Appendix D
Guidelines for Species Survey, Monitoring and Protection Measures

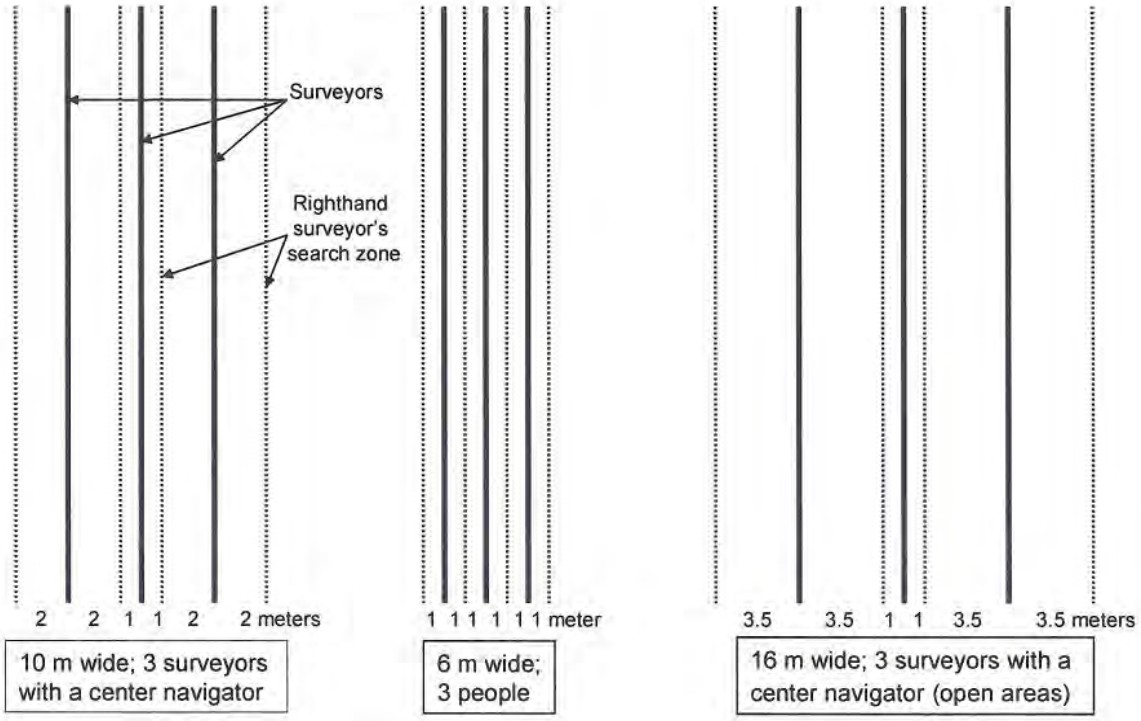

Fig 5. Diagrams of strip transects for various vegetation densities showing projected paths of surveyors (dark lines) and their search zones (dashed lines), with search-zone widths at bottom.

Wildlife Management Area	Gopher Tortoise ID (GT ID)	Management Unit ID (MU ID)	MU Acres	GT potential habitat acres within MU	Density Category *	Quality of Habitat**
Moody Branch	1		34	32		
Moody Branch	2		43	26		
Moody Branch	3		3	1		
Moody Branch	5		17	14		
Moody Branch	7		52	35		
Moody Branch	9		66	21		
Moody Branch	10		37	26		
Moody Branch	12		32	29		
Moody Branch	13		46	1		
Moody Branch	14		85	45		
Moody Branch	15		91	19		

* Density Categories	
Low	< 0.5 tortoise (1 burrow) per acre
Medium	0.5 - 1.0 tortoise (1-2 burrows) per acre
High	> 1 tortoise (2 burrows) per acre
** Quality of Habitat	
Low	Canopy cover > 80%; Herb cover < 25%
Medium	Canopy cover 50 - 80%; Herb cover 25 - 50%
High	Canopy cover < 50%; Herb cover > 50%

MU - Management Unit Identification as defined by the WMA manager

GT - Gopher Tortoise Identification used to develop data for this project only

GT acres label indicates the available acreage for potential Gopher Tortoise habitat within each management unit in the WMA. This is the analysis results from combining 3 layers: SSURGO soils, FWRI Potential Gopher Tortoise Habitat and FNAI Natural Communities.

Fig. 4. Spreadsheet that will accompany the second map, including 2 blank columns to be filled in by the manager giving gopher tortoise density and habitat quality in low, medium, and high categories (as defined).

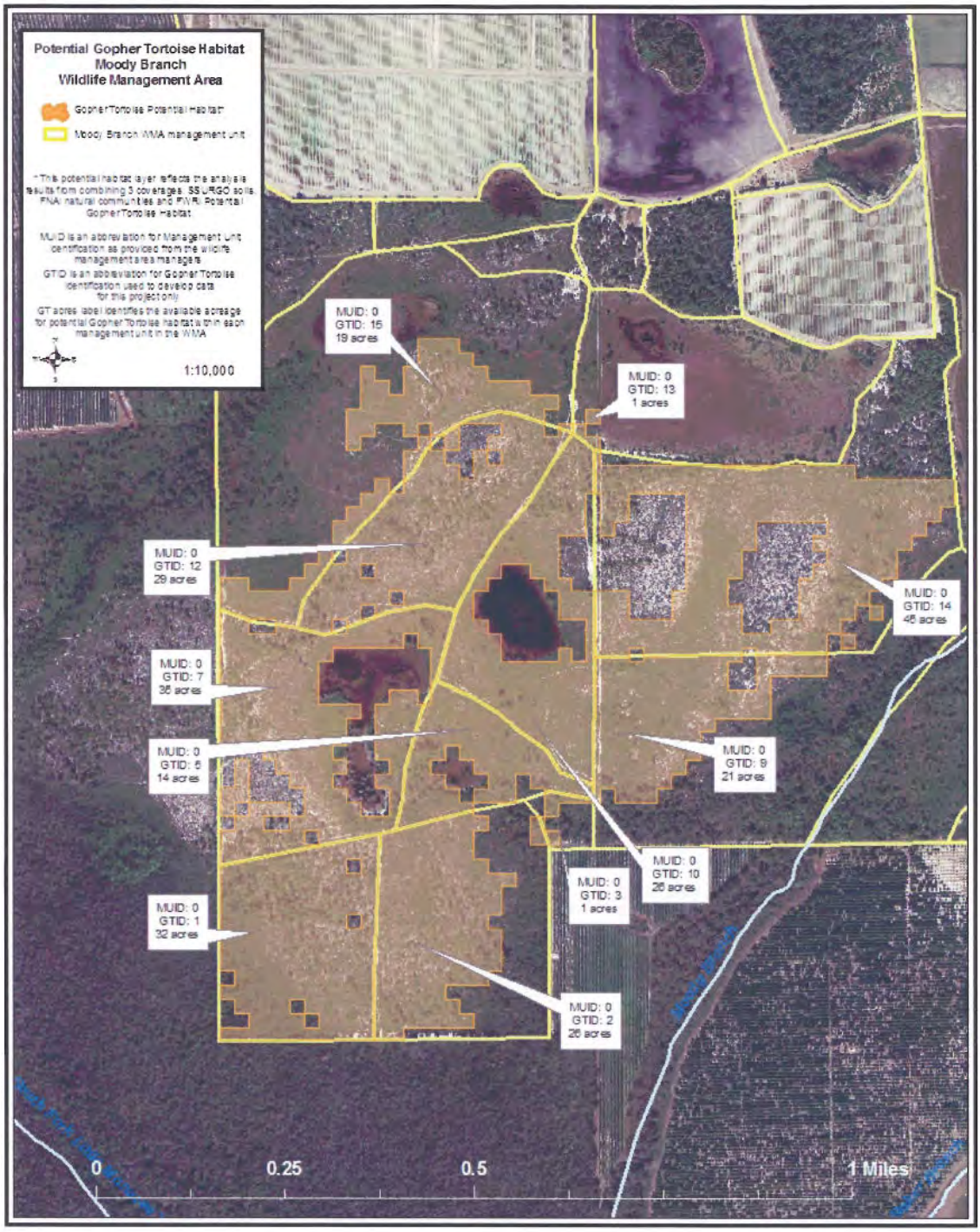

Fig. 3. Second map of a WMA showing potential high-quality gopher tortoise habitat filled in, plus acreages of tortoise habitat per management unit.

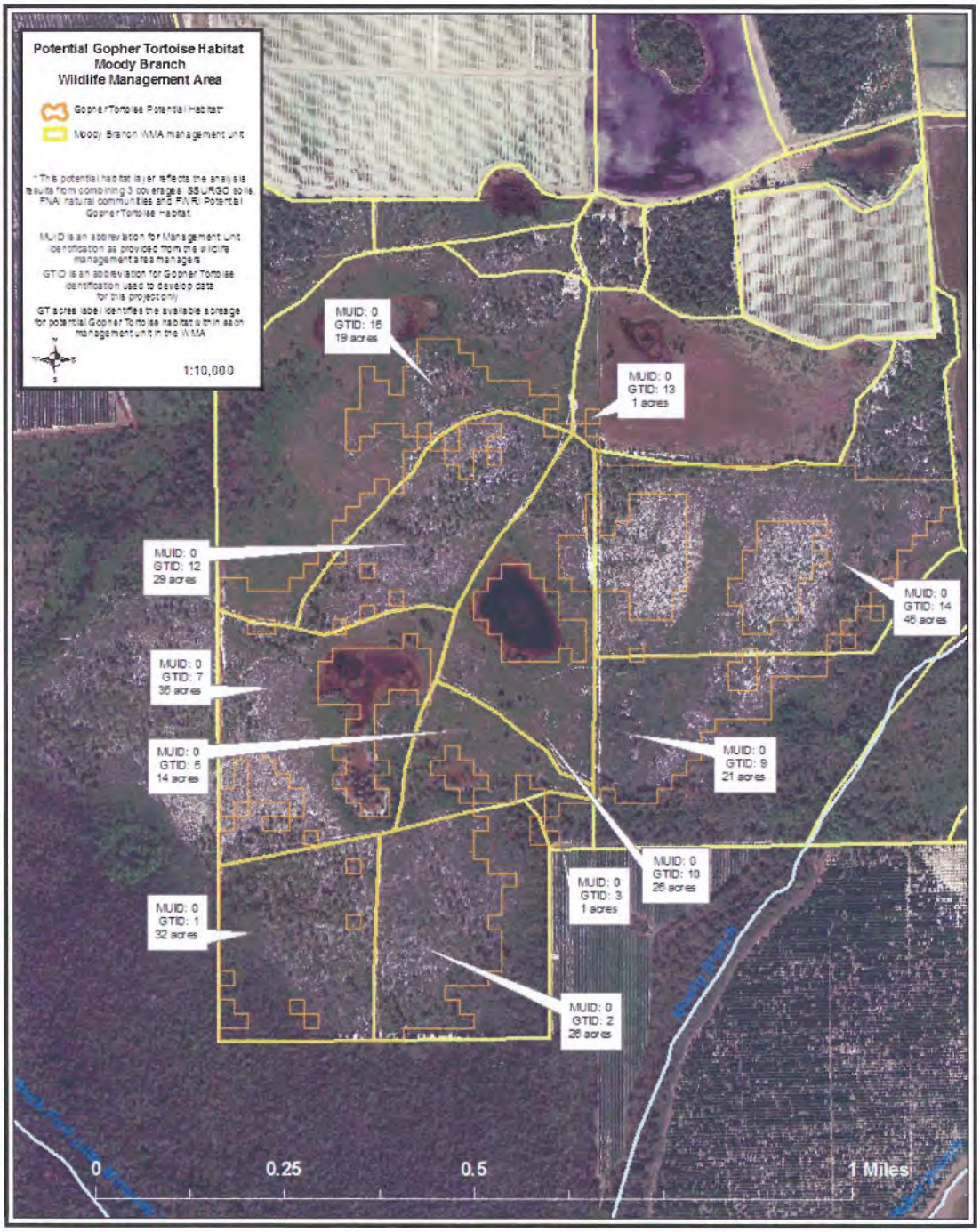

Fig. 2. First map of a representative WMA showing potential high-quality gopher tortoise habitat outlined in gold, plus acreages of tortoise habitat per management unit.

Fig. 1. Photographs of active gopher tortoise burrows.

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- Habitat Patch Size and Percent Surveyed

  We set 50 ac as the minimum size of patches for surveys, because Cox *et al.* (1987) considered 25–50 ac (10–20 ha) of appropriate habitat to be the minimum area required to maintain a population of 40–50 tortoises for several decades. Cox *et al.* (1987) recommended that at least 15% of the appropriate tortoise habitat on a site be surveyed in order to estimate population density. This 15% figure is also used on surveys of FWC mitigation parks, and it is what FWC recommends environmental consultants use to estimate tortoise densities.

- Burrow to Tortoise Conversion Factor

  We are assuming a burrow occupancy rate of 50%, or 2 burrows per tortoise, as recommended by Ashton and Ashton (*in press*). For a 6-m-wide transect, which is recommended for use in dense vegetation, the factor to divide by is 0.75. For the standard 10-m-wide transect, the factor to divide by is 1.25, and it is 2.0 for a 16-m-wide transect suitable for use in open habitat.

- Survey Season

  Burrow surveys are typically conducted during the tortoise activity season, which is typically mid-March or April through October in northern Florida (Cox *et al.* 1987, Ashton and Ashton *in press*). In southern Florida, surveys can be conducted whenever daytime temperatures exceed 70°F (21°C) for several consecutive days (Cox *et al.* 1987).

- Transects should be situated throughout the habitat patch in approximate proportion to the coverage of various habitat types or vegetative associations.

- At least 15% of the area or habitat patch should be surveyed; therefore, 7.5 ac of a 50-ac patch should be surveyed, which is equivalent to 12 strip transects that are 10 m wide, 20 transects that are 6 m wide, or ca. 8 transects that are 16 m wide.

- In long patches of contiguous habitat, multiple transects can be run end-to-end.

- Surveys need to be conducted during the tortoise activity season, which is typically April–October in northern Florida, but surveys can be started in March in southern Florida.

- Surveys should not be conducted within 2 days of rain in order to allow accurate determination of burrow activity; rain will eliminate tortoise sign and may wash debris into the burrow opening.

- Tortoise Density per Acre = Total No. Burrows ÷ Total No. Transects ÷ 1.25 (for 10-m-wide transects)

- Tortoise Density per Acre = Total No. Burrows ÷ Total No. Transects ÷ 0.75 (for 6-m-wide transects)

Justification for Recommended Protocol

- Transect Dimensions and Number of Surveyors

  Lohoefener and Lohmeier (1984) determined that optimal strip widths for detecting ≥ 98% of large burrows (≥ 20 cm wide) should be 3.2–12.8 m (10.5–42 ft), depending upon vegetation density. Several researchers have recommended strip transects 7 m (23 ft) x 150 m (492 ft) (Auffenberg and Franz 1982; McCoy and Mushinsky 1991, 1995; McCoy *et al.* 2002). Auffenberg and Franz (1982) did not specify the number of surveyors, but the other authors used 3 surveyors walking abreast. Ashton and Ashton (*in press*) recommend using 3 persons to survey transects ca. 6 m (19.6 ft) wide, and increasing transect width up to 10 m in very open habitats. Enge and Douglas (2000) typically used 3 persons to survey 10-m-wide transects of variable lengths. Cox et al. (1987) recommended 20 m x 250 m transects but did not specify the number of surveyors; transects were established randomly and the centerline flagged before conducting surveys. The survey method used on FWC mitigation parks uses the same transect dimensions as Cox *et al.* (1987), but the centerlines are not established prior to surveys, so the transects are only run once. For this ground truthing phase, we do not believe that reliable burrow estimates would be obtained using a single person to survey transects 10–20 m wide. We recommend using 3 persons to survey 10-m-wide transects, adjusting transect widths in response to vegetation density. After training, Ashton and Ashton (*in press*) claim that using 3 persons is > 4 times as efficient as 1 person and 3 times as efficient as 2 persons.

- A disjunct section of the property apparently has low tortoise densities.
- Restored areas that provide good tortoise habitat, but source populations are too far away for natural reestablishment.

Survey Methodology

- Use strip transects 10 m wide x 250 m long (= 0.62 ac in area), unless the vegetation is very dense or very open.
- The transect width should be adjusted according to vegetation density, which affects burrow visibility; in very open habitats (*e.g.,* pastures), the transect width can be increased to 16 m (= 1 ac in area), but in areas with lots of obstructing vegetation (*e.g.,* dense palmettos, oak scrub), the transect width should be reduced to 6 m (= 0.37 ac in area).
- The transect length can be measured while surveying using a hipchain or GPS unit.
- Use 3 surveyors per strip transect, with the most qualified person walking the centerline and serving as the navigator and data recorder; this person is also responsible for finding burrows within 1 m (3.3 ft) of the centerline.
- For a standard 10-m-wide strip transect, the 2 flanking surveyors should walk abreast of the center person and ca. 3 m (10 ft) away; these flankers are responsible for finding burrows 1–5 m from the centerline and reporting them to the center person to record (Fig. 5).
- For a 6-m-wide strip transect, the 2 flanking surveyors should walk 2 m from the center person and survey for burrows 1–3 m from the centerline; for a 16-m-wide strip transect; the flankers should walk ca. 3.5 m (12 ft) from the center person and survey for burrows 1–8 m from the centerline (Fig. 5),
- Burrows near the margins of the strip transect can be determined as "on transect" by measuring with a tape or by using a 5-m-long string held by the center person.
- Burrows should be classified as "Active" or "Inactive," which are defined as:

  Active = burrow entrance and apron clear of debris and rooted vegetation; fresh tortoise sign is present in the form of flattened scrape-marks from the plastron, footprints, scat, or dirt recently displaced by digging.

  Inactive = no evidence of recent tortoise activity (see definition above); the burrow may be dilapidated, but it is still clearly a half-moon shape (not circular) with a mostly intact roof; rooted vegetation should be absent within 10 cm of the burrow mouth; the burrow floor may be rutted by erosion; leaves and debris may have washed or blown into the opening, and there may be signs of mammal intrusion (Fig. 6).

- Tortoise Density Categories

  Based upon surveys of mitigation park lands, which are managed for tortoises and are on good sites, the mean density is ca. 1.2 tortoises/acre (range 0.5–1.8/acre); therefore, a low tortoise density is considered to be < 0.4 tortoises/acre, a medium density is 0.4–0.8 tortoises per acre, and a high density is > 0.8 tortoises per acre. These densities for good habitat are low compared to other studies. For example, Cox *et al.* (1987) compiled density estimates from 32 sites in various habitats in Florida and Georgia; they found a mean density of 2.7 tortoises per acre, ranging from 0.2 to 8.3 tortoises per acre. However, the wide transect width used on mitigation park lands probably results in missed burrows, reducing the estimated tortoise densities. We used a correction factor that was 20% (0.5 vs. 0.614) lower than that used on mitigation parks, but we included abandoned burrows in our calculations, which would increase the density estimates. To compensate for the inclusion of abandoned burrows and the possible underestimation of actual tortoise densities on mitigation parks, we selected slightly higher cutoffs for tortoise densities (0.5 and 1.0 instead of 0.4 and 0.8).

- Survey Season

  Burrow surveys are typically conducted during the tortoise activity season, which is typically April–October (Ashton and Ashton *in press*), although it is extended in southern Florida. However, we are not interested in classifying burrow status, so surveys can be conducted any time of the year, including winter. Tuberville and Dorcas (2001) assumed that burrow detectability was higher when vegetation was dormant, and burrow detectability is increased on burned areas (Diemer 1992, Smith 1992, Mann 1993, Moler and Berish 2001). Because most prescribed burning still occurs during the dormant season, this would be an ideal time to conduct burrow surveys.

INTENSIVE SURVEYS TO CONFIRM ROUGH DENSITY ASSESSMENTS

A "Restock Review Team" will decide which FWC lands identified as having low tortoise densities are potential restocking sites and need to be ground truthed. This decision depends upon many factors that will not be addressed here. These more intensive surveys should be conducted by trained personnel to ensure data quality.

RECOMMENDED PROTOCOL FOR CONFIRMING DENSITIES

Criteria for Inclusion for Ground Truthing

- Isolated, low-density (< 0.5 tortoises/acre) habitat patch without nearby (≤ 1000 m) higher density patches that would provide potential sources of recruitment via immigration.

- Entire property is suspected of having low tortoise densities based on initial assessment.

person runs a strip transect 20 m wide x 250 m long, with each strip transect sampling an area of 0.5 ha (ca. 1.2 ac). These strip-transect dimensions were recommended by Cox et al. (1987), but most researchers recommend using transect widths of only 6–10 m. Most studies have a single person walking the centerline of strip transects, but some studies recommended using 3 persons walking abreast (McCoy and Mushinsky 1991, Ashton and Ashton *in press*). Transect lengths may be of set lengths, such as 150 m (Auffenberg and Franz 1982) or 250 m (Cox *et al.* 1987, Burke and Cox 1988, Ashton and Ashton *in press*), or of variable lengths (Lohoefener and Lohmeier 1984; McCoy and Mushinsky 1991, 1992*a*). To simplify calculations of tortoise densities per acre, we recommended using strip transects with an area of 1 acre, and we modified the strip-transect dimensions used to survey mitigation park lands by reducing the width by 4 m instead of decreasing the length by 50 m. This transect width of 16 m is still wider than that recommended by most researchers, and some burrows will not be detected, but this step in the process is intended to only be a rough assessment that will later be ground truthed. A good review of gopher tortoise population estimation techniques is provided by Carthy *et al.* (2005).

- Habitat Patch Size

  We set 50 ac as the minimum size of patches for surveys because Cox *et al.* (1987) considered 25–50 ac (10–20 ha) of appropriate habitat to be the minimum area required to maintain a population of 40–50 tortoises for several decades. McCoy and Mushinsky (pers. comm.) suggest that long-term viability of a tortoise population may require ca. 250 ac (100 ha) of habitat.

- Burrow to Tortoise Conversion Factor

  Mitigation park surveys use the burrow conversion factor of 0.614 recommended by Auffenberg and Franz (1982), which means that 61.4% of all active and inactive burrows are assumed to be occupied, and abandoned burrows are assumed to be vacant. The 0.614 conversion factor tends to overestimate abundance (McCoy and Mushinsky 1992*b*, Moler and Berish 2001). Appropriate conversion factors vary among habitats, sites, seasons, and years (Burke and Cox 1988, Burke 1989, Breininger *et al.* 1991, McCoy and Mushinsky 1992*b*, Moler and Berish 2001). After extensive surveys in various habitats throughout Florida, Ashton and Ashton (*in press*) found an overall occupancy rate of 50% (*i.e.,* 2 burrows per tortoise) for active, inactive, and abandoned burrows combined. Auffenberg and Franz (1982) defined an "old" burrow as one in which the mouth has been washed in or covered with debris, and this definition has been adopted by many researchers, who typically call this type of burrow "abandoned." However, these "abandoned" burrows can be occupied by tortoises, typically juveniles or subadults (Witz *et al.* 1991; Ashton and Ashton 2001, *in press*), and distinguishing between abandoned and inactive burrows is notoriously difficult. Five tortoise experts examined the same 95 burrows, and their estimates of the number of burrows that should be classified as abandoned ranged from 10.5 to 48% (Smith *et al.* 2005). We opted to use the simple conversion factor of 1 tortoise for every 2 identifiable tortoise burrows.

- A single person walks the centerline of the transect, using a compass or GPS unit to navigate, and records all burrows observed within 8 m (26 ft) on either side of the centerline.

- The surveyor should only leave the centerline to determine whether something suspicious looking is actually a burrow, or to confirm whether a burrow is within 8 m of the centerline, which can be done by pacing the distance.

- If a hipchain is not used, the centerline needs to be marked (*e.g.*, by flagging or leaving the clipboard) whenever the surveyor leaves it.

- At least 5% of the area of a habitat patch should be surveyed; therefore, 2.5 ac of a 50-ac patch will need to be surveyed, which requires 2.5 transects (should be rounded up to 3 transects).

- To save time, a transect can be run in one direction for 250 m, and another transect run in the opposite direction back to the starting point, as long as the centerlines of adjacent transects are separated by $\geq$ 20 m (65 ft) to ensure that their strips do not overlap.

- In long patches of contiguous habitat, multiple transects can be run end-to-end (*e.g.*, 500- or 750-m-long transects).

- A team of up to 3 persons can survey simultaneously, with the center surveyor being the navigator and walking slightly in front of the flanking surveyors; each person is responsible for surveying a 16-m-wide strip, and the centerlines of all transects should be separated by $\geq$ 20 m to avoid overlap.

- In areas with dense palmettos or similar obstructing vegetation, burrow detectability is significantly decreased; in these cases, the strip-transect width should be decreased from 16 m to 8 m, and the transect length should be increased from 250 to 500 m.

- Once 2 transects in a habitat patch are found to have > 2 burrows (the equivalent of > 1 tortoise/acre), the survey can be discontinued in that patch, because the objective is to identify areas with low tortoise densities.

- Surveys can be conducted at any time of the year, preferably after burns when burrow are easier to detect.

- Tortoise Density per Acre = Total No. Burrows ÷ No. Transects ÷ 2

<u>Justification for Recommended Protocol</u>

- Transect Dimensions

  This methodology is based primarily upon that used to survey tortoises on FWC mitigation park lands, with slight modifications. For mitigation park surveys, 1

considered for restocking, but large-acreage former cattle leases where tortoises were eliminated should be considered for restocking.

RECOMMENDED PROTOCOL FOR ASSESSING POPULATION DENSITIES

The objective is to assign a density category (low, medium, or high) to each large patch of potential tortoise habitat or MU. The recommended survey protocol is considered to represent the minimum effort required to yield reasonably accurate density estimates. This phase of the process is intended to be only a rough assessment; areas identified as having low densities will later be resurveyed more intensively for confirmation. Before going in the field, the map of potential habitat should be examined, and habitat patches for possible survey efforts should be determined. If field visits determine that these habitat patches provide unsuitable habitat for good tortoise densities, they do not have to be surveyed.

Criteria for Inclusion of a Habitat Patch for Surveying

- Patch should be $\geq$ 50 ac (20 ha) in size, but it does not have to be confined to only 1 MU.
- Patch must contain a suitable habitat type (*e.g.*, sandhill, oak scrub, xeric hammock, upland pine forest, mixed pine-hardwood forest, scrubby flatwoods, mesic flatwoods, dry prairie, coastal strand, pasture, old field, abandoned citrus grove).
- Water table should be $\geq$ 12 inches (30 cm) below the surface.
- Patch must contain good-quality habitat; if the habitat is fire suppressed or has too dense a canopy and no forage for tortoises, there is no need survey it because present conditions will not support additional tortoises (this may change after habitat restoration activities).

Survey Methodology

- Survey unnecessary if manager already knows that a habitat patch or portions of his area have high tortoise densities (> 2 burrows per acre).
- Transect placement should be determined by consulting the habitat map; transects should bisect "solid" areas of tortoise habitat, avoid wetlands, and not run parallel and adjacent to roads, which often have higher tortoise densities; if feasible, transects should intersect instead of parallel topographic contours.
- Use strip (*i.e.*, belt) transects 16 m (52.5 ft) wide x 250 m (820 ft) long (= 1 acre in area).
- The transect length can be measured while surveying using a hipchain or global positioning system (GPS) unit.

Initial Rough Assessment of Tortoise Densities

The initial step in identifying potential lands for restocking is to get the area manager's opinion on present tortoise densities. The density categories are:

- Low = < 0.5 tortoise (1 burrow) per acre
- Medium = 0.5–1.0 tortoise (1–2 burrows) per acre
- High = > 1 tortoise (2 burrows) per acre

We recommend counting all burrows that are identifiable as being dug by a gopher tortoise, and not recording burrow size classes or status categories, such as active, inactive, and abandoned. Unlike most tortoise surveys, we are lumping together all burrow categories, including abandoned. We are counting tortoise burrows with the following characteristics:

> *A "half moon" shaped hole in the ground with a flat bottom and arched roof, width approximately twice the height, and usually a mound of sand in front of the burrow entrance, although this mound may be absent in some vegetative or soil types* (Fig. 1). *The bottom of the burrow may be rutted by erosion, but the burrow should not be circular (often indicates an armadillo burrow) or very irregular in shape. Debris can occlude the burrow opening, but the roof should not be collapsed, and live or dead rooted vegetation should not be present at or near the base of the opening* (see Ashton and Ashton 2001).

Only areas with low tortoise densities and good habitat conditions will be initially considered as relocation sites, but areas with medium densities might be considered once areas with low densities have been restocked. Areas with high tortoise densities will never be augmented with relocated tortoises.

In some cases, an area manager might already have information on tortoise density or know that there are > 2 burrows per acre, indicating a high density. If tortoise densities are not known, a rough assessment of densities will need to be undertaken. The purpose of this rough assessment is to identify areas with apparently suitable tortoise habitat but low densities.

Map of Potential Tortoise Habitat

To assist in the rough assessment of tortoise densities, the manager will be provided with at least 2 maps of the area showing potential high-quality tortoise habitat, management unit (MU) boundaries, and acreage of potential habitat within each MU. More than 2 maps will be provided for larger WMA/WEAs with extensive potential tortoise habitat. The first map will have potential tortoise habitat outlined on a color aerial photograph (Fig. 2). For better clarity, a semi-transparent fill will be used to indicate potential tortoise habitat on the second map (Fig. 3), which will also have a spreadsheet listing each MU, the MU acres, the potential tortoise habitat acres, and boxes for the manager to fill in that qualify tortoise density and habitat quality based on defined categories of low, medium, and high (Fig. 4). Potential high-quality habitat was identified using GIS analysis of 2003 landcover and soil layers, which considered depth to the water table. Areas where the water table is within 12 inches (30 cm) of the surface will not normally support high tortoise densities and should not be

APPENDIX 7. Protocol for Assessing Gopher Tortoise Densities on FWC Lands Identified As Potential Restocking Sites

PROTOCOL FOR ASSESSING GOPHER TORTOISE DENSITIES ON FWC LANDS IDENTIFIED AS POTENTIAL RESTOCKING SITES

RATIONALE FOR PROPOSED RELOCATIONS ON FWC LANDS

The objective is to identify wildlife management (WMA) and environmental (WEA) areas where the Florida Fish and Wildlife Conservation Commission (FWC) has lead management responsibility that could serve as recipient sites for gopher tortoises from sites undergoing development. Because incidental take of tortoises during development is no longer considered an acceptable option, public and private lands need to be identified as recipient sites for displaced tortoises. The greatest need is to identify suitable lands south of State Road 50 and near areas undergoing rapid development in the peninsula.

Potential recipient sites must have suitable habitat in good condition that is presently deemed to be understocked with tortoises and will not be readily repopulated without human intervention. The reason(s) for deficient tortoise populations should be recognized or suspected (and no longer exist) before tortoises are stocked onto these lands. Reasons for low densities might include a past history of human harvest, disease die-offs, or unsuitable habitat (*e.g.,* dense pine plantation, fire-suppressed habitat) that has been restored to favorable conditions for tortoises.

This document proposes a protocol for identifying tortoise-deficient FWC lands for possible tortoise relocations. Some FWC lands contain too little tortoise habitat or marginal habitat; these lands do not need to be surveyed, because they are not candidates for restocking. Criteria and methodology for relocating tortoises and subsequent monitoring of their populations are beyond the scope of this document. A "Restock Review Team" will make recommendations on restocking locations and stocking rates, taking into consideration disease and genetic issues, and habitat type and condition. Conservation values should be associated with restocking efforts, such as augmenting a depleted tortoise population, benefiting commensal species, restoring a keystone species, or increasing the number of viable tortoise populations in the region. The juxtaposition of habitat patches with low tortoise densities across the landscape must be considered. Low-density patches should not be restocked if they can be naturally repopulated via immigration from higher density areas situated within 1 km; however, patches of sufficient size that are isolated by natural (*e.g.,* river, swamp) or manmade (*e.g.,* interstate highway, railroad track) barriers to movement, should be considered for restocking. Restocking should not occur on lands adjacent to Florida's best conservation lands that contain large areas of high-quality tortoise habitat (*i.e.,* heritage sites or assurance colonies).

A 3-pronged approach will be taken to identify potential recipient sites: 1) remote sensing to identify potential tortoise habitat, 2) initial rough assessment to identify areas with low tortoise densities in apparently good habitat, and 3) verification of low densities via more intensive surveys.

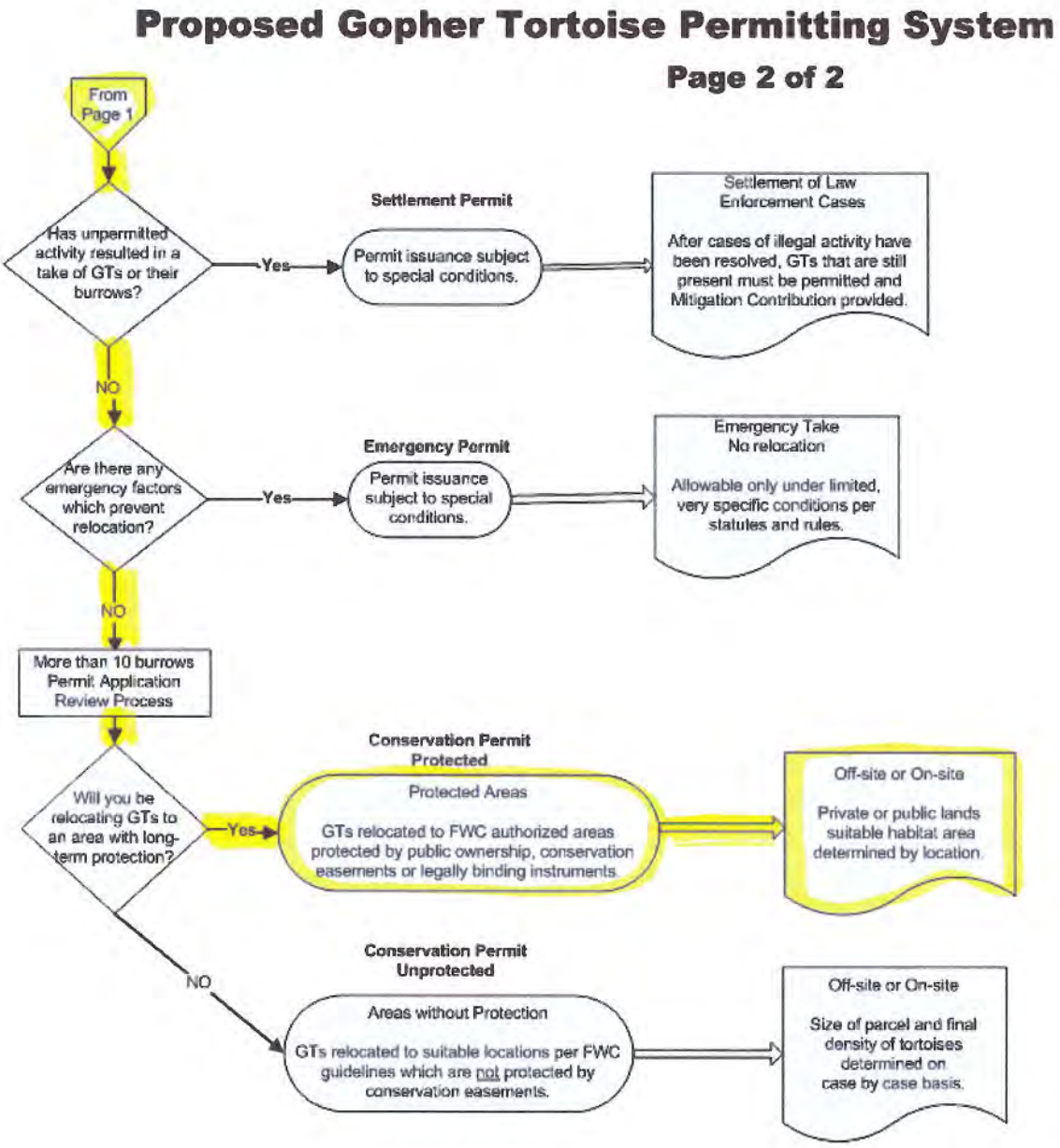

Figure 2. Proposed gopher tortoise permitting system process map.

Proposed Gopher Tortoise Permitting System

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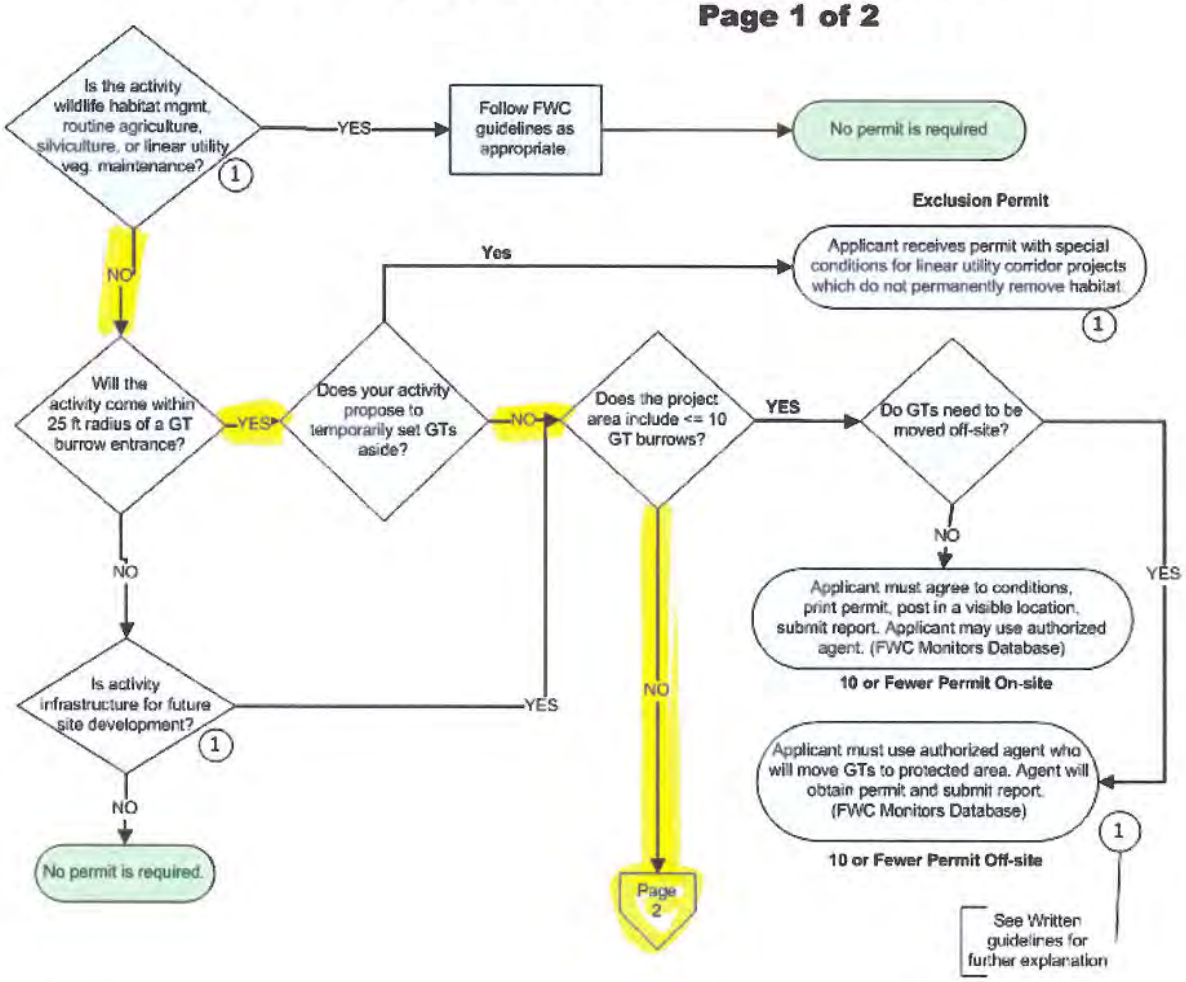
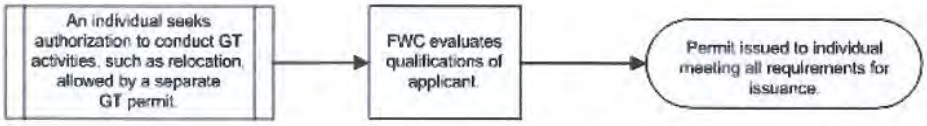
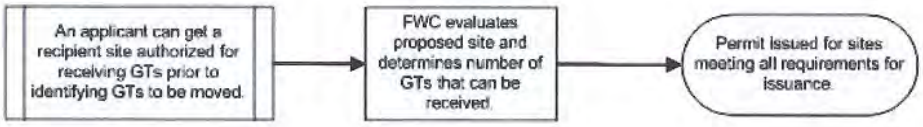


Certification Permits

Authorized Agent Permit



Recipient Area Process



7/19/2007

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average of 25,000 acres per year in public acquisition and an average of 16,000 acres per year within the private sector).

(3) Restock 60,000 gopher tortoises by 2022 (an average of 4,000 per year) to protected, managed, suitable habitats where they no longer occur or where densities are low.

(4) Decrease gopher tortoise mortality on lands proposed for development through a redesigned FWC gopher tortoise permitting system; responsible and humane relocation of 180,000 tortoises by 2022 (an average of 12,000 per year) to protected, managed, suitable sites where their future survival and long-term population viability are very likely; improved enforcement effectiveness; and expanded partnerships with local governments in all urbanizing counties by 2010.

The plan presents a suite of conservation actions that serve to achieve the measurable conservation objectives. These actions are best accomplished by applying an adaptive management approach that allows for easy adjustments to policies, guidelines, and techniques based on observed conservation benefits/detriments and sound science. The actions are organized into the following broad sections: proposed regulations, permitting, local government coordination, law enforcement, habitat preservation, habitat management, population management, disease management, incentives, monitoring, education and outreach, and future research.

Conservation and recovery of the gopher tortoise through the implementation of this plan will require the cooperation of local governments; regional, state, and federal agencies; non-governmental organizations; business interests; and the public. Although this plan was developed by FWC in collaboration with the stakeholders, it cannot be successfully implemented without significant direct involvement of these agencies and non-governmental organizations.

Public comment and outside review were formally solicited and incorporated at several junctures during the listing process and writing of this management plan. Public comment periods were noticed in the Florida Administrative Weekly to solicit: (1) information on the biological status of the gopher tortoise to be considered during the development of the final Biological Status Report (Enge *et al.* 2006a); (2) the conservation needs of the gopher tortoise and any economic or social factors that were considered during the initial writing of the draft management plan; and (3) public input on 2 drafts of the management plan. Public comments also were heard at the June 7, 2006 FWC Commission meeting, when the results of the biological status assessment were reported, and at the June 13, 2007 FWC Commission meeting during review of the revised management plan.

EXECUTIVE SUMMARY

This management plan provides the framework for conserving and managing the gopher tortoise (*Gopherus polyphemus*) in Florida and meets the requirements of Rule 68A-27.0012, F.A.C. The listing process was initiated in May 2002 when Florida Fish and Wildlife Conservation Commission (FWC) staff introduced a petition (Gruver 2002) to reclassify the gopher tortoise from a "species of special concern" (Rule 68A-27.005, F.A.C.) to a "threatened" species (Rule 68A-27.004, F.A.C.).

Following the guidance of FWC's listing process (Rule 68A-27.0012, F.A.C.), a 5-member biological review panel for the gopher tortoise was approved at the June 2005 Commission meeting. The status review found that the species meets Criterion A (population size reduction) for classification as a threatened species. In June 2006, the Commission determined that listing the gopher tortoise as a candidate for threatened designation was warranted and directed FWC staff to develop a species management plan based on the final Biological Status Report (Enge *et al.* 2006a).

The gopher tortoise is a moderate-sized, terrestrial turtle, averaging 23-28 cm (9-11 in) long. The species is identified by its stumpy, elephantine hind feet and flattened, shovel-like forelimbs adapted for digging. The shell is oblong and generally tan, brown, or gray. The gopher tortoise occurs in the southeastern Coastal Plain from southeastern South Carolina to extreme southeastern Louisiana (Auffenberg and Franz 1982). The gopher tortoise is endemic to the United States, and Florida represents the largest portion of the total global range of the species. Gopher tortoises remain widely distributed in Florida, occurring in parts of all 67 counties. The burrows of the tortoise also provide refuge for 350-400 other species, including 4 listed burrow commensals.

The current cause of imperilment of the gopher tortoise, as identified by the final Biological Status Report (Enge *et al.* 2006a), is the rate of population decline, primarily due to habitat loss. Therefore, the overarching conservation goal of this management plan is to restore and maintain secure, viable populations of gopher tortoises throughout the species' current range in Florida by addressing habitat loss. The plan establishes a measurable conservation goal of decreasing the rate of population decline of the gopher tortoise so that, within 1 tortoise generation (31 years; Miller 2001), the rate of decline is less than the percentage decline which defines the current listing category (*i.e.*, < 50% over 3 generations to go from the threatened designation to species of special concern designation).

To accomplish this goal, the management plan establishes a series of measurable conservation objectives:

(1) Through applied habitat management, improve tortoise carrying capacity of all protected, potential habitat on both public and private lands supporting gopher tortoises by the year 2022.

(2) Increase protected, potential gopher tortoise habitat to 1,955,000 acres by the year 2022. This will require protection of an additional 615,000 acres of habitat (an

GOPHER TORTOISE MANAGEMENT PLAN TEAM

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Process Mapping:	David Arnold
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Charles Hardee

GOPHER TORTOISE MANAGEMENT PLAN

Gopherus polyphemus

September 2007

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
620 South Meridian Street
Tallahassee, FL 32399-1600

4. The contractor will be informed on the protection status of the eastern indigo snake and penalties that may be imposed if regulations are violated at the pre-construction meeting.
5. At the pre-construction meeting, the applicant will provide the contractor with a sufficient number of exhibits to be conspicuously posted at the construction site so that the information is available to all construction employees. In addition, FDOT shall provide sufficient number of copies of the brochure to be distributed to construction personnel.
6. The applicant or its representative will verify that the contractor has conspicuously posted the exhibit(s) prior to the construction.
7. During construction of the project, the applicant or its representative will periodically inspect the eastern indigo snake exhibit(s) posted at the project; and will immediately inform the contractor of any exhibit(s) which is (are) damaged/illegible or need(s) to be replaced.

Protection Measures during Construction for the Eastern Indigo Snake

The eastern indigo snake (*Drymarchon Corais Couperi*) could be present in the project study area. To minimize harm to this species, the applicant has committed to implement the following protection measures:

A. Provide eastern indigo snake educational information to employees prior to the initiation of any clearing or construction. An educational exhibit that has been approved by USFWS shall be posted conspicuously at a site accessible to all employees and a handout will be distributed to employees.

B. The Contractor shall post and distribute educational information to all its workers. The exhibit and brochure shall include photographs of the eastern indigo snake, information on life history and legal protection of the species in Florida, and how to avoid impacts to the species. This material shall be supplied to the contractor by the Construction Environmental Liaison at the pre-construction conference.

C. All construction activities shall cease if live indigo snakes are found within the project area. Work may resume after the snake or snakes are allowed to leave the area on their own.

D. Location of live sightings shall be reported to the Construction Environmental Liaison.

E. If a dead indigo snake is found on the project site, the snake shall be frozen as soon as possible and the Construction Environmental Liaison shall be notified immediately for further instructions.

EASTERN INDIGO SNAKE EDUCATION PLAN

It has been determined through coordination with USFWS that the eastern indigo snake (*Drymarchon Corais Couperil*) may be present in the project area. In an effort to reduce any potential harm to this species, the applicant has developed the following plan to educate the Contractor and its employees of the possible presence of the protected eastern indigo snake in the project area prior to and during construction.

1. The Contractor will be informed of the possible presence of the eastern indigo snake at the pre-construction meeting.

2. A description of the eastern indigo snake will be provided to the contractor along with information on the ecology of the species at the pre-construction meeting.

3. Color photographs of the eastern indigo snake will be posted and distributed at the pre-construction meeting.

The key end products of this procedure are: (1) a complete count of all jay groups onsite and (2) an approximate territory map or home range center for each group. Provide the U.S. Fish and Wildlife Service with a final report that includes the following, as applicable:

A. An information sheet including:
   - Dates and starting and ending times of all surveys conducted.
   - Weather conditions during all surveys, including average temperature, wind speed and direction, visibility, and precipitation.
   - Total number of jay groups found, number of jays in each group and number of juvenile-plumaged jays in each of these groups.

B. An aerial photograph or vegetation map depicting:
   - The entire area of interest.
   - Transect lines and playback stations.
   - Locations of all jays seen or heard while conducting the survey or at any other time, including flight direction.
   - Approximate suspected territory boundaries between jay groups or suspected home range centers for each group.

Mail final reports to:

Scrub-Jay Survey
U.S. Fish and Wildlife Service
6620 Southpoint Dr. South, Suite 310
Jacksonville, FL 32216-0958

Surveys should be carried out on calm, clear days about one hour after sunrise, and should terminate before midday heat or wind. Surveys should not be conducted in winds stronger than a moderate breeze (5-8 mph), in mist or fog, or in precipitation exceeding a light, intermittent drizzle. Heat and especially wind lowers the tendency for jays to respond to distant territorial scolds, and wind reduces the distance over which recordings can be heard. Jays are also reluctant to fly on windy days regardless of hour or season. Surveys also should NOT be conducted if accipiters or other scrub-jay predators are present in the area; in the event this is the case, the surveyor should either wait until the predator is gone or come back on another day.

Surveys may be conducted anytime between March 1 through October 31. However, Ideal survey periods include: 1) spring (especially March), 2) fall (September and October), when territorial displays are most frequent and vigorous, and 3) midsummer (July) when young of the year are independent but still distinguishable by plumage. The poorest times of the year to survey are late winter, when jays are most likely to fly far for food, and late spring when the young are quiet and the adults are occupied with molt and feeding fledglings.

Transects may be driven or walked. If driven, step out or stand atop the vehicle at each playback station. Broadcast the calls at each station for at least 1 minute in all four directions around the playback station, emphasizing any direction in which low-growing oak scrub is the predominant vegetation. On the vegetation map, plot the locations and indicate group size of all Florida scrub-jays where they are first seen or heard. Distinguish adult-plumaged jays from juvenile-plumaged jays whenever possible.

At localities with car trails, large areas of scrub can be surveyed with a vehicle in one day. On foot, the process is more laborious because of the relatively large size of territories (often 10 to 40 acres). Once a group is located, stop broadcasting at that station. Remaining at this station briefly should result in the assembly of the entire group. This allows one to estimate group size and, if done during the midsummer, to distinguish young of the year from adults.

Sometimes two or more groups will be attracted to one station, usually from different directions. Observers should be careful, therefore, to plot each group where it was first spotted or heard, not at the site to which the jays were attracted. In rare circumstances, especially at sites where numerous groups congregate at artificial food or water sources, it may be difficult to differentiate groups. This is especially true where jays have become habituated and tame to human approach. Again, in such cases careful observation is extremely important. Studies of such congregations using color-marked jays have confirmed that almost always they consist of members of different family groups. Often they may have crossed several territory boundaries to reach the neutral feeding or drinking areas. The result gives a false impression of extremely high jay density.

It is essential that the subject area be surveyed as often as necessary (for a minimum of 5 days) to establish an accurate count of jay groups and territorial boundaries. If more than 8 to 10 jays are encountered at a single playback station during a fall or spring survey period, the jays at this site should be monitored carefully over several visits and different times of day. Numbers will shift as groups arrive and depart. Often it is possible to watch where the jays come from or return to as a means of determining how many groups are represented. For determining territorial boundaries, it is essential that the surveyor be familiar with different types of behavior exhibited by scrub-jays. Territorial boundaries may be most accurately predicted through a combination of observing scrub-jays and listening for territorial behavior (in the case where several families of scrub-jays exist in contiguous habitat) or by including habitat suitable for occupation by scrub-jays within a territorial boundary (in the case where a family of scrub-jays is somewhat isolated from other groups). If a question exists as to how many groups of scrub-jays are onsite, or where to draw territorial boundaries, it is strongly recommended that the U.S. Fish and Wildlife Service receive permission from the land owner to conduct an independent survey onsite.

Scrub-Jay Survey Guidelines

(Updated 03/10/2005)

Adapted from: *J.W. Fitzpatrick, G.E. Woolfenden and M.T. Kopeny. 1991. Ecology and development-related habitat requirements of the Florida scrub-jay (Aphelocoma coerulescens). Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program Technical Report No. 8. Tallahassee, FL. 49pp.*

The most effective method for surveying a site for Florida scrub-jays is to traverse the area systematically, using a high quality tape recording of Florida scrub-jay territorial scolding in an attempt to attract the jays. The recording should include clear examples of all typical territorial scolds, including the female "hiccup" call. Vocalizations are available by contacting:

Macaulay Library
Cornell Lab of Ornithology
159 Sapsucker Rd.
Ithaca, NY 14850
Email: macaulaylibrary@cornell.edu
http://birds.cornell.edu

Map plant communities either on a 7.5 foot U.S. Geological Survey (USGS) topographic map or an aerial photograph at a scale of no more than 400 feet per inch. The vegetation map must show all forms of existing development. On the vegetation map, establish parallel line transects with playback stations along each transect. Space the transects and playback stations so that all different scrub types will be sampled for jays (i.e., so that the taped calls will be effectively broadcast across areas of concern). These scrub types should include not only the more "classic" xeric oak scrub, scrubby pine flatwoods, scrubby coastal strand, and sand pine scrub, but should also include:

- pine-mesic oak
- xeric oak
- sand live oak
- improved, unimproved, and woodland pastures;
- citrus groves;
- rangeland;
- pine flat woods;
- longleaf pine xeric oak;
- sand pine;
- sand pine plantations;
- forest regeneration areas;
- sand other than beaches;
- disturbed rural land in transition without positive indicators of intended activity; and disturbed burned areas.

The presence of scrub oaks, no matter how sparsely distributed, is the key indicator of "scrub" habitat.

Distances between transects, and between stations along transects, depend on many factors, including power of the speaker used for broadcasting the calls, topography of the site, and the density of the surrounding vegetation. Adequate spacing between transects can be estimated roughly as the distance at which a person listening to the tape directly in front of the speaker perceives the "bird" to be no more than about 100 meters away. A distance of 100 to 200 meters between transects and between stations is generally adequate when using a good-quality, hand-held cassette player broadcasting at full volume.

$500,000. People who provide information leading to an arrest, criminal conviction, civil penalty, or forfeiture of property are eligible for a reward. Fish, wildlife, and plants involved in violations are subject to forfeiture. Vessels, vehicles, aircraft, and other equipment used to aid in importing, exporting, transporting, selling, receiving, acquiring, or purchasing fish or wildlife or plants in a criminal violation are subject to forfeiture upon a felony conviction involving commercialization.

The Migratory Bird Treaty Act

The Migratory Bird Treaty Act is a Federal law that carries out the United States' commitment to four international conventions— with Canada, Mexico, Japan, and Russia. The conventions protect migratory birds as an international resource. The Migratory Bird Treaty Act (16 U.S. C 703-712) and its implementing regulations (50 CFR 21) provide authority to conserve bird species such as the bald eagle, even if Endangered Species Act protections are removed.

Except as allowed by permit (50 CFR 21.11), the Migratory Bird Treaty Act makes it unlawful to pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry or cause to be carried, receive for shipment, or export any migratory bird—including eggs, parts, and nests. In addition, the Act authorizes and directs the Secretary of the Interior to determine if, and by what means, the take of migratory birds should be allowed and to adopt regulations permitting and governing take—for example, hunting seasons for ducks and geese.

Penalties include a maximum of two years' imprisonment and a $250,000 fine for a felony conviction and six months' imprisonment and $15,000 fine for a misdemeanor conviction. A commercial activity is a felony, just as is take with intent to sell. Maximum fines are doubled for any organization convicted of a felony violation.

Fact Sheet

The Bald Eagle: Other Protection following Delisting under the Endangered Species Act of 1973

November 5, 2004 draft (revised January 4, 2007)

The Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act will continue to protect the bald eagle following delisting under the Endangered Species Act. Originally passed in 1940 to protect bald eagles, the Eagle Act was amended in 1962 to protect golden eagles as well, by prohibiting the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit (16 U.S.C 668(a); 50 CFR 22). "Take" includes pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb (16 U.S.C. 668c; 50 CFR 22.3).

A violation of the Eagle Act can result in a fine of $100,000 or imprisonment for one year, or both, for a first offense. An organization may be fined $200,000. Penalties increase for additional offenses. A second violation is a felony and can result in two years' imprisonment and a fine of up to $250,000 for an individual— or $500,000 for an organization. People who provide information leading to an arrest and conviction are eligible for a reward of up to half of the fine.

The Lacey Act

Congress originally passed the Lacey Act in 1900 to help States protect resident species by making it a Federal violation to transport illegally taken wildlife across State lines. Later amending the law, Congress extended its prohibitions to importing, exporting, selling, acquiring, or purchasing fish, wildlife, or plants taken, possessed, transported or sold in violation of U.S. or Indian law or State or foreign law. Prohibitions of the Lacey Act (16 U.S.C. 3371-78) will continue to apply to the bald eagle including its feathers, parts, nests, and eggs—as well as its products—following delisting under the Endangered Species Act. The Lacey Act also prohibits making false records, labels, or identification of shipped wildlife; importing injurious species; and shipping fish or wildlife in an inhumane manner.

Penalties include a maximum of five years in prison and a $250,000 fine for felony convictions, a maximum $10,000 fine for civil violations, and a $250 fine for marking violations. The maximum criminal fine for an organization is

Fig. 6. Photographs of inactive gopher tortoise burrows.