, or none during this reporting period.

iii. Permitted takes (property/location, number of takes permitted): Not applicable, or none during this reporting period.

SECTION V POPULATION MANIPULATION

This section provides information on efforts by the various signatory agencies and organizations to move or head-start gopher tortoises for their conservation benefit or to avoid injury or mortality that may otherwise result from various activities during the reporting period.

ARMY

a) Relocation (number of tortoises):
Fort Benning: 178
Fort Gordon: 1
Fort Rucker, Fort Stewart: Not applicable, or none during this reporting period.

   i. To permanently protected lands: Fort Benning – 178

   ii. To short-term protected lands: Not applicable, or none during this reporting period.

   iii. To unprotected lands: Fort Gordon – 1

b) Repatriations (number of tortoises): Not applicable, or none during this reporting period.

   i. To permanently protected lands: Not applicable, or none during this reporting period.

   ii. To short-term protected lands: Not applicable, or none during this reporting period.

   iii. To unprotected lands: Not applicable, or none during this reporting period.

c) Head start efforts

   i. Description of effort, property/location, release date (anticipated), number of tortoises: Fort Stewart - A total of 101 head-started gopher tortoises were released on Fort Stewart on June 11, 2010; 65 released into improved habitat improved in Training Area F13. An additional 35 GTs were released in various locations on the western half of the installation. The tortoises are being monitored for retention rate. The head-started tortoises were raised by Georgia Southern University.

d) Onto or off of habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Fort Stewart - 100 head-started juvenile GTs.

NAVY

a) Relocation (number of tortoises): Not applicable to properties under an INRMP.

   i. To permanently protected lands (number of tortoises): Not applicable, or none during this reporting period.

   ii. To short-term protected lands: Not applicable, or none during this reporting period.

   iii. To unprotected lands: Not applicable, or none during this reporting period.

b) Repatriations (number of tortoises): Not applicable to properties under an INRMP.

   i. To permanently protected lands: Not applicable, or none during this reporting period.

   ii. To short-term protected lands: Not applicable, or none during this reporting period.

   iii. To unprotected lands: Not applicable, or none during this reporting period.

c) Head start efforts: Not applicable to properties under an INRMP.

   i. Description of effort, property/location, release date (anticipated), number of tortoises: Not applicable, or none during this reporting period.

d) Onto or off of habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: One tortoise was relocated from an urban area at NAS Pensacola to installation habitat.

AIR FORCE

a) Relocation (number of tortoises):

   i. To permanently protected lands (number of tortoises): Not applicable, or none during this reporting period.

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands:
Patrick AFB, FL: 47
Avon Park Air Force Range, Eglin AFB, FL, MacDill AFB, FL Moody AFB, GA, Tyndall AFB, FL: Not applicable, or none during this reporting period.

b) Repatriations (number of tortoises)

i. To permanently protected lands: Not applicable, or none during this reporting period.

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands: Not applicable, or none during this reporting period.

c) Head start efforts

i. Description of effort, property/location, release date (anticipated), number of tortoises: Not applicable, or none during this reporting period.

d) Onto or off of habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise:
Eglin AFB, FL: Seven on-site relocations
Avon Park Air Force Range, MacDill AFB, FL, Moody AFB, GA, Patrick AFB, FL, Tyndall AFB, FL: Not applicable, or none during this reporting period.

UNITED STATES MARINE CORPS

a) Relocation (number of tortoises)

i. To permanently protected lands (number of tortoises): Not applicable, or none during this reporting period.

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands: Not applicable, or none during this reporting period.

b) Repatriations (number of tortoises)

i. To permanently protected lands: Not applicable, or none during this reporting period.

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands: Not applicable, or none during this reporting period.

c) Head start efforts

i. Description of effort, property/location, release date (anticipated), number of tortoises: Not applicable, or none during this reporting period.

d) Onto or off of habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

UNITED STATES FOREST SERVICE

a) Relocation (number of tortoises): None have occurred as yet, but are planned as part of the indigo snake repatriation to enclosed areas.

i. To permanently protected lands (number of tortoises): Not applicable, or none during this reporting period.

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands: Not applicable, or none during this reporting period.

b) Repatriations (number of tortoises)

i. To permanently protected lands: Not applicable, or none during this reporting period.

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands: Not applicable, or none during this reporting period.

c) Head start efforts

i. Description of effort, property/location, release date (anticipated), number of tortoises: Not applicable, or none during this reporting period.

d) Onto or off of habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

UNITED STATES FISH AND WILDLIFE SERVICE

a) Relocation (number of tortoises)

   i. To permanently protected lands: 26

   ii. To short-term protected lands: Not applicable, or none during this reporting period.

   iii. To unprotected lands: Not applicable, or none during this reporting period.

b) Repatriations (number of tortoises):

   i. To permanently protected lands: Not applicable, or none during this reporting period.

   ii. To short-term protected lands: Not applicable, or none during this reporting period.

   iii. To unprotected lands: Not applicable, or none during this reporting period.

c) Head start efforts

   i. Description of effort, property/location, release date (anticipated), number of tortoises: Not applicable, or none during this reporting period.

d) Onto or off of habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

ALABAMA

a) Relocation (number of tortoises)

i. To permanently protected lands (number of tortoises): One waif tortoise discovered in Shelby County north of the species range in Alabama released in Barbour County on state property.

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands: Not applicable, or none during this reporting period.

b) Repatriations (number of tortoises)

i. To permanently protected lands: Not applicable, or none during this reporting period.

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands: Not applicable, or none during this reporting period.

c) Head start efforts

i. Description of effort, property/location, release date (anticipated), number of tortoises: Not applicable, or none during this reporting period.

d) Onto or off of habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

FLORIDA

a) Relocation (number of tortoises): A total of 2,727 tortoises were relocated during the reporting period. The summary table is listed below.

i. To permanently protected lands (number of tortoises): 1,601

Most of the tortoises relocated from development sites during this reporting period went to long-term protected sites. These sites are all permitted by the FWC and include a perpetual conservation easement to FWC. A total of 1601 tortoises were relocated sites with this designation.

ii. To short-term protected lands: 792

Most of the 792 tortoises relocated to short-term protected sites were relocated to a research project site that is permitted to study the effects of cattle grazing on relocated tortoise landscape distribution.

iii. To unprotected lands: 331

The 331 tortoises relocated were all tortoises relocated on-site of small projects (unprotected) and development projects (from the 10 or Fewer Burrows permit).

Summary of relocation activities

FWC permit type	i) Relocated to Long-term Protected Sites	ii) Relocated to Short-term Protected sites	iii. Relocated to Unprotected sites	Relocated to Areas with No Designated Status
10 or Fewer Burrows permit	149	104	331	3
Conservation permit	1452	688	0	0
TOTALS	1601	792	331	3

b) Repatriations (number of tortoises): FWC is working with state land management agencies to develop guidelines for a consistent, scientific approach to re-establishing gopher tortoise populations on public conservation lands. Draft restocking guidelines have been completed as of June 2010. FWC will seek additional public input before finalizing the guidelines.

i. To permanently protected lands: Not applicable, or none during this reporting period.

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands: Not applicable, or none during this reporting period.

c) Head start efforts

i. Description of effort, property/location, release date (anticipated), number of tortoises: Not applicable, or none during this reporting period.

d) Onto or off of habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: *See table under "a" above*. A total of 3 tortoises were relocated to the Apalachicola National Forest during the reporting period. This area is designated as a research recipient site but meets this definition for this report.

GEORGIA

a) Relocation (number of tortoises)

   i. To permanently protected lands (number of tortoises): Three waif tortoises (origin unknown) found in the Piedmont of Georgia were relocated to the Aiken Gopher Tortoise Heritage Preserve in South Carolina.

   ii. To short-term protected lands: Not applicable, or none during this reporting period.

   iii. To unprotected lands: Not applicable, or none during this reporting period.

b) Repatriations (number of tortoises)

   i. To permanently protected lands: A Candidate Conservation Agreement with Assurances (CCAA) has been jointly developed by Georgia DNR-WRD, Georgia Power, and USFWS for the repatriation of tortoises to restored habitat at Plant Vogtle, Burke County. The CCAA is remains under review by USFWS, after which, if approved, tortoises may be moved from development sites as they become available.

   ii. To short-term protected lands: Not applicable, or none during this reporting period.

   iii. To unprotected lands: Not applicable, or none during this reporting period.

c) Head start efforts

   i. Description of effort, property/location, release date (anticipated), number of tortoises: In response to concerns for excessive nest predation, personnel at Reed Bingham State Park recovered a number of nests for laboratory incubation and eventual release of head-started juvenile tortoises. Unfortunately, either through transport or incubator malfunction, none of the 215 eggs developed to hatching.

d) Onto or off of habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

SOUTH CAROLINA

a. Relocation (number of tortoises): The AGTHP received 3 adult waif tortoises in 2010 from GA DNR; 1 juvenile waif (a Florida animal) from SCDNR in 2010. We received nine hatchling tortoises from elsewhere in South Carolina. These were all released into large confined pens on the AGTHP, which is a permanently protected land.

   i. To permanently protected lands (number of tortoises): Not applicable, or none during this reporting period.

   ii. To short-term protected lands: Not applicable, or none during this reporting period.

   iii. To unprotected lands: Not applicable, or none during this reporting period.

b. Repatriations (number of tortoises)

   i. To permanently protected lands: Staff and partners documented eleven hatchling tortoises from natural nests on the AGTHP in 2010. Four of these hatchlings were the offspring of native tortoises; seven hatchlings were the offspring of previously translocated tortoises.

   ii. To short-term protected lands: Not applicable, or none during this reporting period.

   iii. To unprotected lands: Not applicable, or none during this reporting period.

c. Head start efforts

   i. Description of effort, property/location, release date (anticipated), number of tortoises - A total of 20 hatchling tortoises were released into chain link dog pens on the AGTHP in 2010. These pens have wire mesh roofs as well as an interior aluminum flashing barrier. They should prevent predation from mammals and birds. All hatchling tortoises were provided with starter burrows. The pens have ample forage for feeding. We will recapture hatchlings and take body measurements in the spring of 2011.

d. Onto or off of habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

POARCH BAND OF CREEK INDIANS

a) Relocation (number of tortoises)

   i. To permanently protected lands (number of tortoises): 5

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands: Not applicable, or none during this reporting period.

b) Repatriations (number of tortoises)

i. To permanently protected lands: Not applicable, or none during this reporting period

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands: Not applicable, or none during this reporting period.

c) Head start efforts

i. Description of effort, property/location, release date (anticipated), number of tortoises: Found on roadways or construction sites (3)

d) Onto or off of habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

AMERICAN FOREST FOUNDATION

a) Relocation (number of tortoises): Not applicable, or none during this reporting period.

i. To permanently protected lands (number of tortoises): Not applicable, or none during this reporting period.

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands: Not applicable, or none during this reporting period.

b) Repatriations (number of tortoises):

i. To permanently protected lands: Not applicable, or none during this reporting period.

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands: Not applicable, or none during this reporting period.

c) Head start efforts

i. Description of effort, property/location, release date (anticipated), number of tortoises: Not applicable, or none during this reporting period.

d) Onto or off of habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

LONGLEAF ALLIANCE

a) Relocation (number of tortoises)

i. To permanently protected lands (number of tortoises): Not applicable, or none during this reporting period.

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands: Not applicable, or none during this reporting period.

b) Repatriations (number of tortoises)

i. To permanently protected lands: Not applicable, or none during this reporting period.

ii. To short-term protected lands: Not applicable, or none during this reporting period.

iii. To unprotected lands: Not applicable, or none during this reporting period.

c) Head start efforts

i. Description of effort, property/location, release date (anticipated), number of tortoises: Not applicable, or none during this reporting period.

d) Onto or off of habitat without a designated special protection status, but included in a management plan that provides for the conservation of the gopher tortoise: Not applicable, or none during this reporting period.

Section VI Research

This section provides information on gopher tortoise-related research projects either conducted or funded by the various signatory agencies and organizations, or that took place on land owned or managed by them, during the reporting period.

ARMY

a) Conducted by or supported by agency (if published, include citation):
Fort Benning: Auburn University is currently conducting research related to habitat requirements and forest assessments for the gopher tortoise.

Fort Stewart: Fort Stewart is currently monitoring the 65 released head-started GTs in F13. Recruitment is being monitored in 300 acres of habitat improved in 2009. Activities for David Rostal (Georgia Southern Univesity) from Oct 1, 2009 to Sept 30, 2010: Reproductive studies May 20 - June 9, 2010.

Fort Gordon: Researchers from the Southeastern Cooperative Wildlife Disease Study conducted a health assessment by capturing and evaluating gopher tortoises from various areas of Fort Gordon. Each tortoise was tested for URTDs (results pending) and marked for future identification.

Other Army Research and Development:
Radzio, T. A., J. C. Hackler, A. D. Walde, D. K. Delaney and M. G. Hinderliter. 2009. *Gopherus polyphemus* (Gopher Tortoise). Emergence behavior. Herpetological Review 40(1):77.

Radzio, T. A., J. C. Hackler, A. D. Walde, D. K. Delaney and M. G. Hinderliter. 2009. *Terrapene carolina* (Eastern Box Turtle) and *Gopherus polyphemus* (Gopher Tortoise). Interspecific Interaction. Herpetological Review. 40(2): 217.

Evans, D., S. Roberts, J. Jones, K. Edwards, H. Alexis Londo, D. Nicholson, S. Tweddale, and D. Delaney. In editing. Field Assessment of Gopher Tortoise Habitat at Camp Shelby, MS - Phase II: Overstory and Combined Assessments. ERDC-CERL TR-09-DRAFT

NAVY

a) Conducted by or supported by agency (if published, include citation):

- Rare Plant and Animal Inventory of Naval Air Station Whiting Field and Associated Properties by Jim Surdick Ph.D. and Paul Russo of Florida Natural Areas Inventory. Final report issued October 2010
- Rare Plant and Animal Inventory of Naval Air Station Pensacola, Bronson Field, Saufley Field, and Corry Station by Jim Surdick Ph.D. and Paul Russo of Florida Natural Areas Inventory. Final report issued October 2010
- Endangered and Threatened Species Survey Naval Air Station Jacksonville, Duval County, Florida. Gulf South Research Corporation. Final Report issued September 2010.
- Endangered and Threatened Species Survey Naval Station Mayport, Duval County, Florida. Gulf South Research Corporation, in progress.
- Endangered and Threatened Species Survey Whitehouse Outlying Landing Field, Duval County, Florida. Gulf South Research Corporation, in progress.
- A Survey of NSA Panama City for Gopher Tortoises by Robby Smith and Jered Jackson, U.S. Navy, NAVFAC SE, Final Report, July 2010.

AIR FORCE

a) Conducted by or supported by agency (if published, include citation):
Avon Park Air Force Range: Rothermel and Castellon, unpublished survey reports for October 2008 through September, 2009 and October 2009 through November, 2010 (See details provided in Section IV.a above)

Moody AFB, GA: Surveillance for upper respiratory tract disease (URTD) and other physiological parameters was continued through the reporting period. Long-term monitoring of habitat response to prescribed burning continued during the reporting period. This study involves mapping and quantifying vegetation response to prescribed burns to facilitate adaptive management for gopher tortoises. Results from this study will be received at the end of the study (2013).

Eglin AFB, FL, MacDill AFB, FL, Patrick AFB, FL, Tyndall AFB, FL: Not applicable, or none during this reporting period.

UNITED STATES MARINE CORPS

a) Conducted by or supported by agency (if published, include citation): Not applicable, or none during this reporting period.

UNITED STATES FOREST SERVICE

a) Conducted by or supported by agency (if published, include citation): Several research studies, including a long-term study by Dr. Guyer, have been ongoing in the Conecuh National Forest. Recent and ongoing State Wildlife Grant research involving the Conecuh National Forest and the gopher tortoise are summarized at Alabama Department of Conservation and Natural Resources website at: http://www.outdooralabama.com/research-mgmt/State%20Wildlife%20Grants/projectsfunded.cfm

Summaries of the relevant studies are as follows -

Amphibian and Reptile Response to Longleaf Pine Ecosystem Restoration, Conecuh National Forest: Conecuh National Forest (CNF) is in the third year of a 30-year plan to restore the native longleaf pine ecosystem. CNF supports populations of 38 high priority amphibians and reptiles, including more species of frogs than any other National Forest. This project will evaluate 60 restoration plots to document amphibian and reptile response to longleaf ecosystem restoration, compare current conditions to previous studies, identify potential reintroduction sites for rare and extirpated species, evaluate monitoring protocols of Partners in Amphibian and Reptile Conservation and provide educational opportunities for partners and resource managers. Craig Guyer, AU and Mark Bailey, Conservation Southeast. October 2004 - November 2006. (Final Report)

Use of Gopher Tortoises in Restoration of the Upland Longleaf Fauna on the Conecuh National Forest: The longleaf pine ecosystem is one of the world's most imperiled forest types. Many rare amphibian and reptile species are found in this forest, especially those that burrow in loose soils. For these reasons, restoration of longleaf pine forests is one of the most challenging conservation problems in North America. The Gopher Tortoise is a keystone species of the longleaf pine ecosystem, principally because of the burrows that this species creates. These holes assist in maintenance of an unusually rich flora and fauna. For these reasons, Gopher Tortoises are crucial to the success of conservation plans for the longleaf pine ecosystem. Thanks to 15 years of proactive management on the Conecuh National Forest (CNF), the habitat structure of a significant portion of the forest has moved closer to the aspect of old-growth longleaf pine forests. Despite success in improving habitat structure, Gopher Tortoise populations on the CNF have not recovered to densities observed in old-growth forests. The slow recovery of tortoises makes it difficult to create features that will allow recovery of missing species such as the Eastern Indigo Snake, Southern Hognose Snake, and Eastern Pocket Gophers. Therefore, implementation of active tortoise management to enhance populations on the CNF is vital for maintenance of the longleaf herpetofauna on this key property. This project will 1) work with staff at the CNF to develop a plan for implementing herpetofauna repatriation projects, 2) survey and map

burrows of Gopher Tortoises on a large site selected for eventual release of Eastern Indigo Snakes and 3) establish five large penned sites for relocation of adult Gopher Tortoises and juvenile Eastern Indigo Snakes. Dr. Craig Guyer, AU. October 2007 - September 2008. (Final Report)

UNITED STATES FISH AND WILDLIFE SERVICE

a) Conducted by or supported by agency (if published, include citation): Not applicable, or none during this reporting period

ALABAMA

a) Conducted by or supported by agency (if published, include citation): A State Wildlife Grant has been awarded to Dr. Craig Guyer of Auburn University. Dr. Guyer's study is entitled "A Survey of Gopher Tortoise (*Gopherus polyphemus*) burrows on key Alabama Properties". The key properties include Conecuh Nationa lForest (Covington/Conecuh County), Geneva State Forest (Geneva County), and Alabama Forever Wild property, the Perdido River-Longleaf Hills Tract (Baldwin County). Stated objectives of this research include: 1.) Creating maps of habitats likely to be occupied by gopher tortoises on the Perdido River-Longleaf Hills Tract, Conecuh National Forest,and Geneva State Forest . 2.) Performing comprehensive burrow surveys and vegetative analyses on each property. 3.) Using burrow surveys and vegetative analyses to develop a model of carrying capacity for properties likely to be used in state conservation plans for gopher tortoises. This is a three year project beginning in October 2008. Project is budgeted for approximately $300,000 of which $136,00 is State Wildlife Grant funds. To date, Objective 1 has been completed. Objective 2 has been determined unworkable in its original intent but will be modified using data collected for third phase of the project during 2010-2011. (Guyer, C., S. Glenos, and B. Lowe. 2010. A Survey of Gopher Tortoise (*Gopherus polyphemus*) burrows on key Alabama Properties Annual Performance Report. Alabama State Wildlife Grant: T-3-3)

FLORIDA

a) Conducted by or supported by agency (if published, include citation):

Currently underway:

- FWC is funding a study to evaluate the effects of cattle grazing on gopher tortoise stocking densities to determine optimal numbers of gopher tortoises that can co-exist with cattle. This study is anticipated to be completed in 2012.

- Evaluate effectiveness of restocking peninsular tortoises to the Panhandle (Nokuse Plantation).
- The response of translocated gopher tortoises to stocking density and enclosure size on the Apalachicola National Forest.

Completed:

- Population dynamics assessment of a previously-studied gopher tortoise population in northern Florida, Final Report (June 16, 2010), Florida Fish and Wildlife Conservation Commission. The results of this study indicated that viable and robust gopher tortoise populations can persist on sites undergoing intensive silviculture, and further substantiated tortoise use of windrow berms, ecotones, and better drained soils.
- The results of the study on the genetics of Florida Panhandle gopher tortoises will be presented at the upcoming Gopher Tortoise Council Meeting in October 2010.
- "Effects of Mycoplasmal Upper Respiratory Tract Disease on Morbidity and Mortality of Gopher Tortoises in Northern and Central Florida" published in the Journal of Wildlife Diseases (July 2010). Several techniques (serological and clinical signs) were used to study URTD of 205 adult gopher tortoises on public lands in Northern and Central Florida from 1998-2001 showing a 5% (11 tortoises) prevalence of a mycoplasmal infection (either *M. agassizii* or *M. testudineum*), but none of the techniques were able to predict the likelihood of death.

GEORGIA

a) Conducted by or supported by agency (if published, include citation): Two studies at Reed Bingham State Park, related to the head-starting efforts (*See Section V(c-i*)), are being conducted by researchers at Valdosta State University: 1) Dr. Colleen McDonough is researching the predatory behavior of armadillos to determine patterns during gopher nesting season and 2) Dr. Mitch Lockhart is conducting behavioral studies on the head-started hatchlings themselves.

SOUTH CAROLINA

a) Conducted by or supported by agency (if published, include citation): Radio-tracking of released tortoises is currently on-going. A manuscript on home range size and activity patterns of the translocated tortoises on the AGTHP is in preparation

POARCH BAND OF CREEK INDIANS

a) Conducted by or supported by agency (if published, include citation): Not applicable, or none during this reporting period.

AMERICAN FOREST FOUNDATION

a) Conducted by or supported by agency (if published, include citation): Not applicable, or none during this reporting period.

LONGLEAF ALLIANCE

a) Conducted by or supported by agency (if published, include citation): Not applicable, or none during this reporting period.

SECTION VII LAND CONSERVATION

This section provides information on the amount of gopher tortoise habitat the various signatory agencies and organizations protected through acquisition, conservation easement, or other efforts, and/or lost due to development or other activities, during the reporting period.

ARMY

a) Acquisitions, easements and other long-term conservation protection: Not applicable, or none during this reporting period.

b) Land/habitat loss due to development activities or habitat degradation (identify cause of loss and if permanent/non-permanent): Fort Benning – 250 acres during new range construction. Most of the acreage will be regained after construction of the ranges.

NAVY

a) Acquisitions, easements and other long-term conservation protection: Not applicable, or none during this reporting period.

b) Land/habitat loss due to development activities or habitat degradation (identify cause of loss and if permanent/non-permanent): Not applicable, or none during this reporting period.

AIR FORCE

a) Acquisitions, easements and other long-term conservation protection: Not applicable, or none during this reporting period.

b) Land/habitat loss due to development activities or habitat degradation (identify cause of loss and if permanent/non-permanent):
Eglin AFB, FL: Loss of 330 acres permanently due to development of 7th Special Forces Group backyard range complex and various other mission critical construction projects.
Patrick AFB, FL: Three projects completed in FY10 resulted in the permanent loss of gopher tortoise habitat: Clearing of Airfield East and West End Clear Zones – permanent loss of 114 acres of habitat; Construction of Transporter Road – permanent loss of 4 acres of habitat; Construction of Satellite Operations Support Facility – permanent loss of .5 acres of habitat.

Avon Park Air Force Range, Tyndall AFB, FL, MacDill AFB, FL, Moody AFB, GA: Not applicable, or none during this reporting period.

UNITED STATES MARINE CORPS

a) Acquisitions, easements and other long-term conservation protection: Not applicable, or none during this reporting period.

b) Land/habitat loss due to development activities or habitat degradation (identify cause of loss and if permanent/non-permanent): Not applicable, or none during this reporting period.

UNITED STATES FOREST SERVICE

a) Acquisitions, easements and other long-term conservation protection: Not applicable, or none during this reporting period.

b) Land/habitat loss due to development activities or habitat degradation (identify cause of loss and if permanent/non-permanent): Not applicable, or none during this reporting period.

UNITED STATES FISH AND WILDLIFE SERVICE

a) Acquisitions, easements and other long-term conservation protection: Not applicable, or none during this reporting period.

b) Land/habitat loss due to development activities or habitat degradation (identify cause of loss and if permanent/non-permanent): Not applicable, or none during this reporting period.

ALABAMA

a) Acquisitions, easements and other long-term conservation protection: A 1,786 acre tract in Monroe County was purchased by the Alabama Forever Wild Program in September 2010. Potential gopher tortoise habitat is contained in this property but exact acreage has yet to be determined.

b) Land/habitat loss due to development activities or habitat degradation (identify cause of loss and if permanent/non-permanent): Not applicable, or none during this reporting period.

FLORIDA

a) Acquisitions, easements and other long-term conservation protection: 1,996.42 acres

The properties covered in this section reflect gopher tortoise recipient sites protected under a conservation easements newly permitted within the reporting period. Other permitted long-term recipient sites were utilized for relocation efforts during this reporting period.

Long-term Protected Recipient Sites

Recipient Site Name	County	Acreage under perpetual conservation easement	Acreage of gopher tortoise habitat under perpetual conservation easement
Longbranch Crossing	Clay	293.05	210.76
NW Hackletrap	Glades	1165.4	510.55
C. Herman Beville Ranch	Sumter	890	492.37
Total gopher tortoise habitat protected/acquired			1213.68

Short-term Protected Recipient Sites

Recipient Site Name	County	Acreage protected and managed	Acreage of gopher tortoise habitat under a conservation easement or public ownership
Nokuse Plantation Black Creek	Walton	995	439
The Woods	Lafayette	701.8	301.3
Lake Louisa State Park	Lake	42.5	42.44
Total gopher tortoise habitat protected/acquired			782.74

b) Land/habitat loss due to development activities or habitat degradation (identify cause of loss and if permanent/non-permanent)

Description	Number of Permits	Acres of gopher tortoise habitat impacted/lost
Gopher Tortoise 10 or Fewer Burrows	215	2190.28
Gopher Tortoise Conservation	89	3278.57
Total acres lost due to development activities		5468.85

GEORGIA

Acquisitions, easements and other long-term conservation protection: 803 acres of tortoise habitat were acquired by the state and 4765 acres were protected through conservation easements as part of both the Georgia Land Conservation Program and the Georgia Land Conservation Tax Credit Program. The table below breaks down the acreages by property.

TYPE	NAME	COUNTY	TOTAL ACRES	ACRES POTENTIAL TORTOISE HABITAT
Acquisition	Rayonier-Phase 2	Long	6199	803
Easement	Fountain	Macon/Taylor	817	205
Easement	Nonami Oglethorpe	Dougherty	8595	717
Easement	Kelley Crop LLC 1	Baker	401	102
Easement	Kelly Crop LLC 2	Baker	105	101
Easement	NWTF	Burke	1150	75
Easement	NWTF	Screven	730	46
Easement	GALT	Brantley	909	3
Easement	Gaskins	Berrien	5040	1014
Easement	Tall Timbers	Thomas	516	51
Easement	NWTF	Burke	909	27
Easement	Tall Timbers	Brooks	1075	172
Easement	GALT	Laurens	471	15
Easement	Towns	Wheeler	4498	1254
Easement	SRLC	Charlton	235	10
Easement	Tall Timbers	Brooks	1393	289
Easement	GALT	Effingham	132	7
Easement	GALT	Effingham	154	10
Easement	GALT	Effingham	146	11
Easement	Tall Timbers	Decatur	647	114
Easement	GALT	Decatur	1335	7
Easement	GALT	Decatur	1336	47
Easement	GALT	Crawford	418	73
Easement	Myrtlewood	Thomas	1572	26
Easement	Tall Timbers	Brooks	1077	262
Easement	GALT	Effingham	138	7
Easement	GALT	Montgomery	182	109
Easement	GALT	Toombs	110	11
Easement Total			19205	5765

b) Land/habitat loss due to development activities or habitat degradation (identify cause of loss and if permanent/non-permanent): Not applicable, or none during this reporting period.

SOUTH CAROLINA

a) Acquisitions, easements and other long-term conservation protection: Not applicable, or none during this reporting period.

b) Land/habitat loss due to development activities or habitat degradation (identify cause of loss and if permanent/non-permanent): Not applicable, or none during this reporting period.

POARCH BAND OF CREEK INDIANS

a) Acquisitions, easements and other long-term conservation protection: On-going

b) Land/habitat loss due to development activities or habitat degradation (identify cause of loss and if permanent/non-permanent): Not applicable, or none during this reporting period.

AMERICAN FOREST FOUNDATION

a) Acquisitions, easements and other long-term conservation protection: Not applicable, or none during this reporting period.

b) Land/habitat loss due to development activities or habitat degradation (identify cause of loss and if permanent/non-permanent): Not applicable, or none during this reporting period.

LONGLEAF ALLIANCE

a) Acquisitions, easements and other long-term conservation protection: Not applicable, or none during this reporting period.

b) Land/habitat loss due to development activities or habitat degradation (identify cause of loss and if permanent/non-permanent): Not applicable, or none during this reporting period.

SECTION VIII EDUCATION AND OUTREACH

This section provides information on publications, workshops, events, promotional activities, and other efforts by the various signatory agencies and organizations designed to educate the public and train professionals about gopher tortoises and to promote their conservation during the reporting period.

ARMY

a) Publications (signage, brochures):
Fort Gordon – Fort Gordon updated their installation map to include GT data. The map is provided to military units who conduct field training exercises on the installation. The units use the map to plan their training exercises with consideration given to environmental conditions.

b) Workshops and events (date, location, audience, organizer):
Fort Gordon – Staff biologists conducted approximately 10 GT events in FY 10. GT life history, habitat requirements and conservation are briefed. Audiences included children, military personnel, civilian personnel and the general public..

Fort Rucker – Earth Day Event that included GT conservation.

Fort Stewart - Five Environmental Compliance Officer courses were taught 11/19/2009; 01/28/2010; 03/25/2010; 06/10/2010; 08/19/2010); School Visits - 24 (2400 students; Boy/Girl/Cub Scout presentations – 4; Field Trips for outside groups – 21; Professional presentations to organizations – 4.

c) Public service broadcasts/announcements:

Fort Benning – Article on GT in Fort Benning News.

d) Electronic media (website, Listserv, other internet-based outreach):
Fort Stewart - In June 2010 several television news crews and newspaper reporters came to conduct interviews on Fort Stewart's head-start release and the research being conducted.

Fort Rucker – Established a Natural Resources Website that provide GT conservation information.

NAVY

a) Publications (signage, brochures): Habitat protection and species informational signage posted and maintained at Navy Outlying Landing Field Whitehouse to protect tortoise

road crossings. All installations produced signage and brochures for identification and information on protected species including the gopher tortoise. Burrow protection markers and cones were used for education, outreach, and protection at NAS Pensacola and NAS Whiting Field.

b) Workshops and events (date, location, audience, organizer): Navy Region Southeast participated in the 2nd Annual Gopher Tortoise CCA meeting.

c) Public service broadcasts/announcements: Not applicable, or none during this reporting period.

d) Electronic media (website, Listserv, other internet-based outreach): Tortoise informational material published to NAS Pensacola website, Conservation section.

AIR FORCE

a) Publications (signage, brochures): Not applicable, or none during this reporting period.

b) Workshops and events (date, location, audience, organizers):
Avon Park Air Force Range: We brief incoming military units and contractors on identification and avoidance of Threatened, Endangered and sensitive species including gopher tortoise and burrows. We provided three such briefing this year: prior to Joint Integrated Fire Exercise (November, 2009) and Atlantic Strike (May, 2010) and one on-site briefing prior to construction of vehicle shed and parking area in tortoise habitat (March, 2010). All briefing were conducted at APAFR and organized by staff members: Hal Sullivan, Tod Zechiel, and Mark Fredlake. Traci Castellon gave a presentation on the results of her survey work at the Turtle Survival Alliance conference, Orlando, FL, August, 2010. Traci also conducted a Master Naturalist training session on Gopher Tortoise, indigo snake, and other sensitive reptiles and amphibians in September, 2010.

Eglin AFB, FL: December 2009 – Air Armament Academy class open to all Eglin personnel. Two hour threatened and endangered species class which included a section on gopher tortoises.

Patrick AFB, FL: The 45th Space Wing exhibited an educational display that included information regarding the gopher tortoise program at the Wing. This display was set up at the following venue: 1/27/10 – 1/31/10: Space Coast Wildlife and Birding Festival; Titusville, FL; organized Brevard Nature Alliance; audience is public nature/bird lovers. Additionally, 45 SW natural resource personnel conducted a tour of CCAFS natural and cultural resources, which included a talk on the biology of gopher tortoises, as well as the Air Force's part in protecting them. 3/13/10: Natural resources presentation that included gopher tortoises given to the Customs and Border Patrol (CBT) at CCAFS. Organized by CCAFS biologists; audience was approximately 30 members of the CBT;

5/17/10: Natural resources presentation that included gopher tortoises given at the NASA Climate Change Workshop. Organized by NASA; audience was NASA and various federal/state agencies; 8/3/10: Natural resources presentation that included gopher tortoises given at the Installation Restoration Program (IRP) Advisory Board meeting; organized by IRP; audience is board members and the public.

Moody AFB, GA: In Feb 2010 the installation did a presentation at the "Georgia Chapter of The Wildlife Society" meeting at Valdosta State University.

c) Public service broadcasts/announcements: Not applicable, or none during this reporting period.

d) Electronic media (website, Listserv, other internet-based outreach): Not applicable, or none during this reporting period.

UNITED STATES MARINE CORPS

a) Publications (signage, brochures): Not applicable, or none during this reporting period.

b) Workshops and events (date, location, audience, organizer): Not applicable, or none during this reporting period.

c) Public service broadcasts/announcements: Not applicable, or none during this reporting period.

d) Electronic media (website, Listserv, other internet-based outreach): Not applicable, or none during this reporting period.

UNITED STATES FOREST SERVICE

a) Publications (signage, brochures): 3 signs erected on national forest lands in FL

b) Workshops and events (date, location, audience, organizer): Not a workshop, but the State and Private Forestry branch of the USDA Forest Service is working with private landowners on longleaf pine restoration efforts.

c) Public service broadcasts/announcements: Not applicable, or none during this reporting period.

d) Electronic media (website, Listserv, other internet-based outreach): Not applicable, or none during this reporting period.

UNITED STATES FISH AND WILDLIFE SERVICE

a) Publications (signage, brochures): Not applicable, or none during this reporting period.

b) Workshops and events (date, location, audience, organizer) : Not applicable, or none during this reporting period.

c) Public service broadcasts/announcements: Not applicable, or none during this reporting period.

d) Electronic media (website, Listserv, other internet-based outreach): Not applicable, or none during this reporting period.

ALABAMA

a) Publications (signage, brochures): The ADCNR official magazine, Outdoor Alabama, produced a six-page article in the July 2010 issue entitled "Longleaf and Gophers: An Odd Pair Supporting a Full House". Magazine featured a cover photograph of a gopher tortoise with the article describing the association of gopher tortoises and longleaf pine forests, history of decline, and look towards the future.

b) Workshops and events (date, location, audience, organizer): Not applicable, or none during this reporting period.

c) Public service broadcasts/announcements: Not applicable, or none during this reporting period.

d) Electronic media (website, Listserv, other internet-based outreach): ADCNR official website maintains a species profile of the gopher tortoise (http://www.outdooralabama.com/watchable-wildlife/what/Reptiles/Turtles/gt.cfm).

FLORIDA

a) Publications (signage, brochures): A newly created Spanish version of the "Living with Gopher Tortoises" brochure was distributed to more than 500 non-profit, educational, and governmental organizations in Florida. FWC staff also created the "Got Gophers, Get Permits" poster for distribution to planning councils, county and city building departments, and local permitting offices. Additionally, staff developed a field manual for FWC law enforcement officers to help address wildlife complaints related to gopher tortoises in an effective and consistent manner statewide. A fact sheet for Recipient Sites was also developed and distributed to private landowners enrolled in FWC's landowner Assistance Program. The fact sheet, along with all gopher tortoise

publications, is available for free download on our website: MyFWC.com/GopherTortoise.

b) Workshops and events (date, location, audience, organizer): To enhance the protection and conservation of gopher tortoises and gopher tortoise habitat statewide, FWC developed a training workshop for agency law enforcement officers. This training will help FWC officers address wildlife complaints related to gopher tortoises in an effective and consistent manner statewide. Additionally a series of seven workshops were conducted in Bay, Clay, Citrus, Collier, Martin, Polk, and Taylor County. The workshops were attended by over 200 representatives primarily from public organizations. Citizens were further engaged in gopher tortoise conservation through two stakeholder meetings held 2/26/10 in Lecanto, Florida, and 9/24/2010 in Gainesville, Florida. A facilitator's training and companion teacher's curriculum was developed and implemented in October 2010 at a FWC-sponsored Project Wild training. This curriculum has been duplicated on DVDs that is available upon request to teachers in Florida. The curriculum meets Florida's Sunshine Standards for education.

c) Public service broadcasts/announcements: The gopher tortoise was the cover feature article of the May/June 2010 issue of FWC's magazine Florida Wildlife. Additionally, a full-page newspaper insert ran throughout Florida called the "Featured Critter." The goal is to reach a broad public audience with key facts about gopher tortoises and the gopher tortoise conservation efforts underway in Florida. In June 2010, a press release was circulated to notify citizens of updates to the Gopher Tortoise Permitting Guidelines.

d) Electronic media (website, Listserv, other internet-based outreach): The online gopher tortoise permitting system was expanded to include additional permit application types online for easy access by the public.

GEORGIA

a) Publications (signage, brochures): No new GA DNR-WRD publications were produced during the reporting period, but three items have been reprinted and/or widely distributed during this time. A tear-sheet specific to the gopher tortoise in GA is made available to educators across the state and is regularly set out on tables at pertinent public events. Similar use is given to a Longleaf Pine-Wiregrass Community Access Guide booklet, although it contains information on other animals, plants, and issues beyond just tortoises. A booklet entitled "A Landowner's Guide to Conservation Incentives" is provided to interested private landowners, and although it does not have information specific to gopher tortoises, it does provide excellent information on programs that can assist landowners in managing or conserving their lands for tortoises and other species.

b) Workshops and events (date, location, audience, organizer): GA DNR personnel either organized the workshops/events shown in the table below or GA DNR personnel were heavily involved in conducting them. These events reached approximately 1800 people who were instructed on land management and conservation programs beneficial to gopher tortoises, as well as conservation issues facing the gopher tortoise. The table below summarizes each workshop.

Location	Topic/Audience	# in Attendance
McRae	Advanced Project WILD Sandhills Workshop	20
Swainsboro	Pine Tree Festival (DNR sandhills booth)	1000+
Hawkinsville	GA Land Conservation Program	30
Butler	Healthy Forest Reserve Program	50
Donalsonville	Gopher Tortoise Workshop for Landowners	45
Swainsboro	Land Conservation/ Ohoopee Dunes NA	75
Tifton	Master Timber Harvester Workshop	50
Butler	Cons. Management at Fall Line Sandhills NA	15
Atlanta	Endangered Species Day at ATL Botanical Garden	500+
Cusseta	Mead-Westvaco Forester Training	50

c) Public service broadcasts/announcements: Not applicable, or none during this reporting period.

d) Electronic media (website, Listserv, other internet-based outreach):

- Gopher Tortoise conservation was featured in the March 2010 WRD-Nongame Conservation Section's monthly e-newsletter, which has a current distribution of 5,000 addresses. (http://us1.campaign-archive.com/?u=946679e7fe51bbf81ce578cc1&id=f56bae569b&e=&utm_source=WRD+nongame+news&utm_campaign=f56bae569b-DNR_e_news_March_20103_24_2010&utm_medium=email)

- The Gopher Tortoise was also a focal species in the August e-newsletter. (http://us1.campaign-archive.com/?u=946679e7fe51bbf81ce578cc1&id=9cf4951eb7&e=)

- State Parks' quarterly e-newsletter (distribution currently to 1,200 children) for Junior Rangers ("The Georgia Junior Ranger") featured "Creatures of the Longleaf Pine Forest," including the Gopher Tortoise. (http://us1.campaign-archive.com/?u=bee8920090f58e70def4d630a&id=7a05e22078)

- Tortoises were featured in three press releases during this period:

April 19: "Townsend WMA project aimed at restoring sandhills habitat," gopher tortoises mentioned as a key species in logging to remove slash pine and restore longleaf.
(http://jacksonville.com/news/georgia/2010-04-20/story/dnr-restore-sandhills-habitat)

August 30: "States make headway conserving sandhills," review of multistate sandhills project's first year includes coverage of work involving gopher tortoises. (www.georgiawildlife.com/node/2345)

Sept. 1: "Georgia events mark 10th anniversary of wildlife grants," celebration of SWG's first decade briefly mentions gopher tortoises and efforts to keep off the species off the endangered list. (www.georgiawildlife.com/node/2346)

- Lastly, one of the printed documents listed under VIII(a), "A Landowner's Guide to Conservation Incentives," is also available electronically: (http://georgiawildlife.dnr.state.ga.us/documentdetail.aspx?docid=370&pageid=1&category=conservation)

SOUTH CAROLINA

a) Publications (signage, brochures): Andrew Grosse, SREL technician working with SCDNR on AGTHP project submitted a paper on nest guarding behavior in female tortoises.

b) Workshops and events (date, location, audience, organizer): Several of the researchers led a University of Georgia herpetology class on a weekend field trip to the AGTHP in 2010. A local Boy Scout Troop also visited the site for a field trip.

c) Public service broadcasts/announcements: DNR's conservation work with the gopher tortoise at AGTHP was featured in an episode of SCETV's Expedition's with Patrick McMillan, we produced a news release on the AGTHP work.

d) Electronic media (website, Listserv, other internet-based outreach): Not applicable, or none during this reporting period.

POARCH BAND OF CREEK INDIANS

a) Publications (signage, brochures): Two

b) Workshops and events (date, location, audience, organizer): Not applicable, or none during this reporting period

c) Public service broadcasts/announcements: Not applicable, or none during this reporting period.

d) Electronic media (website, Listserv, other internet-based outreach): Not applicable, or none during this reporting period.

AMERICAN FOREST FOUNDATION

a) Publications (signage, brochures): AFF has distributed Gopher Tortoise Conservation Awareness signs as well as the Pine Ecosystem Handbook for the Gopher Tortoise to over 50 landowners and resource professionals that requested them in Florida, Georgia and Alabama. These landowners and resource professionals own or impact decisions on over 97,500 acres across the southeast. Landowners that request signage must provide AFF with information on how their forest management benefits pine ecosystem conservation and gopher tortoise habitat. AFF also wrote about the gopher tortoise in two publications:

- Gartner, T. "Habitat Credit Trading" PERC Reports, Improving Environmental Quality Through Markets. Spring 2010.
- Gartner, T. "Voluntary Gopher Tortoise Habitat Credit Trading System." Mountain Forum Bulletin, Payments for Environmental Services edition. Dec 2009.

b) Workshops and events (date, location, audience, organizer): AFF has presented at many events throughout the past year. These events include:

- October 15-16, 2009, Ann Arbor, Michigan, University of Michigan Ross School of Business Net Impact Conference: Markets with a Mission. Audience: business leaders, students, non-profit organizations concerned with ecological issues that define today's business environment.
- May 3-6, 2010 Austin, Texas, National Mitigation Banking Association Conference. Audience: bankers, regulators and users of mitigation banks.
- May 17-20, 2010, Lake Tahoe, Nevada, Project Learning Tree Conference. Audience: environmental educators and students.
- June 9 - June 11, 2010, Bozeman, Montana, PERC, Workshop III on Property Rights, Markets, and the Environment. Audience: Researchers, environmental entrepreneurs, policy makers, environmental practitioners.
- June 14, 2010, Valencia, Spain, Generalitat Valenciana (Valencia Department of Agriculture). Audience: policy makers.

- June 23-24, 2010 Raleigh-Durham, North Carolina, Ecosystem Markets Conference. Audience: conservation non-profits, federal & state natural resources agencies, academia, the private investment sector, forestry, and private tree farms.
- July 13-15, Burlington, Vermont, 17th National Tree Farm Convention. Audience: Tree Farmers
- July 19-23, 2010, USFWS/The Conservation Fund Conservation Banking Training Workshop: Federal natural resource agencies (Department of Defense, Federal Highways, US Army Corps of Engineers, USDA, USFWS, US Army, US Marine Corps, USDA Office of Environmental Markets, National Oceanic and Atmospheric Administration, Department of Interior).

c) Public service broadcasts/announcements: Not applicable, or none during this reporting period.

d) Electronic media(website, Listserv, other internet-based outreach): AFF maintains a website (http://www.affoundation.org/ccs_sandhill.html) that contains information on the gopher tortoise habitat crediting system.

LONGLEAF ALLIANCE

a) Publications (signage, brochures): Economics of Longleaf Booklet, Brochure on Sandhill Mitigation Credit System (in press)

b) Workshops and events (date, location, audience, organizer):

- 8 Longleaf Academies at SDFEC conducted by LLA
- 4 landowner workshops at Autaugaville, Geneva, Monroeville, SDFEC

c) Public service broadcasts/announcements: Not applicable, or none during this reporting period.

d) Electronic media (website, Listserv, other internet-based outreach): Not applicable, or none during this reporting period.

SECTION IX LEGAL PROTECTION MEASURES

This section provides information on any gopher tortoise-related laws, rules, regulations, policies, etc. proposed, passed, or put in place either by the various signatory agencies and organizations or that will affect them during the reporting period.

ARMY

a) State laws, rules and regulations: Not applicable, or none during this reporting period.

b) Agency policies/directives/compliance documents: Not applicable, or none during this reporting period.

NAVY

a) State laws, rules and regulations: Not applicable, or none during this reporting period.

b) Agency policies/directives/compliance documents: Not applicable, or none during this reporting period.

AIR FORCE

a) State laws, rules and regulations: Not applicable, or none during this reporting period.

b) Agency policies/directives/compliance documents: Not applicable, or none during this reporting period.

UNITED STATES MARINE CORPS

a) State laws, rules and regulations: Not applicable, or none during this reporting period.

b) Agency policies/directives/compliance documents: Not applicable, or none during this reporting period.

UNITED STATES FOREST SERVICE

a) State laws, rules and regulations: Not applicable, or none during this reporting period.

b) Agency policies/directives/compliance documents: Forest Supervisor's Closure Order Banning the Gassing of Gopher Tortoise Burrows originated in 2002 and reauthorized in 2007 (through 2012). Clause in Timber Sale Contracts – CT6.24 – Site Specific Special Protection Measures: "To protect gopher tortoise burrows, log decks and skid trails will be agreed upon in advance by the Forest Service and the Purchaser. Within the Sale Area, gopher tortoise burrows will be protected from damage by all motorized vehicles."

UNITED STATES FISH AND WILDLIFE SERVICE

a) State laws, rules and regulations: Not applicable, or none during this reporting period.

b) Agency policies/directives/compliance documents: Not applicable, or none during this reporting period.

ALABAMA

a) State laws, rules and regulations: Adopted by the Alabama Conservation Advisory Board in March 2009, an addition to an existing regulation was enacted in 2010 stating "it shall be unlawful to concentrate, drive, rally, molest, or to hunt, take, capture or kill or attempt to hunt, take capture or kill any bird or animal from or by the aid of gasoline or any noxious chemical or gaseous substance to drive wildlife from their burrows, dens, or retreats". The regulation is 220-2-1 Prohibited Methods and Devices for Hunting.

b) Agency policies/directives/compliance documents: Not applicable, or none during this reporting period.

FLORIDA

a) State laws, rules and regulations: Over the past year, FWC worked with stakeholders and developed rules for imperiled species in Florida. Additional new rules were enacted to eliminate permitting duplication and confusion between federal and state listed species. Along with the new imperiled species rule, the airport safety rule was developed and implemented allowing airports in Florida to take and harass wildlife that pose a safety threat within airport safety areas. The revised rule can be accessed here: http://www.myfwc.com/docs/WildlifeHabitats/Chapter_68A-27_final.pdf

b) Agency policies/directives/compliance documents: Three new permits were approved and two were implemented. Expected implementation of the Disturbed Site permit will take place after further revision in 2011.

- Disturbed Site permit will be used when sites are prematurely cleared before relocation of tortoises has occurred or when the clearing prevents burrow surveys to be accurately verified.
- Burrow and Structure Safety—this permit is intended for on-site relocation of tortoises when burrows have compromised public safety or an existing structure. The "Burrow or Structure Protection" permit option is used only when FWC education efforts do not provide relief and assurance to homeowners where a tortoise has burrowed under an existing structure.
- Research Recipient Site permit authorizes properties to receive displaced tortoises in order to carry out FWC-permitted research projects that further the goals of the Gopher Tortoise Management Plan.

GEORGIA

a) State laws, rules and regulations: Not applicable, or none during this reporting period.

b) Agency policies/directives/compliance documents: Not applicable, or none during this reporting period.

SOUTH CAROLINA

a) State laws, rules and regulations: Not applicable, or none during this reporting period.

b) Agency policies/directives/compliance documents: The Management Plan for Tillman Sandridge Heritage Preserve was updated and approved by the SCDNR Board. A Conservation Strategy for the Gopher Tortoise in South Carolina was finalized and is currently under review by DNR leadership.

POARCH BAND OF CREEK INDIANS

a) State laws, rules and regulations: Not applicable, or none during this reporting period.

b) Agency policies/directives/compliance documents: Not applicable, or none during this reporting period.

AMERICAN FOREST FOUNDATION

a) State laws, rules and regulations: Not applicable, or none during this reporting period.

b) Agency policies/directives/compliance documents: AFF continues to work with USFWS and other stakeholders to develop a pre-compliance methodology for non-listed species like the gopher tortoise. During this reporting period, we have made significant progress and have been in continual talks with USFWS at the local, regional and national level.

LONGLEAF ALLIANCE

a) State laws, rules and regulations: Not applicable, or none during this reporting period.

b) Agency policies/directives/compliance documents: Not applicable, or none during this reporting period.

SECTION X CCA AGENCY CONSERVATION STRATEGY (SEE CCA SECTION 10.2)

This section provides information on any deviations from the CCA by the various signatory agencies and organizations, or any additional goals or strategies adopted by them beyond those stated in the CCA during the reporting period.

ARMY

a) Deviations from CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

b) New goals and strategies not included under the CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

NAVY

a) Deviations from CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

b) New goals and strategies not included under the CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

AIR FORCE

a) Deviations from CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

b) New goals and strategies not included under the CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

UNITED STATES MARINE CORPS

a) Deviations from CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

b) New goals and strategies not included under the CCA Agency Conservation Strategy: MCSF Blount Island – Still plan on relocating all gopher tortoises to location off of the installation. Once this action is complete MCSF Blount Island will need to be removed from the Gopher Tortoise CCA.

UNITED STATES FOREST SERVICE

a) Deviations from CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

b) New goals and strategies not included under the CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

UNITED STATES FISH AND WILDLIFE SERVICE

a) Deviations from CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

b) New goals and strategies not included under the CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

ALABAMA

a) Deviations from CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

b) New goals and strategies not included under the CCA Agency Conservation Strategy: Discussions with the U.S. Fish and Wildlife Service were held in March 2010 aimed at a possible future adoption of a gopher tortoise/black pine snake safe harbor agreement/candidate conservation agreement with assurances.

ADCNR is a continuing partner in a Multistate Sandhills Ecological Restoration Plan which received State Wildlife Grant funding in 2009 with goals to enhance and restore over 30,000 acres of sandhills habitat throughout the gopher tortoise's eastern range by 2012.

FLORIDA

a) Deviations from CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

b) New goals and strategies not included under the CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

GEORGIA

a) Deviations from CCA Agency Conservation Strategy: The CCA strategy for Georgia includes potential translocation efforts involving tortoises displaced by development in Florida. Since the finalization of the CCA, the Florida tortoise stakeholders' group declined to allow Florida animals to be moved to other states. The translocation efforts remain the same; however, non-Florida sources of tortoises will be used, as they become available. No other deviations have been made.

b) New goals and strategies not included under the CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

SOUTH CAROLINA

a) Deviations from CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

b) New goals and strategies not included under the CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

POARCH BAND OF CREEK INDIANS

a) Deviations from CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

b) New goals and strategies not included under the CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

AMERICAN FOREST FOUNDATION

a) Deviations from CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

b) New goals and strategies not included under the CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

LONGLEAF ALLIANCE

a) Deviations from CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

b) New goals and strategies not included under the CCA Agency Conservation Strategy: Not applicable, or none during this reporting period.

Appendix I - Poarch Band of Creek Indians: Executive Summary

POARCH BAND OF CREEK INDIANS

5811 Jack Springs Road • Atmore, Alabama 36502
Tribal Offices: (251) 368-9136 • Administrative Fax: (251) 368-4502
www.poarchcreekindians-nsn.gov

GOPHER/TORTOISE UPDATE

POARCH BAND OF CREEK INDIANS

JANUARY, 2011

By: Laura Lee Cook, Environmental Director

The Gopher/Tortoise project for Poarch Band of Creek Indians is located at Magnolia Branch, a large Reserve along the Big Escambia, Little Escambia, and Sizemore Creek area. The nearest town is Atmore, Alabama. Mobile, Alabama is the nearest city and located approximately 60 miles to the east and Pensacola, Florida located 60 miles to the south with Montgomery Alabama located 150 miles north.

We have a population of gopher/tortoise somewhere in the neighborhood of 25-30. Some of these were already located in the area but others have been brought in when they were found along roadways, or in construction sites where they might not survive. We have a multitude of burrows where we find small gopher/tortoise as well as large or fully grown ones.

This year we relocated the habitat before burning and/or clearing a major parcel of land for planting long-leaf pines. We have a silk fence around the new area in order for the gopher/tortoise to become acclimated to the new surroundings. After a few months, this fence will be removed as it was in the last area where we had first established an area for the new ones.

We are in the process of erecting a large sign near the entrance to the park and in the area where the gopher/tortoise population is actually located. In this way, more visitors will be aware of the habitat and hopefully join in on "saving" the gopher/tortoise.

See pictures attached.

Seeking Prosperity and Self Determination

Appendix II - Definitions (please see the GTCCA for a full list of definitions)

Habitat without a designated special protection status – applies to lands that are included in a management plan: this could consist of state public lands under a state management plan; Department of Defense installations (with a signed/approved Integrated Natural Resources Management Plan - INRMP).

Integrated Natural Resources Management Plan (INRMP) - a document that supports the military mission by combining a series of component plans into an ecosystem management approach and is the primary tool for managing species and their habitats on military installations. INRMPs are statutory driven natural resources management plans required by the Sikes Act.

Long-term protection (habitat) – applies to either privately owned lands placed under a perpetual (i.e., endless duration) conservation easement, or publicly owned lands purchased for conservation purposes where either restrictions on the acquisition funding source or government commitment (through ordinances or other regulations) would prevent or prohibit the eventual sale or development of the property.

Protected (habitat) – applies to any land that is protected from any future development (i.e. take of habitat).

Short-term protection (habitat) – applies to either privately or publicly owned lands that have some enforceable protection commitment, but those commitments do not meet the definition of "long-term protection."

Unprotected Site (habitat) – applies to lands that do not have any enforceable protection commitments or use restrictions that would prevent them from being modified and made unsuitable for tortoises.

Appendix III - List of Acronyms

ACDPS	Alachua County Department of Public Safety
ADCNR	Alabama Department of Conservation and Natural Resources
AFB	Air Force Base
AFF	American Forest Foundation
AGTHP	Aiken Gopher Tortoise Heritage Preserve
APAFR	Avon Park Air Force Range
ARRA	American Recovery and Reinvestment Act
BRAC	Base Closure and Realignment Commission
CA	Conservation Area
CCA	Candidate Conservation Agreement
CCAA	Candidate Conservation Agreement with Assurances
CCAFS	Cape Canaveral Air Force Station
DEP	Florida Department of Environmental Protection
DOF	Florida Division of Forestry
DOD (or DoD)	Department of Defense
FDACS	Florida Department of Agriculture and Consumer Services
FLARNG	Florida National Guard
FWC	Florida Fish and Wildlife Conservation Commission
GIS	Geographic Information System
GPS	Global Positioning System
GT	Gopher Tortoise
GTHP	Gopher Tortoise Heritage Preserve
GTT	Gopher Tortoise Team
INRMP	Integrated Natural Resources Management Plan
LLA	Longleaf Alliance
LIP	Landowner Incentive Program
MCSF	Marine Corps Support Facility
MCLB	Marine Corps Logistics Base
MOCC	Mobile Operations Control Center
NA	Natural Area
NAS	Naval Air Station
NSB	Naval Submarine Base
OSBS	Ordway-Swisher Biological Station
PFA	Public Fishing Area
SCDNR	South Carolina Department of Natural Resources
SERPPAS	Southeast Regional Partnership for Planning and Sustainability
SF	State Forest
SJRWMD	St. Johns River Water Management District
SP	State Park
SREL	Savannah River Ecology Laboratory
SW	Space Wing

APPENDIX C: Indigo Snake Protection Measures

TYNDALL AFB DIVISIONOF NATURAL RESOURCES

Eastern Indigo Snake Protection Plan

Installation of a Reclaimed Water Irrigation System Improvement Project

3/1/2011

Eastern Indigo Snake

(Drymarchon corais couperi)

The eastern indigo snake *(Drymarchon corais couperi)* is a large, **non-poisonus**, and relatively docile snake. The eastern indigo snake is listed as a Threatened Species by the U.S. Fish and Wildlife Service and the Florida Fish and Wildlife Conservation Commission and is therefore protected from being captured, harmed, harassed, wounded, hunted, etc. Although rare, the eastern indigo snake may occur in any habitat in the project area.

Life History And Ecology

The eastern indigo snake is shiny, blue-black or glossy black in color with cream, orange or reddish color around the chin, throat and side of the head. It is a thick-bodied snake that can reach 8.6 feet in length but smaller individuals (6 feet) are more commonly seen. Although some young indigos exhibit a lighter coloring and speckled pattern on their back, the young generally resemble the adults. Eggs are laid in May or June (5-10 eggs), hatchlings may appear as late as August and September. Hatchlings are 18-24 inches long with a black body and usually have a blue and white speckled pattern on the back and tail. The eastern indigo snake is most commonly confused with two similar species; black ratsnake (*Elaphe obsoleta obsoleta*) and southern black racer (*Coluber constrictor priapus*). An identification guide to common black snakes is available in Appendix A.

Figure 1. Eastern Indigo Snake Head Colors
Credit : Pattavia, P./USFWS

Figure 2. Eastern Indigo Snake Common Sighting
Credit :Mount R./USFWS

The indigo snake is diurnal, i. e., active during the day. In the construction area, the indigo snake is most likely to be found along the edges of wetlands and other water bodies where food is abundant. It feeds on fish, frogs, toads, lizards, snakes, small turtles, birds, and small mammals. This snake also prefers large woody debris piles in pine flatwoods and hardwoods communities.

Laws and Enforcement

The eastern indigo snake is listed as a *threatened* species by the U.S. Fish and Wildlife Service. Under Section 9 of the Endangered Species Act of 1973 (16 U.S.C. 1531), as amended, it is unlawful for any person to "take" any threatened species. The term "take" is defined as "…harass, harm, pursue, hunt, shoot wound , kill, trap, capture, or collect, or attempt to engage in any such conduct."

The eastern indigo snake is listed as a state *threatened* species by the Florida Fish and Wildlife Conservation Commission. Under the State of Florida Wildlife Code Rule, Chapter 39 of the State Administrative Code, Rule 39-27.002 states the "No person shall pursue, molest, harm, harass, capture or possess any endangered or threatened species or parts thereof or their nest or eggs…". Additionally, Rule 39-27.011 states that "No person shall kill, attempt to kill, or wound any endangered or threatened species".

Figure 3. USFWS Fish and Wildlife Biologist holds a threatened Eastern indigo snake (Drymarchon corais couperi). Credit :Pattavia, P./USFWS

Violating these federal and state laws could be punishable with fines up to $50,000 and/or one year imprisonment for crimes involving endangered species, and $25,000 and/or six months imprisonment for crimes involving threatened species. Misdemeanors or civil penalties are punishable by fines up to $25,000 for crimes involving endangered species and $12,000 for crimes involving threatened species.

What Should You Do If You See An Eastern Indigo Snake On-Site?

- Stop all Construction activity in the vicinity of the snake.
- Allow the snake to exit the construction area on its own and without aid or interference.
- Location of live sightings shall be reported to the Primary Contact (Marybeth Morrison, Solid Waste Authority, Environmental Programs Supervisor) or if unavailable then the contractor should contact the Authority's Construction Environmental Liaison (specified on the following page). The Authority will then contact the USFWS Panama City field office at (850) 769-0552 and FWC (941) 575-5765 for further instruction.
- Once the snake has left the area, then construction activities can resume.

What Should You Do If You Find a Dead Eastern Indigo Snake On-Site?

- Stop all Construction activity in the vicinity of the snake.
- Location of the snake shall be reported to the Primary Contact (Marybeth Morrison) or if unavailable then the contractor should contact the Authority's Construction Environmental Liaison (specified below). The Authority will either perform or direct the collection and preservation of the dead snake. Preservation will involve soaking the dead snake in water and freezing it immediately. The Authority shall consult with the USFWS Panama City field office at (850) 769-0552 for further instruction.

Reporting Contacts for Eastern Indigo Snake Sightings

Primary Contact

Tyndall AFB Division of Natural
Resources
Wildlife Biologist A Civ USAF AETC
325 CES/CEAN
Wendy Jones (850) 527-2009

Secondary Contacts (For use when Primary Contact is unavailable)

Tyndall's Natural Resource Office:
(850) 283-2822

Construction Personnel Education for the Eastern Indigo Snake

Provide eastern indigo snake educational information to construction personnel prior to the initiation of any clearing or construction. An educational exhibit, approved by USFWS, will be posted in a conspicuous on-site location accessible to employees.

1. Educational information shall be posted and distributed to all construction personnel. The exhibit and brochure includes photographs of the eastern indigo snake, information on life history and legal protection of the species in Florida, and how to avoid impacts to the species. This material shall be supplied by the Authority at the pre-construction meeting.

2. To reduce any potential for harm to the eastern indigo snake, the following plan will be utilized to educate construction personnel and Authority staff of the possible presence of the protected eastern indigo snake in the project area prior to and during construction.

3. Construction personnel will be informed of the possible presence of the eastern indigo snake at the pre-construction meeting.

4. Construction personnel will be provided a description of the eastern indigo snake along with information on the ecology of the species at the pre-construction meeting. A copy of the educational material is available in Appendix B of this document.

5. Color photographs of the eastern indigo snake will be provided at the pre-construction meeting.

6. At the pre-construction meeting, construction personnel will be informed of the protection status of the eastern indigo snake and the penalties that may be imposed if regulations are violated.

7. At the pre-construction meeting, a sufficient number of exhibits will be provided in order to ensure that the materials are conspicuously posted at the construction site. A copy of the exhibit to be posted is available in Appendix C.

8. The Authority or it's Construction Environmental Liaison will verify that the exhibits have been conspicuously posted prior to construction and will periodically confirm the posting of this exhibit during construction.

References

Ashton, R. E., Jr. and P. S. Ashton. 1988. Handbook of Reptiles and Amphibians of Florida, Part One, The Snakes. Windward Publishing, Inc., Miami, Florida.

Johnson, S. A. and M. E. McGarrity. 2006. "Black Snakes": Identification and Ecology. WEC214, Department of Wildlife Ecology and Conservation, Institute of Food and Agricultural Sciences, University of Florida. Published November 2006. Reviewed November 2009.

Logan, T.H. 1997. Florida's Endangered Species, Threatened Species, and Species of Special Concern. Florida Game and Fresh Water Fish Commission, Tallahassee, FL

Moler, P. E. 1992. Rare and Endangered Biota of Florida, Amphibians and Reptiles. Volume 111. University Press of Florida, Tallahassee, Florida.

Smith, T-I. M. and E. D. Brodie, Jr. 1982. A Guide to Field Identification; Reptiles of North America. Golden Press, New York.

Steiner, T.M., O.L. Bass, Jr., and J.A. Kushlan. 1983. Status of the eastern indigo snake in southern Florida National Parks and vicinity. S. FL. Res. Ctr. Rept. SFRC-83/01. 25 pp. (Everglades National Park, Homestead, Florida).

U.S. Fish and Wildlife Service. 1982. Eastern Indigo Snake Recovery Plan. U.S. Fish and Wildlife Service. Atlanta, Georgia. 23 pp.

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Appendix A

WEC214

UF UNIVERSITY of FLORIDA
IFAS Extension

"Black Snakes": Identification and Ecology[1]

Steve A. Johnson and Monica E. McGarrity[2]

Introduction

The southeastern United States is home to a great diversity of snakes. There are about 45 species of snakes (only 6 of which are venomous) that may be found along the Atlantic and Gulf coastal states from Louisiana to North Carolina. These snakes live in a variety of upland and wetland habitats and play important roles in the region's ecology. They are both predators and prey, and thus form important links in natural food webs.

Regrettably, populations of many species of snakes are declining not only throughout the southeastern United States but also worldwide. These declines are largely due to habitat loss and degradation, high mortality on roads and pollution associated with development, agriculture and other human activities. In addition, introduction of invasive species, disease, parasitism and even climate change may exert negative effects on snake populations. Many species of snakes must also withstand pressures caused by unsustainable collection for the pet trade as well as persecution by humans as a result of misinformation or lack of knowledge regarding snakes.

Black-Colored Snakes in the Southeast

Some snake species look quite similar and may be difficult for those inexperienced with snakes to confidently identify. Among these are several species of southeastern snakes commonly called “black snakes” because of their primarily black coloration. These include the Black Swampsnake, Black Ratsnake, Ring-necked Snake, Red-bellied Mudsnake, Black Pinesnake, Eastern Indigo Snake and the Southern Black Racer. The latter two — Eastern Indigo and Black Racer—are the species most often referred to as “black snakes”.

In addition to those listed above, individuals of several species of water snakes, the Eastern Hog-nosed Snake and the venomous Cottonmouth Moccasin may be black colored to a great extent, depending on the age of the individual and the habitat in which it is found. The following is a list of black-colored snakes found in the southeastern U.S., the habitats they occur in and some identifying features. The Eastern Indigo Snake and Southern Black Racer are given special consideration.

1. This document is WEC214, of the Department of Wildlife Ecology and Conservation, Institute of Food and Agricultural Sciences, University of Florida. Published November 2006. Reviewed November 2009. Please visit the EDIS Web Site at http://edis.ifas.ufl.edu. For a better understanding of figures and graphics, please print in a color printer.

2. Steve A. Johnson, Ph.D., Assistant Professor, University of Florida, Gulf Coast REC and Department of Wildlife Ecology and Conservation, Plant City, FL
Monica E. McGarrity, Biological Scientist, University of Florida, Gulf Coast REC, Plant City, FL

Black Swampsnake (*Seminatrix pygaea)*

The Black Swampsnake inhabits coastal areas from North Carolina to Florida (Fig. 1). This small snake (10-15 inches) has smooth scales, a glossy black back and a bright orange belly (Fig. 2). Black Swampsnakes are only found in and around wetlands: primarily cypress swamps, marshes and lake edges, where they feed on tadpoles, worms, small fish, frogs and salamanders. In the U.S., many states have lost as much as 80% of their wetlands, resulting in the loss of great numbers of individuals of species that, like the Black Swampsnake, are restricted to these wetland habitats.

Figure 1. Black Swampsnake Range (shown in black). Credits: Monica McGarrity, University of Florida

Figure 2. Black Swampsnake showing bright orange belly. Credits: John Jensen, Georgia DNR, 27 Aug 2005

Black Ratsnake (*Elaphe obsoleta obsoleta*)

The Black Rat Snake is one of several subspecies of Ratsnakes (Yellow and Gray Ratsnakes are others). Ratsnakes are common throughout the eastern U.S., although the black subspecies of rat snake does not occur in Florida (Fig. 3). This snake can be quite large (it may exceed six feet in length) and has slightly keeled scales (raised ridge along the middle of each scale) that make it appear somewhat rough. Its back is almost entirely black (small flecks of whitish color may show through the black), whereas its chin and belly have a lot of white markings (Fig. 4). Black Ratsnakes are excellent climbers and are found in a great variety of habitats, ranging from pine forests to agricultural fields. They feed primarily on rodents, birds and birds' eggs.

Figure 3. Black Ratsnake Range (shown in black, other Rat Snake subspecies in gray). Credits: Monica McGarrity, University of Florida

Southern Ring-necked Snake (*Diadophis punctatus punctatus*)

Ring-necked Snakes are found throughout most of the eastern U.S. (Fig. 5). These diminutive snakes seldom grow longer than 12 inches. Ring-necked Snakes have smooth scales and a black or dark gray back, whereas the belly is a bright orange/yellow, often with a row of black spots. As the name implies, there is an obvious ring of orange/yellow around its neck (Fig. 6, Fig 7). When alarmed or threatened, Ring-necked Snakes coil their tail like a corkscrew.

Figure 4. Black Ratsnake showing white chin and belly markings and white flecks on back. Credits: John Jensen, Georgia DNR, May 2004

These snakes are fairly secretive and may be found under logs and rocks in moist uplands, where they eat earthworms, slugs, small salamanders and small snakes.

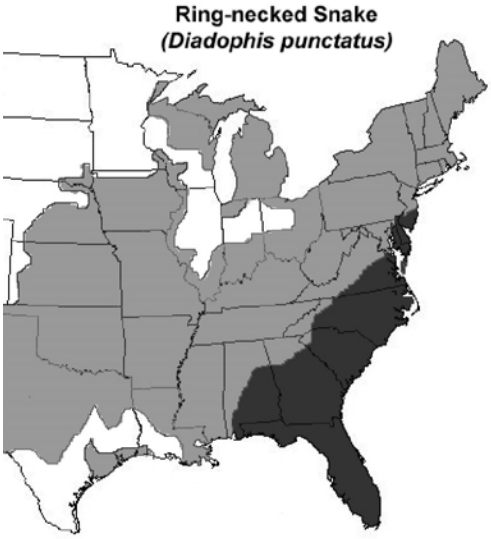

Figure 5. Southern Ring-necked Snake Range (shown in black, other ring-necked subspecies in gray). Credits: Monica McGarrity, University of Florida

Eastern Mudsnake (*Farancia abacura*)

Mudsnakes are found in coastal areas and river basins in the southeastern U.S. (Fig. 8). They can grow to over six and a half feet in length, but are very docile snakes despite their large size and pose no threat to people. They are thick bodied with smooth, glossy scales and a pointed tail tip (Fig. 9). The back is black, whereas the belly is a checkerboard of black and a reddish pink color that extends up onto the sides

Figure 6. Southern Ring-necked Snake showing typical defensive posture -- note the coiled tail. Credits: Steve A. Johnson, University of Florida

Figure 7. Southern Ring-necked snake showing yellow belly coloration. Credits: Kenneth Krysko, FLMNH, 1996

of the snake. Mudsnakes are highly aquatic and may be found in swamps, lakes and rivers throughout the Southeast, where they feed primarily on large, eel-like aquatic salamanders such as Amphiumas.

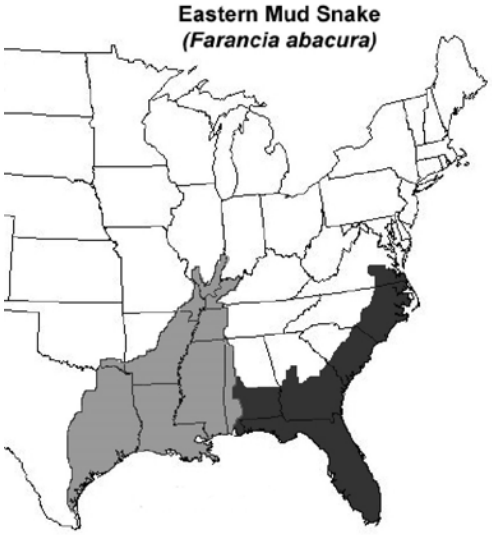

Figure 8. Eastern Mudsnake Range (shown in black, other mud snake species in gray). Credits: Monica McGarrity, University of Florida

Figure 9. Eastern Mudsnake. Credits: Dirk Stevenson, USAEC, 13 June 2006

Black Pinesnake (*Pituophis melanoleucus*)

The Black Pinesnake is one of a group of closely related snake species (includes other Pinesnakes, Bull and Gopher Snakes) with a fairly broad geographical range. However, the range of the Black Pinesnake is relatively limited, and this species is only found in certain parts of the southeastern U.S. (Fig. 10). Black Pinesnakes have keeled scales and a nearly uniform black or dark brown color on their backs and bellies with a faint blotched pattern often seen toward the tail (Fig. 11). Black Pinesnakes, like the other species of pinesnakes, have a distinctive cone-shaped scale on the tip of their snout. These snakes may grow as large as six feet in length. When they feel threatened, pinesnakes will coil and hiss loudly. They prefer dry pinelands with sandy soils and are excellent burrowers, spending much of their lives underground in mammal burrows. They feed mainly on mammals, but will also eat birds.

Eastern Indigo Snake (*Drymarchon couperi*)

Eastern Indigo Snakes are found from southeastern Georgia, Alabama and Mississippi south to the Upper Florida Keys (Fig. 12). These are magnificent, thick-bodied snakes that can grow to over eight feet long, making them the largest native snake in North America (north of Mexico). Their smooth scales are a glossy bluish-black color, including the belly, although the chin and throat may range from light cream to orange or deep maroon in color (Fig. 13). They are usually very docile in nature, but when threatened may hiss loudly and

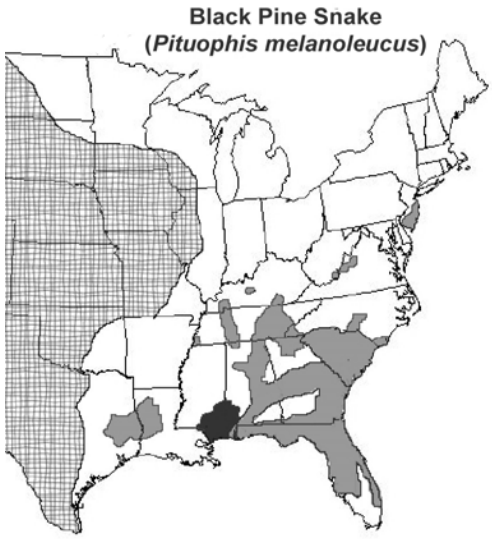

Figure 10. Black Pinesnake Range (shown in black, other pinesnake species in gray, Gopher and Bullsnake in crosshatch). Credits: Monica McGarrity, University of Florida

Figure 11. Black Pinesnake. Credits: Kenneth Krysko, FLMNH, 1996

shake their tail, making a rattling sound if the snake is in dry leaves or debris.

Eastern Indigo Snakes inhabit pine forests, hardwood hammocks, scrub and other uplands. They also rely heavily on a variety of wetland habitats for feeding and temperature regulation needs and are able to swim, even though they are not considered aquatic. In drier upland sites they inhabit the burrows of the Gopher Tortoise, which has resulted in the colloquial name of “blue gopher”. Eastern Indigos are well known and respected for their ability to eat venomous snakes, such as rattlesnakes, Cottonmouths and Copperheads. In addition, they feed on other non-venomous snakes, frogs and rodents.

Habitat loss from development and agriculture, habitat degradation due to lack of fire and human activities, and collection for the pet trade have led to significant reductions in populations of Eastern Indigo Snakes, which are protected throughout their range by state and federal laws. Eastern Indigo Snakes have been listed as a threatened species by the Florida Fish and Wildlife Conservation Commission since 1971 and by the U.S. Fish and Wildlife Service under the Endangered Species Act since 1978, and it is illegal to handle, harass, kill, capture, keep or sell them without a federal permit. However, despite these protections, habitat loss and degradation throughout their range continue to cause the decline of this important snake. You should consider yourself lucky if you see one of these beautiful "black snakes."

Figure 12. Eastern Indigo Snake Range (shown in black). Credits: Monica McGarrity, University of Florida

Southern Black Racer (*Coluber constrictor priapus*)

Black Racers, also known as Eastern Racers, are a group of closely related subspecies that are similar in appearance and range across the eastern half of the U.S. (Fig. 14). The Southern Black Racer, along with several other subspecies of racers, is the true black snake of the southeastern U.S. These snakes are long and slender; the largest reaching up to six feet in length (most are less than four feet long). They have smooth scales and range from jet black to dark gray on their backs and bellies, with chins and throats that are lighter or white in color (Fig. 15).

Figure 13. Eastern Indigo Snake showing maroon chin coloration. Credits: Natalie Hyslop, University of Georgia, Feb 2005

Young Black Racers, though thin like the adults, have an overall appearance much different than adults. Juvenile Black Racers have a series of reddish to brown colored blotches down the middle of their backs on a background color of gray. They also have abundant small, dark specks on their sides and bellies (Fig. 16). Because of these mid-dorsal blotches, juveniles are sometimes confused with the venomous Pygmy Rattlesnake (*Sistrurus miliarius*), which also has blotches down the center of its back. However, Pygmy Rattlesnakes have much heavier bodies and stocky heads with a dark band from the eye to the corner of the jaw.

Despite their scientific name (*Coluber constrictor*), Black Racers do not always constrict their prey, but rather use their speed to chase down a prey animal, grab it with their strong jaws and swallow it alive. Racers are harmless to people and generally attempt to make a speedy escape when approached. However, if they feel threatened and are unable to flee, they may vigorously shake their tail (making a rattling sound on dry leaves), defecate on their captor or even bite if handled.

Black Racers inhabit a great variety of natural habitats, ranging from pine forests to the Florida Everglades. They are active during the day and are one of the most commonly encountered snakes in suburban yards and parks. As their name implies, they are swift and agile. They spend most of their

lives on the ground, yet are excellent climbers and may be found in shrubs and small trees. Black Racers eat a variety of prey items including frogs, lizards, mice, rats, small snakes and even birds' eggs.

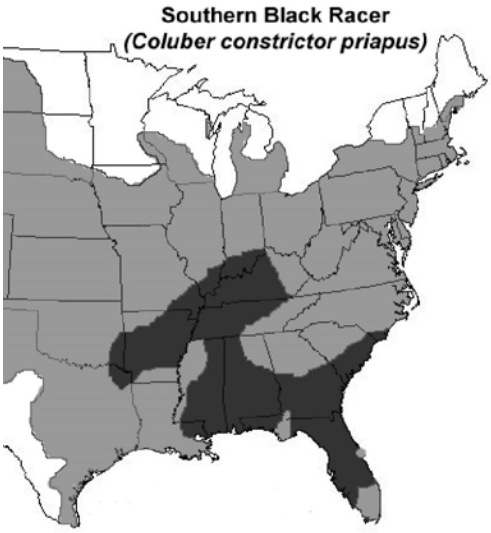

Figure 14. Southern Black Racer Range (shown in dark gray, other black racer subspecies in light gray). Credits: Monica McGarrity, University of Florida

Figure 15. Southern Black Racer (Adult). Credits: Steve A. Johnson, University of Florida, 4 June 2005

Summary

In spite of great variation in body size, habitat use, diet and behavior, the lack of bold, readily apparent distinguishing marks can make identification of these "black snakes" a daunting task for those inexperienced with snakes. Nonetheless, an informed observer can readily recognize the bright orange belly of the Black Swamp Snake or the namesake ringed neck of the Ring-necked Snake, and may quickly learn to distinguish between the smooth, glossy sheen of the Eastern Indigo or Black Racer and the keeled, somewhat rough look of the Black Pine and Black Rat Snakes. These snakes may seem nondescript at first glance, though knowledge of these and other more subtle, yet telltale characteristics will assist in the rewarding task of becoming familiar with the "black snakes" of the southeastern U.S.

Figure 16. Southern Black Racer (Juvenile) - note the slender body and reddish colored blotches. Credits: Steve A. Johnson, University of Florida

Fortunately, there are a variety of books and web sites that are extremely helpful references for use in determining the identity of an unknown non-venomous or venomous snake. In addition, these references will assist you in learning even more about the ecology of our native snakes, and may help to further your understanding of the threats facing these species and the importance of protecting them. Certainly, knowledge is the key to understanding that the only good snake is NOT a dead snake, and that these species play vital roles in the habitats in which they are found – an important lesson that must be learned and passed on before it is too late for already threatened species like the Eastern Indigo Snake.

Snake Identification Resources

Web Sites

Florida Museum of Natural History—Online guide to Florida Snakes
http://www.flmnh.ufl.edu/natsci/herpetology/FL-GUIDE/onlineguide.htm

University of Florida EDIS Documents - Venomous Snakes

Dealing with Venomous Snakes in Florida School Yards http://edis.ifas.ufl.edu/UW225

Emergency Snakebite Action Plan http://edis.ifas.ufl.edu/UW226

Preventing Encounters Between Children and Snakes http://edis.ifas.ufl.edu/UW227

Recognizing Florida's Venomous Snakes http://edis.ifas.ufl.edu/UW229

Florida Fish and Wildlife Conservation Commission - Snakes
http://www.wildflorida.org/critters/snakes.asp

University of Georgia—Snakes of Georgia and South Carolina
http://www.uga.edu/srelherp/snakes/index.htm

Georgia Wildlife Federation - Reptiles of Georgia
http://www.gwf.org/resources/georgiawildlife/reptileindex.html

Alabama Department of Conservation and Natural Resources Snakes in Alabama
http://www.dcnr.state.al.us/watchable-wildlife/what/Reptiles/Snakes/

Books and Guides

Gibbons, W. & M. Dorcas. 2005. *Snakes of the Southeast.* University of Georgia Press, 253 pp.

Carmichael, P. & W. Williams. 1991. *Florida's Fabulous Reptiles and Amphibians.* Tampa: World Publications.

Conant, R. & J. Collins. 1998. *A Field Guide to Reptiles and Amphibians: Eastern and Central North America.* New York: Houghton Mifflin Company, xvii + 616pp, illustr.

Baylor, J.L. & F.W. King. 1998. *National Audobon Society Field Guide to North American Reptiles and Amphibians.* New York: Knopf/Chanticleer Press, 743pp, illustr.

Appendix B

What Should You Do If You Find a Dead Eastern Indigo Snake On-Site?

- Stop all Construction activity in the vicinity of the snake.
- Report to Tyndall AFB Wildlife Biologist. Tyndall will either perform or direct the collection and preservation of the dead snake. Preservation will involve soaking the dead snake in water and freezing it immediately.
- Tyndall shall consult with the USFWS Panama City field office at (850) 769-0552 immediately for further instruction.

Project Contacts for Indigo Snake Sightings:

Tyndall AFB Division of Natural Resources
Wildlife Biologist A Civ USAF AETC 325 CES/CEAN
Wendy Jones
(850) 527-2009

If the Wildlife Biologist Contact is unavailable, please contact Tyndall's Natural Resource Office:
(850) 283-2822

The eastern indigo snake is most commonly confused with two similar species; black ratsnake (Elaphe obsoleta obsoleta) and southern black racer (Coluber constrictor priapus). Adults of these species are shorter in length, have thin bodies and are white under the chin and body.

For more information:

Ashton, R. E., Jr. and P. S. Ashton. 1988. Handbook of Reptiles and Amphibians of Florida, Part One, The Snakes. Windward Publishing, Inc., Miami, Florida.

Logan, T.H. 1997. Florida's Endangered Species, Threatened Species, and Species of Special Concern. Florida Game and Fresh Water Fish Commission, Tallahassee, FL

Moler, P. E. 1992. Rare and Endangered Biota of Florida, Amphibians and Reptiles. Volume 111. University Press of Florida, Tallahassee, Florida.

U.S. Fish and Wildlife Service. 1982. Eastern Indigo Snake Recovery Plan. U.S. Fish and Wildlife Service. Atlanta, Georgia. 23 pp.

Brochure developed by the Environmental Restoration Division of PIKA/Pirnie JV.

EASTERN INDIGO SNAKE
Protection Plan

LEARN MORE INSIDE

EASTERN INDIGO SNAKE

LIFE HISTORY AND ECOLOGY

The eastern indigo snake is shiny, blue-black or glossy black in color with cream, orange or reddish color around the chin, throat and side of the head.

It is a thick-bodied snake that can reach 8.6 feet in length but smaller individuals (6 feet) are more commonly seen. Eggs are laid in May or June (5-10 eggs), hatchlings may appear as late as August and September.

Hatchlings are 18-24 inches long with a black body and usually have a blue and white speckled pattern on the back and tail. Despite the speckled pattern on their back, the young generally resemble the adults.

The indigo snake is diurnal, i. e., active during the day. The indigo snake is most likely to be found along the edges of wetlands and other water bodies where food is abundant. This snake also prefers large woody debris piles in pine flatwoods and hardwoods communities.

Protection Status

The eastern indigo snake is listed as a **threatened species** by the U.S. Fish and Wildlife Service. Under Section 9 of the Endangered Species Act of 1973 (16 U.S.C. 1531), and the State of Florida Wildlife Code Rule, Chapter 39 of the State Administrative Code, Rule 39-27.002, as amended, it is unlawful for any person to "take" any threatened species. The term "take" is defined as "...harass, harm, pursue,, hunt, shoot wound , kill, trap, capture, or collect, or attempt to engage in any such conduct."

Violating these laws with regard to the Indigo snake is punishable with fines up to $25,000 and/or six months imprisonment. Misdemeanors or civil penalties are punishable by fines up to $25,000 for crimes involving endangered species and $12,000 for crimes involving threatened species.

What Should You Do If You See An Eastern Indigo Snake On-Site?

- Stop all Construction activity in the vicinity of the snake.
- Allow the snake to exit the construction area on its own and without aid or interference.
- Report to the Authority's Environmental Programs Supervisor. The Authority will contact the USFWS Panama City field office at (850) 769-0552 for further instruction.
- Once the snake has left the area, then construction activities can resume.

Appendix C

WARNING

PROTECTED BY LAW

The protected Eastern Indigo Snake (Drymarchon corais couperi) may exist on this site.

Photography and Video imaging have been used to Document this Protected Species!

It is a FEDERAL Violation of the Endangered Species Act of 1973 (16 U.S.C. 1531), Under Section 9 as amended, it is unlawful for any person to "take" any threatened species. The term "take" is defined as "…harass, harm, pursue,, hunt, shoot wound , kill, trap, capture, or collect, or attempt to engage in any such conduct."

It is a Violation of the State of Florida Administrative Code, Chapter 39 Rule 39-27.002 states the "No person shall pursue, molest, harm, harass, capture or possess any endangered or threatened species or parts thereof or their nest or eggs…". Additionally, Rule 39-27.011 states that "No person shall kill, attempt to kill, or wound any endangered or threatened species".

Protected Species Violations will be Prosecuted!

Project Contacts for Indigo Snake Sightings:

Tyndall AFB Division of Natural Resources
Wildlife Biologist A Civ USAF AETC 325 CES/CEAN
Wendy Jones
(850) 527-2009

If the Wildlife Biologist Contact is unavailable, please contact Tyndall's Natural Resource Office: (850) 283-2822

TSR	Tillman Sandridge Heritage Preserve
UF	University of Florida
URTD	Upper Respiratory Tract Disease
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WEA	Wildlife and Environmental Area
WMA	Wildlife Management Area
WRD	Wildlife Resources Division
WRI	World Resources Institute