

Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

Camp Blanding Joint Training Center
Clay County, FL



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Prepared by the U.S. Fish and Wildlife Service, Florida Armory Board, and the Florida Fish and Wildlife Conservation Commission in cooperation with the Army National Guard

March 28, 2017

EXECUTIVE SUMMARY

In the Southeast Region of the U.S. Fish and Wildlife Service, there are 470 Federal candidate species and other at-risk species ranging from narrow endemics to wide-ranging mammals and birds. Given the number and diversity of these species, it is clear that a monumental effort is needed for their conservation. Approaching such a task with a single-species mindset would be both ineffective and inefficient.

The need to develop Candidate Conservation Agreements with Assurances that cover large geographic areas and address the needs of multiple species was emphasized in the Southeast Region's Ecological Services Work Plan for fiscal year 2013 and beyond (Service 2013). To further the Work Plan's "Desired Future Condition of At-Risk Species Conservation," this Candidate Conservation Agreement with Assurances is designed to deliver conservation at the habitat scale. The premise of this strategy is that most candidate and at-risk species face threats associated with loss and/or degradation of habitat (a description of the substantive habitats addressed in this CCAA is discussed in the Description of the Enrolled Lands section below).

Through this Candidate Conservation Agreement with Assurances, the State of Florida Armory Board will implement conservation actions on portions of the Camp Blanding Joint Training Center to effectively protect, restore, and manage the candidate and at-risk species' (Covered Species) habitat so as to eliminate or reduce threats to a level that precludes or removes the need to list a species under the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 *et seq.*). Three conservation objectives and multiple conservation actions are presented in this Agreement to accomplish this goal. Where threats other than habitat loss and degradation are known, this Candidate Conservation Agreement with Assurances addresses specific actions to reduce or eliminate them.

This Candidate Conservation Agreement with Assurances is unique in that the Covered Species are Federal candidates and/or species that are listed by the Florida Fish and Wildlife Conservation Commission (Commission) as State-threatened species or species of special concern. Through this Agreement and the associated Enhancement of Survival Permit, the Armory Board will receive regulatory assurances from the Service in the event a Covered Species is Federally-listed in the future as well as from the Commission for the Covered Species that are State-listed as of the effective date of this Agreement.

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in North Florida**

Camp Blanding Joint Training Center
Clay County, FL
Agreement Number 1448-XXX-XXX

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1.0 INTRODUCTION

Candidate Conservation Agreements with Assurances, (“Agreement” or “CCAA”) are voluntary commitments made by non-federal partners to undertake actions that will remove or reduce threats to candidate and other at-risk species. Conservation actions included in a CCAA must significantly contribute to the elimination of the need to list species identified in the CCAA. Correspondingly, the goal of any CCAA is to preclude the need to list species under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*). This Agreement is part of the State of Florida Armory Board’s application to the U.S. Fish and Wildlife Service, a bureau of the U.S. Department of the Interior, for an Enhancement of Survival Permit. The conservation actions specified in the Agreement will be implemented in accordance with the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(ESA), the U.S. Fish and Wildlife Service’s Final Policy for Candidate Conservation Agreements with Assurances (64 Federal Register 32726-32736) (Final Policy), and 50 C.F.R. §§ 13 and 17, and in accordance with the Florida Fish and Wildlife Conservation Commission’s rules relating to Endangered or Threatened Species, Chapter 68A-27. The goals and objectives of this Agreement will be accomplished through implementation of the conservation actions set forth in this Agreement. Successful implementation of this Agreement will protect and enhance the habitat of the covered species, which is the single-most common threat to all the species.

This Candidate Conservation Agreement with Assurances is effective and binding on the date last signed below (“Effective Date”). This Agreement is between the State of Florida Armory Board (Armory Board), the Florida Fish and Wildlife Conservation Commission (FWC), and the U.S. Fish and Wildlife Service (Service), with cooperation and concurrence from the Army National Guard. As required by CCAA policy, the signatories to this CCAA are non-federal entities. Therefore, the Armory Board, FWC, and the Service are collectively the “Parties” to this agreement. However, the Department of Defense (DoD), through the Army National Guard, is named as a cooperator and concurring party because the predominant land use of the property enrolled in this CCAA is readiness training for various branches of the armed services under the DoD. In addition, DoD funding supports many of the environmental staff responsible for implementing the conservation actions identified in this CCAA. Although the FWC is a signatory to this Agreement, they are also considered a cooperator since they do not require the ESA regulatory assurances provided under the Final Policy for Candidate Conservation Agreements with Assurances.

CCAA Tracking Number: TE 72196B

The following lands are enrolled under this Agreement:

The enrolled lands (“Enrolled Lands”), which are owned by the State of Florida and depicted in Figure 1, below, are 46,507 acres of the 73,000-acre Camp Blanding Joint Training Center (“CBJTC” or “Installation”) located in Clay County, Florida. Federal lands were transferred to the Armory Board, State of Florida, in order to consolidate ownership and perpetuate the availability of Camp Blanding for military training and use, Public Law 493 (H.R. 9340, 1954). The Installation is a State Property but in the event that the State of Florida or board shall at any time use for other than military purposes, sell, convey, or otherwise dispose of all or any part of the State or Federal land, all of the right, title, and interest in and to the Federal land shall revert to the United States (Public Law 493, 1954). The Enrolled Lands are comprised of six different habitat types, including flatwoods, Sandhill, scrub, ephemeral wetlands, forested wetlands, and surface waters (Table 1). These lands are portions of CBJT that support natural habitat and are not at risk of future development or intensive military operations (Figure 1).

The following species are covered by this Agreement:

The twenty-two species listed in Table 2, below, are the covered species (“Covered Species”).

Agreement and Enhancement of Survival Permit Durations:

Unless suspended, revoked or terminated, the duration of this Agreement is fifteen (15) years from its Effective Date. The duration of the Enhancement of Survival Permit (“Permit”), which will be issued in conjunction with this Agreement, shall be fifteen (15) years or until the Agreement is suspended, revoked or terminated. The Permit shall become effective as to a Covered Species on the date of the Service’s final rule listing the species as “threatened” or “endangered” under the ESA.

Camp Blanding Joint Training Center
Enrolled Acreage for
Candidate Conservation Agreement with Assurances

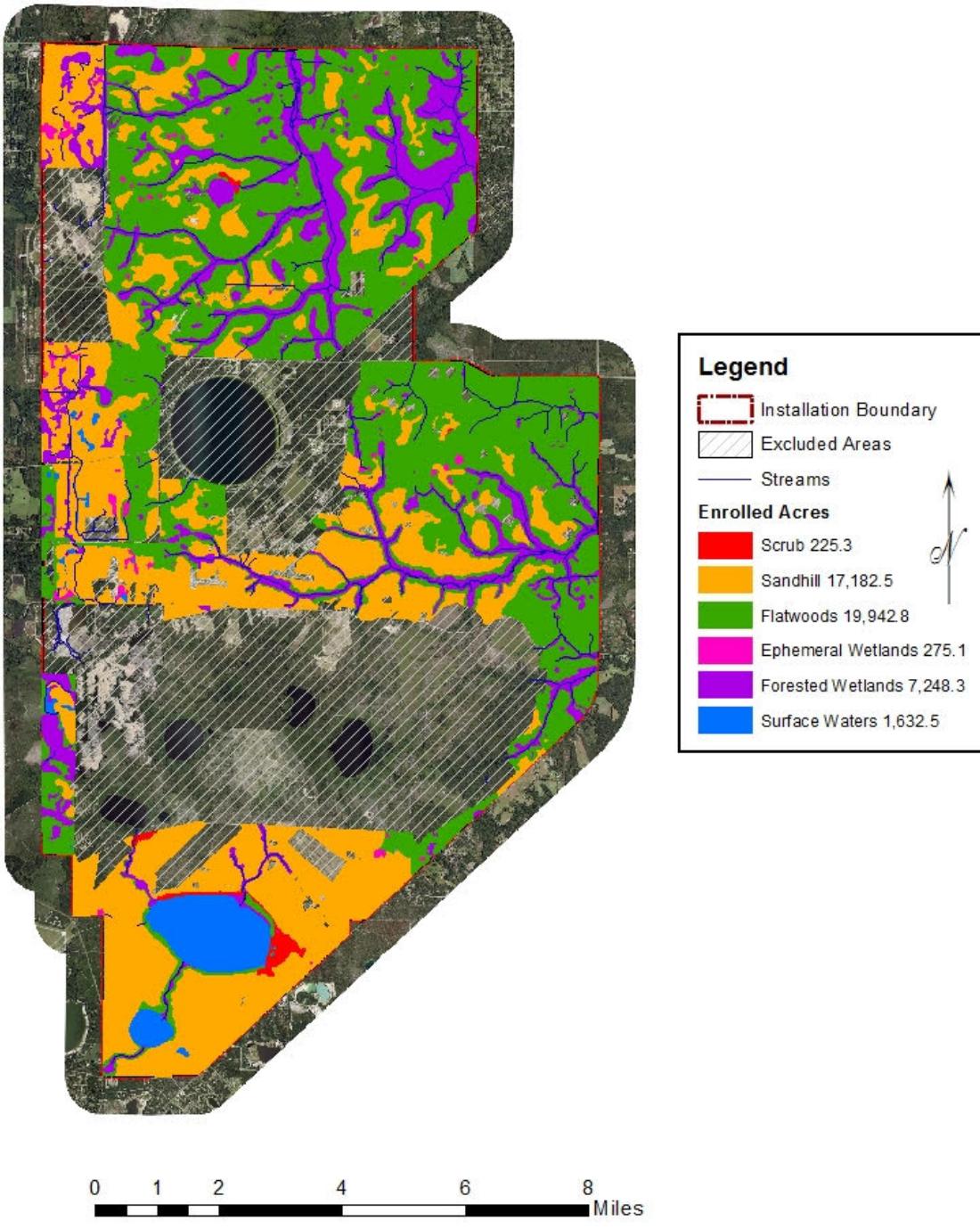


Figure 1. Map of the Enrolled Lands and Breakdown by Habitat Types.

Table 1. List of Habitat Types and Amounts within the Enrolled Lands.

Enrolled Habitat Type	Amount of Enrolled Land
Flatwoods	19,943 acres
Sandhill	16,791 acres
Scrub	225 acres
Ephemeral Wetlands	275 acres
Forested Wetlands	7,248 acres
Surface Waters - Lakes and Ponds - Streams	1,633 acres 121 miles
<i>Total Enrolled Lands</i>	<i>46,507 acres</i>

2.0 AUTHORITY AND PURPOSE

The Service is authorized to enter into this Agreement pursuant to Sections 2, 7, and 10 of the Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 *et seq.*) (“ESA” or “Act”).

Section 2 provides that encouraging interested parties, through Federal financial assistance and a system of incentives, to develop and maintain conservation programs is essential to safeguarding the Nation’s heritage in fish, wildlife, and plants. Section 7(a)(1) of the ESA requires the Service to review and utilize the programs it administers to further the purposes of the ESA. The Service is further authorized to enter into this Agreement pursuant to its “Final Policy for Candidate Conservation Agreements with Assurances” (64 Federal Register 32726-32736) (“Final Policy”) and the Service’s implementing regulations at 50 C.F.R. §§ 13 and 17 as well as to issue an ESA section 10 (a)(1)(A) enhancement of survival permit for proposed and candidate species as well as for species that might become candidates in the future.

The purpose of this CCAA is to remove or preclude the need to list any of the Covered Species as “endangered” or “threatened” under the ESA via the Armory Board’s implementation of the “Conservation Actions” set forth in section 6.0, below, when combined with benefits that would be achieved if the actions were also implemented on other necessary properties. Importantly, this Agreement is a collaborative effort by the Parties to conserve the Covered Species.

A main use of Camp Blanding Joint Training Center is light infantry training, which includes foot traffic, wheeled vehicle traffic, and individual fighting positions throughout the Training

Table 2. List of Covered Species and their associated Habitats within the Enrolled Lands.

Common Name	Scientific Name	FWS Status ¹	FWC Status ¹	HABITAT						
				Flatwoods	Sandhill	Scrub	Ephemeral Wetlands	Forested Wetlands	Surface Waters	
Amphibians										
Gopher frog	<i>Lithobates capito</i>	P	SSC	X	X	X	X			
Striped newt	<i>Notophthalmus perstriatus</i>	C		X	X	X	X			
Birds										
Florida sandhill crane	<i>Grus canadensis pratensis</i>	P	T				X			
Little blue heron	<i>Egretta caerulea</i>		SSC				X	X		
Southeastern American kestrel	<i>Falco sparverius paulus</i>		T		X	X				
Swallow-tailed kite	<i>Elanoides forficatus</i>	SSC		X	X		X	X		
Tricolored heron	<i>Egretta tricolor</i>		SSC				X	X		
Butterflies										
Dukes' skipper	<i>Euphyes dukesi calhouni</i>	P						X		
Caddisflies										
Little Oecetis Longhorn caddisfly	<i>Oecetis parva</i>	P								X
Crayfish										
Black Creek crayfish	<i>Procambarus pictus</i>	P	SSC							X
Dragonflies										
Purple skimmer	<i>Libellula Jesseana</i>	P					X	X	X	
Say's spiketail	<i>Cordulegaster sayi</i>	P			X			X	X	
Fish										
American eel	<i>Anguilla rostrata</i>	P								X
Mammals										
Florida mouse	<i>Podomys floridanus</i>		SSC		X	X				
Sherman's fox squirrel	<i>Sciurus niger shermani</i>		SSC	X	X					
Mussels										
Southern lance	<i>Elliptio ahenea</i>	P								X
St. John's elephantear	<i>Elliptio monroensis</i>	P								X

¹Status Key: T=threatened, P=petitioned, C=candidate, SSC=species of special concern

Note: Bolded species are known to occur on CBJTC; the remaining species are known to occur in areas immediately surrounding CBJTC and are believed to "likely occur" on CBJTC.

Table 2 (continued). List of Covered Species and their associated Habitats within the Enrolled Lands.

Common Name	Scientific Name	FWS Status ¹	FWC Status ¹	HABITAT					
				Flatwoods	Sandhill	Scrub	Ephemeral Wetlands	Forested Wetlands	Surface Waters
Reptiles									
Eastern diamondback rattlesnake	<i>Crotalus adamanteus</i>	P		X	X	X			
Florida pine snake	<i>Pituophis melanoleucus mugitus</i>	P	SSC	X	X	X			
Gopher tortoise	<i>Gopherus polyphemus</i>	C	T	X	X	X			
Southern hognose snake	<i>Heterodon simus</i>	P			X				
Spotted turtle	<i>Clemmys guttata</i>	P					X	X	X

¹Status Key: T=threatened, P=petitioned, C=candidate, SSC=species of special concern

Note: Bolded species are known to occur on CBJTC; the remaining species are known to occur in areas immediately surrounding CBJTC and are believed to “likely occur” on CBJTC.

Areas; hunting is a secondary use. Although not directly benefitting the covered species, light military training and hunting activities are not expected to take the species and are included in this Agreement since they occasionally occur in the enrolled lands. Survival training that requires direct take of covered species is not included.

The use of a Candidate Conservation Agreement with Assurances is appropriate even though several of the covered species are not listed as formal candidate species by the Service. In providing for Candidate Conservation Agreements with Assurances, the Service did not intend to exclude species that are not officially listed as candidate species (see the Final Policy, page 32732). Instead, the Service recognizes that taking steps before a species enters a serious decline is often the most effective way to conserve that species, thereby possibly precluding the need to list the species under the ESA.

All Parties to this Agreement recognize that they have specific statutory responsibilities that cannot be delegated, particularly with respect to the management and conservation of natural resources. Nothing in this Agreement is intended to abrogate any of the Parties' respective responsibilities. This Agreement is subject to, and is intended to be consistent with, all applicable Federal and State laws.

3.0 THREATS TO THE COVERED SPECIES

The success of any conservation or recovery effort depends on reducing or eliminating threats to the continued existence of a species. The Service uses the five criteria of section 4(a)(1) of the ESA to evaluate threats to a species: a) the present or threatened destruction, modification, or curtailment of habitat or range; b) overutilization for commercial, recreational, scientific, or educational purposes; c) disease or predation; d) the inadequacy of existing regulatory mechanisms; and, e) any other natural or manmade factors affecting continued existence.

The main factor threatening nearly all of the Covered Species is the destruction or modification of habitat across their ranges. The aquatic species are being impacted by overall water quality and habitat degradation from impoundments, dredging and channelization, siltation, pollutants, and water temperature changes. Impoundments can cause direct impact to flow regime and substrate conditions as well as result in water temperature fluctuations. Dredging and channelization directly alter habitat and destabilize substrate, increase erosion and siltation, and remove woody debris that serves as cover for fish and basking areas for turtles. New road construction, culvert replacement, and certain agricultural practices, including logging, lead to siltation, runoff, and pollutants entering waterways. Residential and commercial development can also directly or indirectly degrade aquatic habitats through siltation and runoff. Vegetation removal along waterways also directly impacts species such as fish and crayfish by increasing water temperatures.

The Covered Species that occur in upland habitat on the Enrolled lands are impacted by destruction and fragmentation of their habitat from large and small scale development projects, agriculture, logging, mining, and roadways. Areas with high road density lead to the direct mortality of species from vehicle collisions and fragmentation of habitat. Isolated or fragmented habitat also leaves species' populations more vulnerable to disease outbreaks, natural disasters, and reduced gene flow. Fire suppression is another factor that affects many of the upland species. Without a proper fire regime, hardwoods encroach upon upland pine habitats and alter suitable habitat structure for native wildlife such as the gopher tortoise that needs open canopies and adequate sunlight for proper groundcover and foraging.

Disease and/or predation affect several of the Covered Species. For example, gopher tortoises are known to suffer from upper respiratory infections, and an apparent fungal disease impacting muscle tissue has been reported in several Black Creek crayfish. Moreover, amphibians, in general, are at risk from chytrid disease and *ranaviruses*. Invasive plant and animal species are a major threat to native plants and animal species through competition, predation, and/or disease introduction. Exotic red fire ants, armadillos, and coyotes along with raccoons and other scavengers have been shown to depredate tortoise nests and hatchlings. Some predators are also known to eat adult fish, crayfish, and amphibians with feral hogs impacting amphibian and other

aquatic species by disturbing upland habitat and increasing siltation in adjacent streams. Imported red fire ants are known to kill metamorphosing amphibians and juvenile reptiles and birds. Species that occur in or near highly developed urbanized areas are also at risk from depredation by domestic pets. Lastly, many invasive plants, such as water hyacinth and hydrilla, significantly impact aquatic habitats and their native inhabitants. For additional information concerning threats to Covered Species, see Appendix II, appended hereto.

4.0 EXPECTED BENEFITS AND CONSERVATION GOALS AND OBJECTIVES

4.1 Expected Benefits

This CCAA is expected to maintain and/or increase the Covered Species' population numbers and quality of habitat through implementation of best management practices ("BMPs"), reduction and/or elimination of disease transmission, and control of exotic and invasive species within the Enrolled Lands. The conservation actions that will be implemented under this Agreement were derived from the best scientific data available regarding the life history, biology, and known habitat requirements of each of the Covered Species, all of which are known to occur directly on or in the immediate areas surrounding the CBJTC (Table 2). In conjunction with adaptive management, the conservation actions are expected to increase and secure the long-term viability of the Covered Species and, thus, remove or preclude the need to list them as "threatened" or "endangered" under the ESA were it assumed the conservation actions also were implemented on other necessary properties, which is the CCAA standard.

4.2 Conservation Goals and Objectives

The goals and objectives (collectively "Objectives") of this Agreement correlate to three of the five criteria of ESA section 4(a)(1) that the Service utilizes to evaluate threats to a species: factor "a" (the present or threatened destruction, modification, or curtailment of habitat or range); factor "c" (disease or predation); and, factor "e" (any other natural or manmade factors affecting continued existence). The Objectives are as follow:

Objective 1 – To maintain or enhance the quality of habitat for the Covered Species on the Enrolled Lands

Nearly all of the Covered Species have been affected by and are threatened by the destruction or degradation of their habitat. Through the Armory Board's implementation of the Best Management Practices described in the "Conservation Actions" section, below, native habitat will be maintained and/or enhanced on the Enrolled Lands to

benefit the Covered Species. Creating a mosaic of well-maintained habitat will ensure the long-term survival of the Covered Species and contribute to the overall status of the Covered Species' populations as well as non-covered species on properties adjacent to the Covered Lands.

Objective 2 – To reduce or eliminate disease transmission to the Covered Species on the Enrolled Lands

Several of the Covered Species are known to be impacted or threatened by disease. To maintain healthy populations within the Enrolled Lands, the Armory Board agrees to assess the general health status of all Covered Species that might be impacted by disease within a year of the Effective Date of this Agreement. Should any disease be found that poses a significant threat to the health and persistence of a Covered Species or should a Covered Species show signs of such a disease, the Armory Board will consult with the Signatories of this agreement to determine the appropriate steps to reduce or eliminate the spread of the disease.

Objective 3 – To reduce or eliminate exotic and invasive species on the Enrolled Lands

The Armory Board will implement the specific management practices outlined in the “Conservation Actions” section, below, to reduce or eliminate exotic and invasive species on the Enrolled Lands. These management practices will benefit the Covered Species by bettering habitat quality and reducing competition from invasive and exotic species.

5.0 EXISTING CHARACTERISTICS ON AND DESCRIPTION OF THE ENROLLED LANDS

The CBJTC, which is comprised of 73,000 acres in southwest Clay County, Florida, is primarily used by the U.S. Department of Defense’s Army National Guard for light military training, including infantry, foot traffic, wheeled vehicle traffic, and individual fighting positioning. A secondary use of the Installation is for hunting. The CBJTC is bounded on the west by the Clay County line and on the southeastern and eastern boundaries by State Road 21. It is located roughly 45 miles equidistant from the cities of Gainesville to the southwest, Jacksonville to the northeast, and St. Augustine to the east. The main gate to the Installation is located on State Road 16, approximately 12 miles east of the city of Starke. The majority of the vegetation on the Installation consists of flatwoods and sandhills.

The Enrolled Lands are comprised of 46,507 acres of the CBJTC that support natural habitat for the Covered Species. Some areas of the Enrolled Lands are periodically used for light military

training; however, the Cantonment area, Impact area, and a small area on the northwest portion of the Installation that is slated for pine straw harvesting are not covered by this Agreement. There also is no risk of future development or intensive military operations occurring within the Enrolled Lands (Figure 1). Hunting also occurs at times on parts of the Enrolled Lands, but neither hunting nor light military training is expected to result in take of the Covered Species. Moreover, direct take of the Covered Species from survival training exercises is not authorized under this Agreement or the associated Permit. In addition to flatwoods and forested wetlands, the other four habitat types within the Enrolled Lands are Sandhill, scrub, ephemeral wetlands, and surface waters (Figure 1). Due to a history of fire suppression, overharvesting, and replanting with unsuitable pine species more than 50 percent of the CBJTC is undergoing a long-term, large-scale restoration of longleaf pine forest primarily in the flatwoods and Sandhill communities.

It is the Parties' intention that implementation of this Agreement will create vegetation appropriate to the soils and hydrology that naturally occur within the ecosystem of the Enrolled Lands. To this end, all river, lake, and creek systems on the Enrolled Lands will be surrounded by functioning riparian zones that continue throughout a watershed and connect to other watersheds by mixed species' corridors. It is further anticipated that the pinelands within the Enrolled Lands will become a mosaic of mature flatwoods, mixed hardwoods stands, and pine plantations. Some of the existing plantations around red-cockaded woodpecker (*Picoides borealis*) and other habitat zones essential to the Covered Species will be managed solely with thinning with the retention of pines with a larger average diameter. Xeric habitats, primarily Sandhill, will consist of both open longleaf pine and mixed pine-oak stands with a substantial reduction in the moderately high densities of turkey oak that currently occupy many areas. This Agreement incorporates measures to slowly phase out, replace and replant the existing sand pine plantations with longleaf pine. The driest habitat type on the Enrolled Lands will be scrub with fire regularly applied throughout the habitats.

5.1 Flatwoods

The Enrolled Lands contain 19,943 acres of flatwoods habitat. Some flatwoods habitat will require significant efforts to restore longleaf pine as the dominant tree species, while others may require minor, but strategic efforts (e.g., prescribed fires) to encourage natural recovery.

Flatwoods (mesic, wet and scrubby) are characterized by low, flat topography and poorly drained acidic sandy soils. Historically, frequent fires would create an open canopy of longleaf pine with saw palmetto and gallberry in the understory and wiregrass in the groundcover. Currently, the flatwoods on the Installation have a longer fire interval, more even-aged overstory, denser understory with a larger shrub component, and fewer herbaceous species in the groundcover. Both fire and seasonal precipitation influence community structure and composition. The four

dominant overstory species are longleaf pine, slash pine, loblolly pine, and pond pine. Live oak, water oak, sweetgum, red maple, and ash are also occasionally found among the overstory species, especially in north and central Florida.

Mesic flatwoods are seldom inundated and typically have slash or longleaf pine in the overstory, a dense understory of saw palmetto, gallberry, rusty lyonia, and wax myrtle, and wiregrass in the groundcover. Wet flatwoods are inundated for 1-2 months per year and have slash pine, pond pine, and/or cabbage palm in the overstory, wax myrtle and gallberry in the understory, and grasses and forbs in the groundcover; the composition of these species varies, however, with fire frequency. Scrubby flatwoods sit at a slightly higher elevation than mesic flatwoods and are the ecotone between flatwoods and sandhills/scrub. The overstory in these flatwoods is variable with a high frequency of shrub oak species in the understory and a sparse herbaceous layering.¹

5.2 Sandhill

The Enrolled Lands contain 17,182 acres of Sandhill habitat that occurs on upland sites with an open pine canopy (typically longleaf pine), a sparse mid-story of deciduous oaks such as turkey oak, and a moderate to dense groundcover of herbaceous species and low woody species. Soils in this habitat are deep, well-drained, and relatively infertile. Historically, low-intensity fires occurred every 1-3 years keeping litter accumulation low. These frequent, low-intensity fires, which often occurred during the growing season, maintained the open structure of the forest, reduced the prevalence of hardwoods, and increased the abundance of herbaceous species. The frequency, intensity, and season of fire are the most important factors in Sandhill ecology as they determine community structure and species' composition. Due to the absence of fire and the historical overharvest of longleaf pine, oaks now dominate many of the Sandhill areas on the Installation. Lengthy fire suppression also leads to xeric hammock, turkey oak barrens, or sand pine dominated Sandhill^{2, 3}.

¹ Paragraph summarized from Abrahamson, W.G. and D.C. Hartnett (1990). Pine Flatwoods and Dry Prairies. In R.L. Myers and J.J. Ewel (Eds.), *Ecosystems of Florida* (pp. 103-149). Gainesville, FL: University Presses of Florida.

² Paragraph summarized from Florida Natural Areas Inventory. (2010). *Guide to the Natural Communities of Florida* (2010 ed.).

³ Paragraph summarized from Myers, R.L. (1990). Scrub and High Pine. In R.L. Myers and J.J. Ewel (Eds.), *Ecosystems of Florida* (pp. 150-193). Gainesville, FL: University Presses of Florida.

5.3 Scrub

The Enrolled Lands contain 225 acres of scrub habitat. Scrub habitat is found on well-drained, infertile, sandy ridges and composed of evergreen oak shrubs with or without an overstory usually of sand pine. Scrubs with a sand pine overstory – sparse to dense – are typically found on the highest sandy ridges. The oak species most commonly found in scrub habitat are sand live oak, myrtle oak, Chapman’s oak, and scrub oak, which often form a dense thicket intermingled with bare sand and little herbaceous groundcover. Florida rosemary, saw palmetto, and rusty staggerbush often also are present. In contrast to Sandhill, scrub requires infrequent, high intensity fires ranging from every 5 to 100+ years depending on the scrub type. The large range in fire frequency is due to differences in litter accumulation, chance ignitions and the variation among scrubs.^{2,3}

5.4 Ephemeral Wetlands

Ephemeral wetlands, which comprise 275 acres of the Enrolled Lands, are small, isolated ponds with spatial and temporal variability in hydroperiod. In Florida, ephemeral wetlands are generally found in flatwoods, Sandhill, and scrub habitats. Given their presence in these habitats, fire is an important factor in the ecology of these wetlands. Ponds are often dry during the early spring and summer when fires once were historically ignited by lightning and would run through the basin, decreasing organic material and controlling invading upland species. Fire also is important to the herbaceous material growing at the edge of the ponds.⁴

5.5 Forested Wetlands

The Enrolled Lands contain 7,248 acres of forested wetlands. Forested wetlands are defined by their hydroperiod, fire frequency, organic matter accumulation, and source of water (i.e., water quality). There are two major categories of forested wetlands: river swamps and stillwater swamps. River swamps have a short hydroperiod and a visible flow for at least part of the year. Stillwater swamps, on the other hand, have longer hydroperiods and no noticeable flow. River swamps are most common in north Florida and similar to the vegetation found in northern temperate swamps. River swamps, such as those associated with blackwater rivers, have water levels that are closely related to rainfall events and tend to rise or fall quickly. In contrast, stillwater swamps are supplied mostly by shallow groundwater. The soils are saturated and inundated for more than six months per year. The most common wetland tree species is cypress, and in Florida, it dominates forested wetlands with variable water levels. Pond cypress and swamp black gum are common in stillwater swamps while bald cypress and water tupelo are

⁴ Paragraph summarized from Means, R. (2008). *Management Strategies for Florida’s Ephemeral Ponds and Pond-Breeding Amphibians* (FWC Agreement Number 05039).

common in river swamps. Pines, cedars, palms, and other hardwoods are also found in varying frequencies in forested wetlands.⁵ Fire in forested wetlands burns during the dry season decreasing the amount of accumulated organic matter. Fire appears to be rare in the river swamps, but occurs occasionally in stillwater swamps.

5.6 Surface Waters

The Enrolled Lands include 121 miles of streams and 1,633 acres of lakes and ponds. Both North Fork Black Creek, with its headwaters in Kingsley Lake, and Bull Creek are located in the northern part of the Installation and are the primary surface water features in the Enrolled Lands. Both of these creek systems drain toward the north-northeast.

South Fork Black Creek, with headwaters in Stevens Lake and located in the CBJTC's Impact Area, is the primary surface water drainage feature in the central part of the CBJTC. This Creek drains toward the east within the Installation boundaries and then turns to the northeast to join North Fork Black Creek near Middleburg, Florida, to form Black Creek. Several small ponds along with other significant surface waters such as Lowry Lake (1,246 acres), Magnolia Lake (198 acres), and a portion of Blue Pond (81 acres) are among the lands enrolled under this Agreement.

6.0 CONSERVATION ACTIONS

The Parties anticipate that the Armory Board's implementation of the Conservation Actions described below as well as in the tables of Appendix III, appended hereto, would remove or preclude the need to Federally-list either of the Covered Species. The Conservation Actions correspond to the respective habitat type in which they will be implemented. The general management practices described in the Florida Department of Agriculture and Consumer Services' *Silviculture Best Management Practices Manual* (FDACS 2008) ("FDACS Manual"), and the *Forestry Wildlife Best Management Practices Manual* (FDACS 2014) which are incorporated herein by this reference, will be implemented in each of the habitat types.

6.1 Flatwoods

The following actions will be performed in the Flatwoods habitat on the Enrolled Lands:

⁵ Paragraph summarized from Ewel, K.C. (1990). Swamps. In R.L. Myers and J.J. Ewel (Eds.), *Ecosystems of Florida* (pp. 281-323). Gainesville, FL: University Presses of Florida.

- Prescribed fire will be applied in 2-5 year cycles. Fuel loads will be managed by implementing dormant season burns in units with high fuel loads and maintenance burns, typically during the growing season, in units with low fuel loads.
- To maintain the 2-5 year burn schedule, approximately 4,000 to 10,000 acres must be burned annually. The burn schedule can be frequently disrupted, however, by drought conditions or intense hurricane activity. Therefore, at least eighty percent of the flatwoods will be burned on a 2-5 year rotation (3,200 to 8,000 acres/year) provided weather conditions are appropriate. There will be an emphasis by the Armory Board to keep restored fire regimes in the maintenance phase.
- Natural stands will be maintained with their uneven-age or several-age structure. Stand density will be allowed to reach a pine basal area of 100 square feet (sq-ft) per acre before being reduced to a basal area of between 60 and 80 sq-ft per acre, unless the Service determines that a different action is required for a Federally-listed threatened or endangered species (e.g., to meet foraging habitat requirements of the red-cockaded woodpecker).
- Pine plantations will undergo two thinnings and a final harvest during the term of this Agreement. The first thinning will occur when it is appropriate to reduce basal areas to between 60 and 80 sq-ft per acre unless the Service determines that a different action is required for a Federally-listed threatened or endangered species (e.g., to meet foraging habitat requirements of the red-cockaded woodpecker). The second thinning will occur again approximately 10-15 years later to reduce the basal areas to between 60 and 80 sq-ft per acre unless otherwise determined by the Service. The final harvest, which shall be site specific according to restoration objectives, will be performed by clearcut, modified clearcut, shelterwood cut, or seed tree cut to bring basal area to that specifically required for Federally-listed threatened or endangered species (e.g., to meet foraging/nesting habitat requirements of the red-cockaded woodpecker). Plantations that need to be replanted after the final harvest will be replanted using non-aggressive site preparation methods (i.e., no bedding) and containerized longleaf pine.
- Clearcut harvests will be limited in individual stands to a maximum size of approximately 100 acres, except where the health of the forest (beetle infestation or wildfire salvage cuts) or restoration efforts (sand pine or hardwood removal) require otherwise.
- Native flora will be managed to return species' composition to natural levels and densities. This shall be accomplished with fire when possible and mechanical and chemical treatment when necessary.
- If gopher tortoise burrows are observed during timber harvest activities and heavy machinery is being utilized, the machinery will be kept at a radial distance of 25 feet or greater from any burrow entrance. Timber within this radius may be cut by hand but must be felled away from and not dragged over a burrow. Loading decks will also be placed at least 25 feet from any burrow.

- A cursory health assessment (e.g. as per the Gopher Tortoise Permitting Guidelines, 2015) will be conducted by on-site staff for any Covered Species that is encountered during general field reconnaissance or species' surveys. If any disease is found to pose a significant threat to the health or persistence of a Covered Species or if a species shows signs of any such disease, appropriate steps, as determined after consultation with the Service and the FWC, will be taken to reduce or eliminate the spread of the disease.
- Invasive and exotic plant species and noxious weeds will be monitored and controlled through early detection, isolation of infested areas, and, depending on the species or weed, control of individual plants through physical, chemical, or mechanical means. One percent or less of the Enrolled Lands in this agreement will be dominated by exotic species.
- Soil erosion will be minimized during harvesting by using single tree selection harvesting as the primary harvesting method.
- Roads, natural barriers such as streams, and existing fire lines will be used as primary fire lines, but new lines may be established if necessary to protect other stands or features or to enhance burning logistics.
- Although plows may be necessary to create new fire lines, all plowed lines will be maintained with discs rather than plows to avoid disrupting natural drainage patterns.
- For prescribed fire, all efforts will be made to use firebreaks that already exist on the Enrolled Lands.
- During a wildfire event, there are no restrictions on fire line placement. Placement will occur based upon urgency of suppression and actual fire behavior. If a new fire line is created, however, it will be rehabilitated within 3-6 months after the fire is declared to be extinguished.
- Snags (i.e., standing dead trees), den trees (i.e., live trees with cavities in them), and fallen logs will be left undisturbed unless they pose a safety hazard to personnel or critical infrastructure. In addition, any snags that pose a containment risk during wildland fire operations may be removed. However, if salvage cuts are deemed necessary, a minimum of 10 snags (i.e., standing dead trees) per acre will be left to benefit cavity-nesting birds and other species unless all trees need to be removed due to disease or beetle infestation, the snags are a safety hazard to troop maneuvers, or the area will be replanted for reforestation.
- No new paved roads will be constructed unless needed to support a critical military mission or to improve erosion control. A maximum speed limit of 40 mph will be enforced on any new road, and road maintenance will be implemented as needed.

6.2 Sandhill

The following actions will be performed in the Sandhill habitat on the Enrolled Lands:

- Prescribed fire will be applied in 1-3 year cycles. Fuel loads will be managed by implementing dormant season burns in units with high fuel loads and maintenance burns, typically during the growing season, in units with low fuel loads.
- To maintain the 1-3 year burn schedule, approximately 5,000 to 16,000 acres must be burned annually. This burning schedule can be frequently disrupted, however, by drought conditions or intense hurricane activity. Therefore, at least eighty percent of the Sandhill acreage will be burned on a 1-3 year rotation (4,000 to 12,800 acres/year), with at least 30-40% burned during the growing season, provided weather conditions are appropriate. There will be an emphasis by the Armory Board to keep restored fire regimes in the maintenance phase.
- Manage native flora with the aim of returning species composition to natural levels and densities. This shall be accomplished with fire when possible and mechanical and chemical treatment when necessary.
- Natural stands will be maintained with their uneven-age or several-age structure. Stands will be thinned as needed. Natural stands will be maintained at a pine basal area of between 20 and 60 sq-ft per acre, unless the Service determines that a different action required for a Federally-listed threatened or endangered species.
- Existing sand pine and slash pine stands will be removed and harvested on a large scale while retaining volunteer or original longleaf pines. The stands will then be chopped (after 2-3 years for sand pine stands) and/or burned and replanted using non-aggressive site preparation methods (i.e., no bedding) and containerized longleaf pine.
- The harvest of turkey oak dominated stands will occur based on the availability of markets. These stands are generally under planted with containerized longleaf pine seedlings where natural regeneration is less than 200 longleaf pine seedlings per acre. Combinations of fire and herbicides will be used either for site preparation or after planting to ensure seedling establishment. Routine herbicide applications will only be used as a last resort when fire or other non-chemical methods do not sufficiently control competing vegetation.
- Clearcut harvests will be limited in individual stands to a maximum size of approximately 100 acres, except where the health of the forest (beetle infestation or wildfire salvage cuts) or restoration efforts (sand pine or hardwood removal) require otherwise.
- If gopher tortoise burrows are observed during timber harvest activities and heavy machinery is being utilized, the machinery will be kept at a radial distance of 25 feet or greater from any burrow entrance. Timber within this radius may be cut by hand but must be felled away from and not dragged over a burrow. Loading decks will also be placed at least 25 feet from any burrow.
- A cursory health assessment (e.g. as per the Gopher Tortoise Permitting Guidelines, 2015) will be conducted by on-site staff for any Covered Species that is encountered

during general field reconnaissance or species' surveys. If any disease is found to pose a significant threat to the health or persistence of a Covered Species or if a species shows signs of any such disease, appropriate steps, as determined after consultation with the Service and the FWC, will be taken to reduce or eliminate the spread of the disease.

- Invasive and exotic plant species and noxious weeds will be monitored and controlled through early detection, isolation of infested areas, and, depending on the species or weed, control of individual plants through physical, chemical, or mechanical means. One percent or less of the Enrolled Lands in this agreement will be dominated by exotic species.
- Soil erosion will be minimized during harvesting by using single tree selection harvesting as the primary harvesting method.
- Roads, natural barriers such as streams, and existing fire lines will be used as primary fire lines, but new lines may be established if necessary to protect other stands or features or to enhance burning logistics.
- Although plows may be necessary to create new fire lines, all plowed lines will be maintained with discs rather than plows to avoid disrupting natural drainage patterns.
- For prescribed fire, all efforts will be made to use firebreaks that already exist on the Enrolled Lands.
- During a wildfire event, there are no restrictions on fire line placement. Placement will occur based upon urgency of suppression and actual fire behavior. If a new fire line is created, however, it will be rehabilitated within 3-6 months after the fire is declared to be extinguished.
- Snags (i.e., standing dead trees), den trees (i.e., live trees with cavities in them), and fallen logs will be left undisturbed unless they pose a safety hazard to personnel or critical infrastructure. In addition, any snags that pose a containment risk during wildland fire operations may be removed. However, if salvage cuts are deemed necessary, a minimum of 10 snags (i.e., standing dead trees) per acre will be left to benefit cavity-nesting birds and other species unless all trees need to be removed due to disease or beetle infestation, the snags are a safety hazard to troop maneuvers, or the area will be replanted for reforestation.
- No new paved roads will be constructed unless needed to support a critical military mission or to improve erosion control. A maximum speed limit of 40 mph will be enforced on any new roads, and road maintenance will be implemented as needed.

6.3 Scrub

The following actions will be performed in the Scrub habitat on the Enrolled Lands:

- Prescribed fire will be applied during the growing season (February to July); however, some burns might occur during the dormant season, if needed, to prevent the delay of burning. When necessary and possible, fires will follow mechanical treatments.
- The habitat will be managed through prescribed burning or mechanical means when the average shrub height reaches 6-8 feet. Fire return intervals will occur every 5-20 years but may vary based on individual site conditions.
- Extensive all black burns over large acreages of the habitat will be avoided. Instead, the habitat will be managed as a mosaic to ensure that patches of shrubs are available to provide cover and acorns for wildlife species.
- No area will be mowed or burned two years in a row.
- Scrub vegetation will be maintained at a height of less than eight feet; sand pine canopy cover at a height of less than 15 percent cover; and, bare soil coverage at 10-50 percent.
- If gopher tortoise burrows are observed during timber harvest activities and heavy machinery is being utilized, the machinery will be kept at a radial distance of 25 feet or greater from any burrow entrance. Timber within this radius may be cut by hand but must be felled away from and not dragged over a burrow. Loading decks will also be placed at least 25 feet from any burrow.
- Mechanical treatments to restore long-unburned areas will be implemented preferably in winter when many of the reptilian Covered Species are more likely to be underground and out of harm's way.
- A cursory health assessment (e.g. as per the Gopher Tortoise Permitting Guidelines, 2015) will be conducted by on-site staff for any Covered Species that is encountered during general field reconnaissance or species' surveys. If any disease is found to pose a significant threat to the health or persistence of a Covered Species or if a species shows signs of any such disease, appropriate steps, as determined after consultation with the Service and the FWC, will be taken to reduce or eliminate the spread of the disease.
- Invasive and exotic plant species and noxious weeds will be monitored and controlled through early detection, isolation of infested areas, and, depending on the species or weed, control of individual plants through physical, chemical, or mechanical means. One percent or less of the Enrolled Lands in this agreement will be dominated by exotic species.
- Roads, natural barriers such as streams, and existing fire lines will be used as primary fire lines, but new lines may be established if necessary to protect other stands or features or to enhance burning logistics.
- Although plows may be necessary to create new fire lines, all plowed lines will be maintained with discs rather than plows to avoid disrupting natural drainage patterns.
- For prescribed fire, all efforts will be made to use firebreaks that already exist on the Enrolled Lands.
- During a wildfire event, there are no restrictions on fire line placement. Placement will occur based upon urgency of suppression and actual fire behavior. If a new fire line is

created, it will be rehabilitated within 3-6 months after the fire is declared to be extinguished.

- No new paved roads will be constructed unless needed to support a critical military mission or to improve erosion control. A maximum speed limit of 40 mph will be enforced on any new roads, and road maintenance will be implemented as needed.

6.4 Ephemeral Wetlands

The following actions will be performed in the Ephemeral Wetlands habitat on the Enrolled Lands:

- Prescribed fire will be applied to the surrounding uplands at a return interval appropriate to the surrounding habitat type as described in Section 6 of this Agreement. Ephemeral wetlands will be allowed to burn at the same time as their associated uplands if the wetlands are dry enough to sustain fire. When possible, such fires will occur during the growing season.
- Mechanical and/or chemical treatment will be used, provided wading bird colonies are not present, when fire is not sufficient to maintain an open habitat structure or to prevent woody encroachment.
- Mechanical impacts will be minimized, and fire lines to contain wildfires will be restored and rehabilitated.
- To the extent possible, wetland firebreaks will be avoided.
- Neither foams nor surfactants will be allowed or used during any water-handling operation when water is present.
- A cursory health assessment (e.g. as per the Gopher Tortoise Permitting Guidelines, 2015) will be conducted by on-site staff for any Covered Species that is encountered during general field reconnaissance or species' surveys. If any disease is found to pose a significant threat to the health or persistence of a Covered Species or if a species shows signs of any such disease, appropriate steps, as determined after consultation with the Service and the FWC, will be taken to reduce or eliminate the spread of the disease.
- Invasive and exotic plant species and noxious weeds will be monitored and controlled through early detection, isolation of infested areas, and, depending on the species or weed, control of individual plants through physical, chemical, or mechanical means. One percent or less of the Enrolled Lands in this agreement will be dominated by exotic species.
- The amount of herbicides used for invasive plant control, particularly in or around surface waters and wetlands, will be minimized, to the extent possible, through the use of mechanical methods so as to avoid impacts to fish and wildlife habitat.

- Natural hydrology will be maintained by prohibiting impoundments, dredging, and channelization.
- Vehicle operation will not be allowed within known wetland areas unless operated on an established and pre-existing road and/or crossing.
- Natural vegetation will be retained for erosion control, water quality, and wildlife habitat.

6.5 Forested Wetlands

The following actions will be performed in the Forested Wetlands habitat on the Enrolled Lands:

- Prescribed burning in adjacent stands will be allowed to extend into pine-bay stands whenever possible and practical so as to reduce the extensive fuel loads and dense understory in transitional communities due to the absence of fire. Burning will not occur in areas with known wading bird colonies during the nesting season.
- A cursory health assessment (e.g. as per the Gopher Tortoise Permitting Guidelines, 2015) will be conducted by on-site staff for any Covered Species that is encountered during general field reconnaissance or species' surveys. If any disease is found to pose a significant threat to the health or persistence of a Covered Species or if a species shows signs of any such disease, appropriate steps, as determined after consultation with the Service and the FWC, will be taken to reduce or eliminate the spread of the disease.
- Invasive and exotic plant species and noxious weeds will be monitored and controlled through early detection, isolation of infested areas, and, depending on the species or weed, control of individual plants through physical, chemical, or mechanical means. One percent or less of the Enrolled Lands in this agreement will be dominated by exotic species.
- Harvesting will be used only to the extent that it contributes to meeting the objectives set forth in this Agreement and then only as partial harvests that are followed by natural regeneration. None of the mechanized operations undertaken during such harvests will cause adverse impacts, such as sediment loading in adjacent wetlands and watercourses.
- Riparian zones and streamside management zones (SMZs) around water resources will be maintained in accordance with FDACS's *Silviculture Best Management Practices Manual* (FDACS 2008).
- Natural hydrology will be maintained by prohibiting impoundments, dredging, and channelization.
- Avoid roads, trails, or fireline impacts to ecotones.
- Vehicle operation will not be allowed within known wetland areas except on an established and pre-existing road and/or crossing.
- Where there are practicable alternatives, there will be no net loss of the size, function, or value of wetlands or modifications of floodplains and wetlands. In the absence of

practicable alternatives, the Armory Board will obtain an Environmental Resource Permit from the St. Johns Water Management District for any unavoidable impacts to wetlands and water resources functions as well as mitigate for such impacts.

- The amount of herbicides used for invasive plant control, particularly in or around surface waters and wetlands, will be minimized, to the fullest extent possible, through the use of mechanical methods so as to avoid impacts to fish and wildlife habitat.
- Pesticide and herbicide use will be minimal and, then, only in adherence to the National Pollutant Discharge Elimination System (NPDES) Florida Pesticide Generic Permit incorporated herein by this reference.

6.6 Surface Waters

The following actions will be performed in the Surface Waters habitat on the Enrolled Lands:

- Riparian zones and SMZs around water resources will be maintained in accordance with FDACS's *Silviculture BMPs Manual* (FDACS 2008).
- Trees within stream channels or on the immediate stream bank will not be harvested.
- To the extent practicable protection will be given to very large trees and/or old trees, snags, cavity trees, and trees where any part of the canopy overhangs the water.
- The aerial application of a pesticide, mist blowing of a pesticide, cleaning of spray equipment or discharging of rinse water from pesticide or fertilizer applications is prohibited.
- Un-buffered site preparation burning on slopes greater than 18 percent is prohibited.
- Plowed pre-suppression fire lines are prohibited.
- To prevent or minimize siltation inputs, the following will be implemented: concrete headwalls, mitered inlets, and/or riprap will be used for culverts with a diameter of 24" or greater; hardened water crossings will be used where appropriate depth is present; roads will be maintained in accordance with the FDACS's *Silviculture BMPs Manual* (FDACS 2008) and, water bars and water turnouts will be utilized.
- Mechanized operations will be performed in a manner so as not to cause adverse impacts, such as sediment loading, in adjacent wetlands and watercourses.
- A cursory health assessment (e.g. as per the Gopher Tortoise Permitting Guidelines, 2015) will be conducted by on-site staff for any Covered Species that is encountered during general field reconnaissance or species' surveys. If any disease is found to pose a significant threat to the health or persistence of a Covered Species or if a species shows signs of any such disease, appropriate steps, as determined after consultation with the Service and the FWC, will be taken to reduce or eliminate the spread of the disease.
- Invasive and exotic plant species and noxious weeds will be monitored and controlled through early detection, isolation of infested areas, and, depending on the species or

weed, control of individual plants through physical, chemical, or mechanical means. One percent or less of the Enrolled Lands in this agreement will be dominated by exotic species.

- The amount of herbicides used for invasive plant control, particularly in or around surface waters and wetlands, will be minimized, to the extent possible, through the use of mechanical methods so as to avoid impacts to fish and wildlife habitat.

7.0 MONITORING, REPORTING AND INDICATORS OF SUCCESS

The manner in which the various habitat types identified in Section 5, above, respond to the Armory Board's implementation of the restoration and management activities in Section 6.0, above, as well as in the tables of Appendix III, appended hereto, will demonstrate the level of effectiveness and the success of this CCAA. The indicator species and/or ecosystem functions in each of the six habitat types will be monitored to determine whether an observed habitat response has a corresponding positive effect on one or more of the Covered Species.

The Armory Board will prepare and submit a written annual Progress Report to the Service and the FWC by January 31st of each year this Agreement is in effect on the activities implemented under this Agreement during the preceding year. The Report will describe the Armory Board's progress or lack thereof in implementing the Conservation Actions for and in each of the six habitat types based on the indicator species or ecosystem functions described in Section 6.0, above. Following submission of the annual Progress Report, the Service, FWC and Armory Board will meet to discuss the report content and coordinate any changes via Adaptive Management, as described in Section 12.0, below, to the Conservation Activities for implementation during the current year.

To follow are the indicators by which success will be measured for each of the habitat types that occur within the Enrolled Lands.

7.1 Flatwoods

The Conservation Actions for the flatwoods communities will be deemed successful if they result in a healthy ecosystem structure and functions. The basal area of pines and hardwoods, groundcover composition, and percent of invasive species will be measured and reported in the annual Progress Report within the vegetation structure described in Section 6.1, above. The Armory Board will take vegetation measurements and photographs at the ten monitoring sites depicted in Appendix IV, Figure 1, which is attached hereto, and representative of the various flatwoods locations throughout the CBJTC. Seven of the monitoring sites correspond to previously established randomly selected plots within a geographic information system that was used by Integrated Training Area Management (ITAM) for Range and Training Land

Assessment (RTLA), a monitoring program designed to assess military training impacts to training lands. These plots are proportionate to land cover type/soil type combinations. The remaining three monitoring sites were randomly chosen using a tool in ArcGIS where points are placed on a map in under-represented areas within the flatwoods habitat on the CBJTC. Information regarding fire return interval also will be reported in the annual Progress Report with a fire return of 2-5 years being sufficient for this habitat type.

7.2 Sandhill

The gopher tortoise is a keystone species whose populations are good indicators of ecosystem health. Consequently, to determine the success of the Conservation Actions for the sandhill communities, gopher tortoise surveys will be conducted and reported at least once every five years per survey unit (one each on the North Post, East Post, and West Post and two on the South Post). Line Transect Distance Sampling will be used to survey gopher tortoise populations for areas greater than 250 acres in size in each of the five survey units for a total of approximately 1,500 - 2,000 acres per unit. The survey findings will be reported in the annual Progress Report. If gopher tortoise populations remain stable or increase, the CCAA will be considered to be a success as to the Covered Species in this habitat type. The baseline density will be determined during the first year of annual reporting.

The annual Progress Report also will include data on the fire return intervals, vegetation structure (e.g., basal area of pines and hardwoods and groundcover composition), and the percentage of invasive species within the habitat. Vegetation structure must be reported within the parameters of Section 6.2, above. Vegetation measurements and photographs will be taken at the ten designated monitoring sites depicted in Appendix IV, Figure 2, which is appended hereto. Nine monitoring locations were chosen based on previously established plots used for the RTLA program. The remaining site was randomly chosen using the “create random points” tool in ArcGIS to place a point on the map in an under-represented area within the sandhill habitat on the CBJTC. The ten monitoring sites represent the different sandhill locations across the CBJTC.

7.3 Scrub

This Agreement will be deemed successful as to the Covered Species that rely upon scrub habitat if the Conservation Actions in Section 6.3, above, result in a healthy ecosystem structure. The percentage of bare ground as well as vegetation structure and height will be measured at least every five years and reported accordingly in the annual Progress Report. Reported vegetation structure, including percent invasive species, must be within the descriptions outlined in Section 6.3. Vegetation measurements and photographs will be taken at the five monitoring sites randomly chosen by placing points on a map of the scrub habitat areas using a tool in ArcGIS

and depicted in Appendix IV, Figure 3, appended hereto. Three of the sites are in the scrub habitat at Lowry Lake and the remaining two in the scrub habitat at Giddens Road and Blue Pond, respectively.

7.4 Ephemeral Wetlands, Forested Wetlands and Surface Waters

This Agreement will be deemed successful as to the Covered Species occurring within ephemeral wetlands, forested wetlands, and surface waters if the temperature, pH, dissolved oxygen, and turbidity in each of these habitat types are within the water quality levels outlined in Florida's surface water quality standards for Class III waters published at F.A.C. 62-302.530. Each of these factors as well as the extent to which invasive species are present in each habitat type will be measured by no later than 6 months after the last signature on this document and reported in the annual Progress Report. Thereafter, measurements will be taken every three years.

Hydrologic measurements will be taken at five monitoring sites within the ephemeral wetlands, forested wetlands, and surface waters, including streams, lakes and ponds, respectively. The monitoring sites for each of the habitat types are depicted in Appendix IV, Figures 4, 5, 6, and 7, respectively, which are appended hereto. The monitoring sites for the ephemeral and forested wetlands were randomly chosen using the “create random points” tool in ArcGIS to place points on a map within each of the habitat types. The monitoring sites for the streams, lakes and ponds were chosen from among sites used in 2010-2011 by the FWC to conduct its Black Creek crayfish survey (Nelson and Floyd 2011). They also were chosen based on access to and the representation of the different water bodies. If drought conditions or intense hurricane activity disrupt the Armory Board’s ability to take measurements or conduct surveys, the Board will do so as soon as conditions allow. In addition to the measurements and survey information, the Armory Board will include information regarding the implementation of BMPs practices for construction and forestry activities in each of the three habitat types in the annual Progress Report.

In addition to monitoring for invasive species and water quality, the Armory Board will also survey for Black Creek crayfish using dip netting at the ten sites depicted in Appendix IV, Figure 8, which is appended hereto. The first crayfish surveys shall be conducted by no later than 6 months after the last signature on this document and, thereafter, at least once every five years. These surveys will be one of the tools used to evaluate the success of the Conservation Actions for the Covered Species that use streams. Five of the survey sites will overlap with the monitoring sites for streams depicted in Appendix IV, Figure 6. Black Creek crayfish require high quality streams with cool, unpolluted, flowing water, and the species’ presence is a good indicator of a healthy ecosystem. If Black Creek crayfish populations are found to be stable or

increasing in reference to baseline data derived during the first reporting year, this Agreement will be deemed successful for Covered Species in stream habitat.

8.0 RESPONSIBILITIES OF THE PARTIES

8.1 State of Florida Armory Board

The Armory Board is responsible for the supervision and control of all Florida National Guard armories, facilities, and real property (also referred to as “military posts” pursuant to Fl. Stat. § 250.01(12)) within the state that are used primarily for housing and training troops, performing administrative duties, or storing military property, supplies, or records. It also accepts and holds title to real property, by deed or long-term lease, from federal, state or local governments, or from private interests, for use as armories or for other military purposes and adopts rules for managing armories and other facilities under the control of the Florida Department of Military Affairs of which the Florida Army National Guard is a branch. The Armory Board is authorized to enter into this Agreement on behalf of the Florida Department of Military Affairs and its unit, the Florida Army National Guard.

In addition to the responsibilities and obligations otherwise set forth in this Agreement, the Armory Board is responsible for implementing all of the “Conservation Actions” set forth in Section 6.0, above, as well as for the monitoring and reporting obligations set forth in Section 7.0, above, including but not limited to, conducting prescribed burns, surveying for Covered Species, and assessing water quality.

8.2 Florida Fish and Wildlife Conservation Commission

In addition to the responsibilities otherwise set forth in this Agreement, the FWC is responsible for conserving, sustaining, enhancing, and protecting Florida's fish and wildlife resources for the benefit of present and future generations. As such, the Commission exercises regulatory and executive powers with respect to wild animal life, fresh water aquatic life and marine life. This Agreement covers species that are located in the state as well as species that the Commission has listed and determined to be at risk.

The FWC has determined that the Armory Board’s implementation of the “Conservation Actions” set forth in Section 6.0, above, and monitoring and reporting obligations set forth in Section 7.0, above, would meet the criteria for issuance of permit pursuant to F.A.C. 68A-27.007(2)(b) for incidental take of a state-designated threatened species. The FWC agrees to issue an incidental take permit to the Armory Board for the Covered Species that are state-designated threatened species. Additionally, pursuant to the Gopher Tortoise Permitting

Guidelines, revised February 2015, the FWC agreed to categorically exclude and exempt all mission critical military training and other operational activities, as determined by the Florida National Guard, occurring on the CBJTC. The exclusion and exemption do not cover activities associated with the construction of permanent structures or parking lots or the laying of pavement or gravel on the Installation. The FWC also has issued a state gopher tortoise relocation permit, which compliments this CCAA and is appended hereto as “Appendix I.”

The FWC has closely coordinated with the Service to ensure that this Agreement is consistent with applicable State laws and regulations. The Commission will continue to work closely with the Armory Board and the Service on the implementation of this Agreement. The FWC has provided funding, personnel, and other in-kind services to further the conservation of the Covered Species.

8.3 Army National Guard

The Army National Guard is a Directorate within the National Guard Bureau (NGB), which is a joint activity of the DoD (10 USC §113; see also Department of Defense Directive 5105.77, *National Guard Bureau (NGB)*, dated May 21, 2008). As a Party, the Army National Guard will ensure that this Agreement is implemented consistent with the needs for DoD readiness training on the Enrolled Lands. The Army National Guard’s military training activities are deemed “agency actions” per section 7(a)(2) of the ESA, and the Army National Guard completes consultation for federally-listed species in accordance with 50 C.F.R. Part 402. Should a Covered Species become federally-listed as “threatened” or “endangered” in the future, the Army National Guard will be covered for the activities and take addressed in this Agreement, the accompanying Biological/Conference Opinion and the associated Enhancement of Survival Permit. Any activities not covered under this Agreement may need separate consultation should a Covered Species become listed.

8.4 U. S. Fish and Wildlife Service

In addition to the responsibilities otherwise set forth in this Agreement, the Service will:

- a) Administer and provide oversight for this Agreement, including oversight and technical assistance related to the monitoring and reporting requirements for Covered Species, management of Covered Species’ habitat on the enrolled property, and in augmenting and/or reintroducing the Covered Species, when necessary.
- b) Ensure that the proposed management activities meet the applicable regulatory standards and goals of this Agreement.

- c) Inform the other Parties of any known Covered Species' mortalities or injuries within five (5) working days of receiving notice of such event.
- d) Provide assistance in the development of a unified monitoring protocol.
- e) Within 60 days of receipt of annual monitoring reports submitted by the Armory, the Service will review the reports and notify the Armory of any possible issues with or suggested amendments to the CCAA that may warrant consideration.

9.0 FUNDING FOR THE AGREEMENT

The Florida Armory Board shall be responsible for funding all matters pertaining to this Agreement, including but not limited to implementation of the Conservation Actions, monitoring and surveying. Implementation of this Agreement is subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds.

10.0 REGULATORY ASSURANCES TO THE LANDOWNER

The Service's Assurances to the Armory Board

If this Agreement is being properly implemented by the Armory Board, the following assurances apply only with respect to the Covered Species:

(A) Changed Circumstances

1. If the Service determines that additional conservation actions are necessary to respond to changed circumstances, as that term is defined in 50 C.F.R. § 17.3, and these measures are set forth in this Agreement, the Armory Board will implement the actions specified herein.
2. If the Service determines that additional conservation actions not provided for in this Agreement are necessary to respond to changed circumstances, as that term is defined in 50 C.F.R. § 17.3, the Service will not require any conservation actions in addition to those provided for in this Agreement without the consent of the Armory Board.

(B) Unforeseen Circumstances

In the event of unforeseen circumstances, as that term is defined in 50 C.F.R. § 17.3, the Service will not require the commitment of additional land, water or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level agreed to herein for the Covered Species without the consent of the Armory Board.

(1) If the Service determines that additional conservation actions measures are necessary to respond to unforeseen circumstances, the Service may require additional actions of the Armory provided the Agreement is being properly implemented but only if such actions maintain the original terms of this Agreement to maximum extent possible. Any such additional actions will not involve the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources otherwise available for development or use under the terms of this Agreement as of its Effective Date without the consent of the Armory Board.

(2) The Service will have the burden of demonstrating that unforeseen circumstances exist based on the best scientific and commercial data available. These findings must be clearly documented and based upon reliable technical information regarding the status and habitat requirements of the Covered Species. The Service will consider, but not be limited to, the following factors:

- (a) Size of the current range of the Covered Species;
- (b) Percentage of range adversely affected by this Agreement;
- (c) Percentage of range conserved by this Agreement;
- (d) Ecological significance of the portions of the Covered Species' respective ranges that are affected by this Agreement;
- (e) Level of knowledge about the Covered Species and the degree of specificity of the Covered Species' conservation program under this Agreement; and,
- (f) Whether failure to adopt additional conservation actions would appreciably reduce the likelihood of survival and recovery of a Covered Species in the wild.

The FWC's Assurances to the Armory Board

Via this Agreement and the F.A.C. 68A-27.007(2)(b) state permit that the FWC will issue to the Armory Board for incidental take of the state-listed species that are identified as Covered Species in Table 2, above, the FWC assures the Armory Board that it will not require additional conservation actions or impose additional land, water, or resource use restrictions beyond those set forth herein provided the permit and this Agreement are being properly implemented.

11.0 INCIDENTAL TAKE AUTHORIZATION

An Enhancement of Survival Permit (Permit) issued to the Armory Board by the Service will authorize incidental take of the Covered Species consistent with this Agreement and the terms of the Permit. The Permit will become effective as to a Covered Species on the date that the species

is listed as “threatened” or “endangered” under the ESA. On such date, the Armory Board will be authorized take for the covered species that was listed in conjunction with implementation of the Conservation Actions specified in the Agreement. The take is expected to be in the form of mortality, harm, and harassment associated with implementing the best management practices as described in the Conservation Actions section and the monitoring provisions in the Monitoring and Reporting section. The Service has determined that the levels of incidental take authorized by the Permit will not jeopardize the continued existence of either of the Covered Species. The Service has further determined that the levels of incidental take authorized by the Permit is consistent with the overall goal of removing or precluding the need to list the Covered Species if the conservation actions were also implemented on other necessary properties.

The Permit will not be revoked for any reason except those set forth in 50 CFR 13.28(a)(1-4) or unless continuation of the permitted activity would be inconsistent with the criterion set forth in 50 CFR 17.22(d)(2)(iii) and the inconsistency has not been remedied in a timely fashion.

The assurances provided apply only to the covered species in-as-much as the Agreement is being properly implemented. The assurances provided shall in no way limit the Service's retention of its obligations and authorities for consultation under section 7(a)(2) of the Endangered Species Act relative to future Federal actions that may occur within the Project Site that may affect the covered species or other listed, proposed, or candidate species.

The Parties agree and understand that entering into this Agreement does not preclude or otherwise remove the Service's authority to list any of the covered species as threatened or endangered species under the ESA should the Service determine that listing any of the covered species is necessary pursuant to section 4 of the ESA.

Through this Agreement, the FWC also provides the Armory Board assurances, via a permit for the state-listed species found in Table 2, that if the Agreement has been implemented in good faith by the Armory Board, the FWC will not require additional conservation measures nor impose additional land, water, or resource use restrictions beyond those the Armory Board voluntarily committed to under the terms of the original Agreement and that are confirmed in the permit.

NOTIFICATIONS

In the event that any of the Parties detect conditions that may adversely affect any of the covered species at the Project Site, such conditions will be reported to the Armory Board, the FWC, and the Service. Such conditions may include, but are not limited to, evidence of fish kills, spills, or releases of materials that may affect streams in the Project Site; invasion of exotic plant or

animal species at the Project Site; or significantly increased sedimentation within streams at the Project Site.

The Armory Board agrees to provide the Service with an opportunity to rescue individuals of the covered species before any authorized take occurs as described in the Enhancement of Survival Permit. Such notification that authorized take will occur must be provided to the Service at least 30 days in advance of implementing the action and will include a description of the action to be taken and measures to reduce the authorized take. Rescue actions undertaken by the Service shall not unreasonably interfere with the implementation of Conservation Actions under this Agreement.

12.0 ADAPTIVE MANAGEMENT

The Parties agree that adaptive management provisions are necessary to ensure that this Agreement can be modified to address changing conditions or new information regarding or affecting the conservation of the Covered Species and the ultimate success of this Agreement. The Armory Board will evaluate annually the effectiveness of the Conservation Actions set forth herein and prepare and submit a Progress Report annually to the FWC and the Service as described in the “Monitoring and Reporting” section, above, and recommend changes to increase the effectiveness of this Agreement in conserving the Covered Species and satisfying the CCAA standard. Subject to Section 10.0, above, the Parties may initiate requests to modify the Conservation Actions in the manner provided in Section 14.0, below. Requests to modify the Conservation Actions must remain within the scope of this Agreement. Specific areas in which adaptive management may be utilized include adjustments to survey frequency, sampling techniques, and the frequency of monitoring periods.

These objectives will be accomplished through implementation of the specific conservation actions described below. However, in accordance with the principles of adaptive management, which are discussed herein, the status of this Agreement will be evaluated through monitoring efforts and an annual report to assess the Agreement success.

Although not a specific Objective, the Parties believe that increasing knowledge of all covered species at the Project Site will help guide adaptive management and contribute to the overall conservation of the covered species. To accomplish this, the Parties will encourage and support scientific surveys for all covered species on CBJTC. Increasing distribution knowledge of at-risk species on the Project Site will lead to a better understanding of their life history and habitat requirements, which in turn will lead to better management objectives for these imperiled species.

13.0 EMERGENCY SITUATIONS

Emergency situations arising from natural disasters (e.g., tornados, hurricanes, fire, excessive rainfall, extreme drought, insect infestations, or epidemic disease, etc.) may require the initiation of certain land management actions that could result in incidental take of the Covered Species. The Armory Board agrees to notify the other Parties in writing within 14 days of any such occurrence and to allow the Service and/or FWC to enter onto the Enrolled Property to conduct surveys and/or relocation of individuals of the Covered Species prior to initiation of the emergency land management actions. If it is not possible to provide notice before implementing the actions, the Armory Board agrees to the maximum extent practicable to implement such actions so as to avoid impacting locations on the Enrolled Lands where the Covered Species are known to occur. The Armory Board will notify the Service and the FWC in writing, within ten working days of implementing any such action and report all measures undertaken to avoid impacts to the Covered Species and, if take occurred, the amount of such take as to each Covered Species.

14.0 Modifications

Any Party may propose modifications or amendments to this Agreement, including but not limited to the Conservation Actions set forth herein, by providing written notice to and obtaining the written concurrence of each of the other Parties. Such notice shall include a statement of the proposed modification or amendment, the reason for it, and effects anticipated to result from the modification. The Parties will use their best efforts to respond to proposed modifications within sixty (60) days of receipt of such notice. Proposed modifications will become effective upon the date by which each of the Parties has concurred in writing.

15.0 TERMINATION

The Armory Board may terminate this Agreement prior to the duration of 15 years, with good cause, even if the expected conservation benefits have not been realized. The Enhancement of Survival Permit would also be terminated, however, at the same time thus rescinding, among other things, the Armory Board's authority to incidentally take any Covered Species.

To terminate this Agreement, the Armory Board must submit a (60)-day written notice of its intent to terminate to each of the Parties. The notice also must provide the Service and/or the FWC the opportunity or opportunities, as necessary, to come onto the Enrolled Lands within 60 days of the notice to relocate the Covered Species. Notwithstanding any termination of this Agreement, the Armory Board will remain responsible for implementing any outstanding measures identified in the "Conservation Actions" section, above, that the Board is obligated to perform through the termination date.

The FWC may withdraw from this Agreement by providing 60-day written notice of such intent to each of the other Parties. The FWC will remain responsible for any conservation actions under the Wildlife Management Agreement for which it is responsible.

16.0 ADDITIONAL CONSERVATION ACTIONS

Nothing in this Agreement shall restrain or limit either Party from taking additional conservation actions not described herein at its own expense to protect or conserve a Covered Species, provided the Service deems such measures consistent with the conservation goals and objectives of this Agreement.

17.0 SUCCESSION AND TRANSFER

This Agreement shall be binding on and shall inure to the benefit of the Parties and their respective successors and transferees (i.e., new owners) in accordance with applicable regulations (50 CFR 13.24 and 13.25). The rights and obligations under this Agreement shall run with the ownership of the Enrolled Lands and are transferable to subsequent non-Federal property owners pursuant to 50 C.F.R. § 13.25.

The Enhancement of Survival Permit issued to the Armory Board also may be transferred to a subsequent owner of the Enrolled Lands pursuant to 50 C.F.R. § 13.25. If this Agreement and the associated Permit are transferred, the new owner will have the same rights and obligations with respect to the Enrolled Lands as its predecessor. The new owner may also apply to enter into a new CCAA with the Service and FWC to receive its own regulatory assurances and Permit.

The Armory Board agrees to provide written notice to the Service thirty (30) days prior to transferring or conveying, ownership of the Enrolled Lands or any portion of the lands comprising the CBJTC. In the event that the State of Florida or board shall at any time use for other than military purposes, sell, convey, or otherwise dispose of all or any part of the State or Federal land, all of the right, title, and interest in and to the Federal land shall revert to the United States (Public Law 493, 1954). Upon receipt of such notice, the Service will contact the prospective owner to discuss and explain this Agreement and to determine whether the prospective owner is interested in becoming a party to this Agreement or desires to enter into a new agreement. The agreement will be null in the event of the lands reverting to the United States.

In the event that the lands are not reverted to the United States, and should the transferee or conveyee agree to become a party to this Agreement, the Service will regard that person or entity as having the same rights and obligations as the Armory Board such that actions taken by the new party that result in incidental take of a Covered Species would be authorized in accordance with this Agreement. If the transferee or conveyee does not become a party to this Agreement, it would neither incur responsibilities under this Agreement nor receive the regulatory assurances of this Agreement and the Permit.

18.0 PERMIT REVOCATION

The Service may not revoke the Permit issued in association with this Agreement except as provided in this paragraph. The Permit may be revoked for any reason set forth in 50 C.F.R. § 13.28(a)(1) through (4). The Service may also revoke the Permit if continuation of the permitted activity would either appreciably reduce the likelihood of survival and recovery in the wild of any listed species or directly or indirectly alter designated critical habitat such that it appreciably diminishes the value of that critical habitat for both the survival and recovery of a listed species. Before revoking the Permit for either of the latter two reasons, the Service, with the consent of the Armory Board, will pursue all appropriate options to avoid permit revocation. These options may include, but are not limited to: extending or modifying the existing permit; capturing and relocating the Covered Species; compensating the Armory Board to forgo the activity; purchasing an easement or fee simple interest in the Enrolled Lands; or, arranging for a third-party acquisition of an interest in the lands.

19.0 MISCELLANEOUS PROVISIONS

19.1 The Service's regulatory assurances to the Armory Board shall in no way affect the Service's rights, obligations and authorities under the ESA, including but not limited to, consulting under section 7(a)(2) of the ESA relative to this Agreement or to future Federal actions that may affect a Covered Species on the Enrolled Lands or on the CBJTC.

19.2 The FWC's actions under this Agreement shall in no way affect its rights, obligations and authorities under the statutes and rules of the state of Florida.

19.3 The Parties agree and understand that entering into this Agreement does not preclude the Service from listing either or all of the Covered Species as "threatened" or "endangered" under the ESA should the Service determine that such listing is warranted pursuant to section 4 of the ESA.

19.4 The Armory Board agrees to notify the Service and the FWC before take of a Covered Species occurs and to provide the Service with the opportunity to rescue any individual or individuals of the Covered Species prior to the occurrence of any such take. Such notice shall be in writing and provided to the Service and the FWC at least thirty (30) days in advance of the Armory Board engaging in any that would result in such take. The notice shall also include a description of the action that will cause the take, an estimate of the amount of take anticipated to occur, and measures that could be undertaken to reduce or prevent the anticipated take.

19.5 In the event a Party detects conditions on the Enrolled Lands or on the Installation that may adversely affect a Covered Species, such Party agrees to report such conditions to the other Parties immediately. Such conditions may include, but are not limited to, evidence of fish kills; spills or releases of materials or substances that might adversely affect streams on the CBJTC; invasion of exotic plant or animal species on the Enrolled Lands; or, increased sedimentation within streams within the Enrolled Lands.

19.6 The Parties recognize and acknowledge that they have specific statutory responsibilities that cannot be delegated, particularly with respect to the management and conservation of wildlife species and natural resources. Nothing in this Agreement is intended to abrogate any of the Parties' respective responsibilities. This Agreement is subject to and intended to be consistent with all applicable Federal and State laws.

19.7 The Service's implementation of this Agreement is subject to the requirements of the Federal Anti-Deficiency Act (31 U.S.C.S §1341) and the availability of appropriated funds. Nothing herein shall be construed to require the obligation, appropriation, or expenditure of any funds from the U.S. Treasury. The Parties acknowledge that this Agreement does not require the Service to expend any federal appropriated funds unless and until an authorized agency official affirmatively acts to commit such expenditures as evidenced in writing.

20.0 NOTIFICATIONS

Communication, reports, and correspondence required by this Agreement should be directed to the persons listed below. The names and contact information may be changed upon written notice to the persons listed below.

Armory Board: Michael A. Calhoun
 Major General
 Florida National Guard
 Adjutant General
 St. Francis Barracks
 82 Marine Street
 St. Augustine, FL 32084

FWC: Thomas Eason, Ph.D.
 Director, Division of Habitat and Species Conservation
 Florida Fish and Wildlife Conservation Commission
 620 South Meridian Street
 Tallahassee, FL 32399-1600

Service: Leopoldo Miranda
Assistant Regional Director, Ecological Services
U.S. Fish and Wildlife Service
1875 Century Boulevard
Atlanta, GA 30345

21.0 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) COMPLIANCE

Survey, collection, or research activities associated with implementation and maintenance of this Agreement will not entail significant Federal actions under the NEPA and will be given a categorical exclusion designation. All other actions will be evaluated prior to implementation and will comply with NEPA regulations.

IN WITNESS WHEREOF, each Party hereto has caused this Agreement to be executed by an authorized official on the date set forth beside their respective signatures.



Michael A. Calhoun

Major General

Florida National Guard

The Adjutant General

4 APR 17

Date



Nick Wiley

Executive Director

Florida Fish and Wildlife Conservation Commission

4/6/17

Date



Erik T. Gordon

Date

Colonel, U.S. Army

Chief, Installations & Environment Division

Army National Guard

18 April 2017



Leopoldo Miranda

Date

Assistant Regional Director Ecological Services

Southeast Region

U.S. Fish and Wildlife Service

4/6/17

LITERATURE CITED

- Florida Department of Agriculture and Consumer Services. 2008. Florida Forest Service's *Silviculture Best Management Practices Manual*. Tallahassee, Florida. 121 pages. Found at: http://freshfromflorida.s3.amazonaws.com/silvicultural_bmp_manual.pdf
- Florida Department of Environmental Protection. 1998. List of 303(d) Impaired Waters for Florida. Found at: [http://www.dep.state.fl.us/water/watersheds/assessment/docs/303\(d\)-2.pdf](http://www.dep.state.fl.us/water/watersheds/assessment/docs/303(d)-2.pdf).
- Florida Fish and Wildlife Conservation Commission. 2013. Florida's Endangered and Threatened Species. Found at: <http://myfwc.com/media/1515251/threatened-endangered-species.pdf>.
- Nelson, E.B. and M.R. Floyd. 2011. Black Creek Crayfish Baseline Survey. Contract #CFMO ENV-BCCBS. Florida Fish and Wildlife Conservation Commission Report F2892-11-F. 128 pages.
- U.S. Fish and Wildlife Service. 2013. Ecological Services Work Plan for Fiscal Year 13 (FY13). Sent via e-mail from Leopoldo Miranda to Region 4 Project Leaders on February 28, 2013. 5 pages.

Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

Camp Blanding Joint Training Center

Clay County, FL

Appendices I, II, III and IV



Photo by George Willson



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Prepared by the U.S. Fish and Wildlife Service, Florida Armory Board, and the Florida Fish and Wildlife Conservation Commission in cooperation with the Army National Guard

March 28, 2017

APPENDIX I – FWC Gopher Tortoise Relocation Permit



Categorical Exclusion Gopher Tortoise Relocation Permit

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

Species Conservation Planning Section

620 South Meridian Street, M.S. 2A

Tallahassee, FL 32399-1600

Permittee Name: Camp Blanding Joint Training Center

Permittee Address: 5629 SR 16W

Building 4540

Starke, FL 32091

Contact: Ms. Jennifer Perkins

Phone/Fax No.: 904-682-2441/682-3157

Permit #: GTM-13-00001

Effective Date: January 27, 2014

Expiration Date: January 27, 2019

Agent Name: Mr. Matt Stowe

Agent Address: Camp Blanding Joint Training Center

145 Moultrie Crossing Lane

Saint Augustine, FL 32086

Phone/Fax No.: 904-823-0249/823-0189

PERMITTEE IS AUTHORIZED TO:

Capture by using bucket traps, live traps, hand shovel and backhoe excavation of tortoise burrows, remove and relocate gopher tortoises (*Gopherus polyphemus*) by non-harmful means, and to molest, damage or destroy gopher tortoise burrows while conducting these activities, subject to the following conditions and provisions, in association with military training and other operational activities as described in the Gopher Tortoise Permitting Guidelines – April 2008 (revised April 2013) [hereafter, “Permitting Guidelines”].

AUTHORIZED LOCATION(S):

73,000-acre Camp Blanding Joint Training Center located south of State Road 16 and west of State Road 21 (T5S,R23E,S19-36; T5S,R24E,S19 & 30-31; T6S,R23E,S1-15,17-20 & 22-36; T6S,R24E,S6,16-21 & 28-33; T7S,R23E,S1-30 & 32-35; T7S,R24E,S4-9,16-20 & 30; T8S,R23E,S2-5 & 8-9; with Latitude 29° 56' 35" N and Longitude 81° 57' 50" W), in Clay County, relocated to and released at the 206.0-acre Griffis Loop Management Area-A unit recipient site (T7S,R23E,S33; T8S,R23E,S3 & 4; with Latitude 29° 49' 57" N and Longitude 82° 0' 10" W), or temporarily excluded to on-site adjacent recipient areas (see condition #4).

Permittee Signature _____ Date _____

Not valid unless signed. By signature, confirms that all information provided to issue the permit is accurate and complete, and indicates acceptance and understanding of the provisions and conditions listed below. **Any false statements or misrepresentations when applying for this permit may result in felony charges and will result in revocation of this permit.**

Authorized by: Nick Wiley, Executive Director

Authorizing Signature Bradley P. Gruver Date 01/27/14
Bradley P. Gruver, Ph.D., Leader
Species Conservation Planning Section

PERMIT CONDITIONS AND PROVISIONS (continued):

Donor Site

1. Authorizations to conduct the specified activities in association with the relocation of gopher tortoises in Florida are subject to Rules 68A-9.002 and 68A-27 Florida Administrative Code (F.A.C.), and the Florida Fish and Wildlife Conservation Commission's (hereafter, "FWC") Permitting Guidelines, and the following provisions/conditions.
2. Tortoises shall only be relocated when the low temperature at the recipient site is forecasted by the National Weather Service to be above 50° Fahrenheit for three consecutive days after release (including the day of relocation). This three-day window of milder overnight temperatures is required to allow the relocated tortoises to settle into the recipient site and to reduce the chance of cold-related stress or mortality. Authorization of the capture/relocation is otherwise predicated and conditioned on the information and assurances provided in Appendix N of the January 2014 draft of the Camp Blanding Joint Training Center Integrated Natural Resources Management Plan, [hereafter "INRMP"] scheduled to be approved by the National Guard Bureau in 2014, the assurances of which are herein incorporated by reference.
3. Captured gopher tortoises that show signs of disease (i.e., nasal and ocular discharge, emaciation, etc.) should not be relocated to the 206.0-acre Management Area-A unit of the 613-acre Griffis Loop recipient site. At the Permittee's discretion, symptomatic tortoises may be: relocated on-site; transported to and quarantined at a FWC licensed wildlife rehabilitation center (list available upon request) or licensed veterinary facility and observed for recovery and subsequent relocation along with others from the population; transported and donated to a FWC permitted disease research program; or humanely euthanized by a licensed veterinarian when disease is advanced.
4. Gopher tortoises captured from military installation projects that are of short duration, as described in the INRMP, may be released into temporary pens at densities of no more than 3 gopher tortoises per acre, in accordance with the Permitting Guidelines, and excluded from the donor site for no more than 10 days.
5. This permit does not authorize the Permittee access to any public or private properties. Any required permission must be secured from the appropriate landholders prior to undertaking any work on such properties.
6. Captures/relocations may be undertaken only subsequent to issuance of authorization for land clearing or grading, or construction activities, if required, by local, state and/or federal agencies. This permit is subject to revocation at any time pursuant to Chapter 120, Florida Statutes. It is nontransferable and must be readily available for inspection at all times while engaging in the permitted activities.
7. The activities authorized under this permit must be carried out by the Authorized Gopher Tortoise Agent ("Authorized Agent") designated on this permit, or under the direct supervision and responsibility of that Authorized Agent. The Permittee and Authorized Agent shall be as fully responsible for any such activities to the same extent as if they had themselves carried out those activities under this permit.
8. Either this original permit, or a complete copy, must be clearly posted at the affected site at all times while engaged in the permitted tortoise relocation activities.
9. The Permittee, by signing this permit, specifically agrees to allow authorized FWC personnel, upon presentation of credentials as may be required by law, access to the donor and recipient sites at

PERMIT CONDITIONS AND PROVISIONS (continued):

reasonable times, for the purpose of inspecting the capture/relocation activities authorized under this permit.

10. Any gopher tortoise mortality or injury that occurs while conducting activities authorized under this permit shall be reported to the Gopher Tortoise Permit Coordinator (phone number 850-921-1031) within 48 hours of the occurrence. An injured gopher tortoise shall be promptly taken to either a licensed wildlife rehabilitation facility or a licensed veterinarian for evaluation and treatment. Contact information for the facility or veterinarian shall be included with the information reported.
11. Non-native wildlife that are captured during gopher tortoise capture and relocation activities should either be humanely euthanized or placed with an individual, institution, or organization that is properly permitted to possess those species.
12. Gopher tortoise commensals listed in Rule 68A-27 as either State-designated threatened species or species of special concern (this does not include the eastern indigo snake [*Drymarchon couperi*] and other Federally-designated Endangered and Threatened species) and encountered in the gopher tortoise capture operation should either be released on-site or allowed to escape unharmed, or be donated to an educational or research facility that possesses the appropriate FWC scientific collecting/educational use permit and is authorized to receive additional specimens of the captured species. Non-listed native commensals should either be allowed to escape unharmed or released on-site. Refer to Appendix 9 of the Permitting Guidelines for additional information on gopher tortoise commensals. If you have questions regarding the proper method of addressing gopher tortoise commensals encountered during capture operations, contact the Gopher Tortoise Permit Coordinator (phone number 850-921-1031).
13. This permit does not authorize the take of Federally-designated Endangered and Threatened species. Only individuals who are in possession of a valid permit or authorization issued by the United States Fish and Wildlife Service (USFWS) to capture or possess an eastern indigo snake (*Drymarchon couperi*) or other Federally-designated Endangered and Threatened species may physically handle those species. If individuals without a USFWS permit or authorization encounter an eastern indigo snake during attempts to capture gopher tortoises or during subsequent land alteration or development activities within the property, all movement of heavy equipment and land alteration or development activities within the vicinity of the snake shall cease to allow the snake to vacate the area. No movement of heavy equipment, or land alteration or development activities within the vicinity of the snake shall resume until the snake has vacated the work area.
14. The Permittee shall submit a report detailing the capture/relocation of gopher tortoises for each military training or operational activity to the Gopher Tortoise Permit Coordinator either by email to gtpermits@myfwc.com or by mail delivery service to the address listed in the letterhead within 30 days of release of the captured/relocated tortoises involved. A report form is attached for use in that regard. Any request for permit amendment, including renewal, should be submitted at least 45 days prior to the expiration date of this permit.

Recipient Site

15. Up to 262 gopher tortoises may be received at and relocated into the estimated 206.0 acres of tortoise habitat contained within the Management Area-A unit of the 613-acre Griffis Loop recipient site identified above. Applications to amend this permit to authorize relocations of gopher tortoises to other units within this recipient site will be evaluated and acted upon by the FWC under the permitting guidelines and provisions/conditions in place at the time of application.

PERMIT CONDITIONS AND PROVISIONS (continued):

16. The permittee shall have the obligation to manage and maintain habitat for gopher tortoises in accordance with the INRMP.
17. Gopher tortoises released at the designated recipient site shall be released into an enclosure in conformance with the FWC enclosure requirements. The enclosure must be maintained for a minimum period of 6 months from the final release of gopher tortoises into the enclosure, but no longer than twelve months; however, the maximum 12-month time limit will not apply when the entire perimeter of the approved recipient site parcel is permanently fenced in conformance with the FWC enclosure requirements. Enclosure materials, construction methods and dimensions must conform to the requirements specified in the Permitting Guidelines. The enclosures must be regularly monitored and maintained and repaired immediately if damaged to maintain the integrity of the enclosure. Monitoring of the enclosure shall be conducted at least once a week for the first 4 weeks following release of tortoises, and at least once a month thereafter.
18. Gopher tortoises may be released into a temporary enclosure constructed within a portion of a recipient site. The stocking rate within the enclosure may be up to 1.5 times the gopher tortoise density that is approved by the FWC for that entire recipient site parcel. However, the maximum number of tortoises approved by the FWC for release into the entire recipient site parcel shall not be exceeded.
19. The Permittee shall keep written records of all the habitat management activities conducted within, and all tortoises relocated into the recipient site. A report of the habitat management activities, habitat monitoring and gopher tortoise population monitoring, as described in the INRMP, shall be provided to the Gopher Tortoise Permit Coordinator at the address listed in the letterhead in accordance with the phased recipient site monitoring and reporting requirements of the Permitting Guidelines, with the first report due on December 31, 2016. The subsequent reports shall be received by the Gopher Tortoise Permit Coordinator by December 31st every three years thereafter for the first 15 years this permit is in effect. If Camp Blanding has met monitoring and reporting requirements during the first 15 years, the monitoring and reporting requirement is reduced to every 5 years for the next 10 years. Following 25 years of successfully meeting all monitoring, habitat management and reporting requirements, reports are required every ten years as specified in the Permitting Guidelines. Reports shall be in the form specified by the FWC, and shall include the results of all monitoring and habitat management activities conducted through September 30th of the year the report is due.

A person whose substantial interests are affected by FWC's action may petition for an administrative proceeding (hearing) under sections 120.569 and 120.57 of the Florida Statutes. A person seeking a hearing on FWC's action shall file a petition for hearing with the agency within 21 days of receipt of written notice of the decision. The petition must contain the information and otherwise comply with section 120.569, Florida Statutes, and the uniform rules of the Florida Division of Administration, chapter 28-106, Florida Administrative Code. The Permittee shall cease all work authorized by this permit, upon receiving written notice that the FWC has received a petition. The cease work order shall remain in effect until the petition is resolved. The enclosed Explanation of Rights statement provides additional information as to the rights of parties whose substantial interests are or may be affected by this action.

RDM/cs
LIC 6-20
GTM-13-00001.per

Enclosure: Notice of Rights
Draft Camp Blanding INRMP (January 2014) – Appendix N
After Action Report form
cc w/o enc: Mr. Eric Seckinger, FWC, Tallahassee

The following text is an excerpt from Camp Blanding Joint Training Center's 2014 Integrated Natural Resources Management Plan:

4.7.3 Federal Candidate Species

Gopher tortoise: The gopher tortoise is a federal candidate species for listing as a threatened species and a state-listed threatened species that is typically found in dry upland habitats, such as sandhill, scrub, and pine flatwoods. Gopher tortoises excavate deep burrows for refuge from predators, weather, and fire (Hipes et al. 2000). The gopher tortoise is considered a keystone species because their burrows provide refuge for more than 300 animal species that neither harm nor benefit the gopher tortoise, including listed species such as the eastern indigo snake, Florida pine snake, Florida mouse, and gopher frog (FDMA 2011). The gopher tortoise population is thriving at CBJTC; the installation has been used in the past for the relocation of gopher tortoises displaced by development in northeastern Florida.

Through appropriate habitat management (See Sections 4.4.3, 4.4.4, and 4.4.6), CBJTC will manage existing high quality habitat as well as improve and restore degraded habitat in xeric uplands and natural communities that support the gopher tortoise. Frequent prescribed fire will be the primary tool, but other treatments, such as mechanical and chemical removal of hardwoods, replanting longleaf pine or native grasses and other ground cover in appropriate areas, and plantation thinning will be used when necessary. Maintaining these communities in a manner that replicates their natural form and function helps ensure they meet the needs of the gopher tortoise and the other species dependent on these communities.

Management Guidelines: Gopher tortoises are vulnerable to several threats within their range, including habitat degradation and loss (FFWCC 2007). The following management actions are recommended:

- Maintain a 25-foot boundary around all gopher tortoise burrows within the vicinity of projects and military training activities that have the potential to collapse burrows. Identify these burrows with high visibility signs indicating the 25-foot boundary where gopher tortoises will not be relocated during a project or military training.
- Manage fuel loads by implementing dormant season burns in units with high fuel loads and conduct maintenance burns during the growing season on a 1-3 year rotation.
- Natural stands will be maintained with their uneven-age or several-age structure. At cutting cycles of approximately 25 years, stand density will be reduced to basal areas between 60 and 80 square feet (sq-ft) per acre.
- Underplant turkey oak stands with containerized longleaf pine seedlings if natural regeneration is less than 200 longleaf pine seedlings per acre. Where practical and necessary, treatments such as mechanical thinning and herbicide treatment may be used to reduce the hardwood midstory.
- Harvest and remove on a large scale existing sand pine stands while retaining any volunteer or original longleaf pines. After 2-3 years the stands will then be burned and/or chopped, and replanted with containerized longleaf pine.
- Control invasive and exotic species and noxious weeds through early detection, isolation of infested areas, and control of individual plants with physical, chemical, or mechanical means, depending on the species.

Permitting

CBJTC has worked closely with FFWCC in developing the following permitting parameters. Most on-installation activities do not adversely affect the available habitat for gopher tortoises. Projects that are not expected to have a negative impact to gopher tortoise habitat or activities where the area will return to gopher tortoise habitat upon completion will not require a permit. Examples of these projects include military training or readiness events (Picture 1), the placement of conex storage containers (Picture 2), or construction in a management unit that does not adversely impact the quality of the habitat – such as a new tower (Picture 3) on a firing range or a temporary structure in a training area. This is not an exhaustive list. In addition, projects where gopher tortoise habitat will be created or improved, such as the creation of new ranges or renovations of existing ranges (Pictures 7 and 8) will also be covered under the categorical exclusion. The construction of permanent structures and parking lots and the laying of pavement or gravel shall still be permitted through the normal permitting process. For projects that will impact and require the relocation of gopher tortoises, all tortoises shall be captured, marked, and relocated using the methods outlined in FFWCC's Gopher Tortoise Permitting Guidelines, and as conducted by an Authorized Gopher Tortoise Agent.

Gopher tortoises will be temporarily relocated or excluded from areas where projects of short duration, such as range maintenance and berm improvement behind ranges, will occur. These short duration projects typically require some level of ground disturbance. Tortoises will be penned for no longer than 10 days for temporary relocations. For construction activities, training events, and other projects that exceed the 10-day threshold, gopher tortoises will be permanently relocated to an approved recipient site. The number of permanently relocated tortoises is anticipated to be low (e.g. only 20 adult tortoises and 3 juveniles – excavated from 59 burrows – have been permanently relocated from 9 project sites between 2009 and 2012).

To the extent possible, FFWCC will receive notification of any tortoise relocation activity (gtpermits@myfwc.com) at least 72 hours prior to relocation, not including weekends or holidays. At that time, FFWCC will receive a copy of the 100% gopher tortoise burrow survey of the project area. After Action Reports, in the format provided by FFWCC, will be submitted within 30 days of gopher tortoises being relocated.

Recipient Site

The area known as Griffis Loop is bounded by Griffis Loop and Greble Road (Figure 1). Only light maneuvers, such as light infantry (foot traffic) and rubber-wheeled vehicles, have occurred in the area and it is expected that only these activities will continue. Training only occurs occasionally in this area and vehicles rarely leave the road. The area will be managed with fire, on approximately a 1-3 year interval, to maintain canopy cover at $\leq 60\%$ and herbaceous groundcover at $\geq 30\%$. Management guidelines that are recommended above for the entire installation will be implemented at the recipient site. Future management units selected to house recipient sites, including those located on buffer lands, shall have comparable uses and similar burn intervals and vegetative cover percentages.

Griffis Loop is broken up into 3 management units (Figure 1). Management Area A shall be the recipient site used for the next 5 years. Enclosure material will meet the requirements listed in the Gopher Tortoise Permitting Guidelines (revised April 2013). Enclosures within the recipient site will remain in place for 6-12+ months after the last gopher tortoise is relocated into the enclosure. It is anticipated that fencing will be in place longer than 12 months to accommodate multiple projects over a long time-

span. For the long term, when Management Area C is used, fencing will remain in place for at least 12 months because of the proximity of State Road 21. When possible, the enclosure will have a rounded perimeter to prevent tortoises from congregating in corners. Fencing shall be monitored every week for the first month to ensure that it remains intact. Thereafter, fence monitoring will occur according to the Gopher Tortoise Permitting Guidelines. Gopher tortoise population and habitat/vegetation monitoring shall occur at least as often as the intervals described in the Gopher Tortoise Permitting Guidelines. The results of these surveys will also be included in the annual report submitted to FFWCC.

A 15% survey of Management Area A was conducted using the burrow survey methods found in Appendix 4 of the Gopher Tortoise Permitting Guidelines, although Line Transect Distance Surveys are also an appropriate survey method and may be used. Because the entire site provides potential gopher tortoise habitat, 31 acres of the 206-acre recipient site was surveyed to ascertain the current density of tortoises. Management Area A is composed entirely of sandhill habitat (Figure 2), with Kershaw and Penney soils (Figure 3 and Table 2). The survey assessed both soil types. The Land Cover Types map (Figure 2) shows the potential tortoise habitat, transects, and burrow locations (Table 1 contains information pertaining to the gopher tortoise burrows; Table 3 contains information pertaining to the transects). The current estimated baseline density is 0.73 tortoises per acre. The maximum allowable gopher tortoise density is 2 tortoises/acre, resulting in a final stocking rate of 1.27 tortoises/acre that can be relocated to this recipient site is (i.e., approximately 262 tortoises). Burrows less than 5 inches in width were not included in the calculation of the baseline density estimation. In addition, juveniles with a total carapace length of less than 130 mm (i.e., 5 inches) that are relocated into the recipient site do not count towards the carrying capacity.

$$\frac{(45 \text{ potentially occupied burrows} > 129\text{mm in width})}{(31 \text{ acres within survey area})} \times (0.50) = 0.73 \text{ tortoises/acre}$$

$$(2 \text{ tortoises/acre allowed} - 0.73 \text{ tortoises/acre baseline density}) \times 206 \text{ acres} \approx 262 \text{ tortoises}$$

A vegetation survey was also conducted using the methods found in Appendix 7 of the Gopher Tortoise Permitting Guidelines. The majority of the site consists of longleaf pine and turkey oak, with a moderate layer of debris on the ground, in addition to wiregrass and forbs. Vegetation height is low and some bare ground is present. A very small amount of habitat is dominated by live oak and turkey oak with a groundcover of debris and sparse woody vegetation. The remaining area – approximately one-third of the site – is dominated by longleaf pine only, with little debris, little bare ground, and more herbaceous vegetation. Canopy cover overall averaged 54% and ranged from 36-68%. Average shrub cover was 3% and ranged from 1-9%. Only 36% of stations had any shrub cover.

Herbaceous vegetation height was wide-ranging at 0-83cm. Eight of the nine transects contained no broadleaf grasses. Only two vegetation stations along one transect had broadleaf grasses ranging from 1-5% and 6-29% cover. While 25% of vegetation stations contained no other species of grass, 39% of stations contained 6-29% cover of other species of grass and 22% had 30-59% cover. Fifteen vegetation stations contained forbs ranging from <1-29% cover. Six vegetation stations contained sedges, five of which ranged from <1-5% cover. Many of the stations had a fair amount of bare ground and debris (19 and 20 stations, respectively, both with 30-95% cover); however, there was no palmetto and virtually no vines present (3 of 6 stations with <1% cover). Half of the woody species component (9 of 19 stations)

contained <5% cover. There was no visible geographical trend in any of the fields across the landscape for shrub or canopy cover, or any of the percent cover classes.

The following is the location information for the Recipient Site Management Area A, which is located entirely within Camp Blanding Joint Training Center in Clay County, Florida:

Section	Township	Township Directional	Range	Range Directional
3	8	S	23	E
4	8	S	23	E
33	7	S	23	E

Latitude Degrees	Latitude Minutes	Latitude Seconds		Longitude Degrees	Longitude Minutes	Longitude Seconds	
29	49	57	N	82	0	10	W

Parcel Numbers
03-08-23-000760-000-00
04-08-23-000825-000-00
33-07-23-000744-000-00

Picture 1



Picture2



Picture 3



Picture 7



Picture 8



Figure 1



**Camp Blanding Joint Training Center
Gopher Tortoise Management Areas
Aerial Map**



0 0.125 0.25 0.5 Miles

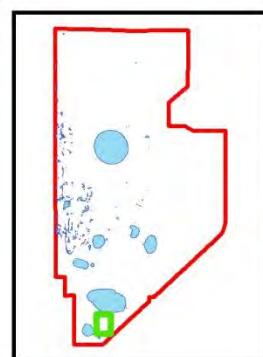
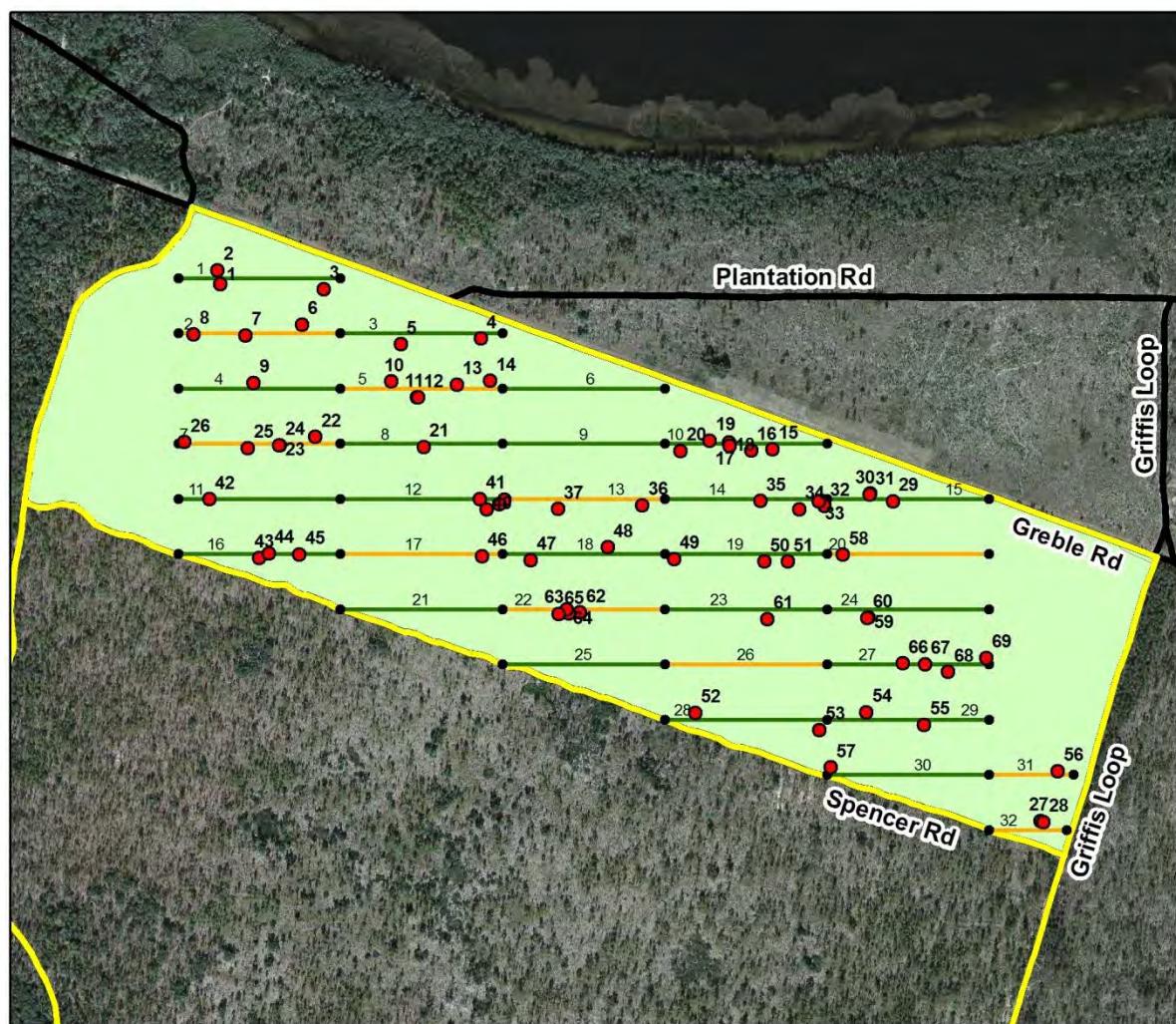


Figure 2



**Camp Blanding Joint Training Center
Gopher Tortoise Management Area A
Vegetation Community Type Map
and Burrow Location Map**



Legend

- Gopher Tortoise Burrows
- Transect Start and End Points
- Roads
- Transects
- Transects with Vegetation Surveys
- Management Areas
- Sandhill (206 acres, FLUCCS code 412)

0 0.125 0.25 0.5 Miles

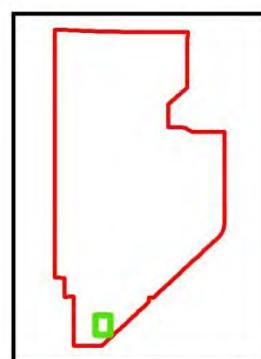


Table 1. Gopher tortoise burrow information.

Burrow ID	Size (mm)	Activity Status	Degrees Minutes Seconds	Burrow ID	Size (mm)	Activity Status	Degrees Minutes Seconds
1	200	potential	29 50 08 N 82 00 28 W	36	320	potential	29 49 57 N 82 00 04 W
2	300	potential	29 50 09 N 82 00 28 W	37	290	potential	29 49 57 N 82 00 09 W
3	90	potential	29 50 08 N 82 00 22 W	38	220	potential	29 49 57 N 82 00 12 W
4	80	potential	29 50 05 N 82 00 13 W	39	180	potential	29 49 57 N 82 00 12 W
5	304	potential	29 50 05 N 82 00 18 W	40	120	potential	29 49 57 N 82 00 13 W
6	70	potential	29 50 06 N 82 00 24 W	41	150	potential	29 49 57 N 82 00 13 W
7	75	abandoned	29 50 05 N 82 00 27 W	42	360	potential	29 49 57 N 82 00 29 W
8	305	potential	29 50 05 N 82 00 30 W	43	190	abandoned	29 49 54 N 82 00 26 W
9	303	potential	29 50 03 N 82 00 26 W	44	370	potential	29 49 54 N 82 00 25 W
10	120	potential	29 50 03 N 82 00 18 W	45	330	potential	29 49 54 N 82 00 24 W
11	120	potential	29 50 02 N 82 00 17 W	46	120	abandoned	29 49 54 N 82 00 13 W
12	180	abandoned	29 50 02 N 82 00 17 W	47	270	potential	29 49 54 N 82 00 10 W
13	200	abandoned	29 50 03 N 82 00 15 W	48	280	potential	29 49 55 N 82 00 06 W
14	170	potential	29 50 03 N 82 00 13 W	49	240	potential	29 49 54 N 82 00 02 W
15	140	potential	29 49 60 N 81 59 56 W	50	470	potential	29 49 54 N 81 59 57 W
16	310	potential	29 49 60 N 81 59 58 W	51	210	abandoned	29 49 54 N 81 59 56 W
17	350	potential	29 50 00 N 81 59 59 W	52	330	abandoned	29 49 47 N 82 00 01 W
18	250	abandoned	29 50 00 N 81 59 59 W	53	400	potential	29 49 46 N 81 59 54 W
19	360	potential	29 50 00 N 82 00 00 W	54	320	potential	29 49 47 N 81 59 51 W
20	420	abandoned	29 49 60 N 82 00 02 W	55	380	potential	29 49 46 N 81 59 48 W
21	230	potential	29 49 60 N 82 00 16 W	56	190	potential	29 49 44 N 81 59 40 W
22	250	potential	29 50 00 N 82 00 23 W	57	240	abandoned	29 49 44 N 81 59 53 W
23	210	abandoned	29 49 60 N 82 00 25 W	58	180	potential	29 49 55 N 81 59 52 W
24	150	potential	29 49 60 N 82 00 25 W	59	300	potential	29 49 52 N 81 59 51 W
25	400	potential	29 49 60 N 82 00 27 W	60	370	potential	29 49 51 N 81 59 51 W
26	170	potential	29 49 60 N 82 00 30 W	61	270	potential	29 49 51 N 81 59 57 W
27	80	potential	29 49 41 N 81 59 41 W	62	250	abandoned	29 49 52 N 82 00 07 W
28	290	potential	29 49 41 N 81 59 41 W	63	280	potential	29 49 52 N 82 00 08 W
29	280	potential	29 49 57 N 81 59 49 W	64	250	abandoned	29 49 52 N 82 00 08 W
30	240	potential	29 49 58 N 81 59 51 W	65	150	potential	29 49 52 N 82 00 09 W
31	260	potential	29 49 58 N 81 59 51 W	66	60	potential	29 49 49 N 81 59 49 W
32	190	potential	29 49 57 N 81 59 53 W	67	250	abandoned	29 49 49 N 81 59 48 W
33	330	potential	29 49 57 N 81 59 54 W	68	260	potential	29 49 49 N 81 59 46 W
34	210	abandoned	29 49 57 N 81 59 55 W	69	260	potential	29 49 50 N 81 59 44 W
35	340	abandoned	29 49 57 N 81 59 57 W				

Figure 3



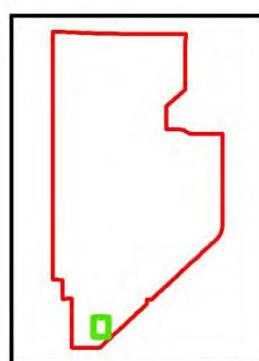
**Camp Blanding Joint Training Center
Gopher Tortoise Management Area A
Soils and Transect Map**



Legend

- Transect Start and End Points
- Roads
- Transects
- Transects with Vegetation Surveys
- Management Areas
- 34 Kershaw (202 acres; >72" DWT)
- 56 Penney (4 acres; >72" DWT)

0 0.125 0.25 0.5 Miles



DWT = depth to water table

Table 2. Soil types.

Soil Type	Soil Code	Acres	DWT*
Kershaw	34	202	>72"
Penney	56	4	>72"

* Depth to water table

Table 3. Gopher tortoise survey transect information.

Transect ID	Length (m)	Width (m)	Vegetation Survey*	# Potentially Occupied Burrows	# Abandoned Burrows	# Juvenile Burrows	# Adult Burrows	Density (per acre)
1	250	16	No	3	0	1	2	1.5
2	250	16	Yes	2	1	2	1	1
3	250	16	No	2	0	1	1	1
4	250	16	No	1	0	0	1	0.5
5	250	16	Yes	3	2	2	3	1.5
6	250	16	No	0	0	0	0	0
7	250	16	Yes	4	1	0	5	2
8	250	16	No	1	0	0	1	0.5
9	250	16	No	0	0	0	0	0
10	250	16	No	4	2	0	6	2
11	250	16	No	1	0	0	1	0.5
12	250	16	No	3	0	1	2	1.5
13	250	16	Yes	3	0	0	3	1.5
14	250	16	No	2	2	0	4	1
15	250	16	No	3	0	0	3	1.5
16	250	16	No	2	1	0	3	1
17	250	16	Yes	0	1	1	0	0
18	250	16	No	2	0	0	2	1
19	250	16	No	2	1	0	3	1
20	250	16	Yes	1	0	0	1	0.5
21	250	16	No	0	0	0	0	0
22	250	16	Yes	2	2	0	4	2
23	250	16	No	1	0	0	1	0.5
24	250	16	No	2	0	0	2	1
25	250	16	No	0	0	0	0	0
26	250	16	Yes	0	0	0	0	0
27	250	16	No	3	1	1	3	1.5
28	250	16	No	1	1	0	2	0.5
29	250	16	No	2	0	0	2	1
30	250	16	No	0	1	0	1	0
31	130	16	Yes	1	0	0	1	0.25
32	120	16	Yes	2	0	1	1	0.5
TOTAL				53	16	10	59	

* "Yes" refers to those transects that were also used as vegetation survey transect

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APPENDIX II – Species Accounts

Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

AMERICAN EEL

Anguilla rostrata



Figure 1. The American eel has a very large range, from Greenland south to Brazil.

Description

The American eel is an elongate, slender, snakelike fish with a yellowish to brown body with a white to pale yellowish ventral surface (Figure 1). It has a small pointed head, with the lower jaw protruding beyond the upper jaw; a long dorsal fin that is continuous with the tail fin and anal fin; and a small single gill slit on each side in front of the pectoral fin. Its slippery skin appears to be devoid of scales. Total length is up to 152 cm (60 inches).

Geographic Range and Distribution

The American eel has a very large range in the Atlantic Ocean and estuaries and rivers of the Atlantic and Gulf coasts of the United States and southeastern Canada, as well as much of the Mississippi River basin and the West Indies and Caribbean regions. The American eel is known from the St. Johns River and hence may be present on the Camp Blanding Joint Training Center.

Life History

Spawning has never been directly observed, but apparently occurs in the Sargasso Sea during winter and early spring (McCleave et al. 1987). Each female produces about 0.4-21.9 million eggs. Adults presumably die after spawning. Larvae are transported by currents to areas near the continental margin of North America, but the mechanism by which they arrive in estuarine areas is not known, nor is it known precisely how they

arrive in the Gulf of Mexico or the coast of South America.

Larvae metamorphose during the pelagic stage (8-12 months after hatching, or perhaps more than a year later), and unpigmented "glass eels" actively move toward land. Glass eels develop external pigmentation as they enter coastal areas and are then referred to as "elvers." Young eels begin moving upstream in river systems before pigmentation is complete, generally in spring in the northeastern United States. Eels develop into the "yellow eel" stage, which resembles the adult stage, usually by age two. Some yellow eels move far into stream headwaters whereas others remain in estuaries. After the lengthy "yellow eel" stage, eels may undergo a physical and physiological transformation into a distinct, sexually mature "silver eel" stage, and move downstream and into the ocean to spawn. Morphologically altered silver eels have not been observed in all parts of the range.

In general, eel populations in freshwater tend to be female dominated (Facey and LaBar 1981, Helfman et al. 1987). Size and age of maturity are greater in the north than in the south (Helfman et al. 1987). For example, maturation occurs in 8 to 24 years in the Chesapeake Bay Region, but may occur earlier in southern regions and later in northern regions.

Yellow eels feed opportunistically on various bottom- and near bottom-dwelling animals, mostly invertebrates and slower fishes (Denoncourt and Stauffer 1993). In freshwater, they feed on insects (especially Ephemeroptera, Plecoptera, and Trichoptera), worms, crayfish and other crustaceans, and small frogs and fishes; the diet varies geographically, seasonally, and among size classes. Larvae feed on plankton.

Habitat Requirements

Soft, undisturbed bottom sediments may be important to migrating elvers for shelter

(Facey and Van Den Avyle 1987). Post larval eels tend to be bottom dwellers and hide in burrows, tubes, snags, plant masses, other types of shelter, or in the substrate; they are inactive in bottom mud in winter in the north (Van Den Avyle 1984). Mature adults migrate back downstream to return to the Sargasso Sea. In the ocean, American eels have been observed at depths greater than 6,000 meters.

Threats

Possible factors contributing to the decline along the Atlantic coast of Canada and the United States include barriers to migration, habitat loss and alteration, hydroturbine mortality, oceanic conditions, overfishing, parasitism, predation, and pollution (Haro et al. 2000, Richkus and Whalen 2000).

Dams are frequently mentioned as a factor in the apparent declines in American eel abundance. Dams that reduce or restrict upstream movements limit the amount of habitat available to eels. Many surveys indicate that density and population size of American eels tend to decrease with increasing distance inland and with increasing severity of obstructions to movement. Given the dominance of large females in many riverine habitats, such habitat reduction could conceivably lead to reduced eel productivity and abundance. However, the importance of freshwater in eel productivity is still an open question (e.g., Morrison and Secure 2003).

Passage through turbines at hydropower dams during downstream migration may represent a major source of eel mortality (Ritter et al 1997). Turbine-induced mortality ranges from 5 to 60%, depending on turbine type, flow rate, and the length of the fish (Hadderingh 1990). Mortality of eels passing downstream through turbines may contribute to reduced eel abundance in eastern Canada (Jessop 2000). The amount of nonlethal injury to eels that pass through turbines is not well documented.

Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

AMERICAN EEL

Anguilla rostrata

Substantial long-term and short-term changes in ocean temperature, salinity, and upper-ocean transport conditions (Stebbing et al. 2002, Colbourne 2004, Drinkwater and Gilbert 2004, Curry and Mauritzsen 2005, Rossby et al. 2005, Sutton and Hodson 2005) have been documented recently. Attrill and Power (2002) showed that during a recent 16-year period (1977-1992), climatic forcing, by means of the North Atlantic Oscillation, was consistently the most important parameter explaining variation in assemblage composition and abundance and growth of juvenile marine fishes during their estuarine residence in the Thames Estuary, United Kingdom. This information suggests that an investigation of the relationship between oceanic conditions and patterns of abundance and recruitment of the American eel might be fruitful in understanding recent population fluctuations.

The bulk of the commercial eel catch in the United States (80%) occurs in central coastal (mid-Atlantic) states, with less from northern (19%) and southern (1%) states (Casselman 2001). For example, both Massachusetts and Florida have been granted de minimis status by the Atlantic States Marine Fisheries Commission for their commercial American eel fisheries in recent years. This indicates that their landings comprise an insignificant portion of the overall harvest.

The small commercial fishery for American eels in Florida operates almost exclusively in the St. Johns River system (Florida Fish and Wildlife Conservation Commission, 2014). The documented annual American eel harvest in Florida is small; commercial landings in 2000 totaled only 6,054 lb (2,752 kg), the lowest harvest year since 1994 (Bonvechio et al. 2004). In 2001, landings more than doubled to 14,218 lb (6,463 kg), but they declined to 7,587 lb (3,441 kg) in 2002 and 8,486 lb (3,849 kg) in 2003. A consistent decline in eel harvest has been observed since the early 1990s, but harvest reported in 2003 was similar to that reported in recent

years (Bonvechio et al. 2004). From 1980 to 2003, American eel landings in Florida exhibited a substantial decline; the highest reported harvest during this time period was in 1980-81 and totaled 460,000 lbs (208,652 kg) (Bonvechio et al. 2004). Commercial landings in Florida are of large eels; in recent years, no commercial harvest of the glass eel stage, silver (mature) eel stage, or of bait-sized juvenile eels was reported for Florida (Bonvechio et al. 2004). Currently there is no known recreational fishery for the American eels in Florida; incidentally caught eels generally are released alive (Bonvechio et al. 2004).

Listing Status

The American eel is not listed by the Florida Fish and Wildlife Conservation Commission nor under the federal Endangered Species Act (ESA). However, the Council for Endangered Species Act Reliability petitioned the U.S. Fish and Wildlife Service to list the species under the ESA (CESAR 2010). The Service made a substantial 90-day finding for the petition and is currently soliciting information for use in the 12-month finding.

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Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

AMERICAN EEL

Anguilla rostrata

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Note: Information in this species account was used directly from the NatureServe Explorer *Anguilla rostrata* webpage (<http://natureserve.org/explorer>).

Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

BLACK CREEK CRAYFISH

Procambarus pictus



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Figure 1. Black Creek crayfish are also known as the spotted royal crayfish.

Description

The Black Creek crayfish is medium-sized (about 3 inches), with dark claws and a dark carapace that has a white or yellowish middorsal stripe, white spots or streaks on its sides, and a rust-colored abdomen (Franz et al. 2008; Figure 1). Due to this distinctive pattern, this crayfish is also known as the “spotted royal crayfish.” The color pattern may help it hide during the day amidst the stream bottom detritus, tree roots, and vegetation (Franz 1994).

Geographic Range and Distribution

The great majority of occurrence records for Black Creek crayfish are in streams and tributaries that are part of the extensive Black Creek drainage (Figure 2). The handful of other streams outside of the Black Creek drainage where Black Creek crayfish have been found include the Etoniah Creek drainage in Putnam County, Trout Creek in St. Johns County, and Corklan Branch, Big Davis Creek, and Holly Creek in Duval County. These outlying streams (and any others that may yet be discovered) could have important conservation value to the Black Creek crayfish by expanding its known extent of occurrence and spreading the vulnerability to threats among a greater number of separate drainages.

The range of the Black Creek crayfish includes public lands managed by the Florida Army National Guard (Camp Blanding Joint Training Center) and the Florida Forest Service (Jennings State Forest, Etoniah Creek

State Forest). These lands are wildlife management areas wherein wildlife is managed by the Florida Fish and Wildlife Conservation Commission (FWC), and have hosted recent surveys for Black Creek crayfish (Franz et al. 2008, Nelson and Floyd 2011). Additional conservation lands with occurrence records for Black Creek crayfish include parcels managed by the St. Johns River Water Management District (SJRWMD; Florida Natural Areas Inventory [FNAI] 2013).

Habitat Requirements

The Black Creek crayfish is endemic to northeast Florida, where it inhabits small, relatively cool and swift, sand-bottomed, and tannic-colored headwater and tributary streams (Franz and Franz 1979, Franz 1994). These streams typically emanate from sandhills and occasionally flow through or from swampy terrain (Franz and Franz 1979, Brody 1990, Franz 1994, FNAI 2001, Nelson and Floyd 2011).

Streams occupied by Black Creek crayfish are often referred to as “high quality” streams due to their cool, unpolluted water, constant flow, and high oxygen content. The small gill chamber of the Black Creek crayfish is an adaptation requiring highly-oxygenated cool waters (Franz et al. 2008). Habitat attributes include a sandy bottom with aquatic vegetation and woody debris to serve as daytime retreats, plus a forested overstory (with sunny openings) that gives shade, cools the air and water temperatures, and provides a consistent influx of leafy and woody debris to serve as food sources (Franz et al. 2008, FWC 2010).

Life History

As is true of other crayfish species, male Black Creek crayfish periodically alternate between a reproductively ready form (Form I) and a form that is not reproductive (Form II). Reproductive males occur from January to September (Franz 1994). A female crayfish carries her eggs on the underside of her

abdomen, attached to leg-like appendages called swimmerets, and they are protected there in a sort of “brood chamber.” The clutch of eggs can number from 47 to 146, and the newly hatched young hold onto the swimmerets and each other. They may remain with the mother, protected by her, for 2 to 3 weeks. Black Creek crayfish young that hatch in late summer are mature by the following spring (Franz 1994). Black Creek crayfish can live up to 16 months (Franz 1994), so a female apparently produces just one clutch of eggs in her lifetime.

Black Creek crayfish have a similar diet as other stream-dwelling crayfish. They eat aquatic plants, dead plant and animal material, and detritus. Potential predators of Black Creek crayfish include fish, softshell and snapping turtles, and birds. In general, though, crayfish populations should be resilient to natural predators (FWC 2010).

Threats

Potential threats to the Black Creek crayfish are those that would impact the high quality streams where it dwells. These threats include pollution, change in water temperature, siltation, damming, and other changes in water and habitat quality (Franz and Franz 1979, Brody 1990, FNAI 2001). For example, damming immediately changes the character of a stream and its suitability for Black Creek crayfish, resulting in reduced oxygen, increased siltation, and higher water temperature. Improperly controlled effluent from mining sites may degrade water quality and negatively impact Black Creek crayfish populations. Brody (1990) reported the lack of crayfish and other stream fauna from a stream (Boggy Creek) that receives effluent from mine tailing ponds of a titanium extraction operation. This stream is a tributary to the North Fork of Black Creek just north (and downstream) of Camp Blanding Joint Training Center.

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BLACK CREEK CRAYFISH

Procambarus pictus

Populations on public lands (Camp Blanding and Jennings State Forest) may receive some protection, but those sites on private lands may be threatened with expanding urbanization, mining, and silviculture (Franz and Franz 1979, Brody 1990, FNAI 2001). Roadwork associated with bridges being newly constructed, repaired, or retrofitted is a potential source of impact to water quality, primarily siltation and other construction-related pollution. Plans for the construction of Jacksonville's First Coast Outer Beltway are being finalized; this project will pass through a portion of the Black Creek crayfish range (Florida Department of Transportation 2013) and would be expected to impact stream crossings.

Little is known about the potential impact of disease and parasites on Black Creek crayfish. Specimens with an apparent fungal disease have been reported by Franz et al. (2008) and Nelson and Floyd (2011). Infected specimens had chalky white muscle tissues visible through the exoskeleton on the underside of the abdomen. Franz stated this condition is believed to be highly contagious and often fatal, but the impact on crayfish populations is unknown (Franz et al. 2008, FWC 2010). Further research on this condition is warranted.

Listing Status

The Black Creek crayfish was listed by the State of Florida as a Species of Special Concern in 1989 (Florida Game and Fresh Water Fish Commission 1989, Wood 1991). This status makes it illegal to take, possess, transport, or sell Black Creek crayfish except as authorized by a permit from the FWC. In 2010, the FWC directed staff to evaluate the status of all species listed as Threatened or Species of Special Concern that had not undergone a status review in the past decade. After assessing the biological status of the species using criteria specified in Rule 68A-27.001, F.A.C., the Biological Review Group concluded that the Black Creek

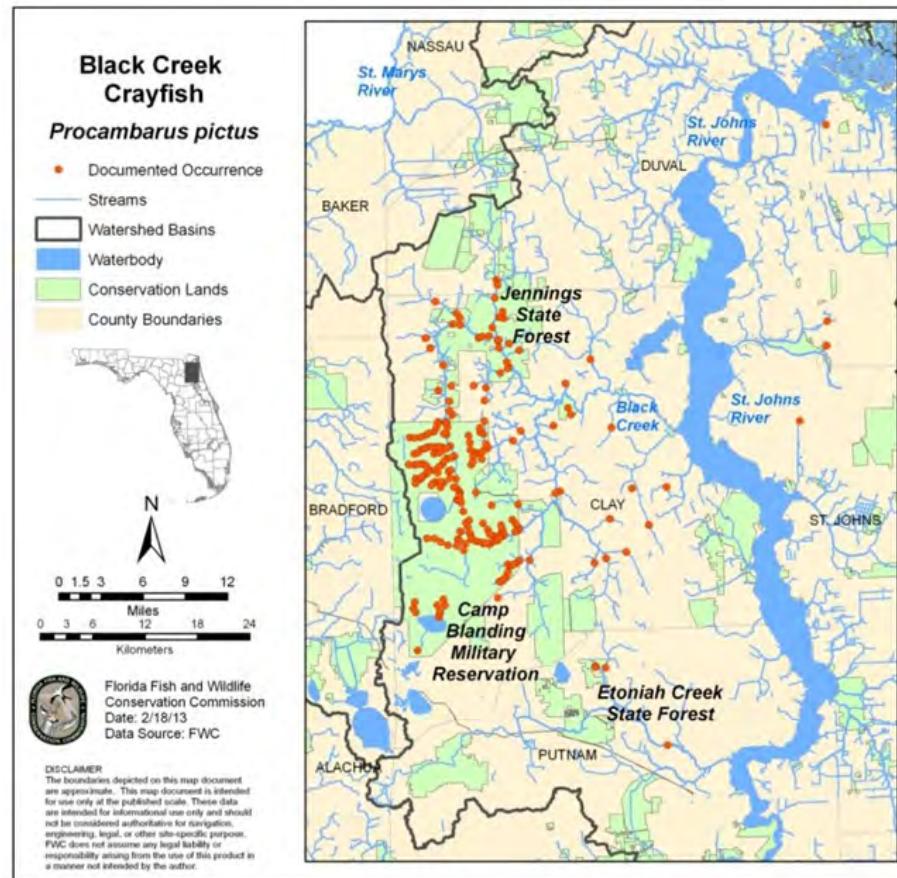


Figure 2. Map showing occurrence records for the Black Creek crayfish.

crayfish met criteria necessary to warrant listing it as a State Threatened species.

The Black Creek crayfish is not listed by the U.S. Fish and Wildlife Service (Service). However, the Center for Biological Diversity recently petitioned the Service to list the crayfish under the federal Endangered Species Act (CBD 2010). The Service made a substantial 90-day finding for the petition and is currently soliciting information for use in the 12-month finding.

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Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

BLACK CREEK CRAYFISH

Procambarus pictus

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Note: All information in this species account was used directly from the Draft Species Action Plan for the Black Creek Crayfish, *Procambarus pictus*; prepared by the Florida Fish and Wildlife Conservation Commission; dated May 9, 2013. 35 pages.

Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

DUKES' SKIPPER

Euphyes dukesii calhouni



Figure 1. The *E. dukesii calhouni* subspecies of Duke's skippers is endemic to Florida.

Description

Dukes' skippers range in size from 1 ¼-1 ½ inches (32-38 mm) and have short, rounded wings. Females are slightly larger than males. The upper surfaces of the wings in both sexes are deep brown (Figure 1). The females have a band on the hindwings that has two to three pale yellow spots. Males have a black stigma on the forewing. The undersides of the hindwings are light brown with pale yellow rays (Opler and Krizek 1984, Pyle 1995, Scott 1986).

The caterpillars of this species have a black head and light green body. The pupae nest in sedge leaves; they tie themselves into the upper portion of plants with silk (Nielsen 1999).

Geographic Range and Distribution

There are three populations of Dukes' skippers (*Euphyes dukesii*) in eastern North America. The subspecies *E. dukesii calhouni* inhabits the southern United States coastal plain and is endemic to Florida. The endemic nature of *E. dukesii calhouni* was recognized in the mid - 1990's. Calhoun (1995) speculates that their isolation from populations on the North American mainland may be attributed to Pleistocene glacial events.

Habitat Requirements

This species prefers shaded wetlands dominated by the larval food plant *Carex lacustris*, including coastal swamps and ditches. In Florida, *E. dukesii calhouni* is limited to swamp habitats that support large stands of the sedge

host plants and various *Rhynchospora* and *Carex* species (Shuey 1996).

Life History

In the southern part of their range, Dukes' skippers have three flights from mid-May through October. Males are often seen patrolling over the tops of sedges and will perch in search of females (Scott 1986, Iftner et al. 1992). After mating, females lay their eggs under the leaves of their host plants, sedges in the genus *Carex*. After hatching, the larvae undergo several molts and hibernate in the fourth instar stage (Glassberg 1999, Iftner et al. 1992, Nielsen 1999, Opler and Krizek 1984, Pyle 1995).

From hatching through the death of the adult stage, a Dukes' skipper probably lives about a year or less. Several months of that time may be spent dormant in the winter. The estimated lifespan of an adult Dukes' skipper in the wild is approximately three weeks.

Dukes' skippers have a weak flight pattern and are most often seen flying within sedges or visiting nectar plants. *E. dukesii calhouni* frequent sunlit patches of their host plants and can be seen nectaring on a variety of plants (Iftner et al. 1992, Nielsen 1999, Calhoun 1995).

Dukes' skipper larvae feed on *Carex laucastris* in the north and *Carex hyalinolepis* in the south. They are also reported to utilize *Carex walteriana*, and *Rhynchospora*. In Florida, the primary hostplant of *E. dukesii calhouni* has been identified as *Rhynchospora inundata*, but they are also known to utilize *Rhynchospora miliacea* and species of *Carex* (Glassberg 1999, Opler and Krizek 1984, Scott 1986, Calhoun 1995).

Adults nectar on buttonbush (*Cephaelanthus occidentalis*), common milkweed (*Asclepias syriaca*), swamp milkweed (*Asclepias incarnata*), joe-pye weed (*Eupatorium maculatum*), blue mistflower (*E. coelestinum*), pickerelweed (*Pontederia cordata*), hibiscus species

(*Hibiscus sp.*), sneezeweed (*Helenium autumnale*), alfalfa (*Medicago sativa*), and red clover (*Trifolium pratense*) (Iftner et al. 1992, Nielsen 1999, Opler and Krizek 1984, Scott 1986).

Threats

Dukes' skippers are primarily threatened by conversion of their wetland habitat to development and other uses. They also face predation from a variety of insects. Praying mantids, lacewings, ladybird beetles, assassin bugs, ground beetles, spiders, ants, and wasps prey upon the larvae. Adult butterflies are eaten by robber flies, ambush bugs, spiders, dragonflies, ants, wasps, and tiger beetles. There are also many vertebrate predators including lizards, frogs, toads, birds, mice, and other rodents (Scott 1986). Dukes' skippers may also be threatened by chemicals sprayed to control mosquitoes.

Listing Status

Dukes' skippers are not listed by the Florida Fish and Wildlife Conservation Commission or the U.S. Fish and Wildlife Service (Service). However, the Center for Biological Diversity recently petitioned the Service to list the skipper under the federal Endangered Species Act (CBD 2010). The Service made a substantial 90-day finding for the petition and is currently soliciting information for use in the 12-month finding.

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DUKES' SKIPPER

Euphyes dukesi calhouni

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http://animaldiversity.ummz.umich.edu/accounts/Euphyes_dukesi/

Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

EASTERN DIAMONDBACK RATTLESNAKE

Crotalus adamanteus



©Kevin Enge

Figure 1. The eastern diamondback rattlesnake (*Crotalus adamanteus*) occurs in all Florida counties.

Description

The eastern diamondback rattlesnake (*Crotalus adamanteus*) is the largest venomous snake in North America (Timmerman and Martin 2003) and the largest rattlesnake in the world (Timmerman and Martin 2003). This snake can be distinguished by its large size (maximum length, 244 cm [96 in]; although most are between 100-150 cm [39-59 in]) and its bulk (Ernst 1992). It is brown with a dorsal pattern of dark, yellow-bordered, diamond shaped markings; light stripes that border a dark band which extends downward and backward through the eye; and a brown and white ringed tail tipped with a rattle (Ernst 1992; Figure 1). The ventral surface is yellow to cream with brown mottling (Ernst 1992).

Two other species of rattlesnakes in Florida are sympatric with the distribution of the eastern diamondback rattlesnake. These species, the pigmy rattlesnake (*Sistrurus miliarius*) and the canebrake rattlesnake (*Crotalus horridus*), are generally smaller and have different colorations and patterns (Timmerman and Martin 2003). No other rattlesnake in Florida has the combination of the dorsal diamond pattern, light facial stripes, and ringed tail (Ernst 1992).

Geographic Range and Distribution

The eastern diamondback rattlesnake historically ranged on the Coastal Plain from North Carolina south throughout Florida and westward to the easternmost parishes of Louisi-

ana (Dundee and Rossman 1989; Ernst 1992; Ernst and Ernst 2003). The eastern diamondback rattlesnake occurs in all Florida counties and has been documented on Camp Blanding Joint Training Center (Gregory et al. 2006).

Habitat Requirements

The eastern diamondback rattlesnake is primarily a specialist of longleaf pine habitats (Guyer and Bailey 1993), including sandhill, flatwoods, and upland pine forest; other habitats utilized include oldfields, flood-plains, hardwood hammocks, dry prairie, scrub, and coastal strand (Hipes et al. 2000). The pre-settlement range was essentially statewide in appropriate habitats including the barrier islands and keys (Martin and Means 2000). Conversion of native habitats and fire suppression have greatly reduced the amount of suitable habitat, and the eastern diamondback is rare or absent from significant portions of its former range. Eastern diamondback rattlesnakes require large tracts of open-canopy habitats (Means 2006; Steen et al. 2007; Means, unpublished data). Open-canopy conditions with diverse, herbaceous groundcover provide structure and a food base for the rattlesnake's primary prey species, rodents and rabbits (Means, unpublished data).

In addition to stump holes and other underground sheltering sites, eastern diamondback rattlesnakes utilize gopher tortoise burrows (*Gopherus polyphemus*) as microhabitat and seasonal refugia (Ernst 1992; Martin and Means 2000; Timmerman and Martin 2003).

Life History

In Florida, eastern diamondback rattlesnakes are active throughout the year (Ernst 1992). To escape cold and hot extremes, eastern diamondbacks seek refuge in mammal burrows, stump holes, hollow logs, and particularly in gopher tortoise burrows (Ernst 1992). Ashton and Ashton (1981) report mating to occur in the spring and fall. Females give birth to between 8 and 15 young

in the late fall (Mount 1975; Ashton and Ashton 1981; Ernst 1992). After the neonates are born, they utilize the same refugia as the adults (Ernst 1992).

Eastern diamondback rattlesnakes are ambush predators, but may actively seek out prey using scent trails or thermal trails detected using their facial pits (Ernst 1992). Prey items consist mainly of rodents and rabbits, but they are also known to eat birds (Mount 1975; Ernst 1992; and Means, pers. comm.).

Although humans are the main source of mortality, eastern diamondbacks are eaten by feral hogs (*Sus scrofa*), carnivorous mammals (*Procyon*, *Ursus*, *Mephitis*, *Lutra*, *Canis*, *Felis*), birds of prey (*Bubo*, *Buteo*, etc.), wood storks (*Mycteria*), and other snakes (*Lampropeltis*, *Drymarchon*, *Coluber*) (Ernst 1994).

Threats

The decline of the eastern diamondback rattlesnake is associated with the loss, alteration, and degradation of native habitats due to commercial and residential development, agriculture, and mining (Timmerman and Martin 2003). The loss of suitable habitat is further exacerbated by alterations to the natural fire return interval of upland pine habitats. Additional threats may include road mortality and general persecution of snakes by humans. Localized commercial collection for regional rattlesnake roundups has been a conservation issue in the past, and continues to be so in several Alabama and Georgia towns (Means 2009).

Listing Status

The eastern diamondback rattlesnake is not listed by the Florida Fish and Wildlife Conservation Commission or under the federal Endangered Species Act (ESA). However, in 2011, a group of four organizations petitioned the U.S. Fish and Wildlife Service (Service) to list the species under the ESA

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EASTERN DIAMONDBACK RATTLESNAKE

Crotalus adamanteus

(CBD 2011). The Service made a substantial 90-day finding for the petition and is currently soliciting information for use in the 12-month finding.

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FLORIDA MOUSE

Podomys floridanus



Figure 1. Florida mice typically build their burrows inside the burrows of other species.

Description

The Florida mouse has relatively large ears, eyes, and hind feet. The Florida mouse is also characterized by the presence of only 5 (sometimes 4, and rarely 6) plantar tubercles on the soles of the hind feet, instead of the 6 plantar tubercles typical of the genus *Peromyscus*. The adult's pelage is brown or tawny on top, with white undersides and orange-buff colored fur on the cheeks, shoulders, and lower sides (Figure 1). Adults also have a relatively large body size, weighing between 20 and 49 g (0.7 to 1.7 oz) (Whitaker and Hamilton 1998, Layne 1990, Layne 1992, Jones and Layne 1993). The Florida mouse often exhibits a skunk-like odor (Layne 1990).

Geographic Range and Distribution

Florida mice occur throughout central Florida, where they are largely restricted to fire-maintained, xeric, upland communities with deep, well-drained, sandy soils (Figure 2). The Florida mouse is known from Camp Blanding Joint Training Center (Hipes and Jackson 1994, Gunter 2003).

Habitat Requirements

The primary natural communities occupied by the Florida mouse are scrub (includes scrubby flatwoods, oak scrub, sand pine scrub, and rosemary scrub) and sandhill, though the species can often be found in drier mesic flatwoods and has been recorded in a number of other natural communities such

as flatwoods, hammocks, and wetland edges during dispersal (Layne 1990). Groundcover may be sparse, especially in scrub, but the number of Florida mice in a sandhill may be correlated with ground cover diversity (T. Doonan, Florida Fish and Wildlife Conservation Commission, personal communication).

Life History

Reproduction occurs throughout the year but peaks in fall and winter. Litters typically consist of 2 to 4 young. Offspring wean at 3 to 4 weeks. Mean survival time for adults (as recorded during trapping studies) was reported as being longer in sandhill (4.2 months) than in scrub (2 months) (Layne 1990). However, survivorship of more than 360 days was reported in 8.6% of one local population (Jones 1990).

Florida mice consume a wide range of food items including acorns, insects, seeds, nuts, fungi, and other plant material. Given the range of food they consume, Florida mice are probably opportunistic feeders (Jones 1993); however, they are dependent upon the presence of acorns as a major component of their diet (Jones 1990, 1993; Layne 1990, 1992). Food resources are important in determining habitat quality.

Florida mouse populations may be isolated and scattered because the distribution of their primary habitats are often discontinuous (Layne 1990). Habitat loss and degradation exacerbate this problem as the already discontinuous habitat becomes increasingly fragmented. This creates problems with demographic connectivity.

Florida mice excavate burrows that they use as daytime refuges and as nesting sites, with expanded nesting chambers usually present (Layne and Jackson 1994). They typically build their burrows inside the burrows of other species, often in gopher tortoise (*Gopherus polyphemus*) burrows. Florida mice burrows are typically found as small U-shaped tunnels off the sides of the main go-

pher tortoise burrow. Florida mice use gopher tortoise burrows for shelter and protection and as cover from fire and adverse weather conditions (Layne 1990). The Florida mouse can be sensitive to cold temperatures and begins to show signs of cold stress at 10° C (50° F) (Jones 1990). For these reasons, the ecology of the Florida mouse is considered to be tightly linked to the gopher tortoise (Jones and Layne 1993). This association leaves the Florida mouse vulnerable to gopher tortoise population decline. However, Florida mice will use burrows of other species such as the nine-banded armadillo (*Dasypus novemcinctus*) and old-field mouse (*Peromyscus polionotus*). They also opportunistically use stump holes or other holes, especially in scrub (Layne and Jackson 1994; Jones 1990; Layne 1990, 1992; Lips 1991; and Jones and Layne 1993).

Home ranges of the Florida mouse tend to be smaller in scrub than in sandhill, which may be a function of greater resource abundance in scrub (Layne 1990). Scrub habitat generally supports higher numbers of Florida mice than sandhill. Reported density estimates have ranged from 1.6 ha to 28 ha (0.64 to 11.2 ac) and average around 5 to 10 ha (2 to 4 ac) depending on the location and community type (Layne 1992). Jones (1990) reported that in sandhill, females had a home range size of 2,601 m² (0.64 ac), while males had an average home range of 4,042 m² (1.0 ac).

Threats

The Florida mouse depends on fire-maintained, xeric uplands occurring on deep, well-drained soils, especially scrub and sandhill (Jones and Layne 1993). Because of this habitat specificity, the major threat to the Florida mouse is loss and degradation of habitat caused by conversion to other uses (e.g., development and agricultural use) and insufficient management (e.g., fire suppression) (Layne 1990, 1992). For example, in Highlands County, 64% of the species' habitat was destroyed between 1940 and 1980,

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FLORIDA MOUSE

Podomys floridanus

with an additional 10% considered disturbed or degraded (Layne 1992).

Historically, the distribution of sandhill and scrub communities in Florida was naturally fragmented and discontinuous (Myers 1990). Unfortunately, these communities are becoming increasingly fragmented (Layne 1992). The result is that Florida mouse populations are becoming more isolated, with reduced movement of individuals among populations a predicted consequence (Layne 1992). Effects of such increased isolation can be more frequent loss of local populations and reduced gene flow within or among populations (Hilty et al. 2006).

Dependence of Florida mice on gopher tortoise burrows as sites for their own burrows (Jones and Layne 1993) leaves Florida mice vulnerable to the decline of gopher tortoises in some habitats. Some research has estimated that the gopher tortoise populations in Florida have declined 50% to 60% over the past 60 to 93 years (Enge et al. 2006). The International Union for Conservation of Nature (IUCN) stated, “*Podomys floridanus* is moderately dependent on gopher tortoise burrows (Pergams et al. 2008), and gopher tortoises in Florida are well documented to be in decline, as much as 80% by some estimates due to habitat destruction as well as Upper Respiratory Tract Disease (URTD).” However, most of the estimated gopher tortoise declines associated with habitat loss occurred prior to the last 10 years (Cox and Kautz 2000, Enge et al. 2006, Endries et al. 2009). Further, Berish et al. (2010) reported that while URTD may be chronic in many gopher tortoise populations, mortality is typically low and rarely results in local extinctions that would have a negative effect on Florida mouse populations.

There are some concerns that relocation of Florida mice, which currently is allowed in limited circumstances under permitting provisions in FWC's Gopher Tortoise Permit-

ting Guidelines (FWC 2013), may have unintended consequences on local populations of Florida mice. Previous versions of the gopher tortoise permitting guidelines provided little guidance on relocations, and the current limitations are a result of concern over the potential impacts. Both the Gopher Tortoise Management Plan (FWC 2012) and the current permitting guidelines recognize that additional data are needed to evaluate the potential benefits of relocations relative to the potential negative impacts to Florida mouse populations.

Insufficient or inappropriate habitat management can also threaten the Florida mouse. This species shows a preference for early successional habitats maintained or created by fire. The availability of these habitats declines as natural and prescribed fires are suppressed (Hafner et al. 1998). This could be problematic on private lands, where prescribed fire return intervals may be longer than is required to maintain the habitat quality necessary for robust Florida mouse populations. However, for managed conservation lands across regions of the state occupied by the Florida mouse, Debra Childs Woithe, Inc. and PBS&J (2010) recently estimated that only 37% to 61% of sandhill and 15% to 50% of scrub currently meet management targets for fire return intervals. The manner in which this criterion is used may be of further concern because fire return intervals are at best indices of habitat quality and target intervals are not consistent among agencies.

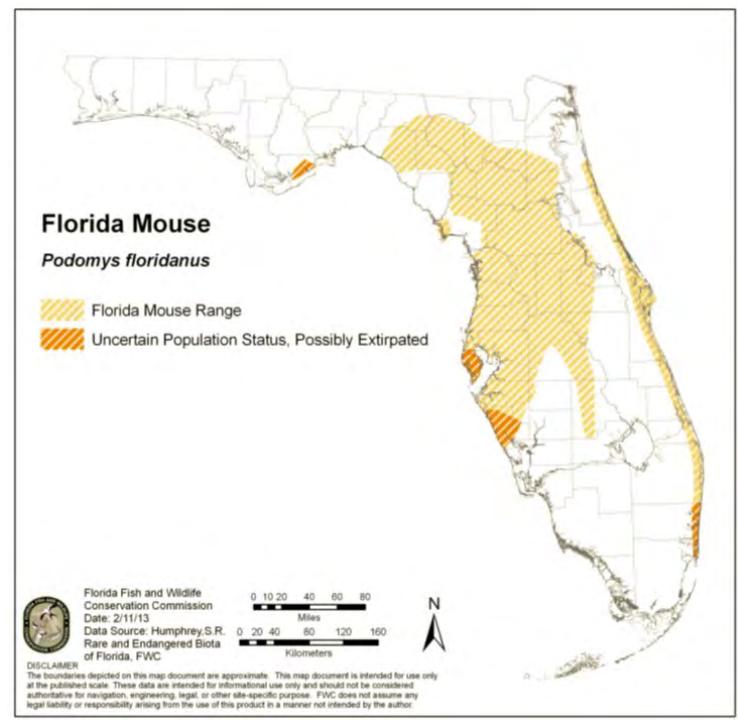


Figure 2. The historical extent of occurrence of the Florida mouse, adapted from Layne (1992).

A number of species prey upon Florida mice, including several snakes, foxes (*Urocyon cinereoargenteus* and *Vulpes vulpes*), raccoons (*Procyon lotor*), and bobcats (*Lynx rufus floridanus*) (Layne 1992, Jones and Layne 1993). Some of these predators benefit from close association with people, which may increase the threat of predation to Florida mice as habitats become fragmented and natural areas are increasingly interspersed with developed areas. Red imported fire ants (*Solenopsis invicta*) may be a potential predatory threat to the Florida mouse (Wetterer and Moore 2005), as well as free-ranging domestic cats (Loss et al. 2013).

Listing Status

The Florida mouse is currently listed as a Species of Special Concern by the Florida Fish and Wildlife Conservation Commission (FWC). FWC's Florida mouse Biological Review Group (BRG) concluded from their

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FLORIDA MOUSE

Podomys floridanus

biological assessment that the Florida mouse did not meet listing criteria. As a result, the FWC recommended that the Florida mouse be removed from the state's list of Species of Special Concern under Rule 68A-27, F.A.C. The Florida mouse is not listed, nor has it been petitioned to be listed, under the federal Endangered Species Act.

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FLORIDA MOUSE

Podomys floridana

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FLORIDA PINE SNAKE

Pituophis melanoleucus mugitus



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Figure 1. Florida pine snakes prefer dry upland habitats with well-drained sandy soils.

Description

The Florida pine snake is a large, non-venomous snake with dark brown to reddish markings on a gray to sandy-colored background (Figure 1). The scales on the upper part of the body are strongly keeled, and the anal scale is undivided. The head and snout are distinctly cone-shaped and adapted for burrowing (Franz 1992). Florida pine snakes range in length from 38 to 61 cm (15–24 inches) at hatching and 122–168 cm (48–66 inches) for adults, with a maximum recorded length of 228.6 cm (90 inches) (Conant and Collins 1998, Hipes et al. 2000). Newly hatched Florida pine snakes resemble adults, but their patterns are often brighter and bolder (Tuberville and Mason 2008, Miller et al. 2009). These snakes are well known for their impressive defensive displays, which include hissing loudly, inflating the body, vibrating the tail noisily against leaf litter, raising the front of the body, and even striking with the mouth closed or partially open (Tuberville and Mason 2008).

Geographic Range and Distribution

The Florida pine snake occurs throughout the Atlantic and Gulf coastal plains, from southeastern South Carolina to south Florida, and west to Mobile Bay, Alabama (Jordan 1998). In Florida, this species historically occurred throughout the state except for the Everglades and the Florida Keys. Museum records indicate the distribution of this snake in South Florida is patchy (Franz 1992). In 1998, a Florida pine snake was

identified at Camp Blanding Joint Training Center (Jordan 1998) and more recent sightings have been documented onsite by staff biologists.

Habitat Requirements

Florida pine snakes prefer dry upland habitats with a moderate to open canopy cover and well-drained sandy soils (Franz 1992, Hipes et al. 2000, Ernst and Ernst 2003). In Florida, the Florida pine snake is most commonly found in sandhills, but may also occupy other habitat types including scrub, xeric hammock, scrubby flatwoods, mesic pine flatwoods, dry prairie, old fields, and pastures (Allen and Neill 1952, Enge 1997, Ernst and Ernst 2003, Franz 2005). Altered fire regimes in sandhill habitat and resulting hardwood encroachment presumably create less favorable habitat conditions for Florida pine snake (FWC 2011). Florida pine snakes can tolerate some degree of degraded habitats, but may not use habitats where succession has led to closed-canopy forests (Hipes et al. 2000).

Life History

Florida pine snakes are active from March through October but show the greatest activity in May, June, July, and October when they move more frequently and travel farther distances (Franz 1992). Miller (2008) estimated average home range size to be 70.1 ha (173 acres) for males and 37.5 ha (93 acres) for females in southern Georgia. These home range estimates were similar to home range estimates found by Franz (1986) in northern Florida. Eggs are usually laid from June to August, and hatching occurs in September and October (Franz 1992, Hipes et al. 2000). Although Florida pine snake nesting has not been observed in the wild, females are believed to nest inside the burrows of other animals (Lee 1967, Franz 2005).

Florida pine snakes can spend up to 70–80% of their time in underground refuges (Franz 1992, Miller 2008). Pine snakes use refuges

to forage, nest, and escape adverse weather conditions or fire. In Florida, Georgia, and South Carolina, Florida pine snakes primarily use pocket gopher (*Geomys pinetorum*) burrows as refuges. However, in the absence of pocket gopher burrows, Florida pine snakes will also use stump holes, gopher tortoise (*Gopherus polyphemus*) burrows, and the burrows of nine-banded armadillos (*Dasypus novemcinctus*) and mice (Franz 1992, Hipes et al. 2000, Franz 2005, Miller 2008).

Threats

The major threat to the Florida pine snake is loss and degradation of habitat caused by conversion to other uses (e.g., development, agricultural use, and mining) and insufficient management (e.g., fire suppression) (Hipes et al. 2000, FWC 2011).

Because the Florida pine snake is dependent on underground refugia, it is vulnerable to the loss or decline of burrowing species. It has been estimated that gopher tortoise populations in Florida have declined 50-60% over the past 60-93 years (Enge et al. 2006). Pocket gopher populations are also suspected to be declining throughout Alabama, Georgia, and Florida (Georgia Department of Natural Resources 2008, Miller et al. 2008). These declines could be significant as Florida pine snakes both forage and seek refuge in pocket gopher burrows (Ashton and Ashton 1981, Franz 1992, Franz 2005). Forestry-related practices (e.g., stump removal, root raking, and soil compaction from heavy equipment operating on site) could be eliminating Florida pine snakes habitat as this species and many others utilize stump holes, rotting root canals, and other animal burrows as underground refuges (Means 2005).

Listing Status

The pine snake (*Pituophis melanoleucus*) is classified as a species of “Least Concern” on the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species (Hammerson 2007).

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FLORIDA PINE SNAKE

Pituophis melanoleucus mugitus

Currently, the Florida pine snake subspecies is considered uncommon to rare and possibly in decline over most of its range (Franz 1992, Miller et al. 2009). In 1985, the Florida Game and Fresh Water Fish Commission (predecessor to the FWC) listed the Florida pine snake as a Species of Special Concern.

The Florida pine snake is not listed by under the federal Endangered Species Act (ESA). However, the Center for Biological Diversity recently petitioned the U.S. Fish and Wildlife Service to list the species under the ESA (CBD 2012). The Service is in the process of developing the 90-day finding for the petition and will subsequently solicit information for use in the 12-month finding, if applicable.

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FLORIDA SANDHILL CRANE

Grus canadensis pratensis



Figure 1. Adult Florida sandhill cranes stand about 1.2 meters (almost 4 feet) tall.

Description

Florida sandhill cranes are omnivorous, heavy-bodied, gray birds with long necks and legs (Figure 1) that inhabit open grasslands and marshes (Tacha et al. 1992). The cranes stand nearly 1.2 meters (4 feet) tall and fly with their necks outstretched. The sexes appear identical except the male is slightly larger. Their distinctive rattling calls can be heard from far away.

Geographic Range and Distribution

Florida sandhill cranes occur from southern Georgia, primarily in the Okefenokee Swamp, to the Everglades (Stys 1997). However, most of the population is in peninsular Florida from Alachua County in the north to the northern edge of the Everglades in the south (Figure 2).

Florida sandhill cranes are non-migratory and exhibit year-round home range fidelity. Territorial adult home ranges are influenced by several factors including habitat quality, status, and season (Nesbitt and Williams 1990). A pair's average home range is about 450 ha (1,100 ac). Although home ranges can overlap, core nesting areas are defended from other cranes and vary from 120 to 250 ha (300-635 ac).

Habitat Requirements

Sandhill cranes rely on shallow marshes for roosting and nesting and open upland habitats for foraging (Wood and Nesbitt 2001). Preferred crane habitat occurs where most vegetation is less than 50 cm, or 20 in, tall (Stys 1997). The crane avoids forests and deep marshes, and may preferentially use open upland habitats such as pastures and transitional pastures (Nesbitt and Williams 1990). Sandhill cranes in north Florida spent 86% of their time in 4 habitat types: pasture, freshwater marsh, pasture-marsh transition, and pasture-forest transition (Nesbitt and Williams 1990).

Life History

Florida sandhill cranes are perennially monogamous and long-lived, with a low annual reproductive potential (Wood and Nesbitt 2001). They begin breeding at 3 years of age but are rarely successful until age 5 (Nesbitt 1992). Although Florida sandhill cranes can begin breeding as early as December and extend nesting through August, they nest primarily from February through April. Nesting typically takes place in marshes, or shallow lakes and ponds with dense emergent vegetation (Johnsgard 1983). Nests are composed of plant stems in shallow water or on the ground in marshy areas. Water depth at nests averages 13-33 cm (5-13 in). Although each pair's eggs are laid in a single nest, accessory nests or platforms are also built. Nesting success relies on relatively predictable water levels and absence of predators. Nest disturbance can lead to abandonment (Stys 1997), but pairs can re-nest after a nest failure.

A clutch consists of 1-3 (usually 2) eggs (mean=1.72, Nesbitt 1988) which are incubated by both parents for an average of 30 days. Brood size averages 1.32 and both parents also share in raising the young. The downy young are cinnamon brown and achieve flight at 65-70 days of age. Young Florida sandhill cranes stay with their parents about 10 months before becoming independent and gaining their featherless red crowns.

Threats

The most common threat to Florida sandhill cranes is habitat loss and degradation due to human development and lack of appropriate land management. Like many declining species in Florida, Florida sandhill cranes depend on open habitats such as prairies, improved pastures, and freshwater marshes. Because much of their habitat is privately owned, it is vulnerable to development and overgrowth of wetland and upland vegetation. Potential Florida sandhill crane habitat in Florida declined by an average 16.6% per decade between 1974 and 2003; total available habitat was estimated to have declined 42% in these 3 decades (Nesbitt and Hatchitt 2008).

Florida sandhill cranes avoid overgrown habitats and dense forest canopies that result from ecological succession unchecked by disturbances, such as fire. Loss of natural fire regimes in both upland and wetland plant communities across the Florida landscape hamper Florida sandhill crane success. As habitat conditions degrade, Florida sandhill cranes will leave their home range and travel up to 15 km (9.3 miles) to find resources, making them more vulnerable to mortality. Thus, proximity of wetlands to upland foraging areas for roosting and nesting is important.

Dense vegetation contributes to increased Florida sandhill crane mortality through predation. Florida sandhill cranes have become more restricted to overgrown areas where predators like bobcats (*Lynx rufus*) are more successful at killing them. Florida sandhill crane predation is also exacerbated by an abundance of predators, like raccoons (*Procyon lotor*), that thrive near humans. Predation by other species such as coyotes (*Canis latrans*), red fox (*Vulpes vulpes*), domestic dogs (*Canis lupus familiaris*), feral hogs (*Sus scrofa*), and fire ants (*Solenopsis invicta*) is also a threat. Climate-induced changes, such as altered hydroperiod and fire regime, may

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FLORIDA SANDHILL CRANE

Grus canadensis pratensis

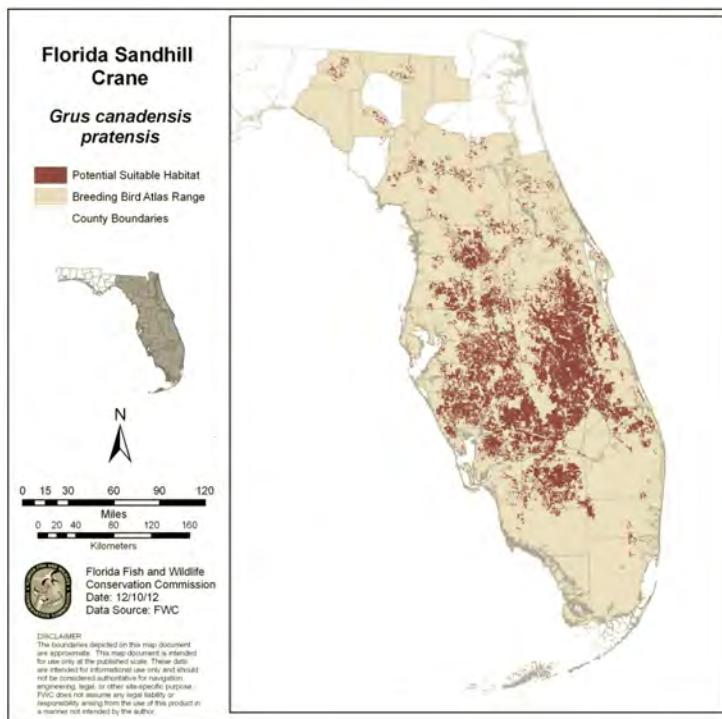


Figure 2. Range and potential habitat of the Florida sandhill crane.

lead to increased crane mortality by both native and exotic predators.

Due to their reliance on wetlands for roosting and nesting, Florida sandhill cranes are particularly vulnerable to flooding, drought, ground water withdrawals by humans, storms, and climate change. Droughts threaten Florida sandhill crane nesting success and extended droughts can lead to low annual reproduction. Florida sandhill cranes usually forgo nesting when wetlands are dry. Low water levels leave nests and young vulnerable to predation. Increased duration and intensity of droughts due to climate change threaten historic hydrological levels, leading to loss of nesting habitat. Longer dry periods can also cause changes in fire regimes that would affect the vegetation structure of upland Florida sandhill crane habitat. Other human impacts, such as ditching and diverting water to drain wetlands, are far-reaching and detrimental.

Conversely, rapid rises in water levels can also cause Florida sandhill crane nests to fail.

Wetlands near impermeable surfaces such as roads and parking lots are subject to more rapid flooding. Climate change predictions for Florida also include increased heavy rainfall events, which will likely lead to localized flooding, another source of nest failure. Additionally, the timing of precipitation events may shift, contracting the breeding season and resulting in lower nesting success.

Listing Status

Florida sandhill cranes are listed as Threatened by the Florida Fish and Wildlife

Conservation Commission. They are protected under the federal Migratory Bird Treaty Act, but are not listed under the federal Endangered Species Act (ESA). However, the Center for Biological Diversity recently petitioned the U.S. Fish and Wildlife Service (Service) to list the Florida sandhill crane under the ESA (CBD 2010). The Service made a substantial 90-day finding for the petition and is currently soliciting information for use in the 12-month finding.

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Note: All information in this species account was used directly from the Draft Species Action Plan for the Florida Sandhill Crane, *Grus canadensis pratensis*; prepared by the Florida Fish and Wildlife Conservation Commission; dated April 10, 2013. 31 pages.

Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

GOPHER FROG

Lithobates capito



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Figure 1. Gopher frogs typically inhabit xeric uplands that are close to breeding wetlands.

Description

The gopher frog is a relatively large frog, with adults measuring between 64 and 112 mm (2.5 and 4.4 inches) from snout to vent (Cash et al. 2008). Gopher frogs range in color from light tan to gray or dark brown with irregular black or dark brown blotches on the back, sides, and legs (Figure 1). A raised ridge runs from behind the eye to the hind leg on both sides. During the breeding season, males can be distinguished from females by the presence of dark thumb pads called nuptial pads. Gopher frog tadpoles are greenish gold with irregular, scattered dark spots over the body and tail.

Geographic Range and Distribution

The historical range of the gopher frog extended eastward from the Mobile River delta in Alabama across the southeastern Coastal Plain into North Carolina (Jensen and Richter 2005). In Florida, the gopher frog historically occurred throughout the state except for the Everglades and extreme South Florida (FWC 2011, Krysko et al. 2011, Figure 2). Gopher frogs – adults, larval stage, and egg masses – have been documented on Camp Blanding (Gregory et al. 2006).

Habitat Requirements

Gopher frogs typically inhabit xeric (well-drained) upland habitats that are in close proximity (< 5 km [3.1 mi]) to suitable breeding wetlands. In Florida, gopher frogs have been found in a wide variety of upland

habitats including: sandhills, upland pine forests, scrub, xeric hammock, mesic and scrubby flatwoods, dry prairie, mixed hardwood-pine communities, pastures, and various other disturbed habitats that still harbor gopher tortoises (Enge 1997; K. Enge, FWC, unpublished data). Suitable breeding wetlands include a variety of shallow, fishless, temporary and semi-permanent wetland habitats that have an open canopy and emergent vegetation (Jensen and Richter 2005). Breeding has been observed in depression marshes, basin marshes, wet prairies, dome swamps, upland sandhill lakes, sinkhole ponds, ditches, and borrow pits (FWC 2011).

Gopher frogs spend the majority of the non-breeding season in the uplands where they shelter in gopher tortoise burrows. However, they will use other refugia such as pocket gopher and small mammal burrows, crayfish burrows, stump holes, leaf litter, hollow logs, and clumps of grass (Wright 1932, Carr 1940, Blihovde 2006, Roznik 2007, FWC 2011).

Life History

Detailed information on gopher frog life history and habitat requirements has been summarized by Jensen and Richter (2005). Although the longevity of gopher frogs in the wild is not known, individuals have lived as long as 7 years in captivity (Jensen and Richter 2005). During the breeding season, gopher frogs migrate up to 5 km (3.1 mi) to breeding wetlands to mate and lay eggs (Humphries and Sisson 2012). The breeding season can occur during any time of year in association with heavy rains (Jensen and Richter 2005), but is generally September – April in northern Florida (Palis 1998, FWC 2011), and often occurs in the summer in central and south Florida (Godley 1992).

Studies suggest that gopher frogs reach sexual maturity between 1.5 and 2 years of age (Phillips 1995, Palis 1998, Jensen and Richter 2005). Males attract females for mating

at breeding ponds by calling. Once paired with a male, females will deposit a single globular, fist-sized egg mass of 500-5,000 eggs in the wetland attached to submerged or emergent vegetation (Palis 1998, Jensen and Richter 2005). As the egg mass is laid, it is externally fertilized by the male. Eggs hatch within 4–5 days and continue development as larvae (tadpoles), which take 3–7 months to develop and metamorphose into froglets (Wright 1932, Phillips 1995, Palis 1998). Newly metamorphosed frogs leave the wetlands shortly after transforming and migrate into the uplands, where they shelter in burrows (Roznik and Johnson 2009). Adults return to the uplands after breeding and may migrate to and from breeding ponds using the same routes (Franz 1986, Palis 1998).

Threats

The most common threats to gopher frogs in Florida and range-wide are habitat loss and alteration of xeric upland habitats. Other threats include fire suppression and altered fire regimes in both upland and wetland habitats, wetland destruction and degradation, off-road vehicle use in pond basins, groundwater withdrawals, climate change impacts on wetland and upland habitat, fish introductions to breeding wetlands, and disease impacts on populations.

Gopher frogs require both suitable upland and wetland habitats to complete their life cycle and are therefore threatened by habitat loss and degradation in both. In Florida and across its range, the gopher frog has experienced significant losses in both its upland and wetland habitats (Jensen and Richter 2005, FWC 2011). Although gopher frogs can tolerate some degree of habitat fragmentation and can be found in pastures and other disturbed habitats (FWC 2011), they are not commonly found in areas converted to intensive agriculture, silviculture, or urban areas (Franz and Smith 1999; Wigley et al. 1999; Means and Means 2005; L. Smith, Jones

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GOPHER FROG

Lithobates capito

Ecological Research Center, unpublished data). Gopher frogs also appear to avoid fire-suppressed uplands that have become overgrown with hardwoods (Roznik et al. 2009).

Listing Status

The gopher frog is currently listed as a Species of Special Concern by the Florida Fish and Wildlife Conservation Commission (FWC). However, in 2010, the FWC convened a biological review group (BRG) of experts on the gopher frog to assess the biological status of the species using criteria specified in Rule 68A-27.001, Florida Administrative Code. The gopher frog BRG concluded from the biological assessment that the gopher frog did not meet any listing criteria, and the gopher frog will be removed from the Species of Special Concern list.

The gopher frog is not listed under the federal Endangered Species Act (ESA). However, the Center for Biological Diversity recently petitioned the U.S. Fish and Wildlife Service to list the species under the ESA (CBD 2012). The Service is in the process of developing the 90-day finding for the petition and will subsequently solicit information for use in the 12-month finding, if applicable.

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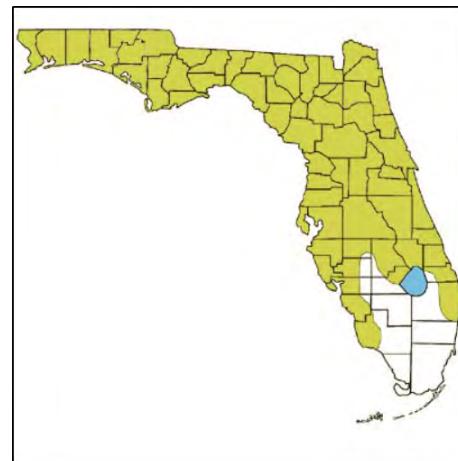


Figure 2. Historical range of the gopher frog in Florida based on historical records and the location of suitable habitat. Map credit: Monica McGarry, University of Florida.

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GOPHER FROG

Lithobates capito

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Note: Information in this species account was used directly from the Florida Fish and Wildlife Conservation Commission's Florida Gopher Frog Species Action Plan; dated November 1, 2013. 38 pages.

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GOPHER TORTOISE

Gopherus polyphemus



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Figure 1. Gopher tortoises typically inhabit well-drained sandy soils.

Description

The gopher tortoise is a moderate-sized, terrestrial turtle, with an average carapace length of 23–28 cm (9–11 in). The species is identified by its stumpy, elephantine hind feet and flattened, shovel-like forelimbs adapted for digging (Figure 1). The shell is oblong and generally tan, brown, or gray in coloration.

Geographic Range and Distribution

The gopher tortoise occurs in the southeastern Coastal Plain from southeastern South Carolina westward to extreme southeastern Louisiana (Auffenberg and Franz 1982, Figure 2). The gopher tortoise is endemic to the United States, and Florida represents the largest portion of the total range of the species. Gopher tortoises remain widely distributed in Florida, occurring in parts of all 67 counties; however, their current range in South Florida is limited because of unsuitable habitat and increased urbanization (Mushinsky et al. 2006). Tortoise populations occur as far south as Cape Sable and on islands off the east and west coasts (Auffenberg and Franz 1982, Kushlan and Mazzotti 1984). The gopher tortoise is documented at Camp Blanding as well as other areas of Clay and surrounding counties (Hipes et al. 2000).

Habitat Requirements

The gopher tortoise typically inhabits relatively well-drained, sandy soils. The gopher tortoise is generally associated with longleaf

pine (*Pinus palustris*) –xeric oak (*Quercus* spp.) sandhills, but also occurs in scrub, xeric hammock, pine flatwoods, dry prairie, coastal grasslands and dunes, mixed hardwood-pine communities, and a variety of man-made environments such as pastures, old fields, and grassy roadsides (Auffenberg and Franz 1982; Kushlan and Mazzotti 1984; Diemer 1986, 1987, 1992; Breininger et al. 1994).

Gopher tortoises excavate burrows that average 4.5 m (14.8 ft) in length and 2 m (6.6 ft) in depth (Hansen 1963). These burrows, which provide protection from temperature extremes, desiccation, fire, and predators, serve as refuges for approximately 360 other species, including listed species such as the gopher frog (*Lithobates capito*), eastern indigo snake (*Drymarchon couperi*), Florida pine snake (*Pituophis melanoleucus mugitus*), and Florida mouse (*Podomys floridanus*) (Cox et al. 1987, Jackson and Milstrey 1989, Witz et al. 1991, Kent et al. 1997).

Life History

The gopher tortoise is slow to reach sexual maturity, has low fecundity, and has a long life span (Landers 1980). Females reach sexual maturity at 9–21 years of age, depending on local resource abundance and latitude; males mature at a slightly younger age (Landers et al. 1980, Diemer and Moore 1994, Mushinsky et al. 1994, Aresco and Guyer 1999). The breeding season is generally April–November. Nests are constructed (often in burrow aprons) from mid-May to mid-June, and only one clutch is produced annually (Landers et al. 1980). Clutch size is usually five to nine eggs, with an average of six (Diemer and Moore 1994, Butler and Hull 1996). Predation on nests and hatchlings by mammals, birds, and snakes is heavy (Alford 1980, Landers et al. 1980, Butler and Sowell 1996, Smith 1997).

Gopher tortoises feed primarily on broadleaf grasses, wiregrass, grass-like asters, legumes, and fruits (Garner and Landers 1981, Mac-

donald and Mushinsky 1988), but they are known to eat >300 species of plants (Ashton and Ashton 2004). Tortoise densities and movements are affected by the amount of herbaceous ground cover (Auffenberg and Iverson 1979). Generally, feeding activity is confined to within 50 m (164 ft) of the burrow (Auffenberg and Franz 1982), but a tortoise may travel >100 m from its burrow for specific forage requirements (Ashton and Ashton 2008). Home range size varies with habitat type, season, and sex of the tortoise; moreover, considerable individual variation has been found (Diemer 1992). Reported annual average home ranges for males have varied from 0.5 to 1.9 ha (1.2 to 4.7 ac). Females generally have smaller home ranges, with reported averages ranging from 0.1 to 0.6 ha (0.2 to 1.6 ac) (McRae et al. 1981, Diemer 1992, Smith et al. 1997). Multiple burrows are typically used (McRae et al. 1981, Auffenberg and Franz 1982, Diemer 1992), which complicates estimates of population density (McCoy and Mushinsky 1992b).

Threats

The primary threat to gopher tortoises in Florida is habitat destruction, fragmentation, and degradation, particularly from urbanization and development, agriculture, and phosphate/heavy metals mining (Diemer 1986, 1987; Berish [Diemer] 1991; McCoy and Mushinsky 1995; Berish 2001). Populations in the Florida Panhandle have been severely depleted by human predation and from habitat degradation resulting from fire suppression and planting dense stands of sand pine (*Pinus clausa*) in sandhill habitat (Auffenberg and Franz 1982; Diemer 1986, 1987; Berish 2001). Formerly large tortoise populations in the northern peninsula have been depleted by agriculture, overharvest, and increasing development (Taylor 1982, Diemer 1987). In Central Florida, urban growth and development, phosphate mining, and citrus production are the primary threats (Auffenberg and Franz 1982; Diemer 1986, 1987). In

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GOPHER TORTOISE

Gopherus polyphemus

South Florida, tortoise habitat has been destroyed or degraded by urbanization, intensive agriculture, and invasive exotic plant species (Berish [Diemer] 1991, Berish 2001). Habitat fragmentation of rural areas by roads and increased vehicular traffic due to development result in increased road mortality of gopher tortoises, which are often drawn to roadsides because of available forage (Franz and Auffenberg 1978; Landers and Buckner 1981; Landers and Garner 1981; Lohofener 1982; Diemer 1986, 1987; Berish 2001; Mushinsky et al. 2006).

Degradation of tortoise habitat on silvicultural lands occurs when the canopy of pine plantations becomes closed and little or no understory forage is available to tortoises (Landers and Buckner 1981; Landers and Garner 1981; Auffenberg and Franz 1982; Diemer 1986, 1987; Berish 2001). Intensive site preparation often associated with pine silviculture reduces native ground cover, and the sparse cover of legume and non-legume forbs provide poor forage, resulting in slower tortoise growth rates and delayed sexual maturity (Aresco and Guyer 1999). Lack of prescribed fire or suppression of natural fires also results in canopy closure and reduced tortoise forage plants (Landers and Speake 1980; Landers and Garner 1981; Auffenberg and Franz 1982; Diemer 1986, 1987; Berish 2001). Local isolated populations of gopher tortoises may persist for decades in overgrown habitat, but recruitment of young into these populations declines as the canopy increases and habitat quality decreases (McCoy and Mushinsky 1992a, Mushinsky and McCoy 1994).

The spread of exotic invasive plant species, such as cogongrass (*Imperata cylindrica*) and hairy indigo (*Indigofera hirsute*), also degrades tortoise habitat (Berish [Diemer] 1991, Hicklin 1994, Berish 2001, Basiotis et al. 2005). Cogongrass can quickly form a tall, dense ground cover that is unsuitable for the gopher tortoise, particularly on rangelands, pastures, roadsides, and reclaimed phosphate

mines (Shilling et al. 1997, Mushinsky et al. 2006). Gopher tortoise eggs and hatchlings are preyed upon by mammals, birds, and snakes (Douglass and Winegarner 1977, Fitzpatrick and Woolenden 1978, Landers et al. 1980, Butler and Sowell 1996, Smith 1997). Approximately 80–90% of nests are typically depredated, primarily by mammalian predators such as the raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), gray fox (*Urocyon cinereoargenteus*), and opossum (*Didelphis virginiana*) (Hallinan 1923, Ernst and Barbour 1972, Douglass and Winegarner 1977, Landers et al. 1980). More than 90% of hatchlings may not survive their first year (Witz et al. 1992, Butler and Sowell 1996, Epperson and Heise 2003). Adults are nearly immune to predation, but some may be killed by dogs (*Canis familiaris*) and coyotes (*C. latrans*) (Douglass and Winegarner 1977, Causey and Cude 1978, Hawkins and Burke 1989; Mushinsky et al. 2006). Gopher tortoise populations can typically sustain natural predation pressure, with only one to three of every 100 eggs probably producing a breeding adult (Landers 1980). However, predator populations, such as raccoons and crows (*Corvus* spp.), can be artificially high in some habitats because of anthropogenic factors (Smith and Engeman 2002). Also, potential new tortoise predators have invaded Florida via human transport or habitat alteration: nine-banded armadillo (*Dasypus novemcinctus*), coyote, monitor lizards (*Varanus* spp.), and imported red fire ant (*Solenopsis invicta*) (Douglas and Winegarner 1977, Auffenberg and Iverson 1979, Main et al. 2000, Epperson and Heise 2003; Enge et al. 2004; Owens et al. 2005).

Heavy human predation on the gopher tor-

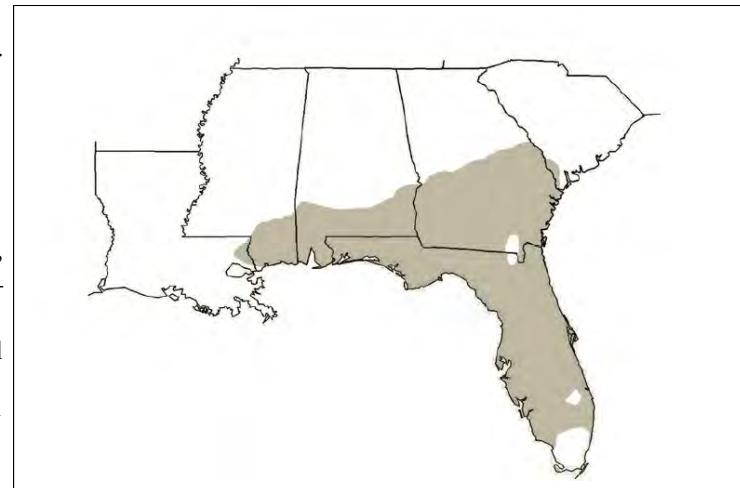


Figure 2. Distribution of the gopher tortoise in the southeastern United States.

toise occurred in the past in Florida, especially in the Panhandle and northern peninsula (Harcourt 1889, Fisher 1917, Anderson 1949, Alberson 1953, Hutt 1967, Matthews 1979, Auffenberg and Franz 1982, Taylor 1982, Diemer 1986, Mickler 1986, Diemer 1987, Berish 2001). Prior to the closure of tortoise harvest in the late 1980s, one community in Okaloosa County held an annual tortoise cookout. Although tortoise protection and decreased tortoise populations have reduced human consumption rates, some tortoise populations may still be depleted by sustained human predation (Mushinsky et al. 2006). Road development facilitates human access into remote areas and may lead to exploitation of additional gopher tortoise populations.

Beginning in the 1990s, upper respiratory tract disease (URTD) was identified as a potential threat to the gopher tortoise (Brown et al. 2002), and relatively large die-offs (100–300+ shells) that might be linked to URTD were documented on several public lands in Florida (McLaughlin 1997, Smith et al. 1998, Brown et al. 1999, Berish 2001, Gates et al. 2002, Rabatsky and Blahovde 2002). Besides at least two *Mycoplasma* species responsible for URTD, gopher tortoises also may have herpesvirus and iridovirus.

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Pathogens may be partially responsible for recent declines in some gopher tortoise populations, but URTD may have a long evolutionary history as a gopher tortoise disease. McCoy et al. (2005) speculate that *Mycoplasma agassizii* may be detected in virtually every population, if enough tortoises are sampled. There are several possibilities why URTD has only been discovered recently: 1) increased research on the species, 2) increased stress on gopher tortoise populations from habitat fragmentation and degradation has lowered their resistance to pathogens, 3) a more virulent form of the pathogen has evolved, or (4) URTD was introduced by humans via exposure to infected captive tortoises (Mushinsky et al. 2006). On Sanibel Island, 87% of tortoises tested were seropositive for exposure to the pathogen, and at least one population here appears to have experienced a 25–50% reduction in breeding age adults (McLaughlin 1997, McLaughlin et al. 2000). However, McCoy et al. (2005) found that observed declines in the demographic well-being of gopher tortoise populations did not appear to be related to the presence of *Mycoplasma agassizii*.

Listing Status

The gopher tortoise is listed as a Threatened species by the United States Fish and Wildlife Service under the federal Endangered Species Act (ESA) for populations occurring west of the Mobile and Tombigbee Rivers in Alabama, Mississippi, and Louisiana (50 CFR §17.11). The status of the gopher tortoise in its eastern range was evaluated by the USFWS in 2010-2011. The 12-month status review was published in the Federal Register in July 2011 (76(144):45130-45162) and included the finding that the species is warranted for federal listing under the ESA as Threatened, but precluded from listing due to higher priority listing activities (U.S. Fish and Wildlife Service 2011). As such, it is currently considered as a Candidate species under the ESA. Candidate species are not subjected to federal regulations under the ESA, and current conservation actions can

potentially help preclude the need for future federal listing in the eastern portion of the species' range. The gopher tortoise is also listed as Threatened by the Florida Fish and Wildlife Conservation Commission.

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GOPHER TORTOISE

Gopherus polyphemus

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GOPHER TORTOISE

Gopherus polyphemus

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LITTLE BLUE HERON

Egretta caerulea



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Figure 1. Little blue herons have slate blue plumage that blends in well with dark marsh plants.

Description

On average, little blue herons measure 24 inches in length with a 40-inch wingspan, and weigh about 12 ounces – one-sixth the mass of a great blue heron (*Ardea herodias*). Little blues appear dark overall, with a relatively stout neck, moderately long, yellow-green legs, and a dagger-shaped, slightly drooped blue bill with a black tip (Figure 1). The entire body below the upper neck is slate blue. A purplish maroon color, boldest in summer, adorns the head and neck. Sexes are alike. First-year birds begin their lives completely white and are difficult to distinguish from juvenile snowy egrets (*Egretta thula*). After about nine months, grayish feathers begin to molt into the white plumage, creating a remarkable splotched appearance.

Geographic Range and Distribution

Little blue herons breed along the Atlantic coast from southern Maine to Florida, with concentrations from South Carolina southward. Breeding across the Florida peninsula, this is distributed unevenly around the Gulf Coast and coastal plain, with the greatest densities in Louisiana. Little blue herons also breed up the Mississippi River valley into Illinois and through eastern Texas into Kansas. Wintering territory shrinks back to the warmer coasts. Little blue herons also occur throughout the Caribbean, Central America, and South America as far south as Uruguay (Figure 2). The little blue heron is known from Camp Blanding Joint Training Center

(Florida Fish and Wildlife Conservation Commission 1997).

Habitat Requirements

Little blue herons nest in small trees, shrubs, and mangrove stands near or over water. Estuaries, saltwater and freshwater marshes, and river bottoms are used for feeding and breeding. This heron forages in marshes, lagoons, canals and ditches, impoundments, ponds, streams, and flooded fields, usually where vegetation is emerging or mature. Young little blue herons prefer more open, shallow water. Wintering habitat is similar.

Life History

In colonies with other herons, ibises, and anhingas, little blue herons usually nest in short trees and tall shrubs. Males form small

territories, three to six feet wide, and begin to build nest platforms. The most common display is the “neck stretch”, in which the male elongates his body upward, then collapses down with bill still up but neck folded, wings opened, and legs bent. A soft “unh!” punctuates the display. Pair bonds last for the season. The male gathers twigs and passes them to the female, who constructs the loose nest, with few or no leaves. Both sexes incubate up to six blue-green eggs for about 22 days, then brood, feed, and defend the white hatchlings together.

Little blue heron hatchlings can barely raise their heads and must pick regurgitated food from the nest floor for a few days before they can take food directly from the adults. Young birds leave the nest in about five weeks, but return to roost at night after foraging with other fledglings. They disperse from their natal area before migrating in mid-fall.

After breeding, little blue herons disperse in all directions, but favor the north. Pushed southward by cooler temperatures, usually in late September, this bird migrates via traditional routes along rivers and coasts, with frequent stops to forage and roost. Southern U.S. populations move as far south as Central America, and immature birds often remain there through the next year (Figure 2). Spring migrants appear along the mid-Atlantic coast in late March.

This dark, deliberate stalker walks, pauses, crouches, and stares to find prey. Its diet includes small amphibians; small fish such as anchovies, drum, and killifish; crustaceans such as crayfish and crabs; and insects such as bees, dragonflies, flies, and grasshoppers. This heron often forages alone, but juveniles often join snowy egrets to forage in open waters.



Figure 2. Range map for the little blue heron; used directly from the “All About Birds” website, sponsored by the Cornell Lab of Ornithology, at: http://www.allaboutbirds.org/guide/little_blue_heron/id.

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LITTLE BLUE HERON

Egretta caerulea

Threats

Lacking the breeding plumes most coveted by feather hunters in the 1800s, little blue herons avoided the extensive slaughter of other egrets. Today, the loss of feeding habitat seems to be the greatest limiting factor for this dark heron. Between 1780 and 1980, key breeding and wintering states like Mississippi, Arkansas, and Florida lost over 50% of their wetlands. Despite the recent preservation of key breeding sites like Florida's Pelican Island and Ding Darling National Wildlife Refuge, the little blue heron has not shown significant population increases. As a result of farmland expansion, residential development, and recreation, changes in water levels and flow have degraded coastal and riparian wetlands for breeding and wintering herons. Refuge managers now work to maintain open wetland habitats, which first year little blues use. A few states limit human proximity to sensitive breeding and foraging areas, but additional public education and buffer zones are needed.

"Little Blue Heron" website, sponsored by Audubon, at: <http://birds.audubon.org/species/litblu>.

Listing Status

Little blue herons currently are a Species of Special Concern for the Florida Fish and Wildlife Conservation Commission (FWC). However, the FWC's Little Blue Heron Biological Review Group concluded from their biological assessment that the little blue heron meets the criteria for being listed as Threatened under Rule 68A-27, F.A.C. The listing status is expected to change to Threatened when the Commission approves the Imperiled Species Management Plan in 2015. Little blue herons are also protected under the federal Migratory Bird Treaty Act, but are not listed under the federal Endangered Species Act.

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Note: Unless noted, all information in this species account was used directly from the

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LITTLE OECETIS LONGHORN CADDISFLY

Oecetis parva



© Zachary L. Burington

Figure 1. *Oecetis parva* are only 3–5 mm in length.

Description

Little *Oecetis* longhorn caddisflies are only 3–5 mm in length (Figure 1). Illustrations of both the male and female terminalia (i.e., reproductive organs) can be found in Burington et al. (2012), and larval and case illustrations can be found in Floyd (1995).

Geographic Range and Distribution

This southeastern endemic was historically collected only from Alabama (one male from Wright's Creek near the Florida border) and Florida (throughout most areas of central and northern Florida where natural ponds and lakes occur) (Floyd, 1995; Rasmussen et al., 2008), but the species was recently found at one site in Georgia (Banks Lake National Wildlife Refuge) and several sites in the sandhills region of South Carolina (Burington et al., 2012) (Figure 2). It is possibly extirpated from Alabama.

Habitat Requirements

The little *Oecetis* longhorn caddisfly prefers natural lakes, ponds, springs, and spring runs (Rasmussen et al., 2008). Rasmussen et al. (2008) indicated that *O. parva* was only located in Florida's healthiest lakes and considered the species to be an excellent bioindicator.

Life History

Prior to adult emergence, caddisflies enter a stage of inactivity called the pupal stage that can last for several weeks or months depending on the species. Adult emergence is then triggered by various environmental factors,

effectively synchronizing the adult activity to make mate-finding easier. For *O. parva*, adults are captured typically in the spring and summer (M. Floyd, pers. comm., 2014). There can be more than one cohort at a site, so multiple, synchronous emergences may be observed throughout the summer.

Caddisfly pupation occurs much like pupation of Lepidoptera (moths and butterflies). That is, caddisflies pupate in a cocoon spun from silk (Wiggins, 1977). Caddisflies that build portable cases attach their case to some underwater object, seal the front and back apertures against predation while still allowing water flow, and pupate within it. Once fully developed, most pupal caddisflies cut through their cases with a specially modified pair of mandibles, swim to the water surface, cast off the pupal skin and now-obsolete gills and mandibles, and emerge as fully formed adults. In a minority of species, the pupae swim to shore (either below the water or across the surface) and crawl out of the water to emerge. Many of them are able to fly immediately after breaking from their pupal skin.

The adult stage of caddisflies, in most cases, is very short-lived, usually only 1–2 weeks, but can sometimes last for two months. Most adults are non-feeding and are equipped mainly to mate. Once mating has occurred, the female caddisfly will often lay eggs (enclosed in a gelatinous mass) by attaching them above or below the water surface. Eggs hatch in as little as three weeks.

Caddisflies in most temperate areas complete their life cycle in a single year (Wiggins, 1977). The general temperate-zone lifecycle pattern is one of larval feeding and growth in autumn, winter, and spring, with adult emergence between late spring and early fall, although the adult activity of a few species peaks in the winter. Larvae can be active in very cold water and can frequently be observed feeding under ice. In common with many aquatic insect species, many caddisfly adults emerge synchronously *en masse*. Such

emergence patterns ensure that most caddisflies will encounter a member of the opposite sex in a timely fashion. Mass emergences of this nature are called 'hatches' by salmon and trout anglers, and salmonid fish species will frequently 'switch' to whatever species is emerging on a particular day.¹

Regardless of habitat, caddisfly adults tend to remain somewhat near the emergence site (LaFontaine, 1981; Collier and Smith, 1998) where oviposition occurs. Dispersal away from emergence sites tends to be negatively correlated with density of vegetation along the dispersal corridor; caddisflies tend to disperse shorter distances in dense forest compared with more open vegetation (Collier and Smith, 1998). Although dispersal flights are common especially from temporary habitats, such flights are relatively short and only occur immediately following emergence (Merritt and Cummins, 1996).²

Threats

Rasmussen et al. (2008) believe *O. parva* is an excellent bioindicator of lake health in Florida, as it is abundant in the healthiest lakes. This indicates that this species is threatened by any factor which negatively affects water quality.

The Florida Fish and Wildlife Conservation Commission (2005) reports that this species' freshwater marsh and wet prairie habitat is highly threatened by altered hydrologic regime, altered water quality, and altered

¹ All information in this species account paragraph was used directly from the "Caddisfly" website, sponsored by Wikipedia, at: http://en.wikipedia.org/wiki/Caddisfly#cite_ref-Wiggins-22_5-1.

² All information in this species account paragraph was used directly from the "Oecetis parva" website, sponsored by NatureServe Explorer, at: <http://www.natureserve.org/explorer/servlet/NatureServe?searchName=Oecetis+parva>.

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LITTLE OECETIS LONGHORN CADDISFLY

Oecetis parva

species dominance, and that this species' seepage habitat is highly threatened by altered hydrologic regime. Marsh, seepage, and lake habitats are all threatened by agriculture, urban development, forestry, recreation, water withdrawals, and nutrient loading (FWC 2005).

Listing Status

The little *Oecetis* longhorn caddisfly is not listed by the Florida Fish and Wildlife Conservation Commission or the U.S. Fish and Wildlife Service (Service). However, the Center for Biological Diversity recently petitioned the Service to list the species under the federal Endangered Species Act (CBD 2010). The Service made a substantial 90-day finding for the petition and is currently soliciting information for use in the 12-month finding.

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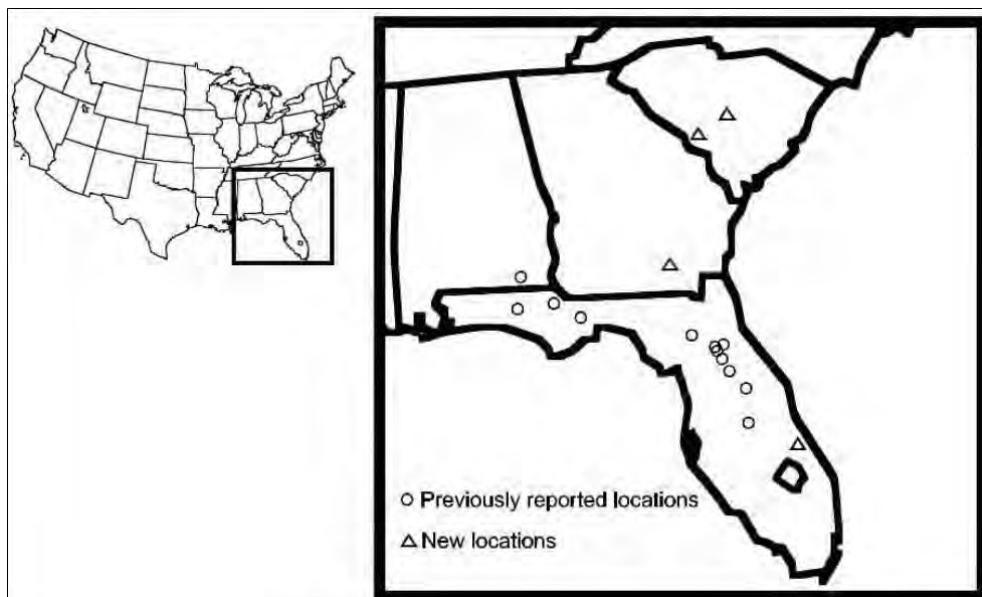


Figure 2. Range of *Oecetis parva* in the southeastern United States. Includes previously reported “O” locations from Rasmussen et al. (2008) and Harris et al. (1991), and new locations “Δ” reported in Burington et al. (2012). Map reproduced from Burington et al. (2012) publication.

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PURPLE SKIMMER

Libellula jesseeana



Figure 1. Male purple skimmers have orange wings with a blue body.

Description

The purple skimmer reaches an average body length of about two inches (5 centimeters), with individuals varying in color depending upon the age and sex. Adult males are pale blue to dark blue in color with orange wings (Figure 1), while females are yellow in color, making them hard to distinguish from the golden-winged skimmer (*Libellula auripennis*). Although its name suggests it is purple in color, only a few individuals typically hold this color.

Geographic Range and Distribution

This species is endemic to Florida and limited to ten counties in the panhandle and northern peninsula of Florida: Bay, Washington, Clay, Putnam, Marion, Lake, Orange, Volusia, Seminole, and Palm Beach (Dunkle 1992, Richardson 2003, Abbott 2012). However, Paulson (2009) stated that the 1937 record from Palm Beach County is quite anomalous and should be confirmed or discredited (Keppner 2012), and Paulson (2011) excluded Palm Beach County from the range map for *L. jesseeana*. Figure 2 shows the range for purple skimmers as noted in Keppner (2012). There is a protected population at Gold Head Branch State Park and Camp Blanding Joint Training Center in Clay County (Daigle 2007). However, most other populations receive no protection.

Habitat Requirements

This species is found in clear, sandy lakes and ponds with little aquatic vegetation but with a shoreline belt of tall maidencane (*Panicum hemitomon*) and/or sedges and St. John's wort (*Hypericum spp.*). According to Dunkle (2000), this species requires the most infertile lakes with sparsest grass.

Life History

Purple skimmers have a flight season from April through October (Dunkle 2000, Paulson 2011, Keppner pers. comm., 2013).

Threats

Eutrophication and other types of water pollution from human settlement at and near lakes, ongoing in much of the purple skimmer's range in Florida, continue to threaten the habitat (Paulson 2009). Ground-water depletion due to irrigation could dry up some of the shallower ponds, which is also continuing to happen on the sandy ridges of Florida. Development around lakes can also lead to pollution from septic tanks. This degradation of the habitat may allow *L. auripennis* to outcompete this rare species.

Listing Status

Purple skimmers are not listed by the Florida Fish and Wildlife Conservation Commission or the U.S. Fish and Wildlife Service (Service). However, the Center for Biological Diversity recently petitioned the Service to list the skimmer under the federal Endangered Species Act (CBD 2010). The Service made a substantial 90-day finding for the petition and is currently soliciting information for use in the 12-month finding.

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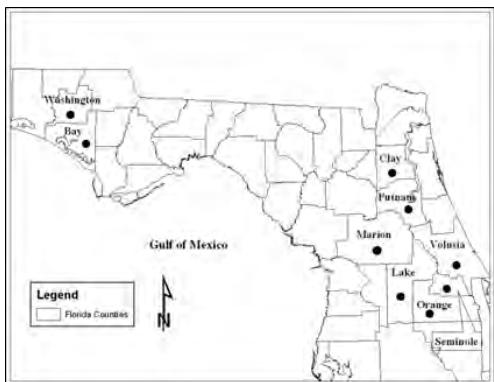


Figure 2. Known Florida county occurrences for the purple skimmer (Keppner 2012).

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PURPLE SKIMMER

Libellula Jesseana

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SHERMAN'S FOX SQUIRREL

Sciurus niger shermani



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Figure 1. Sherman's fox squirrels typically inhabit xeric uplands.

Description

The Sherman's fox squirrel (*Sciurus niger shermani*) is a large tree squirrel typically measuring 600 to 700 mm (23 to 28 in) in length (Figure 1). Its coloring is highly variable with dorsal fur ranging from silver to black, and variations of silver over black and black over silver (Florida Natural Areas Inventory 2001). Fox squirrels of the southeastern coastal plain vary in dorsal coloration from gray to tan agouti to completely non-agouti black, with buff or black on the ventrum (Moore 1956, Kiltie 1989). They almost always have a variable amount of white on the rostrum and ears (Kiltie 1989).

Geographic Range and Distribution

Sherman's fox squirrels range from Georgia southward to peninsular Florida, exclusive of the southwestern portion of the state (FNAI 2001; Figure 2). This subspecies is known from and verified on Camp Blanding Joint Training Center (Gregory et al. 2006).

Habitat Requirements

This species typically inhabits xeric uplands, including sandhill, pine flatwoods, pastures, and other open, ruderal habitats (such as pecan orchards) with scattered pines and oaks (FNAI 2001).

Life History

Longleaf pine seeds and turkey oak acorns appear to be some of the main food items consumed by Sherman's fox squirrels in the sandhill community (Moore 1957). These squirrels have been observed to move their home ranges into live oak (*Quercus virginiana*) forests if a mast failure of turkey oak (*Q. laevis*) occurs (Kantola and Humphrey 1990). The highest quality habitat for Sherman's fox squirrels may therefore be habitat that includes both longleaf pine savanna and live oak forest (Kantola and Humphrey 1990). Additional food items include other acorns, fungi, bulbs, vegetative buds, insects, nuts, and staminate pine cones (Kantola 1992).

Sherman's fox squirrels use several different nests in their home ranges (Kantola and Humphrey 1990). Most nests are leaf nests made of Spanish moss, pine needles, twigs, and leaves, while a few nests are within tree cavities (Kantola and Humphrey 1990). In the Ordway-Swisher Biological Station, nests of this squirrel were found in 6 tree species: longleaf pine (*Pinus palustris*), slash pine (*P. elliottii*), post oak (*Q. stellata*), laurel oak (*Q. laurifolia*), live oak, and turkey oak (Kantola and Humphrey 1990). Turkey oak was used most frequently (68.6%) followed by longleaf pine (17.7%), live oak (4.9%), post oak (3.9%), laurel oak (3.9%) and slash pine (1%) (Kantola and Humphrey 1990). Sherman's fox squirrels in Florida occur at lower densities and have larger home ranges than estimates obtained for *Sciurus niger* elsewhere in its range (Wooding 1997).

A population of approximately 100 to 200 animals was estimated to inhabit the 37 km² (14 mi²) area occupied by the Ordway-Swisher Biological Station, Putnam County, Florida (Kantola and Humphrey 1990). Other density estimates in Florida range from 7 to 38 individuals per km² (Wooding 1997, Humphrey et al. 1985, Kantola 1986, Moore 1957). Average home range size for Sherman's fox squirrels is 16.7 ha (41.2 ac) for females and 42.8 ha (105.7 ac) for males

(Kantola and Humphrey 1990). Kantola (1992) reports midwestern fox squirrel home ranges average 0.8 to 7.0 ha (2.0 to 17.3 ac). Sherman's fox squirrel adults defend mutually exclusive core areas (Kantola and Humphrey 1990). Males have home ranges that overlap with those of females and other males, but there is very little overlap in home ranges of adult females (Wooding 1997). The relatively large home ranges of this subspecies may result from a food supply that varies in time and space (Kantola and Humphrey 1990). The low carrying capacity in Florida may be explained by a lack of high quality, storable seeds, coupled with periodic failures of seed crops (Wooding 1997). Habitat that is low in productivity leads to low population densities, large home range sizes, and the low production of young per unit area (Wooding 1997).

Threats

The biggest threat to Sherman's fox squirrel is destruction of habitat due to encroaching development (Kantola and Humphrey 1990, FWC 2005). Such habitat loss has already been significant; it is estimated that only 10 to 20% of Sherman's fox squirrel historic habitat is still intact (Bechtold and Knight 1982 as cited in Kantola 1992). Most of its habitat has been logged, converted to pasture, degraded by lack of fire, or used for agriculture, commercial development, and residential development (Bechtold and Knight 1982 as cited in Kantola 1992). Florida's longleaf pine forests in particular were reduced by 88% between 1936 and 1986, to the extent that by 1987 only 380,000 ha (1,467 mi²) remained (Wooding 1997). Many of the other habitat types in which Sherman's fox squirrels occur are also declining. Mixed hardwood-pine forest is declining; natural pineland, sandhill, and scrub are in poor condition and declining. Further habitat destruction is expected to continue as Florida's human population continues to expand (FWC 2005, Zwick and Carr 2006, FWC 2008).

Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

SHERMAN'S FOX SQUIRREL

Sciurus niger shermani

In addition to habitat loss, the quality of remaining habitat is also a concern. Kantola and Humphrey (1990) suggested that most remaining tracts of longleaf pine savanna in Florida were not of good quality. Logging and the suppression of fire have led to the replacement of pine trees by turkey oak over much of the Sherman's fox squirrel range (Kantola and Humphrey 1990). Some improvements have been made through restoration projects on public conservation lands and incentive programs for private landowners, but the current condition of natural pinelands is still poor on much of the historic extent (FWC 2005). Management of upland longleaf pine savannas for other specialist species, such as gopher tortoises (*Gopherus polyphemus*), red-cockaded woodpeckers (*Picoides borealis*), northern bobwhite (*Colinus virginianus*), and grassland bird species, can be compatible with the needs of Sherman's fox squirrels (Perkins et al. 2008) if due consideration is given to retention of mast-producing trees. Managers restoring degraded longleaf pine savannas should retain a component of site-appropriate mature oaks to provide mast and nest sites for Sherman's fox squirrel (Perkins et al. 2008). Greenberg and Simons (1999) described land managers as being "misguided" if they removed all mature oaks when attempting to restore or maintain longleaf pine and sandhill ecosystems. Prescribed fire is necessary to prevent encroachment of excessive hardwoods and maintain the open structure preferred by Sherman's fox squirrels in upland longleaf pine savanna and mixed pine-hardwood forests (Weigl et al. 1989, Kantola and Humphrey 1990, Perkins and Conner 2004, Lee et al. 2009).

Fragmentation of habitat poses another risk to Sherman's fox squirrel. Due to their slow, lumbering gait, fox squirrels are vulnerable to road mortality. Mortality from vehicle collisions is likely to increase as Florida's human population increases. Better understanding of Sherman's fox squirrel populations, habitat preferences, and habitat use

may help in planning land use and road construction projects to avoid creating additional hazards.

Fragmentation of suitable habitat further isolates local populations, increasing vulnerability to local extinction events. Hunting of Sherman's fox squirrel may have been detrimental to local populations in the past, particularly those small, isolated populations that had low potential for recolonization (Kantola 1992). Presumably, this threat has decreased as hunting of this squirrel is no longer permitted.

Diseases may pose a significant threat to population stability and viability. White Oak Conservation Center (WOCC) in Nassau

County, FL, recorded several Sherman's fox squirrel die-offs due to a fibromatosis outbreak throughout the property. The population at WOCC has yet to recover from the most recent die-off in 2002 to 2003 (S. Citino, WOCC, personal communication). Although squirrel poxvirus, a skin fungus that can cause high rates of mortality (Terrell et al. 2002), has been detected in Big Cypress fox squirrels (Kellam and Jansen 2010), its impact to the entire species is unknown (USFWS 2002).

Listing Status

The Sherman's fox squirrel is currently listed as a Species of Special Concern by the Florida Fish and Wildlife Conservation Commission (FWC). FWC's Sherman's Fox Squirrel

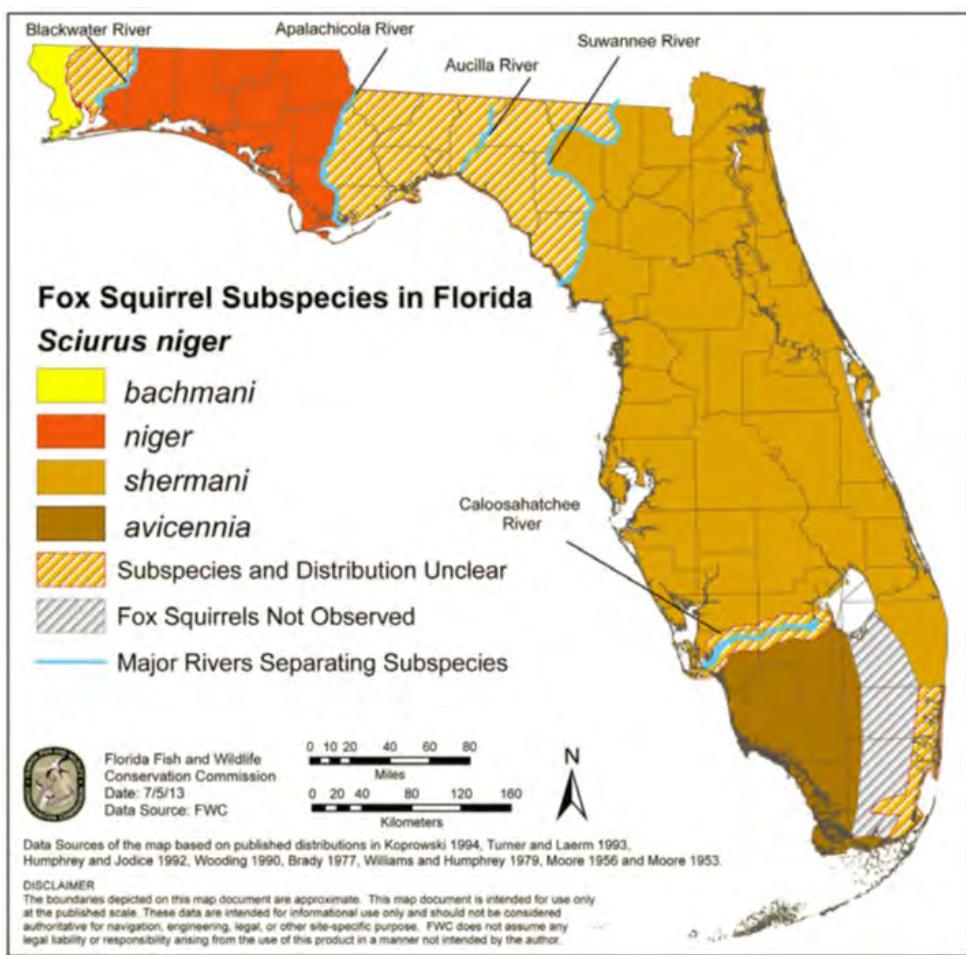


Figure 2. Range of the Sherman's fox squirrel in Florida, compared to that of other fox squirrel subspecies.

Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

SHERMAN'S FOX SQUIRREL

Sciurus niger shermani

Biological Review Group concluded from their biological assessment that the Sherman's fox squirrel did not meet listing criteria. However, the lack of data necessary for an adequate evaluation of the subspecies was of great concern. Therefore the subspecies was recommended to remain as a Species of Special Concern until sufficient data have been collected. The Sherman's fox squirrel is not listed, nor has it been petitioned to be listed, under the federal Endangered Species Act.

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Note: A portion of the information in this species account was used directly from the Florida Fish and Wildlife Conservation Commission's Sherman's fox squirrel Species Action Plan; dated November 1, 2013. 50 pages.

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SOUTHEASTERN AMERICAN KESTREL

Falco sparverius paulus



Figure 1. Male American kestrel perched atop a snag.
©Jack Rogers

Description

The smallest falcon in North America, southeastern American kestrels (*Falco sparverius paulus*) are distinguished in flight by long pointed wings and deep, sometimes fluttering, wing-beats. Adult kestrels are sexually dimorphic; males have buffy underparts with variable spotting, blue-gray wings, a streaked rufous back, and a mostly solid rufous tail, whereas females have buffy underparts with heavy streaking and barred rufous wings, back, and tail (Figure 1). Both sexes have 2 vertical black stripes on each side of their head; one across the base of the beak and one across the back of the head. Female American kestrels are larger than male kestrels. Body mass in Florida, in summer, averages 100 g (0.22 lb) for males and 120 g (0.26 lb) for females.

Geographic Range and Distribution

The southeastern American kestrel was once widely distributed throughout southeastern states; today, the subspecies occurs primarily in Florida and is patchily distributed elsewhere in the coastal plain of Georgia and South Carolina. Within Florida, the southeastern American kestrel was once distributed as far south as the rockland pine forests of Dade County (Holt and Sutton 1926), but now breeds no farther south than Highlands and Lee counties (Figure 2; Robertson and

Woolfenden 1992; FWC 2003). The southeastern American kestrel is known from Camp Blanding Joint Training Center (Hipes and Jackson 1994).

Habitat Requirements

The southeastern American kestrel appears to have evolved in the southeastern sandhill ecosystem. The typical sandhill landscape consists of a widely spaced canopy of longleaf pine (*Pinus palustris*) or slash pine (*P. elliottii* var *densa*) with wiregrass (*Aristida stricta*) and forb dominated groundcover. This ecosystem provides both prey and nesting sites (e.g., tree cavities) for kestrels (Bohall-Wood and Collopy 1986; Hoffman and Collopy 1987; Collopy 1996). Southeastern American kestrels also use a variety of other natural communities in Florida including scrub, scrubby flatwoods, and dry prairie. Pastures, parks, golf courses, and orange groves are also used (Stys 1993), but no information is available about their survivorship and reproductive success in these human-modified habitats.

Life History

Southeastern American kestrels establish breeding territories year-round and have high territory fidelity (Bohall-Wood and Collopy 1986). Southeastern American kestrel territory size has not been measured, but likely varies based on habitat quality, prey availability, and the presence of nesting cavities and perches. Stys (1993) suggested 0.5 km² (124 ac) as an approximation for territory size for mitigation and conservation planning purposes. Territories that include areas of unsuitable plant communities (e.g., dense pinelands or other closed canopy forest) are probably much larger.

Southeastern American kestrels are secondary cavity nesters, meaning they depend on cavities excavated by woodpeckers, or other natural cavities, in trees for nesting sites. Most natural nest cavities are in dead longleaf pine, sand pine (*P. clausa*), or various oak (*Quercus* spp.) trees. Nesting also can occur

in live pines in cavities originally excavated by red-cockaded woodpeckers (*Picoides borealis*) and subsequently enlarged by other woodpeckers (Gault et al. 2004). Kestrels have been recorded nesting in abandoned or occupied buildings, in man-made nest boxes (Smallwood and Collopy 2009), and in utility transmission towers (Beasley and Parrish 2009).

Courtship and pair bonding begins in early January (Bohall-Wood and Collopy 1986). From mid-March through May, 3-5 eggs per clutch are laid. Egg color varies from white to a yellowish or light reddish-brown, typically blotched or mottled with gray or brown (Smallwood and Bird 2002). Incubation lasts 29-31 days and young fledge in 28-30 days. Sexual maturity is reached when kestrels are 1 year old and life expectancy is estimated at an average of 2 years and 9 months for kestrels that survive their first winter (Smallwood and Bird 2002).

American kestrels hunt for food by searching the ground from elevated perches and hovering or soaring over open areas without perches. Major prey items of the southeastern American kestrel are insects, lizards, and less frequently small rodents or birds (Bohall-Wood and Collopy 1986).

Threats

Population declines of southeastern American kestrels in Florida have been largely attributed to clearing of older pine forests, conversion of sandhill and other upland habitats for agriculture and urban development, and fire suppression. These habitat changes led to a lack of suitable nest sites and a loss of ground cover suitable for prey (Hoffman and Collopy 1987, Smallwood and Collopy 2009).

However, southeastern American kestrel habitat relationships are poorly understood at both the plant community level and the landscape level, and therefore reasons for

Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

SOUTHEASTERN AMERICAN KESTREL

Falco sparverius paulus

kestrel population decline are still unclear.

Loss of suitable nesting habitat (i.e., tree cavities) and foraging habitat (i.e., open ground cover) are contributing factors but they cannot alone explain the kestrel's imperiled status. For example, recent bird surveys of restored sandhills throughout Florida (J. Rodgers, FWC, unpublished data; K. Miller, FWC, unpublished data) indicate that southeastern American kestrels are either rare or absent at every location, with the possible exception of Eglin Air Force Base. Habitat fragmentation may have a negative effect on kestrels given that juvenile southeastern American kestrels have a median dispersal distance <5 km (Miller and Smallwood 1997).

Threats to sandhill ecosystems identified by Florida's State Wildlife Action Plan (FWC 2005), including altered fire regime, habitat destruction or conversion, fragmentation of habitats, and the absence or scarcity of key-stone species (i.e., cavity excavators), are likely to have a negative impact on southeastern American kestrels. Therefore, national and state-level conservation initiatives for protection and management of existing sandhill habitat will likely benefit the southeastern American kestrel to some degree.

Listing Status

Southeastern American kestrels are listed as Threatened by the Florida Fish and Wildlife Conservation Commission. They are not listed, nor have they been petitioned to be listed, under the federal Endangered Species Act.

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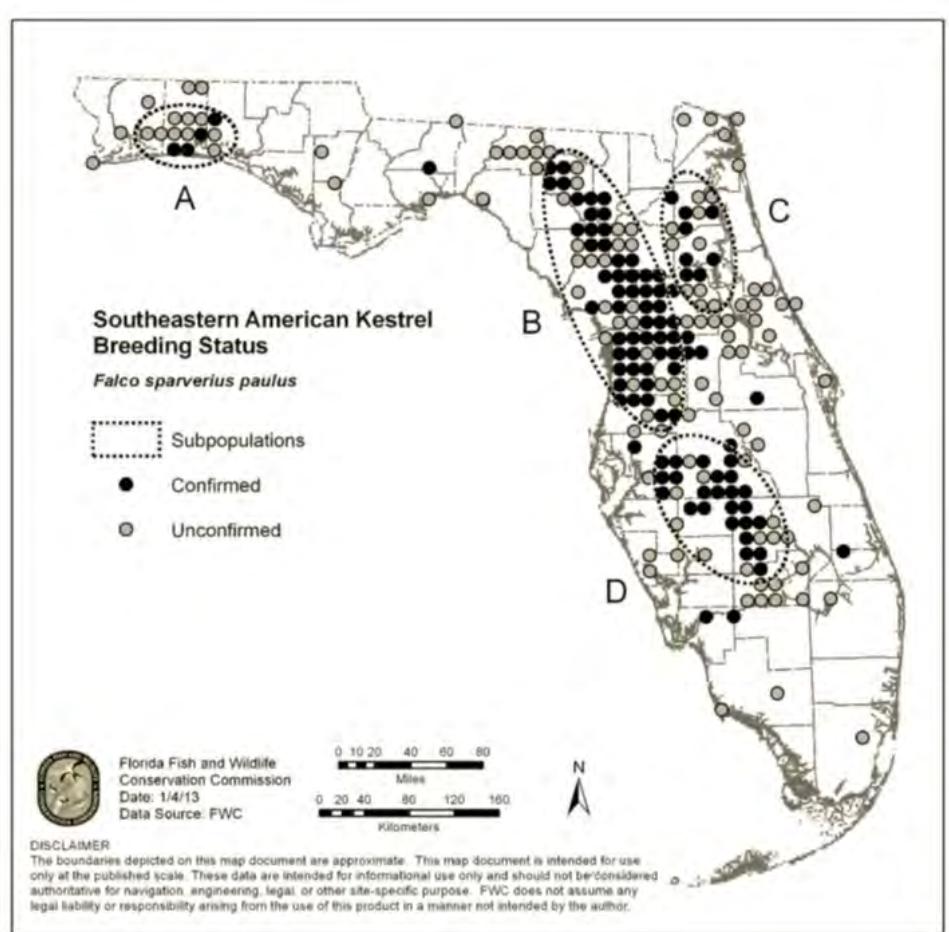


Figure 2. Distribution of the non-migratory southeastern American kestrel. Four largest regional subpopulations (approximated by dashed lines): A) Western Panhandle, B) Brooksville Ridge and vicinity, C) Trail Ridge and vicinity, D) Lake Wales Ridge and vicinity. Points represent 7.5 minute quadrangles where breeding activity was recorded as "Confirmed" (black dots) or "Probable" or "Possible" (gray dots) during Florida's Breeding Bird Atlas (FWC 2003).

Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

SOUTHEASTERN AMERICAN KESTREL

Falco sparverius paulus

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Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

SOUTHERN HOGNOSE SNAKE

Heterodon simus



Figure 1. The southern hognose snake is a small snake with a sharply pointed snout.

Description

The southern hognose snake (*Heterodon simus*) is a small (ca. 20 inches [508 mm]), stocky snake with a sharply pointed snout, keeled scales, and a divided anal scale (Conant and Collins 1991, Hipes et al. 2000). The dorsal base color is sandy gray to tan with three rows of dark blotches, while the ventral surface is white to cloudy gray and has no pattern (Hipes et al. 2000, Reichling 2008, Figure 1). As with other hognose species, diagnostic defensive behaviors include hissing, flattening of the head and neck, and playing dead (Hipes et al. 2000, Reichling 2008).

Geographic Range and Distribution

The southern hognose snake historically ranged from southeastern North Carolina, south to Lake Okeechobee and westward to southern Mississippi (Conant and Collins 1991, Hipes et al 2000, Ernst and Ernst 2003, Reichling 2008). The species may be extirpated or extinct from the westward portions of the range (Tuberville et al. 2000).

Populations in Florida are scattered and localized within the panhandle and peninsula and may be absent from formerly vouchered sites (Hipes et al. 2000). The species has been observed on Camp Blanding Joint Training Center in Clay and surrounding counties (Katy NeSmith, Zoologist, Florida Natural Areas Inventory, pers. comm.).

Habitat Requirements

The southern hognose snake inhabits xeric habitats, including sandhill, scrub, and xeric hammock but is also found in oldfield habitats and some slightly more mesic environments (Ashton and Ashton 1981, Hipes et al. 2000, Reichling 2008). This species is often associated with ephemeral wetlands, where the southern toad (*Anaxyrus terrestris*) is a major prey item (Ashton and Ashton 1981, Hipes et al. 2000).

Life History

As evident by its strongly upturned snout, the southern hognose snake is fossorial, utilizing loose, sandy soils for burrowing (Reichling 2008).

Threats

The decline of the southern hognose snake is associated with the loss, alteration, and degradation of xeric habitats due to commercial and residential development, agriculture, and mining (Hipes et al. 2000). Additional threats include depredation of eggs and hatchlings by fire ants (*Solenopsis invicta*) (Tuberville et al. 2000, Reichling 2008), road mortality (Enge and Wood 2003), and general prosecution of snakes by humans. Localized commercial collection for the pet trade may also be an issue (Enge and Wood 2003).

Listing Status

The southern hognose snake is not listed by the Florida Fish and Wildlife Conservation Commission or under the federal Endangered Species Act (ESA). However, the Center for Biological Diversity petitioned the U.S. Fish and Wildlife Service to list the species under the ESA (CBD 2012). The Service is in the process of developing the 90-day finding for the petition and will subsequently solicit information for use in the 12-month finding, if applicable.

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Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

SOUTHERN LANCE

Elliptio ahenea

Description

The southern lance (*Elliptio ahenea*) is a bivalve that exhibits an approximate 2:1 ratio of length to height. It has compressed valves and a biangulated posterior slope that generally ends at a 90 degree angle to the ventral surface. The species prefers soft bottomed substrates with minimal water flow (Johnson 1972).

Geographic Range and Distribution

The southern lance is a Florida endemic, confirmed from the St. Mary's, St. Johns, Kissimmee, and Suwannee rivers, but is absent from other Gulf drainages, although it may also be present in the Ochlockonee River drainage (Johnson 1972; Williams and Butler 1994). Although the species has not been collected from Camp Blanding Joint Training Center, it has been documented from the Black Creek basin.

Life History

Adults are sedentary filter feeders, while the larvae are parasitic on fish species during the glochidial stage of development (Watters 1992).

Threats

This species is susceptible to the typical filter feeder threats including eutrophication, pollution, and urban runoff.

Listing Status

The southern lance is not listed by the Florida Fish and Wildlife Conservation Commission or under the federal Endangered Species Act (ESA). However, the Center for Biological Diversity petitioned the U.S. Fish and Wildlife Service to list the species under the ESA (CBD 2010). The Service made a substantial 90-day finding for the petition and is currently soliciting information for use in the 12-month finding.

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Note: A portion of the information in this species account was used directly from the NatureServe *Elliptio ahenea* page (<http://natureserve.org/explorer>).

Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

SPOTTED TURTLE

Clemmys guttata



©Kevin Enge

Figure 1. The spotted turtle is a secretive animal preferring slow moving waters.

Description

The spotted turtle (*Clemmys guttata*) is small black turtle (up to 12.5 cm [4.9 in]) with orange to yellow spots on the head and carapace (Figure 1). The carapace is smooth and lacks any keeling or serrations. The plastron is yellow, while marginal scutes may have black areas. The skin is black to gray, while the dorsal surfaces of the limbs are orange, pink, or salmon red. Older individuals may be melanistic and lack the characteristic spots. This species is sexually dimorphic with females usually larger than males (Ernst et al. 1994).

Geographic Range and Distribution

The spotted turtle is found on the Atlantic Coastal Plain from north central Florida to Maine and westward across the northern United States and southern Canada to Lake Michigan (Hipes et al. 2000). Although not confirmed on Camp Blanding Joint Training Center, the species has been documented from several nearby counties (Alachua, Baker, Marion, Putnam, and St. Johns) (Ashton and Ashton 1985, Berry 1992, Hipes et al. 2000).

Habitat Requirements

The spotted turtle is a secretive animal preferring slow moving waters of bogs, swamps, flatwood ponds, and ditches with abundant vegetation (Ernst and Barbour 1989, Hipes et al. 2000).

Life History

The elusiveness of this species in Florida has greatly limited our knowledge of the species' ecology in the state (Berry 1992). Spotted turtles are semi-aquatic and equally at home on land or in water, but are usually found in aquatic habitats with soft bottoms and abundant vegetation cover (Ernst and Barbour 1989).

The breeding season is from March until May, with mating usually occurring in the water (Ernst and Barbour 1989). Nesting occurs from May through July, with females laying one to two clutches of two to eight elliptical, white eggs (Ernst and Barbour 1989, Ernst et al. 1994). Estimated incubation time is between 70 and 83 days (Ernst and Barbour 1989).

Spotted turtles are opportunistic omnivores and may scavenge for their food (Ernst et al. 1994, Berry 1992). Vegetation includes grasses and filamentous green algae (Ernst et al. 1994). Animals consumed include a wide variety of insects and other arthropods, mollusks, annelids, fishes, and amphibians (Ernst and Barbour 1989, Ernst et al. 1994). Predators of spotted turtles include wading birds and mammals, such as skunks and raccoons (Ernst et al. 1994).

Threats

The spotted turtle's decline is associated with habitat loss and degradation due to commercial and residential development, silviculture, and agriculture (Hipes et al. 2000). They may also be susceptible to hydrological alterations associated with drainage projects and groundwater withdrawal (Hipes et al. 2000). Collection for the pet trade may also be a threat (Ernst et al. 1994).

Listing Status

The spotted turtle is not listed by the Florida Fish and Wildlife Conservation Commission

or under the federal Endangered Species Act (ESA). However, the Center for Biological Diversity petitioned the U.S. Fish and Wildlife Service to list the species under the ESA (CBD 2012). The Service is in the process of developing the 90-day finding for the petition and will subsequently solicit information for use in the 12-month finding, if applicable.

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Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

ST. JOHN'S ELEPHANTEAR

Elliptio monroensis

Description

The St. John's elephantear (*Elliptio monroensis*) is a bivalve and is similar to its congener *E. dariensis*, which reaches much larger sizes and thickness than *E. monroensis*, and the latter species generally has a more pronounced posterior ridge. *E. dariensis* is endemic to the Altamaha River system in Georgia while *E. monroensis* is endemic to the St. John's River in Florida (Butler 1994).

Geographic Range and Distribution

The St. John's elephantear has been collected from the following waterbodies: Black Creek, Econlockhatchee River, Julington Creek, Lake Monroe, Lake Baresford, and Lake Woodruff (Butler 1994). Although the species has not been collected from Camp Blanding Joint Training Center, it has been documented from the Black Creek basin.

Habitat Requirements

This species requires sandy substrate in lakes and creeks with little current (Heard 1979).

Life History

Adults are sedentary filter feeders, while the larvae are parasitic on fish species during their glochidial stage of development (Watters 1992). The glochidial host and natural history of the species are unknown at present (NatureServe 2013).

Threats

This species is susceptible to the typical filter feeder threats including eutrophication (i.e., excessive nutrients), pollution, and urban runoff.

Listing Status

The St. John's elephantear is not listed by the Florida Fish and Wildlife Conservation Commission or under the federal Endangered Species Act (ESA). However, the Center for Biological Diversity petitioned the U.S. Fish and Wildlife Service to list the species under the ESA (CBD 2010). The Service made a substantial 90-day finding for

the petition and is currently soliciting information for use in the 12-month finding.

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Note: Some information in this species account was used directly from the NatureServe *Elliptio monroensis* page (<http://natureserve.org/explorer>).

Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

STRIPED NEWT

Notophthalmus perstriatus



© Kevin Enge

Figure 1. The striped newt has two red stripes running from the head to the tail.

Description

The striped newt (*Notophthalmus perstriatus*) is a small, olive green to brown salamander (up to 10.5 cm [4.1 in]) with two dorsolateral red stripes running from the head to the tail (Conant and Collins 1991, Figure 1). The ventral surface is yellow with black spots (Conant and Collins 1991). A terrestrial immature eft stage also exhibits the dorsolateral stripes, but on an orange to red base color (Reichling 2008). During the mating season, male striped newts exhibit a flattened tail, fleshy flanges on the hind limbs, hard scaly projections on the toes, and a swollen vent.

Larval coloration is distinct from that of the adults. Their base coloration is greenish yellow, but they may be translucent and lack coloration, and the stripes are made up of two dorsolateral bands of gray and black (Mecham and Hellman 1952).

Geographic Range and Distribution

The striped newt ranges across southern Georgia and north Florida south to central Florida (Christman and Means 1992). This newt is patchily distributed within its range and there is a major disjunctive gap between western metapopulations in the Apalachicola National Forest and those of the eastern portion of the range (Reichling 2008). The striped newt is known from Camp Blanding Joint Training Center (Hipes and Jackson 1996; A. Farmer, Florida Fish and Wildlife Conservation Commission, pers. comm.

2009).

Habitat Requirements

Striped newts inhabit fire-maintained, xeric pine uplands, principally sandhill, but also scrub and pine flatwoods. Breeding occurs in small, isolated, ephemeral wetlands imbedded in the aforementioned terrestrial habitats (Hipes et al. 2000).

Life History

There are very few data on the terrestrial habits of the striped newt. Breeding migration to ephemeral ponds occurs between January and March (Dodd 1993), with females having been documented to travel greater than 700 meters to a pond (Dodd and Cade 1998).

Threats

The major threat to the striped newt is alteration, degradation, and conversion of breeding and terrestrial habitats (Hipes et al. 2000). Greenberg et al. (2003) note that the striped newt may be intolerant of successional changes associated with fire suppression. Introduction of fishes into isolated, ephemeral wetlands negatively affects the breeding ecology of the species (Hipes et al. 2000).

The stochastic nature of droughts in the striped newt's range has led to the evolution of plasticity of larval development (Reichling 2008). The striped newt is a classic bet hedger, in having several reproductive strategies: paedomorphism (sexually mature larvae); transformation to the eft phase to complete sexual development in the terrestrial environment; and direct development from aquatic larvae to sexually mature adults (Means et al. 1994).

Listing Status

The striped newt is not listed by the Florida Fish and Wildlife Conservation Commission or under the federal Endangered Species Act (ESA). However, the Coastal Plains Institute petitioned the U.S. Fish and Wildlife Service to list the species under the ESA (CPI 2008). The Service made a 12-month finding of warranted but precluded for the petition,

hence the species retains the Candidate status.

Literature Cited

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STRIPED NEWT

Notophthalmus perstriatus

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Candidate Conservation Agreement with Assurances for Multiple At-Risk Species in North Florida

SWALLOW-TAILED KITE

Elanoides forficatus



©Ken Meyer

Figure 1. Swallow-tailed kites have striking black-and-white coloring.

Description

The swallow-tailed kite (*Elanoides forficatus*) is a large but light raptor, weighing only 15 ounces on average and measuring 22 inches long with a 51 inch wingspan (Figure 1). Most often seen in flight, it sports a long, forked tail and long, narrow wings. It appears small-headed. At all times of year, the adults are black and white. The head, neck, lower body, and under wing linings are white. The eye, small bill, upper body, upper wing, and tail are black. On the under-wing, the black of the outer wing narrows to a point along the wing's rear edge and just touches the body. Usually, some of the black upper parts have a blue cast, which is likely created by the swallow-tailed kite's powder feathers. The upper parts of South American birds have a green cast.

Geographic Range and Distribution

In North America, the swallow-tailed kite breeds at a few scattered locations in the Southeastern Coastal Plain, from extreme east Texas to South Carolina (Figure 2). The greatest breeding densities occur in Florida's peninsula, the only place where the range is continuous. In the 1800's, the swallow-tailed kite nested as far north as Wisconsin and ranged over as many as 21 eastern states. A population of swallow-tailed kites also

breeds from southern Mexico through Central America and much of South America. North American kites winter in South America, but blend into resident populations, so that their exact distribution is not understood.

Habitat Requirements

In North America, breeding colonies favor woodlands with trees that rise well above the canopy and with ready access to wet prairies or marshes for food. Mature, forested wetlands dominated by slash pines and cypresses are typical breeding habitat in Florida. Pine-hardwood forests are used in South Carolina, where nests are placed in loblolly pines that average 104 feet tall. A mosaic of wetland habitats with trees of various heights is a key characteristic. Non-native Australian pine offers good height, but often fails to support nests. In Central and South America, the swallow-tailed kite breeds in humid lowland forests and cloud forests. Large trees are also important for communal roosts, as the kites stage before fall migration. Wintering habitats are not well documented.

Life History

The migratory habits of this kite are not completely understood. During the spring, early migrants arrive in Florida in late February, and dates for Texas are probably similar, since nesting starts in mid-March. Migration is likely to follow more than one route over the Gulf of Mexico and around the Gulf, through Central America and Mexico. Before fall migration, adults and young stage in large roosts, which are empty by late September. Fall migrants form small flocks that soar to high altitudes and appear to segregate by age, with juveniles departing last and probably on their own.

The swallow-tailed kite probably forms pairs before reaching the United States in spring. Bonding rituals have not been identified, but the pair chooses a nest site usually within 80 to 750 yards of other swallow-tailed kite nests. They usually build a new stick nest

near the top of a tall tree, but sometimes reoccupy an old one. The nest is lined with lichen, Spanish moss, and pine needles, which help hold the sticks together. Without actually helping, non-breeding kites often attempt to participate in the nesting process, but are rejected.

For 28 days, the pair incubate 2-3 whitish eggs marked with reddish brown. Nesting swallow-tailed kites may travel as far as 15 miles in search of concentrated food sources. The male brings food to the female during the first half of the nesting cycle, and she tears it up for the chicks. In many nests, the smaller, younger chick dies from a combination of starvation and aggression from its older sibling. After 4 weeks, the remaining chick begins to flex and flap its wings. It fledges about a week later. Some young swallow-tailed kites remain close to the nest site, but many move with their parents and may continue to be fed until migration.

The swallow-tailed kite captures and eats much of its prey on the wing by plucking it from vegetation or snatching it from the air, such as dragonflies and June bugs. The diet shifts to the most available food sources and includes many insects, snakes, the chicks of other bird species, and frogs. Fairly unique among raptors, this kite also eats fruit in winter from the rubber tree (*Hevea brasiliensis*) and the macurije tree (*Matayba oppositifolia*). Its thick, spongy stomach lining appears well adapted to absorb the stings of wasps, bees, and fire ants. Other insects in its diet are grasshoppers, leaf-footed bugs, and palmetto weevils. Many larvae are consumed, and the swallow-tailed kite will bring an entire wasp's nest to its own nest. Adults rarely eat on a perch, and this kite often feeds in loose groups.

Threats

Habitat loss, collection of its highly-prized eggs, and widespread shooting of adults decimated a thriving population in the 19th cen-

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SWALLOW-TAILED KITE

Elanoides forficatus

tury. Currently, the ongoing conversion of forested wetlands to agriculture, residential lots, and other commercial development threaten the recovery of this raptor. The challenge is to reintegrate and expand its fragmented habitats, like the moist slash pine forest. Protecting existing nesting “neighborhoods” is also important, because the species shows high site fidelity (C. Faulhaber, pers. comm., 2014). Preferred nesting habitat includes tall pines or cypress with relatively dense understory.

The last breeding stronghold of the swallow-tailed kite in the United States, Florida, may determine its future in North America. Between the 1780's and the 1980's, Florida lost nearly 9.3 million acres, or 46%, of its wetlands, the greatest loss of acreage for any state. More specifically, 90,000 acres of Florida's forested wetlands were destroyed between the mid-1970's and the mid-1980's. Agriculture accounted for two thirds of this loss, while urbanization consumed the other third. By 1989, only 12% of the state's pine forests were standing. In Florida, public lands can only support approximately 200 pairs of these kites. Therefore, participation from private landowners will be critical for the conservation of this bird.

Listing Status

The swallow-tailed kite is not listed by either the Florida Fish and Wildlife Commission or the U.S Fish and Wildlife Service (Service). However, the Service considers the kite a species of special concern and allocates time and resources for its protection.

Literature Cited

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Figure 2. Range map for the swallow-tailed kite; used directly from the “All About Birds” website, sponsored by the Cornell Lab of Ornithology, at: http://www.allaboutbirds.org/guide/Swallow-tailed_Kite/id.

Note: Unless noted, all information in this species account was used directly from the “Swallow-tailed Kite” website, sponsored by Audubon, at: <http://birds.audubon.org/species/swakit>.

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TRICOLORED HERON

Egretta tricolor



©FWC

Figure 1. Tricolored herons were once known as Louisiana herons.

Description

The tricolored heron (*Egretta tricolor*) measures about 26 inches long and weighs approximately 13 ounces, with a 36-inch wingspan. Long, slim, and ornately colored, this fancy heron has notably long legs, neck, and bill (Figure 1). Contrasting with straw colored back plumes, the upper parts, including the head and neck, are slate blue. Below the base of the neck, the under-parts are white. During breeding season, the tricolored heron sports a short white head plume, a buffy throat and fore-neck, a blue face, and a blue bill tipped with black. The eyes are reddish and the legs pinkish. Non-breeding adults have a yellow face, bill, and legs; the throat and fore-neck are white. On juvenile tricolored herons, rusty red adorns the head, neck, upper back, and the front parts of the wings.

Geographic Range and Distribution

In North America, most tricolored herons breed coastally from New Jersey through Florida and then west and south along the Gulf Coast. A few breed into New England and the coastal plain. Populations concentrate around places like Florida's Cape Canaveral, Louisiana's Sabine River estuary, and Texas's mid-coast bays. The tricolored heron's winter range covers much of this same area, with most birds withdrawing below North Carolina. Tricolored herons also breed and winter coastally from Mexico south to Peru and northern Brazil (Figure 2).

Almost all tricolored herons breeding north of North Carolina migrate south; fewer of these herons are seen along the southern Atlantic seaboard in winter than in summer. Northern migrants winter into the southeastern U.S., the Caribbean, and Central America. Immediately after breeding, the tricolored herons disperse, but less widely than other herons or egrets. Spring migration probably starts as early as February and ends as late as early May.

Habitat Requirements

Tricolored herons most often breed in coastal wetlands such as mangroves, estuaries, lagoons, and salt marshes, but they also use freshwater marshes like the Florida Everglades. Wintering birds are generalists that are more attracted by food sources than by a specific habitat type. Rarely found on dry land, tricolored herons prefer wetlands with low vegetation and shallow water, suitable for wading up to their chests.

Life History

In colonies with other herons, tricolored herons usually nest in short trees, tall shrubs, and mangroves. Males establish territories with twig shaking displays, nest platform construction, and exaggerated preening. Courtship displays include the "snap-stretch," in which the male elongates his body upward, then collapses down with bill upheld, neck folded in an S, and plumes erect. As his neck sways, the male emits an "Unh!" Pairs are monogamous. Males gather twigs and pass them to the female, who constructs a loose nest, with increasingly smaller twigs, and finally, coarse grasses. Both sexes incubate three to four bluish-green eggs for about 22 days; together they brood, feed, and defend the yellowish hatchlings.

For the first week after hatching, parent herons regurgitate clumps of food onto the nest floor, which the hatchlings eat until they are strong enough to be fed directly. Young birds are fed for several weeks. When they are able to fly, begging juveniles pursue their

parents around the colony. Adults lead the juveniles to feeding areas, where their association appears to end.

Along shorelines and in water as deep as seven inches, tricolored herons actively pursue small fish like topminnows, killifish, and livebearers, which together comprise almost 90% of the diet. Other prey items include marine worms, water bugs, and spiders. This heron waits in ambush, then walks methodically, runs, or twirls with open wings, and even hovers over fish schools. Typically, the bird then crouches and thrusts out its long neck to snatch up prey.

Threats

Although tricolored heron populations appear stable in North America, they are not secure. In Florida, the Florida Fish and Wildlife Conservation Commission's (FWC) Tricolored Heron Biological Review Group concluded that tricolored herons have declined in the state based on analysis of FWC survey data and Breeding Bird Survey Data from the Everglades (FWC 2011). The wetlands in which this heron breeds and forages are disappearing at an alarming rate, despite mitigation efforts, government studies, and repeated warnings. Other threats may include human disturbance at foraging and breeding sites, increased pressure from predators, altered hydrology, and exposure to environmental contaminants (FWC 2011).

Listing Status

Tricolored herons currently are a Species of Special Concern for the Florida Fish and Wildlife Conservation Commission. However, the FWC's Tricolored Heron Biological Review Group concluded from their biological assessment that the tricolored heron meets the criteria for being listed as Threatened under Rule 68A-27, F.A.C. The listing status is expected to change to Threatened when the Commission approves the Imperiled Species Management Plan in 2015. Tricolored herons are also protected under the

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TRICOLORED HERON

Egretta tricolor

federal Migratory Bird Treaty Act, but are not listed under the federal Endangered Species Act.

Literature Cited

Florida Fish and Wildlife Conservation Commission. 2011. Tricolored Heron Biological Status Review. 14 page

Note: Unless noted, all information in this species account was used directly from the “Tricolored Heron” website, sponsored by Audubon, at: <http://birds.audubon.org/species/trihcr>.



Figure 2. Range map for the tricolored heron, used directly from the “All About Birds” website, sponsored by the Cornell Lab of Ornithology, at: http://www.allaboutbirds.org/guide/tricolored_heron/id.

APPENDIX III – Matrix of Stressors and Conservation Actions per Enrolled Habitat Type

Table 1. Matrix of stressors and conservation actions for FLATWOODS.

Stressor	Planned Conservation Action ¹	Annual Reporting Requirement
Factor A. Present or threatened destruction, modification, or curtailment of the species habitat or range.		
A.1. Degradation or loss of habitat through fire suppression or inadequate prescribed fire program.	Prescribed fire will be used on approximately 2-5 year cycles.	Number of acres burned and time of year burn was implemented. Target is to burn 3,200 to 8,000 acres annually.
A.2. Degradation or loss of habitat through forest management practices that result in a dense canopy and limited herbaceous understory, not resulting from fire exclusion alone.	Manage natural stands and plantations by reducing or maintaining pine basal area to between 60 and 80 square feet per acre, unless threatened or endangered species require otherwise. Replant any harvested plantations with containerized longleaf pine.	Number of acres thinned, harvested, and/or replanted with longleaf pine.
A.3. Degradation or loss of habitat through forest management practices that result in reduced habitat suitability for critical life functions, not resulting from fire exclusion alone.	Snags, den trees, and fallen logs will be left undisturbed unless they are a safety hazard to troop maneuvers.	Notification of any salvage cuts that took place and the density of snags that remain, if applicable.
A.4. Fragmentation of habitat from incompatible land-use that results in isolated populations.	Road maintenance as needed and no new paved road construction.	Road maintenance implemented.
Factor C. Disease or predation.		
C.1. Nest, hatchling, juvenile, and adult depredation from native and exotic predators.	Assess level of depredation from informal observance during general management practices and respond accordingly.	Level of depredation and type of predators observed and control methods used, if necessary.
Factor E. Any other natural or manmade factors affecting the species continued existence.		
E.1. Competition, predation, and disease introduction from invasive and exotic	Monitor and control invasive and exotic species and noxious weeds through early detection,	Type of invasive or exotic species present and control methods used.

species.	isolation of infested areas, and control of individual plants with physical, chemical, or mechanical means, depending on the species.	Target is to reduce or maintain these species to one percent or less of the acreage enrolled in this Agreement (i.e., 200 acres).
E.2. Loss of demographic viability and/or increased susceptibility to stochastic environmental factors (e.g., weather events, disease) because of small population size and/or isolation from other populations.	Establish and maintain large areas of suitable habitat through appropriate management actions such as prescribed fire and basal area thinning where needed.	See reporting requirements for Factors A.1 and A.2.

¹**Species Benefitted:** gopher frog, striped newt, swallow-tailed kite, Sherman's fox squirrel, eastern diamondback rattlesnake, Florida pine snake, gopher tortoise

Table 2. Matrix of stressors and conservation actions for SANDHILL.

Stressor	Planned Conservation Action ¹	Annual Reporting Requirement
Factor A. Present or threatened destruction, modification, or curtailment of the species habitat or range.		
A.1. Degradation or loss of habitat through fire suppression or inadequate prescribed fire program.	Prescribed fire will be used on approximately 1-3 year cycles.	Number of acres burned and time of year burn was implemented. Target is to burn 4,000 to 12,800 acres annually, with at least 30-40% of those acres burned during the growing season.
A.2. Degradation or loss of habitat through forest management practices that result in a dense canopy and limited herbaceous understory, not resulting from fire exclusion alone.	Manage natural stands by reducing or maintaining pine basal area to between 20 and 60 square feet per acre, unless threatened or endangered species require otherwise. Harvest and remove existing sand pine, slash pine, and turkey oak dominated stands; replant with containerized longleaf pine.	Number of acres thinned, harvested, and/or replanted with longleaf pine.
A.3. Degradation or loss of habitat through forest management practices that result in reduced habitat suitability for critical life functions, not resulting from fire exclusion alone.	Snags, den trees, and fallen logs will be left undisturbed unless they are a safety hazard to troop maneuvers.	Notification of any salvage cuts that took place and the density of snags that remain, if applicable.
A.4. Fragmentation of habitat from incompatible land-use that results in isolated populations.	Road maintenance as needed and no new paved road construction.	Road maintenance implemented.
Factor C. Disease or predation.		
C.1. Nest, hatchling, juvenile, and adult depredation from native and exotic	Assess level of depredation from informal observance during general management	Level of depredation and type of predators observed and control

predators.	practices and respond accordingly.	methods used, if necessary.
Factor E. Any other natural or manmade factors affecting the species continued existence.		
E.1. Competition, predation, and disease introduction from invasive and exotic species.	Monitor and control invasive and exotic species and noxious weeds through early detection, isolation of infested areas, and control of individual plants with physical, chemical, or mechanical means, depending on the species.	Type of invasive or exotic species present and control methods used. Target is to reduce or maintain these species to one percent or less of the acreage enrolled in this Agreement (i.e., 168 acres).
E.2. Loss of demographic viability and/or increased susceptibility to stochastic environmental factors (e.g., weather events, disease) because of small population size and/or isolation from other populations.	Establish and maintain large areas of suitable habitat through appropriate management actions such as prescribed fire and basal area thinning where needed.	See reporting requirements for Factors A.1 and A.2.

¹**Species Benefitted:** gopher frog, striped newt, Southeastern American kestrel, swallow-tailed kite, Say's spiketail, Florida mouse, Sherman's fox squirrel, eastern diamondback rattlesnake, Florida pine snake, gopher tortoise, southern hognose snake

Table 3. Matrix of stressors and conservation actions for SCRUB.

Stressor	Planned Conservation Action ¹	Annual Reporting Requirement
Factor A. Present or threatened destruction, modification, or curtailment of the species habitat or range.		
A.1. Degradation or loss of habitat through fire suppression or inadequate prescribed fire program.	Prescribed fire will be used on approximately 5-20 year cycles.	Number of acres burned and time of year burn was implemented (to be reported at least once every five years).
A.2. Degradation or loss of habitat through forest management practices that result in a dense canopy and limited herbaceous understory, not resulting from fire exclusion alone.	Manage natural stands by reducing or maintaining scrub vegetation to less than eight feet in height, any sand pine canopy to less than 15 percent cover, and bare soil at 10-50 percent.	Number of acres thinned and/or harvested (to be reported at least once every five years).
A.3. Fragmentation of habitat from incompatible land-use that results in isolated populations.	Road maintenance as needed and no new paved road construction.	Road maintenance implemented.
Factor C. Disease or predation.		
C.1. Nest, hatchling, juvenile, and adult depredation from native and exotic predators.	Assess level of depredation from informal observance during general management practices and respond accordingly.	Level of depredation and type of predators observed and control methods used, if necessary.
Factor E. Any other natural or manmade factors affecting the species continued existence.		
E.1. Competition, predation, and disease introduction from invasive and exotic species.	Monitor and control invasive and exotic species and noxious weeds through early detection, isolation of infested areas, and control of individual plants with physical, chemical, or mechanical means, depending on the species.	Type of invasive or exotic species present and control methods used. Target is to reduce or maintain these species to one percent or less of the acreage enrolled in this Agreement (i.e., 3 acres).
E.2. Loss of demographic viability and/or	Establish and maintain large areas of suitable	See reporting requirements for

increased susceptibility to stochastic environmental factors (e.g., weather events, disease) because of small population size and/or isolation from other populations.	habitat through appropriate management actions such as prescribed fire and vegetation height reduction where needed.	Factors A.1 and A.2.
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¹**Species Benefitted:** gopher frog, striped newt, Florida mouse, eastern diamondback rattlesnake, Florida pine snake, gopher tortoise

Table 4. Matrix of stressors and conservation actions for Ephemeral Wetlands.

Stressor	Planned Conservation Action ¹	Annual Reporting Requirement
Factor A. Present or threatened destruction, modification, or curtailment of the species habitat or range.		
A.1. Degradation or loss of habitat through fire suppression or inadequate prescribed fire program.	Prescribed fire will be used in the surrounding uplands at a return interval appropriate to that habitat type (i.e., flatwoods, sandhill, scrub). Ephemeral wetlands will be allowed to burn when their associated uplands are burned.	Number of ponds, associated acreages burned, and time of year burn was implemented.
A.1. Degradation or loss of habitat through fire suppression or inadequate prescribed fire program.	Where wading bird colonies are not present, mechanical and/or chemical means will be used, if necessary, when fire is not sufficient to maintain an open habitat structure/prevent woody encroachment.	Description of conditions and control methods used.
A.2. Degradation or loss of habitat from impoundments, dredging and channelization, siltation, pollutants, and water temperature changes.	Implement the general management practices described in the Florida Department of Agriculture and Consumer Services' <i>Silviculture Best Management Practices Manual</i> (e.g., retain natural vegetation for erosion control, water quality, and wildlife habitat; do not allow vehicles within known wetland areas, unless on established roads and crossings).	Notification of adherence to the general management practices described in the Florida Department of Agriculture and Consumer Services' <i>Silviculture Best Management Practices Manual</i> . Notification of temperature, pH, dissolved oxygen, and turbidity levels (to be reported at least once every three years).
Factor C. Disease or predation.		
C.1. Nest, hatchling, juvenile, and adult depredation from native and exotic predators.	Assess level of depredation from informal observance during general management practices and respond accordingly.	Level of depredation and type of predators observed and control methods used, if necessary.

Factor E. Any other natural or manmade factors affecting the species continued existence.		
E.1. Competition, predation, and disease introduction from invasive and exotic species.	Monitor and control invasive and exotic species and noxious weeds through early detection, isolation of infested areas, and control of individual plants with physical, chemical, or mechanical means, depending on the species.	Type of invasive or exotic species present and control methods used. Target is to reduce or maintain these species to one percent or less of the acreage enrolled in this Agreement (i.e., 1 acre).

¹**Species Benefitted:** gopher frog, striped newt, Florida sandhill crane, little blue heron, swallow-tailed kite, tricolored heron, purple skimmer, spotted turtle

Table 5. Matrix of stressors and conservation actions for FORESTED WETLANDS.

Stressor	Planned Conservation Action ¹	Annual Reporting Requirement
Factor A. Present or threatened destruction, modification, or curtailment of the species habitat or range.		
A.1. Degradation or loss of habitat from impoundments, dredging and channelization, siltation, pollutants, and water temperature changes.	Implement the general management practices described in the Florida Department of Agriculture and Consumer Services' <i>Silviculture Best Management Practices Manual</i> (e.g., retain natural vegetation for erosion control, water quality, and wildlife habitat; do not allow vehicles within known wetland areas, unless on established roads and crossings).	Notification of adherence to the general management practices described in the Florida Department of Agriculture and Consumer Services' <i>Silviculture Best Management Practices Manual</i> . Notification of temperature, pH, dissolved oxygen, and turbidity levels (to be reported at least once every three years).
Factor C. Disease or predation.		
C.1. Nest, hatchling, juvenile, and adult depredation from native and exotic predators.	Assess level of depredation from informal observance during general management practices and respond accordingly.	Level of depredation and type of predators observed and control methods used, if necessary.
Factor E. Any other natural or manmade factors affecting the species continued existence.		
E.1. Competition, predation, and disease introduction from invasive and exotic species.	Monitor and control invasive and exotic species and noxious weeds through early detection, isolation of infested areas, and control of individual plants with physical, chemical, or mechanical means, depending on the species.	Type of invasive or exotic species present and control methods used. Target is to reduce or maintain these species to one percent or less of the acreage enrolled in this Agreement (i.e., 75 acres).

¹**Species Benefitted:** swallow-tailed kite, Duke's skipper, purple skimmer, Say's spiketail, spotted turtle

Table 6. Matrix of stressors and conservation actions for SURFACE WATERS.

Stressor	Planned Conservation Action ¹	Annual Reporting Requirement
Factor A. Present or threatened destruction, modification, or curtailment of the species habitat or range.		
A.1. Degradation or loss of habitat from impoundments, dredging and channelization, siltation, pollutants, and water temperature changes.	Implement the general management practices described in the Florida Department of Agriculture and Consumer Services' <i>Silviculture Best Management Practices Manual</i> (e.g., prohibit aerial application or mist blowing of pesticide; trees within stream channels or on the immediate stream bank will not be harvested).	Notification of adherence to the general management practices described in the Florida Department of Agriculture and Consumer Services' <i>Silviculture Best Management Practices Manual</i> . Notification of temperature, pH, dissolved oxygen, and turbidity levels (to be reported at least once every three years).
Factor C. Disease or predation.		
C.1. Nest, hatchling, juvenile, and adult depredation from native and exotic predators.	Assess level of depredation from informal observance during general management practices and respond accordingly.	Level of depredation and type of predators observed and control methods used, if necessary.
Factor E. Any other natural or manmade factors affecting the species continued existence.		
E.1. Competition, predation, and disease introduction from invasive and exotic species.	Monitor and control invasive and exotic species and noxious weeds through early detection, isolation of infested areas, and control of individual plants with physical, chemical, or mechanical means, depending on the species.	Type of invasive or exotic species present and control methods used. Target is to reduce or maintain these species to one percent or less of the acreage enrolled in this Agreement (i.e., 18 acres).

¹**Species Benefitted:** little Oecetis longhorn caddisfly, Black Creek crayfish, purple skimmer, Say's spiketail, American eel, southern lance, St. John's elephantear, spotted turtle

APPENDIX IV – Monitoring Locations for the Enrolled Habitat Types

Camp Blanding Joint Training Center
Flatwoods Habitat Monitoring Locations for
Candidate Conservation Agreement with Assurances

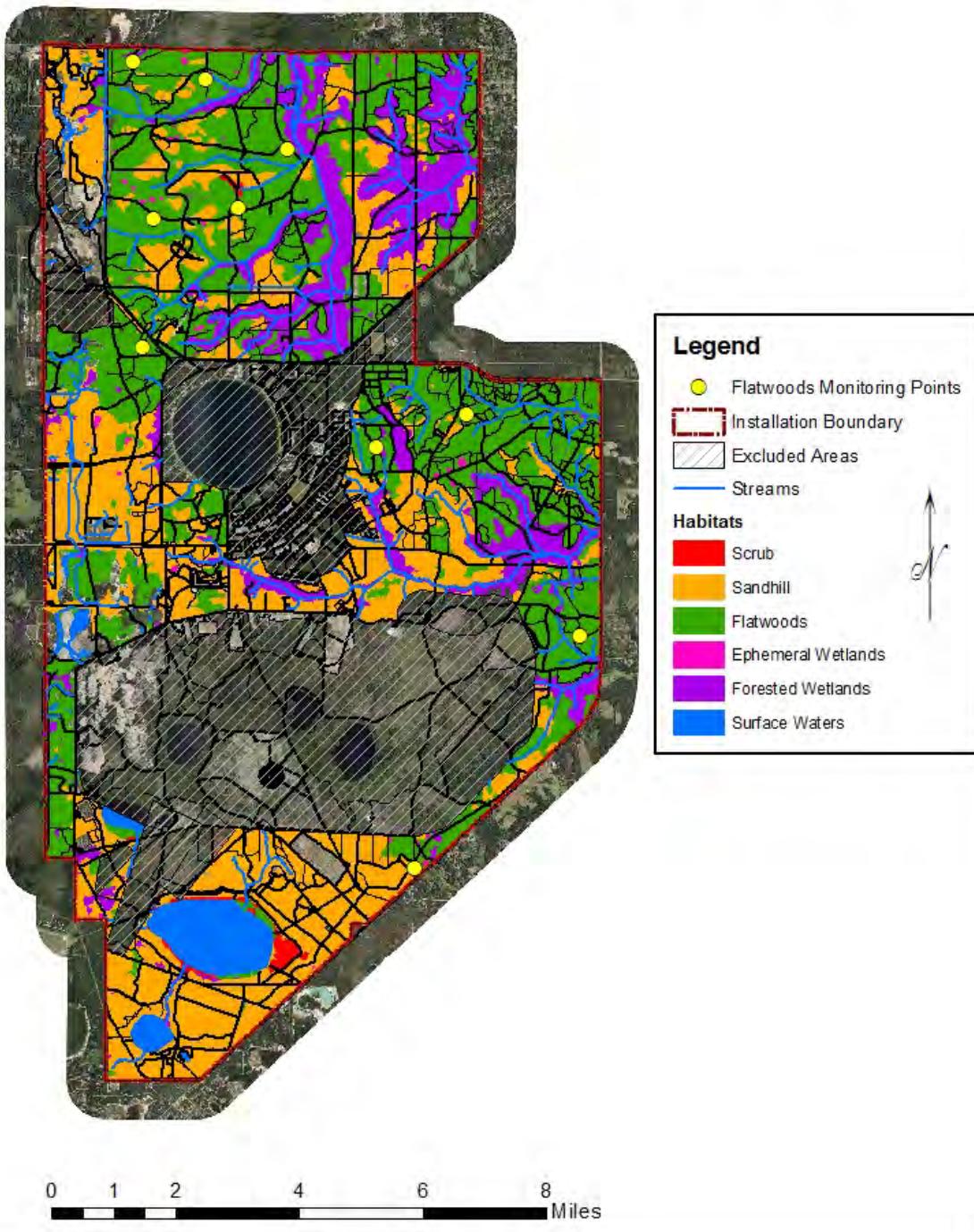


Figure 1. Monitoring locations for flatwoods (n=10).

Camp Blanding Joint Training Center
Sandhill Habitat Monitoring Locations for
Candidate Conservation Agreement with Assurances

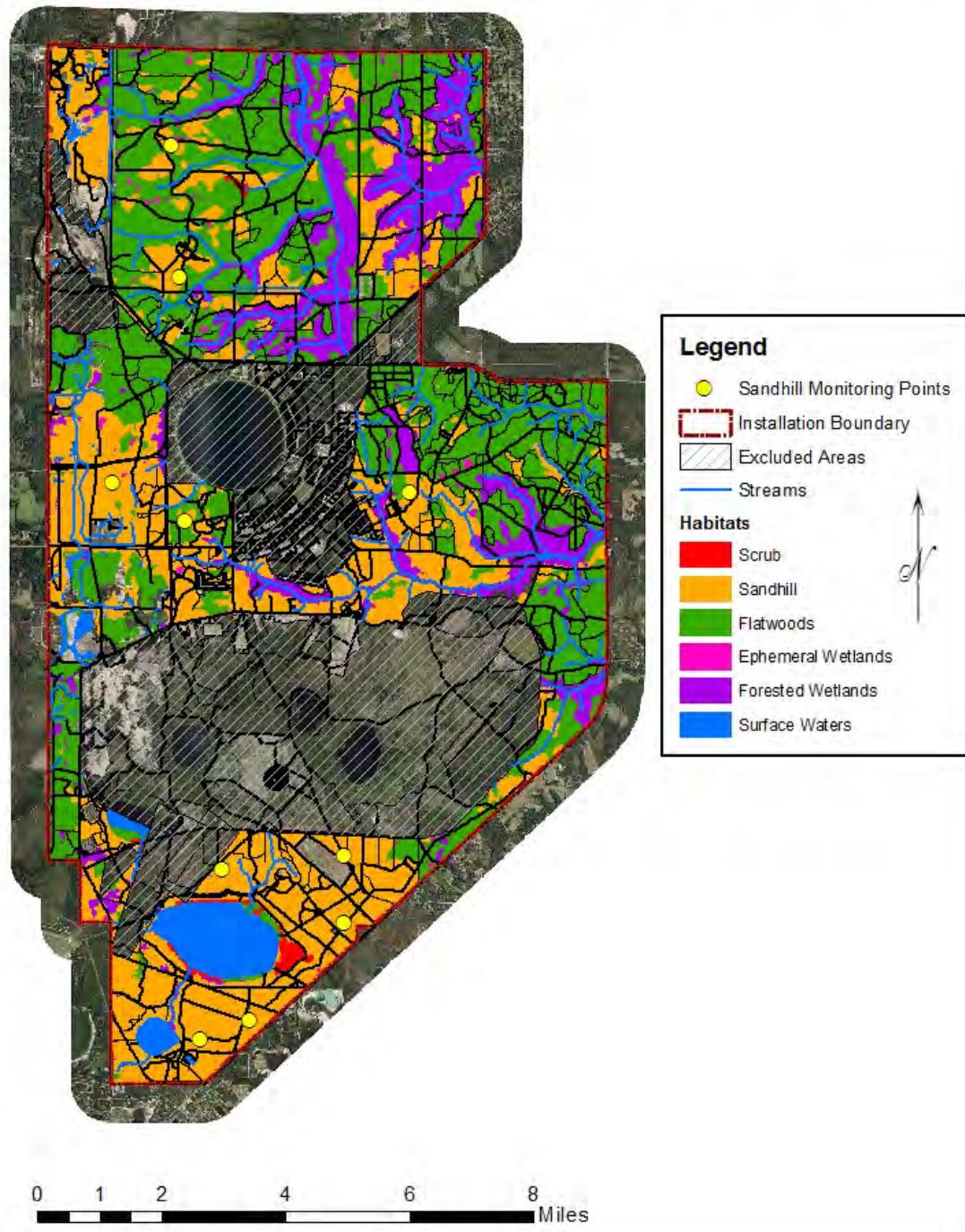


Figure 2. Monitoring locations for sandhill (n=10).

Camp Blanding Joint Training Center
Scrub Habitat Monitoring Locations for
Candidate Conservation Agreement with Assurances

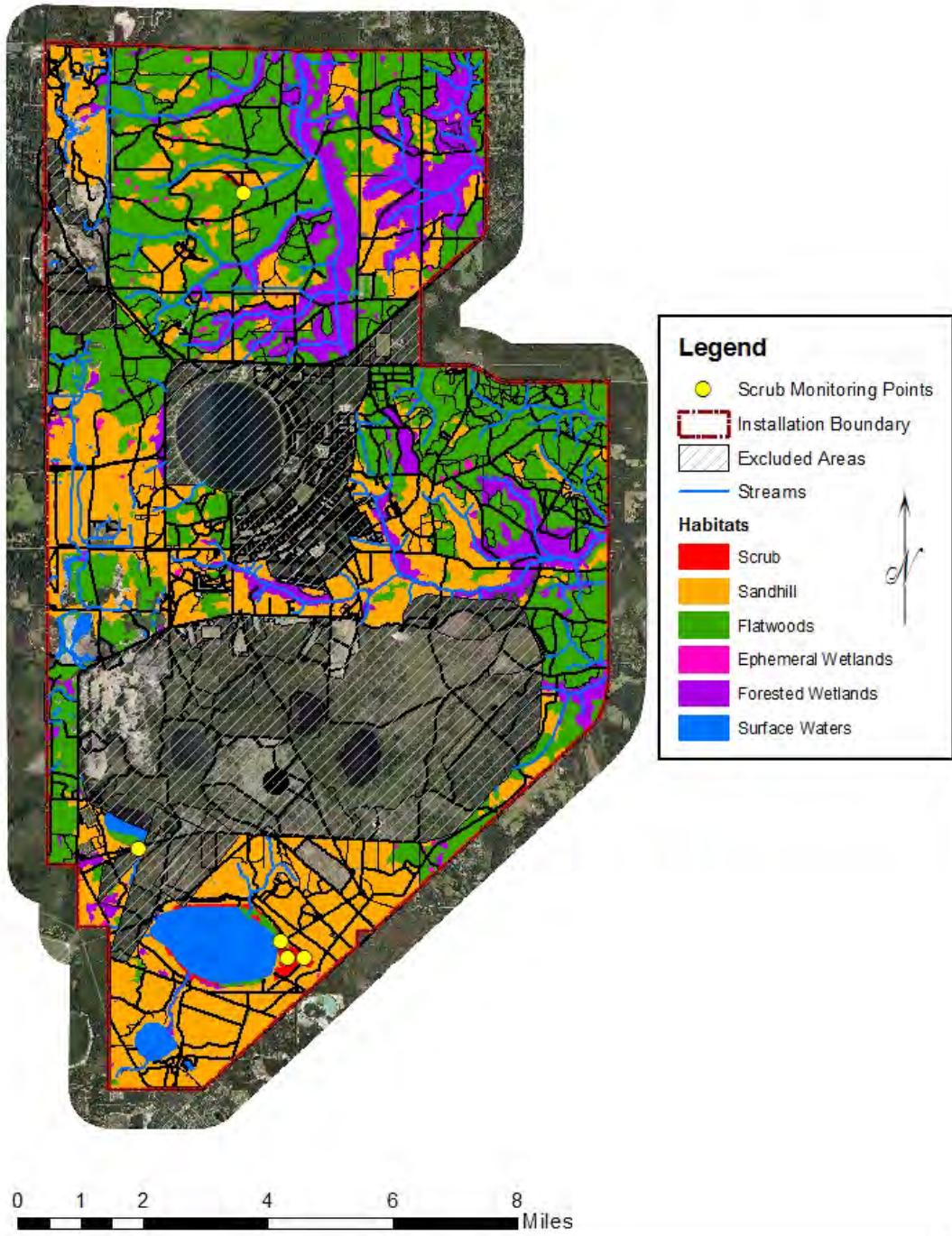


Figure 3. Monitoring locations for scrub (n=5).

Camp Blanding Joint Training Center
Ephemeral Wetlands Habitat Monitoring Locations for
Candidate Conservation Agreement with Assurances

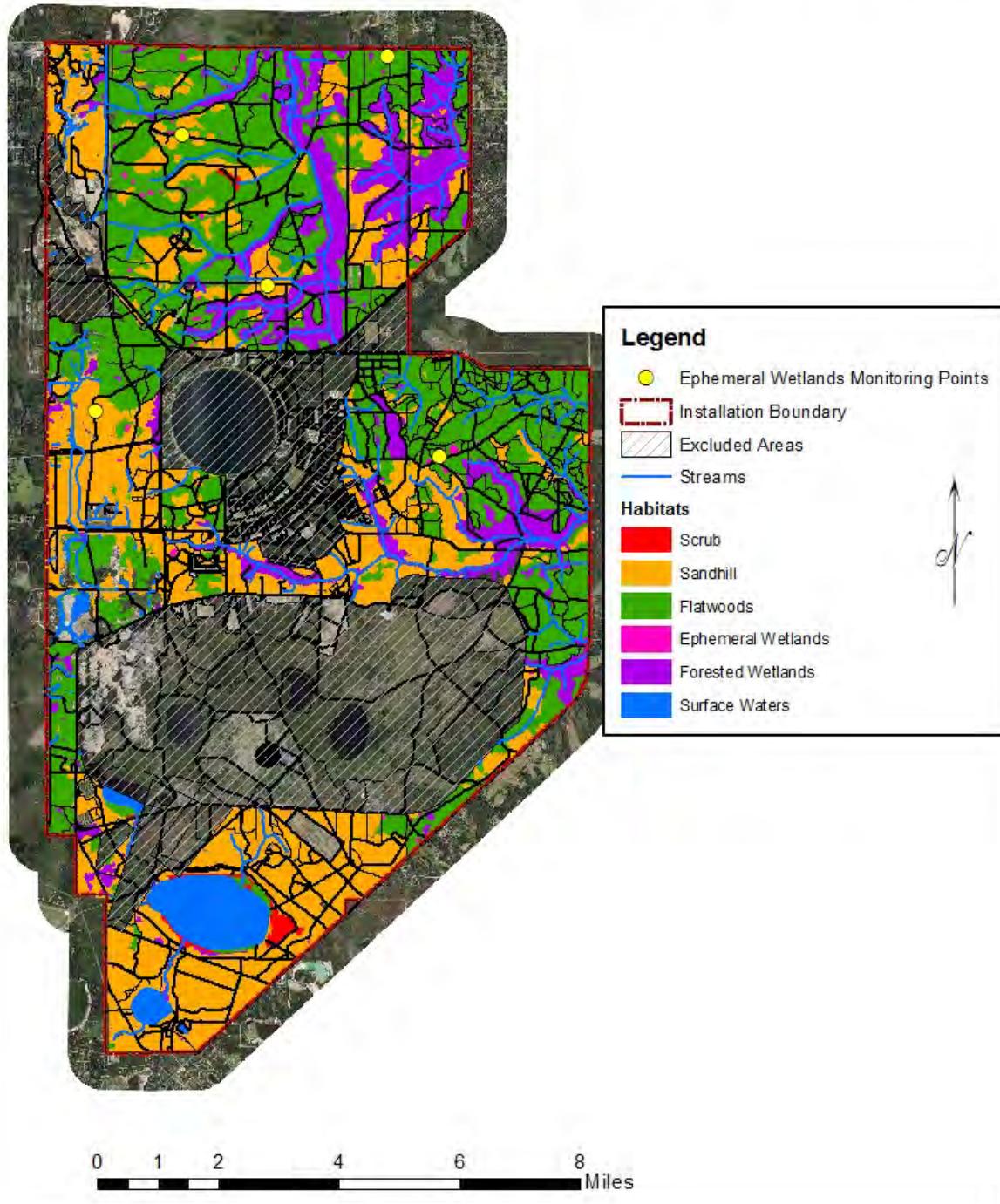


Figure 4. Monitoring locations for ephemeral wetlands (n=5).

Camp Blanding Joint Training Center
Forested Wetlands Habitat Monitoring Locations for
Candidate Conservation Agreement with Assurances

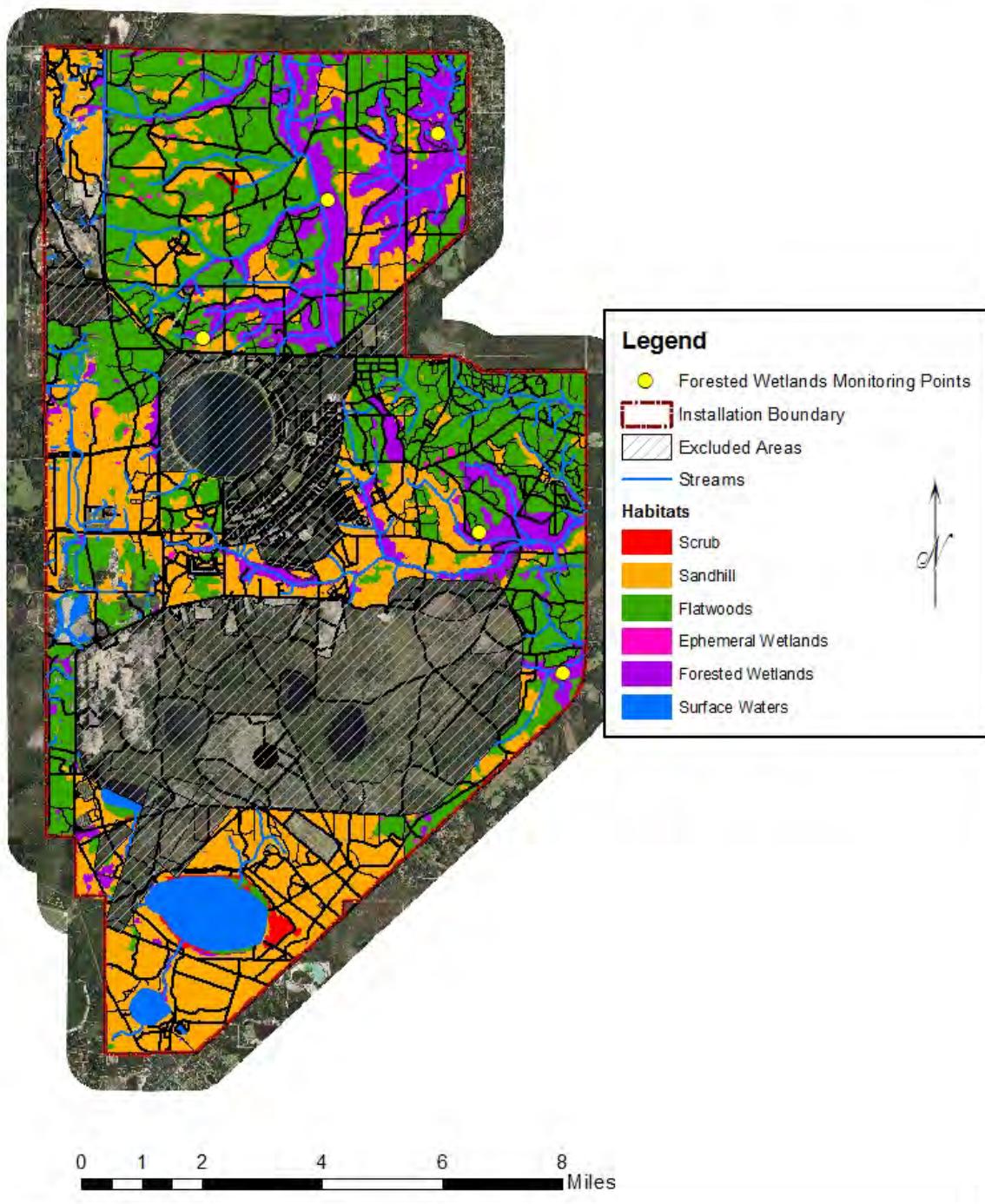


Figure 5. Monitoring locations for forested wetlands (n=5).

Camp Blanding Joint Training Center
Streams Habitat Monitoring Locations for
Candidate Conservation Agreement with Assurances

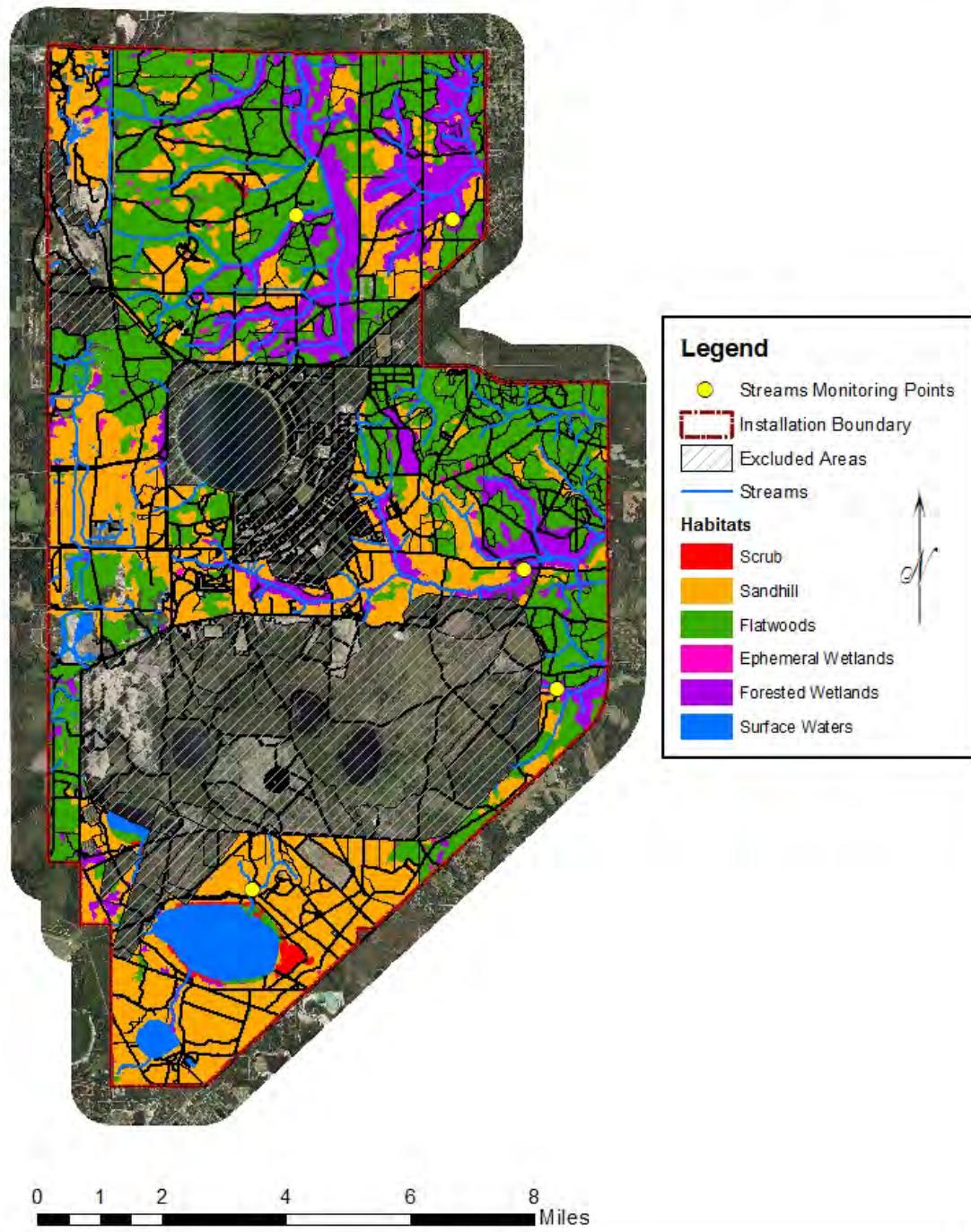


Figure 6. Monitoring locations for streams (n=5).

Camp Blanding Joint Training Center
Lakes/Ponds Habitat Monitoring Locations for
Candidate Conservation Agreement with Assurances

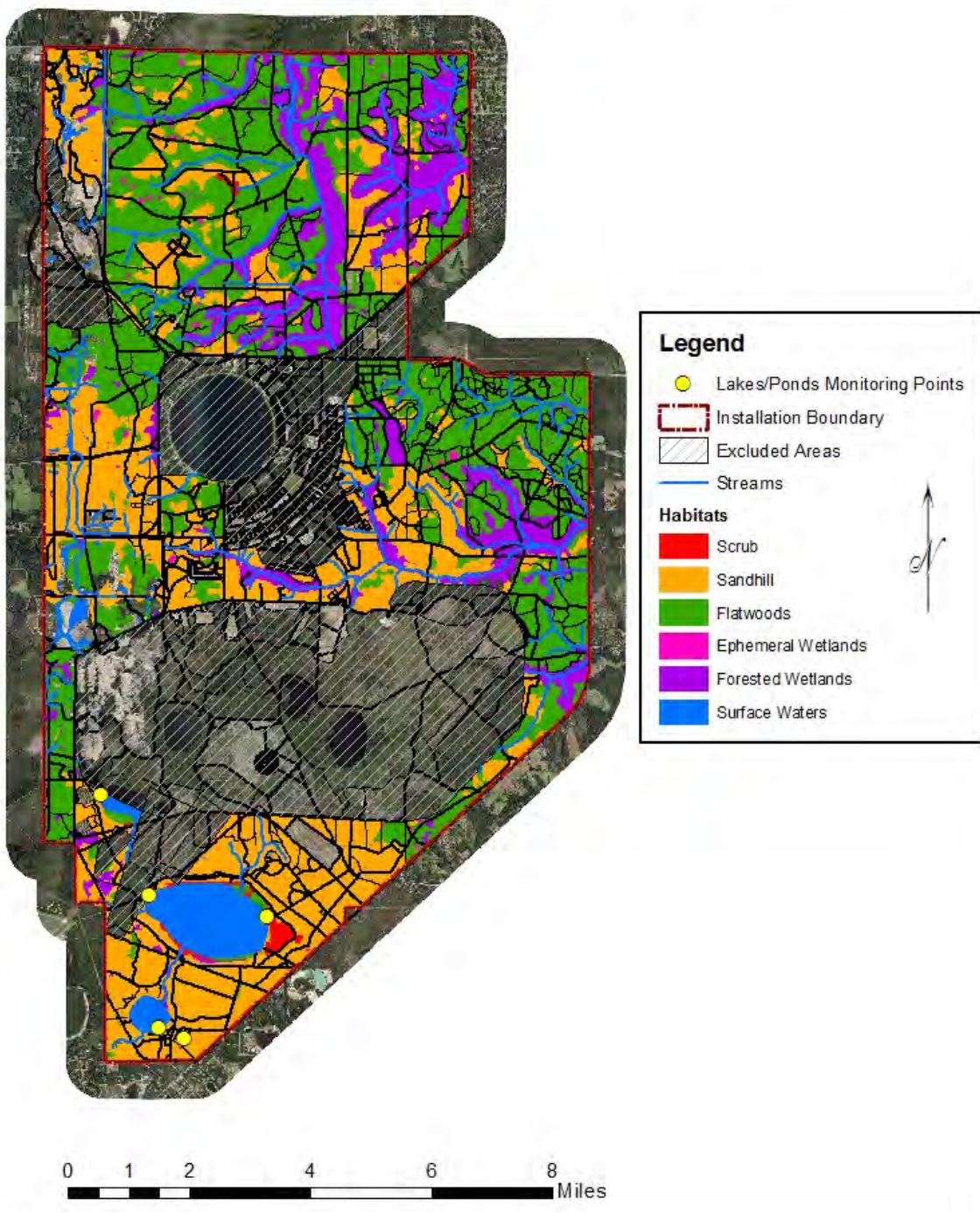


Figure 7. Monitoring locations for lakes/ponds (n=5).

Camp Blanding Joint Training Center
Black Creek Crayfish Monitoring Locations for
Candidate Conservation Agreement with Assurances

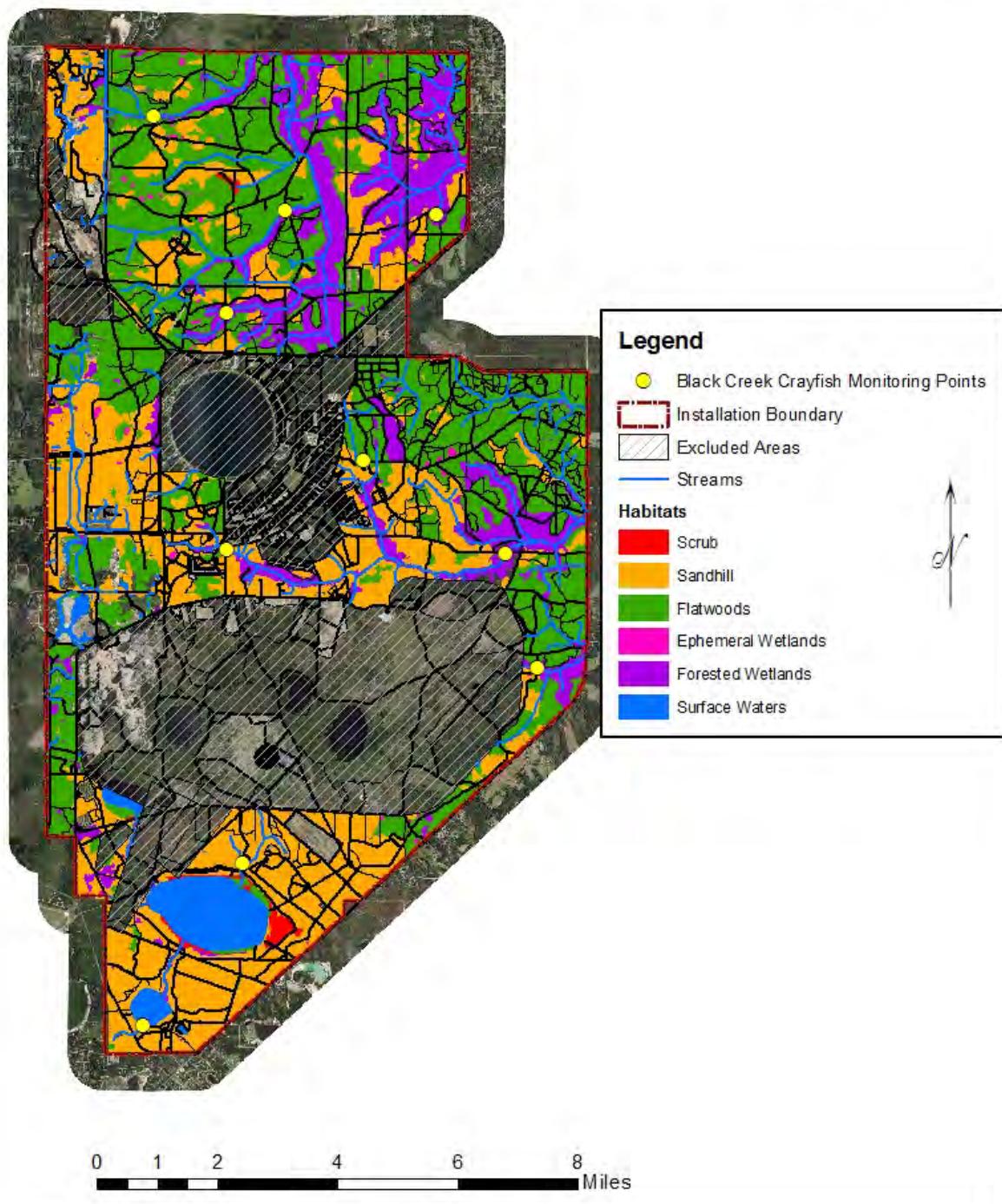


Figure 8. Monitoring locations for Black Creek crayfish surveys (n=10).