

# **GOPHER TORTOISE MANAGEMENT PLAN**

*Gopherus polyphemus*

September 2007



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

**GOPHER TORTOISE MANAGEMENT PLAN TEAM**

Sponsors: Timothy Breault, Director  
Division of Habitat and Species Conservation

Gil McRae, Director  
Fish and Wildlife Research Institute

Team Leader: Greg Holder, Regional Director  
Regional Operations Office, Southwest Region

Team Members: Mike Allen, Division of Habitat and Species Conservation  
Joan Berish, Fish and Wildlife Research Institute  
Monty Hinkle, Division of Law Enforcement  
Alex Kropp, Division of Habitat and Species Conservation  
Rick McCann, Division of Habitat and Species Conservation  
Angela Williams, Division of Habitat and Species Conservation  
Michael Yaun, Legal Office

Team Resources:

Facilitator:	James Perran Ross, Ph.D.
Document Management:	Carla Lambert Jessica Rivera-Gutierrez
Stakeholder Coordination:	James Perran Ross, Ph.D.
Law Enforcement Resource:	Major Andy Love
Legal Resource:	Jim Antista
Community Relations:	Joy Hill
Process Mapping:	David Arnold
Economic Impact:	David Harding, Ph.D.
Graphics Resource:	Marrell Cooper

**MAJOR CONTRIBUTORS**

Charles Hardee

## 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

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.

**TABLE OF CONTENTS**

GOPHER TORTOISE MANAGEMENT PLAN TEAM..... ii

EXECUTIVE SUMMARY ..... iii

TABLE OF CONTENTS..... v

LIST OF TABLES ..... vii

LIST OF FIGURES ..... viii

LIST OF ACRONYMS ..... ix

GLOSSARY ..... x

CHAPTER 1: BIOLOGICAL BACKGROUND..... 1

    Taxonomic Classification ..... 1

    Life History and Habitat ..... 1

    Distribution and Population Status ..... 2

    Historic and Ongoing Conservation Efforts ..... 3

CHAPTER 2: THREAT ASSESSMENT ..... 5

    Reason for Listing..... 5

    Present and Anticipated Threats ..... 5

CHAPTER 3: CONSERVATION GOAL AND OBJECTIVES..... 8

    Conservation Goal ..... 8

    Measurable Conservation Objectives ..... 8

CHAPTER 4: CONSERVATION ACTIONS..... 13

    Proposed Regulations..... 13

    Permitting..... 13

*Permit Design Criteria and Guiding Principles* ..... 14

*Proposed Permitting System* ..... 20

*Guidelines* ..... 23

    Local Government Coordination ..... 25

    Law Enforcement..... 28

    Habitat Preservation..... 30

    Habitat Management..... 31

    Population Management ..... 35

    Disease Management ..... 39

    Incentives ..... 40

*Permit-Based Incentives* ..... 40

*Safe Harbor Agreement* ..... 41

*Landowner Assistance Programs* ..... 42

    Monitoring ..... 43

*Acquisition of Public Lands* ..... 43

*Protected Acres of Gopher Tortoise Habitat on Private Lands* ..... 44

*Habitat Management Actions* ..... 44

*Monitoring Relocated Tortoises* ..... 45

*Long-term Monitoring of Recipient Sites*..... 45

*Gopher Tortoise Population Status and Habitat Loss* ..... 45

*Gopher Tortoise Permits Issued* ..... 46

*Monitoring the Overall Success of the Gopher Tortoise Management Plan*..... 46

    Education and Outreach..... 48

Future Research .....	50
<i>Long-term Population Dynamics and Habitat Use</i> .....	50
<i>Minimum Population Size Needed to Maintain a Functional Population</i> .....	50
<i>Best Burn Regimes for Various Habitats and Best Alternative Management Methods     Where Fire is Precluded</i> .....	50
<i>Tortoise Response to Restoration of Longleaf Pine on Silvicultural Lands</i> .....	51
<i>Methods to Enhance Site Fidelity on Restocking Sites</i> .....	51
<i>Impacts of Herbicides on Tortoises</i> .....	51
<i>Impacts of Exotic Wildlife on Tortoises</i> .....	51
<i>Long-term Effects of URTD on Tortoise Populations</i> .....	52
<i>Refinement of Genetic Differences in Florida Tortoise Populations</i> .....	52
<i>Recolonization of Restocking Sites by Commensal Species</i> .....	52
<i>Effectiveness of Retaining or Relocating Tortoises on Sites Undergoing Development</i> .....	52
CHAPTER 5: IMPLEMENTATION STRATEGY .....	54
Time Frame for Completing Actions .....	55
CHAPTER 6: ECONOMIC, SOCIAL, AND ECOLOGICAL IMPACTS .....	56
Potentially Affected Parties .....	56
Social Impacts .....	57
Economic Effects .....	57
Ecological Impacts .....	58
<i>Potentially Positive Impacts</i> .....	58
<i>Potentially Negative Impacts</i> .....	58
LITERATURE CITED .....	60
APPENDICES .....	68
APPENDIX 1. History of Gopher Tortoise Regulations in Florida .....	68
APPENDIX 2. Proposed Rule Revisions .....	69
APPENDIX 3. Burrow Rule Policy .....	71
APPENDIX 4. Draft Criteria for Authorized Gopher Tortoise Relocation Agents .....	72
APPENDIX 5. Draft Criteria for Responsible Relocation and Restocking of Gopher Tortoises .....	73
APPENDIX 6. Draft FWC Law Enforcement Protocol for Responding to Complaints of Gopher Tortoises on Development Sites .....	83
APPENDIX 7. Protocol for Assessing Gopher Tortoise Densities on FWC Lands Identified As Potential Restocking Sites .....	87
APPENDIX 8. Landowner Assistance Programs – Details and Application Contacts ...	104
APPENDIX 9. Stakeholders .....	105
APPENDIX 10. Statement of Estimated Regulatory Cost to Implement the Gopher Tortoise Management Plan .....	106

**LIST OF TABLES**

Table 1. Page location where each objective is addressed by conservation actions..... 11

Table 2. Proposed timeline for implementing permitting actions..... 24

Table 3. Proposed timeline for implementing local government coordination actions. .... 28

Table 4. Proposed timeline for implementing law enforcement actions. .... 29

Table 5. Proposed timeline for implementing habitat preservation actions..... 31

Table 6. General guidelines for plant communities commonly used by the gopher tortoise including associated fire frequency, and parameters and related values used to define optimum gopher tortoise habitat in Florida. .... 34

Table 7. Proposed timeline for implementing habitat management actions..... 35

Table 8. Proposed timeline for implementing population management actions..... 38

Table 9. Proposed timeline for implementing disease management actions. .... 40

Table 10. Proposed timeline for incentives actions. .... 43

Table 11. Proposed timeline for implementing monitoring actions. .... 47

Table 12. Proposed timeline for implementing education and outreach actions. .... 48

Table 13. Proposed timeline for implementing research actions..... 53

Table 14. Categories of stakeholders’ interest in gopher tortoise management and conservation. .... 56

**LIST OF FIGURES**

Figure 1. Distribution of the gopher tortoise in the southeastern United States. .... 3  
Figure 2. Proposed gopher tortoise permitting system process map. .... 19

## LIST OF ACRONYMS

ARC	Acquisition and Restoration Council
ASPCA	American Society for the Prevention of Cruelty to Animals
BSR	Biological Status Report
CFR	Code of Federal Regulation
CRP	Conservation Reserves Program
CSC	Common Species Common
DEP	Florida Department of Environmental Protection
DOT	Florida Department of Transportation
DWT	depth to water table
EQIP	Environmental Quality Incentives Program
ESA	Endangered Species Act
F.A.C.	Florida Administrative Code
FAQ	frequently asked question
FLUCFCS	Florida Land Use, Cover and Forms Classification System
FNAI	Florida Natural Areas Inventory
FSA	USDA's Farm Service Agency
FSP	Forest Stewardship Program
FTE	full time equivalent
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Fish and Wildlife Research Institute, FWC
GIS	geographic information system
GPS	global positioning system
HSC	FWC Division of Habitat and Species Conservation
LATF	Land Acquisition Trust Fund
LE	FWC Division of Law Enforcement
LIP	Landowner Incentives Program
MU	management unit
NGO	non-governmental organization
OCO	operating capital outlay
NRCS	Natural Resources Conservation Service
PFW	Partners for Fish and Wildlife Program
PID	parcel identification number
SHA	Safe Harbor Agreement
TNC	The Nature Conservancy
TPL	Trust for Public Land
URTD	upper respiratory tract disease
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WEA	wildlife environmental area
WHIP	Wildlife Habitat Incentives Program
WMA	wildlife management area
WMD	water management district

## GLOSSARY

**anthropogenic** - of human origins; human-related; caused by humans.

**asters** - plants in the sunflower family.

**biodiversity** - variety of all forms of life. Gopher tortoises contribute to plant and animal diversity through their burrowing habits.

**biomass** - the total weight of living organisms in a given area.

**burrow occupancy rate** - also known as a correction factor, this is the percentage of gopher tortoise burrows on a particular site that are occupied at a given time (tortoises generally use more than one burrow over time).

**canopy cover** - layer of vegetation extending above head height, usually composed of tree branches.

**carrying capacity** - the maximum number of individuals of a species that an area can support, given the amount and quality of food, water, and cover.

**clutch** - all the eggs produced by one bird or reptile at a single time.

**commensal** - living in a relationship in which one animal derives food, refuge, or other benefits from another animal without hurting or helping it. The gopher frog, eastern indigo snake, Florida pine snake, and Florida mouse are listed commensal species of the gopher tortoise.

**connectivity (habitat)** - the desirable linking or joining of isolated small areas of similar habitat to create larger interconnected blocks to potentially reduce the effects of fragmentation.

**conservation easement** - a voluntary legal agreement between a landowner and a land trust or government agency that limits the type or amount of development on the landowner's property, thus protecting the land's conservation value while retaining private ownership.

**degradation (habitat)** - a lowering in quality of habitat for gopher tortoises, often related to lack of prescribed fire or other management.

**donor site** - the property, usually a development, from which tortoises are removed during relocations.

**ecological niche** - where an organism lives and what it does (*i.e.*, how it fits into its environment). If a gopher tortoise's habitat is its address, then its niche is its role or profession, biologically speaking.

**endemic** - exclusively native to a particular geographic area.

**fecundity** - potential reproductive capacity of an organism or population to reproduce. In gopher tortoises, a low number of eggs and slow growth to sexual maturity translate to low fecundity.

**flatwoods** - common upland habitat characterized by flat terrain, moderately to poorly drained soils, scattered pine trees, saw palmetto, and various other shrubs, forbs, and grasses. Gopher tortoises tend to burrow in the better drained portions of this habitat.

**forage** - plant material, such as grasses, legumes, and other flowering plants, eaten by grazing animals.

**forb** - a flowering plant with a non-woody stem that is not a grass.

**fragmentation (habitat)** - a process of environmental change, usually caused by human-related land clearing, where once connected habitats are now in (often scattered) pieces.

**genotypic assemblage** - gopher tortoise populations that have a similar genetic (hereditary) make-up and that occur in a certain area.

**GIS** - geographic information system: a computer-based system used for storage, retrieval, mapping, and analysis of geographic data. GIS is used for mapping potential gopher tortoise habitat in Florida.

**gopher tortoise** (*Gopherus polyphemus*) - a moderate-sized, terrestrial turtle, with stumpy, elephantine hind feet and flattened, shovel-like forelimbs adapted for digging.

**ground cover** - herbaceous plants and the lowest shrubs occupying an area: a generic term used to describe the mat of plants found on the forest floor.

**ground truth** - checking GIS or other computer-generated information by going to specific locations and performing observations and measurements to determine the accuracy of computer-based habitat mapping.

**habitat** - the place where a gopher tortoise lives that provides all its needs for food and shelter.

**herbaceous** - refers to non-woody plants, generally green and leafy in appearance and texture.

**herpesvirus** - an infectious agent that has been associated with respiratory disease and infections of the mouth and nasal passages.

**human predation** - the taking or harvest of gopher tortoises for food (now illegal).

**incidental take** - potential gopher tortoise mortality, direct (*e.g.*, heavy machinery) or indirect (*e.g.*, entombment), that could occur during land development. Incidental take permits allow such mortality when pre-determined compensation (money or land) is provided to help conserve tortoises and their habitats.

**iridovirus** - an infectious agent that has been associated with respiratory disease and infections of the mouth and nasal passages.

**keystone species** - a plant or animal that increases or decreases the diversity of an ecosystem, depending on its abundance or rarity. The gopher tortoise is a keystone species in upland habitats in Florida.

**legumes** - plants in the bean family.

**long-term protection (habitat)** - either privately owned lands placed under a perpetual (*i.e.*, endless duration) conservation easement, or publicly owned lands purchased for conservation purposes where either restrictions on the acquisition funding source or government commitment (through ordinances or other regulations) would prevent or prohibit the eventual sale or development of the property.

**mark-recapture** - method used in wildlife research that involves capturing animals, marking them, releasing them, then recapturing some of the same individuals during one or more recapture periods.

**mesic (habitat)** - having a moderate or well-balanced supply of moisture.

**midstory** - the middle layer, generally 3-9 feet in height, of trees and shrubs (in a multi-layered forest) shaded by taller trees.

**mitigation contribution** - compensation, usually either in the form of monetary contributions or protected habitat donated, to offset the ill effects of human-related land change (*e.g.*, development) on gopher tortoise populations.

**mitigation parks** - select lands with gopher tortoise populations that have been acquired, permanently protected, and managed using mitigation funds. Such preserves help to offset the loss of habitat from urbanization.

**mycoplasma** - an infectious agent (bacterium) that has been associated with upper respiratory tract disease in gopher tortoises.

**off-site recipient area** - an area which does not lie within the same boundaries (as defined in the legal description or as identified by the county parcel identification number) of the development area from which tortoises are to be removed and which may be under either the same or different ownership.

**on-site recipient area** - an area that is located within the same boundaries (as defined in the legal description or as identified by the county parcel identification number) of the

development area from which tortoises are to be removed and which is under the same ownership as the development area.

**population** - a group of individuals of the same species that occur in a defined area at the same time and regularly interact or interbreed.

**predation** - hunting and killing another animal for food.

**prescribed fire (controlled burning)** - a planned fire applied within a particular land area under the right weather conditions to accomplish specific, well-defined management objectives.

**protected site (relocation)** - either privately or publicly owned lands that meet the definition of “long-term protection.”

**radio-instrumentation (telemetry)** - attaching a small radio transmitter to a gopher tortoise’s shell to allow tracking of its movements. The transmitter emits radio signals that are detected using a hand-held antenna and receiver.

**recipient site** - the property where relocated tortoises are released.

**relocation** - deliberately moving wild gopher tortoises.

**rescue relocation** - deliberately moving individuals or groups of tortoises to areas that are typically unprotected, and may be relatively small, disturbed, or inadequately managed to support long-term population viability. Rescue relocation is conducted primarily to remove wild gopher tortoises from human-caused harm.

**responsible relocation** - deliberately moving wild gopher tortoises into protected, managed, suitable habitat where their future survival and long-term population viability are very likely. Restocking to such sites where tortoise populations have been severely depleted is a form of responsible relocation; however, tortoises may also be responsibly relocated to sites with resident tortoises where the carrying capacity has been increased through habitat management to provide sufficient forage for additional tortoises.

**restocking** - deliberately moving wild gopher tortoises into protected, managed, suitable habitat where resident densities are extremely low and where the tortoises’ future survival and long-term population viability are very likely.

**restocking site** - an area of protected, managed, suitable habitat where gopher tortoise populations have been severely depleted or eliminated.

**roller-chopping** - a forestry method for preparing sites for planting pine trees; also used as a land management tool to reduce the height and density of understory vegetation. A bulldozer pulls a heavy cylindrical drum with cutting blades that chop vegetation.

**sandhill** - upland habitat on gently rolling terrain that has deep, sandy soils, longleaf pine, xeric-adapted oaks, and wiregrass.

**scrub** - upland xeric shrub habitat, with or without sand pines, that has deep, sandy soils, evergreen oaks, and scattered bare patches of sand.

**seropositive** - positive blood test indicating an immune response (exposure) to the bacteria that cause upper respiratory tract disease in gopher tortoises.

**short-term protection (habitat)** - either privately or publicly owned lands that have some enforceable protection commitment, but those commitments do not meet the definition of “long-term protection.”

**shrub** - a woody plant (height variable) that has several stems arising from the base and lacks a single trunk.

**silviculture** - the art and science of establishing and growing healthy, high quality forests to meet human needs.

**site fidelity** - remaining within a particular area.

**soft release (relocation)** - those releases where relocated animals are contained in an enclosure at the recipient site for some period of time before being allowed to roam freely; this differs from hard releases where animals are turned loose without any period to acclimate to their new surroundings.

**stewardship** - taking good care of natural resources.

**succession (habitat)** - predictable and orderly changes in plant composition or structure over time.

**take** - taking, attempting to take, pursuing, hunting, molesting, capturing, or killing any wildlife or freshwater fish, or their nests or eggs by any means, whether or not such actions result in obtaining possession of such wildlife or freshwater fish or their nests or eggs.

**terrestrial** - living on land.

**understory** - the lowest vegetative layer in a forest, consisting of woody and herbaceous growth less than 3 feet in height.

**upland (habitat)** - high, generally dry, lands that are not wetlands (water).

**unprotected site (relocation)** - lands that do not have any enforceable protection commitments or use restrictions that would prevent them from being modified and made unsuitable for tortoises.

**upper respiratory tract disease** - a disease that occurs in gopher tortoises, where infected individuals may show a discharge from the nasal passages or eyes, swelling of the eyelids or area around the eyes, or reddened third eyelid. These so-called clinical signs (*i.e.*, symptoms) come and go over time.

**viable population** - a stable, self-sustaining population with a high likelihood (*e.g.*, more than 95%) of surviving for a long-term period (*e.g.*, 100 years).

**xeric (habitat)** - very dry, in this case due to soil factors.



## CHAPTER 1: BIOLOGICAL BACKGROUND

This section provides a brief summary of information on selected aspects of the biology and life history of the gopher tortoise. For more detailed reviews and information on the biology and conservation of this species, the reader may reference the Biological Status Report (BSR) for the Gopher Tortoise (Enge *et al.* 2006a), Berish 2001, Ashton and Ashton 2004, or Mushinsky *et al.* 2006.

### Taxonomic Classification

Gopher tortoises are members of the Class Reptilia, Order Testudines, and Family Testudinidae. Of 4 North American tortoise species (genus *Gopherus*), the gopher tortoise (*G. polyphemus*) is the only one that occurs east of the Mississippi River.

### Life History and Habitat

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; hatchlings are yellowish-orange.

The gopher tortoise typically inhabits uplands, especially those with relatively well-drained, sandy soils. The gopher tortoise is generally associated with longleaf pine (*Pinus palustris*) and 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 disturbed habitats (Auffenberg and Franz 1982; Kushlan and Mazzotti 1984; Diemer 1986, 1987, 1992b; Breininger *et al.* 1994). Gopher tortoises excavate burrows that average 4.5 m (14.8 ft) long and 2 m (6.6 ft) in depth (Hansen 1963). These burrows, which provide protection from temperature extremes, moisture loss, and predators, serve as refuges for 350-400 other species, including listed commensal species such as the gopher frog (*Rana 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).

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

*The gopher tortoise is slow to reach sexual maturity, has low fecundity, and has a long life span.*

(Landers *et al.* 1980, Diemer and Moore 1994, Mushinsky *et al.* 1994, Aresco and Guyer 1999). The breeding season is generally March - October (Johnson *et al.* 2007). Nests are excavated (often in burrow mounds) from mid-May to mid-June, and only 1 clutch is produced annually (Landers *et al.* 1980). Clutch size is usually 5 to 9 eggs, with an average of 6 (Diemer and Moore 1994, Butler and Hull 1996; see summary in Ashton *et al.* 2007). Incubation period is approximately 80-100 days, depending on latitude (Iverson 1980, Landers *et al.* 1980).

Predation on nests and hatchlings is heavy (Alford 1980, Landers *et al.* 1980, Butler and Sowell 1996, Smith 1997, Pike and Seigel 2006).

Gopher tortoises feed primarily on broadleaf grasses, wiregrass, grass-like asters, legumes, and fruits (Garner and Landers 1981, Macdonald 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  $\geq 100$  m (328 ft) from its burrow for specific forage requirements (Ashton and Ashton in press). Home range size varies with habitat type, season, and sex of the tortoise; moreover, considerable individual variation has been found (Diemer 1992b). 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 1992b, Smith *et al.* 1997; see summary in Pike 2006). Each tortoise typically uses several burrows (McRae *et al.* 1981, Auffenberg and Franz 1982, Diemer 1992b), which complicates estimates of population density (McCoy and Mushinsky 1992b).

*Gopher tortoise densities and movements are affected by the amount of herbaceous ground cover.*

### **Distribution and Population Status**

The gopher tortoise occurs in the southeastern Coastal Plain from southeastern South Carolina to extreme southeastern Louisiana (Auffenberg and Franz 1982); Figure 1. 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; however, their current range in south Florida is limited because of unsuitable habitat and increased urbanization (Diemer 1987; Mushinsky *et al.* 2006). Tortoise populations occur as far south as Cape Sable and on islands off Florida's east and west coasts (Auffenberg and Franz 1982, Kushlan and Mazzotti 1984).

Population estimates for the gopher tortoise in Florida are based on 2003 geographic information system (GIS) data indicating that the current extent of gopher tortoise habitat is approximately 3.3 million acres (Enge *et al.* 2006a). Using density information from McCoy *et al.* 2002 and population ratios of adult to immature tortoises from Diemer 1992a, the estimated number of adult tortoises is approximately 785,000 (Enge *et al.* 2006a, for more detailed explanations of acreage and population estimates).

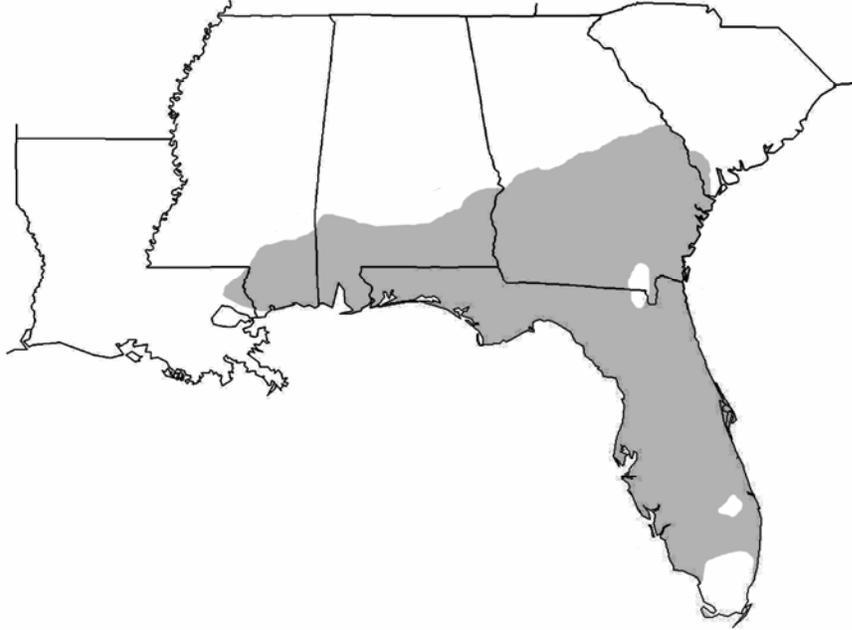


Figure 1. Distribution of the gopher tortoise in the southeastern United States.

### **Historic and Ongoing Conservation Efforts**

Harvest of gopher tortoises has been regulated in Florida since 1972, and the species was fully protected in 1988 (Appendix 1). The introduction of toxic substances into burrows (*e.g.*, gassing to force rattlesnakes from their retreats) was prohibited in 1978, and the racing of gopher tortoises for charity purposes was ended in 1989. By the mid-1980s, impacts from development necessitated increasing regulatory focus. From 1984 to 2007, various policies, protocols, guidelines, and rules have addressed the impacts from urbanization on this imperiled species. In June 2006, the Florida Fish and Wildlife Conservation Commission (FWC) amended its rules to clearly provide protection to the burrows of gopher tortoises.

Originally state-listed as threatened in 1975, the gopher tortoise was reclassified as a species of special concern in 1979 when Florida's imperiled species listing criteria were modified. The species' status classification has remained unchanged for more than 2 decades.

The gopher tortoise is currently listed by the U.S. Fish and Wildlife Service (USFWS) as threatened in accordance with 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 Florida population is currently a candidate species under the ESA (71 Federal Register 53756, 2006). To potentially preclude the need for federal listing in the eastern portion of the species' range and to foster an increased level of collaboration to actively conserve gopher tortoises, the Department of Defense, U.S. Forest Service, USFWS, FWC, Georgia Department of Natural Resources, Alabama Division of

Wildlife and Freshwater Fisheries, and several non-governmental organizations (NGOs) signed a Memorandum of Intent in 2006.

Habitat acquisition has been and continues to be an important element of FWC's conservation strategy for this species. Past acquisition efforts by FWC and other state agencies have focused on securing high quality natural communities because of the values these habitats provide to tortoises, burrow commensals, and other wildlife species. However, since all acquisitions are dependent upon the presence of willing land sellers, state purchases often include both high quality natural habitats and those requiring restoration. Acquisition of quality native habitats will continue to be a priority, but disturbed or altered properties may also be purchased when they contribute towards recovery of the gopher tortoise.

Many local governments have also made significant contributions to the conservation of gopher tortoises, primarily by preserving habitat through various conservation programs, screening development activities to determine the need for a permit from FWC, and directly limiting impacts on tortoises. The FWC has coordinated with a number of counties regarding gopher tortoise mitigation and conservation since the 1980s.

## CHAPTER 2: THREAT ASSESSMENT

### Reason for Listing

In May 2002, Florida Fish and Wildlife Conservation Commission (FWC) staff introduced a petition (Gruber 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-inferred from loss of habitat) 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 will be reclassified to threatened when the management plan is approved.

### Present and Anticipated 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, Smith *et al.* 2006). Tortoise populations in the Florida

*The primary threat to gopher tortoises in Florida is habitat destruction, fragmentation, and degradation.*

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, human predation, 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 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). Site preparation 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).

*Lack of prescribed fire or suppression of natural fires results in canopy closure and reduced tortoise forage plants.*

The spread of exotic plant species such as Brazilian pepper (*Schinus terebinthifolius*), Australian pine (*Casuarina equisetifolia*), cogongrass (*Imperata cylindrica*), and hairy indigo (*Indigofera hirsute*) also degrades tortoise habitat (Berish [Diemer] 1991, Hicklin 1994, Berish 2001, Basiotis *et al.* 2005, Smith *et al.* 2006). Cogongrass from Asia 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 Woolfenden 1978, Landers *et al.* 1980, Butler and Sowell 1996, Smith 1997, Pike and Seigel 2006). 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 virginianus*) (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, Pike and Seigel 2006). Adults are usually immune to predation, but some are 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 themselves despite natural predation pressure, with only 1 to 3 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, new tortoise predators have invaded Florida via human transport or habitat alteration: nine-banded armadillo (*Dasypus novemcinctus*), coyote, monitor lizards (*Varanus* spp.), and red imported 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). Recently, Argentine tegu lizards (*Tupinambis merianae*) have been found using gopher tortoise burrows near Tampa; their impact on tortoises is currently unknown (Enge *et al.* 2006b).

Heavy human predation on the gopher tortoise 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, a 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 continued 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, Diemer Berish *et al.* 2000, Berish 2001, Gates *et al.* 2002, Rabatsky and Blihovde 2002, Siegel *et al.* 2003). Besides at least 2 *Mycoplasma* species which are responsible for URTD, gopher tortoises also may have herpesvirus and iridovirus. 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. There are several possibilities why URTD has only been discovered recently: (1) increased research on gopher tortoises, (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 (Brown *et al.* 1999, Mushinsky *et al.* 2006). On Sanibel Island, 87% of gopher tortoises tested were seropositive for exposure to the pathogen, and at least one population on the island appears to have experienced a 25-50% reduction in breeding age adults (McLaughlin 1997, McLaughlin *et al.* 2000). In a recent survey of selected public lands, McCoy *et al.* (2005) reported that gopher tortoise declines did not appear to be related to the presence of *M. agassizii* in the specific populations studied. However, continued reports of increased mortality on sites with documented *M. agassizii* in sick and dying tortoises suggest that additional research is needed.

## CHAPTER 3: CONSERVATION GOAL AND OBJECTIVES

### Conservation Goal

The **overall goal** or vision for gopher tortoise conservation is to restore and maintain secure, viable populations of gopher tortoises throughout the species' current range in Florida.

*The Goal: Restore and maintain secure, viable populations throughout the species' current range in Florida.*

Achieving this goal will also assist in securing populations of the many commensal species dependent on the burrows and habitat of the gopher tortoise, and may prevent these species from becoming more imperiled in the future. The current cause of imperilment of the gopher tortoise is the rate of population decline, primarily due to habitat loss. Accomplishing this overall goal will require reducing the rate of gopher tortoise population

decline and maintaining or increasing tortoise populations on protected habitat until the species qualifies for a less imperiled listing status. The desirable end state for this vision is:

- Viable gopher tortoise populations remain present in every county in Florida.
- Total tortoise population stabilizes at carrying capacity of protected habitat (public and private).
- Genetic diversity and integrity of total population and subpopulations are retained.
- Protected locations of sufficient area and population size to be perpetually stable.

Realizing this vision will take many years, in part because of the magnitude of the challenges facing this species, and in part due to the inherent biology of these slow growing, long-lived animals. Progress toward this overall goal must therefore be incremental, step by step, strategically and practically directed to optimize the use of available resources. The following measurable objectives are proposed as the first immediate steps to begin this process.

The immediate **biological goal** is to progressively decrease the rate of decline of the gopher tortoise to allow its listing as a species of special concern and eventually as an unlisted, managed species. The Florida Fish and Wildlife Conservation Commission (FWC) proposes a timeline of 15 years (2007 to 2022) as a compromise between gopher generation time (31 years; Miller 2001) and practical 5-year plan periods.

### Measurable Conservation Objectives

Measurable conservation objectives provide bench marks and measurements against which progress toward these goals can be assessed. This plan proposes the following measurable objectives that will be monitored over the plan period.

*The measurable conservation objectives involve habitat management, habitat preservation, restocking gopher tortoises, and decreasing gopher tortoise mortality on development sites.*

***Objective 1: Optimize Gopher Tortoise Carrying Capacity by Appropriate Habitat Management on Protected Lands***

- Manage vegetation to optimize gopher tortoise forage and shelter needs.
  - Targeted fire intervals on the majority of protected, pine-dominated, potential habitat should be 5 years or less.
  - Targeted percent canopy cover on protected, occupied, or potential habitat should be less than 60%. Tortoise forage availability is tied to canopy cover; closed canopies generally have reduced herbaceous forage.
- Develop cooperative agreements, outreach capacity, technical assistance, and cooperation with other local, state, and federal land management agencies to encourage them to manage available tortoise habitat.
- Provide information, direction through the permit process, and technical assistance to private landowners and their advisors to encourage them to improve land management and tortoise carrying capacity.
- Work with private partners and other agencies to seek funding to restore habitat and increase gopher tortoise carrying capacity and review the application of FWC land acquisition funds for this purpose.

***Objective 2: Increase Protected Gopher Tortoise Habitat***

- Increase the amount of protected, potential habitat from recent estimates (2003 data; Enge *et al.* 2006a) of 1,340,000 acres to 1,955,000 acres by 2022. This requires an additional 615,000 acres by both acquisition of new public lands and permanently protecting private lands with conservation easements.
  - Continue public acquisition of potential habitat by all sources at an average of at least 25,000 acres per year through 2022.
    - These annual acquisitions would add 375,000 acres (25,000 x 15 years) and represent a little more than half of the 615,000 acres targeted. Sources of funding include federal, state, and county land acquisition funds; mitigation funds; mitigation payments obtained from permitting; and donations for acquiring uplands. Conservative estimates of lands acquired annually by all sources over the last 17 years suggest that this is an achievable target.
- Increase protection of potential habitat on private lands (*e.g.*, through conservation easements) to an average of 16,000 acres per year through 2022.

- These protection actions would cover another 240,000 acres (16,000 x 15 years). This is approximately 12% of the 1.98 million acres of potential tortoise habitat currently in private ownership. Mechanisms for achieving this objective include an enhanced FWC permitting system (described in this management plan), state and local government partnerships, and private land stewardship programs.

***Objective 3: Restock Gopher Tortoises to Protected, Managed, Suitable Habitats Where They No Longer Occur or Where Densities Are Low***

- Restock 60,000 tortoises by 2022 (an average of 4,000 tortoises per year) on protected, managed, suitable sites that are compatible with a statewide restocking strategy.

***Objective 4: Decrease Gopher Tortoise Mortality on Lands Proposed for Development***

Currently, approximately 16,000 tortoises per year are impacted by development, based on permits issued by FWC.

- Revise permitting to require moving gopher tortoises from development sites:
  - To support restocking of depleted areas (Objective 3 above, an average of 4,000 per year).
  - To responsibly and humanely relocate 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.
  - To accommodate additional gopher tortoises displaced by development on other lands to address specific conservation, educational, or humane needs.
- Cease issuing permits that allow entombment of tortoises (except where there is an immediate danger to the public's health and/or safety or in direct response to an official declaration of emergency by the Governor or other local authority).
- Improve permitting compliance and enforcement effectiveness through partnerships with local governments in all counties by 2010.
- Promote responsible, humane relocation or on-site accommodation of burrow commensals encountered during gopher tortoise relocation efforts.

Table 1. Page location where each objective is addressed by conservation actions.

<b><i>Measurable Objectives</i></b>	<b><i>Conservation Actions (Page #)</i></b>
<p><b><i>Objective 1: Optimize Gopher Tortoise Carrying Capacity by Appropriate Habitat Management on Protected Lands</i></b></p> <ul style="list-style-type: none"> <li>• Manage vegetation to optimize gopher tortoise forage and shelter needs.</li> <li>• Develop cooperative agreements, outreach capacity, technical assistance, and cooperation with other local, state, and federal land management agencies.</li> <li>• Provide information, direction through the permit process, and technical assistance to private landowners and their advisors.</li> </ul>	<ul style="list-style-type: none"> <li>○ Collaborate with ARC (pg. 30-31).</li> <li>○ Coordinate with DEP, WMDs, TNC, FNAI, etc. (pg. 30-31).</li> <li>○ Parameters for habitat management (pg. 31-35).</li> <li>○ Management in FWC’s WMA system (pg. 31-35).</li> <li>○ Database and monitoring for prescribed fire and vegetation (pg. 31-35).</li> <li>○ Education and outreach to land managers and others, e.g., field guide for managing tortoise habitats (pg. 48-49).</li> <li>○ Research on population dynamics, restoration, burn regimes, site fidelity, disease, etc. (pg. 50-53).</li> </ul>
<p><b><i>Objective 2: Increase Protected Gopher Tortoise Habitat</i></b></p> <ul style="list-style-type: none"> <li>• Increase the amount of protected, potential habitat from recent estimates (2003 data) of 1,340,000 acres to 1,955,000 acres by 2022. <ul style="list-style-type: none"> <li>▪ Continue public acquisition of potential habitat by all sources at an average of at least 25,000 acres per year through 2022.</li> <li>▪ Increase protection of potential habitat on private lands (e.g., through conservation easements) to an average of 16,000 acres per year through 2022.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>○ Private landowner incentives for habitat protection (pg. 40-43).</li> <li>○ Local government coordination (pg. 25-28).</li> <li>○ Habitat preservation through state agencies and NGOs (pg. 30-31).</li> <li>○ Monitor habitat acquisition (pg. 43-47).</li> <li>○ Monitor population status and habitat loss (pg. 43-47).</li> <li>○ Public awareness campaign (pg. 48-49).</li> </ul>
<p><b><i>Objective 3: Restock Gopher Tortoises to Protected, Managed, Suitable Habitats Where They No Longer Occur or Where Densities are Low</i></b></p> <ul style="list-style-type: none"> <li>• Restock 60,000 tortoises by 2020 (an average of 4,000 per year) on protected, managed, suitable sites that are compatible with a statewide restocking strategy.</li> </ul>	<ul style="list-style-type: none"> <li>○ Gopher tortoise permitting system (pg. 13-24).</li> <li>○ Survey FWC managed lands for restock potential (pg. 35-38).</li> <li>○ Pilot project Panhandle restocking (pg. 35-38).</li> <li>○ Coordinate with adjacent states (pg. 35-38).</li> <li>○ Monitor restocking activity (pg. 43-47).</li> <li>○ Research on restocking (pg. 50-53).</li> <li>○ Responsible relocation and restocking criteria (Appendix 5, pg. 73).</li> </ul>

Table 1. continued

<b><i>Measurable Objectives</i></b>	<b><i>Conservation Actions (Page #)</i></b>
<p><b><i>Objective 4: Decrease Gopher Tortoise Mortality on Lands Proposed for Development</i></b></p> <ul style="list-style-type: none"> <li>• Revise permitting to require moving gopher tortoises from development sites:               <ul style="list-style-type: none"> <li>○ To support restocking of depleted areas (Objective 3 above, an average of 4,000 per year)</li> <li>○ To responsibly and humanely relocate 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.</li> <li>○ To accommodate additional gopher tortoises displaced by development on other lands to address specific conservation, educational, or humane needs.</li> </ul> </li> <li>• Cease issuing permits that allow entombment of tortoises (except where there is an immediate danger to the public’s health and/or safety or in direct response to an official declaration of emergency by the Governor or other local authority).</li> <li>• Improve permitting compliance and enforcement effectiveness through partnerships with local governments in all counties by 2010.</li> <li>• Promote responsible, humane relocation or on-site accommodation of burrow commensals encountered during gopher tortoise relocation efforts.</li> </ul>	<ul style="list-style-type: none"> <li>○ Consolidate permit review (pg. 13-24).</li> <li>○ Permit cost structure incentives (pg. 13-24).</li> <li>○ On-line permit issuance (pg. 13-24).</li> <li>○ Revise guidelines for responsible and humane relocation of tortoises (pg. 24).</li> <li>○ Local government coordination (pg. 25-28).</li> <li>○ Law enforcement effectiveness (pg. 28-29 and Appendix 6, pg. 83).</li> <li>○ Incentives for private lands (pg. 40-43).</li> <li>○ Educate state attorneys and law enforcement (pg. 48-49).</li> <li>○ Inform and educate homeowners, local authorities, developers, and consultants (pg. 48-49).</li> <li>○ Draft criteria for authorized tortoise relocation agents (Appendix 4, pg. 72).</li> <li>○ Responsible relocation and restocking criteria; adjust permitted stocking density dependent on site protection and quality (Appendix 5, pg. 73).</li> <li>○ Partner with local governments to streamline the permit review process and improve compliance. (pg. 25-28).</li> <li>○ Create financial incentives and processes to allow private recipient sites (pg. 40-43).</li> </ul>

## CHAPTER 4: CONSERVATION ACTIONS

This chapter presents conservation actions which serve to achieve the measurable conservation objectives in Chapter 3. 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. Although science serves as the basis for management actions, there are instances where the Florida Fish and Wildlife Conservation Commission (FWC) and its partners must project beyond available knowledge to help reduce the rate of this species' decline. As new information becomes available, it will be incorporated into ongoing gopher tortoise conservation.

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. Each section contains specific management actions and timelines for implementation.

### Proposed Regulations

The Florida Fish and Wildlife Conservation Commission (FWC) must amend agency rules (Chapter 68A-27, F.A.C.) to reflect the change in listing status of the gopher tortoise and to implement protections necessary to achieve the objectives of this management plan. Revisions to the relevant text of Commission rules 68A-27.004, F.A.C., and 68A-27.005, F.A.C., are included as proposed rule revisions (Appendix 2). The revision to 68A-27.004 provides the standard that FWC staff will use to evaluate a request for a permit (*i.e.*, meeting the management plan's goals and objectives). This is the same standard used in all species listing changes since June 1999. The rule change also provides an exception to the permitting requirement for any actions that comply with FWC approved guidelines. This language will allow for the implementation of the guidelines discussed in Chapter 4, Permitting – Guidelines.

The FWC will update its policy that provides guidance on the process of permitting of activities that impact gopher tortoises and will specify what actions constitute prohibited impacts to gopher tortoises. The FWC staff will develop rule change proposals to formally adopt appropriate sections of the policy.

### Permitting

Two of the conservation objectives of this plan are to restock gopher tortoises where they no longer occur or where densities are low, and to decrease gopher tortoise mortality on lands proposed for development through such restockings and other responsible relocations of displaced tortoises to protected, managed, suitable habitats. Another objective is to increase protected gopher tortoise habitat. This plan will also promote optimizing gopher tortoise carrying capacity on protected lands by appropriately managing upland habitat. The permitting system proposed in this plan will assist in achieving all 4 objectives by requiring all entities developing properties where gopher tortoises will be impacted to go through a permitting review and contribute to the conservation of this species. An additional benefit of the new

permitting system will be the protection of individual gopher tortoises by requiring the relocation of animals away from areas of construction and development. Rules 68A-25.002, F.A.C., and 68A-27.004, F.A.C., require a permit for activities that will likely result in the take of a gopher tortoise or its burrow.

The gopher tortoise has been protected in Florida as a species of special concern for more than 25 years and any activity involving its take has required the prior issuance of an appropriate permit from the Florida Fish and Wildlife Conservation Commission (FWC). With the proposed change in status, the permitting system for gopher tortoises will be restructured to provide greater conservation benefit to the species.

### ***Permit Design Criteria and Guiding Principles***

The FWC staff relied upon its considerable experience administering the existing gopher tortoise permit system to map the new permitting processes, workflow, and decision gates shown in Figure 2. In addition, FWC sought extensive public input to assist in the design of the proposed gopher tortoise permitting system, with consideration of the following criteria and guiding principles:

- Permits will not be required of persons conducting activities associated with wildlife habitat management, routine agriculture, silviculture, or linear utility vegetation management as long as such activities are consistent with published and approved FWC guidelines.
- Design a permitting system that meets gopher tortoise conservation needs as described in the measurable conservation objectives of this plan.
- Shift staff resources away from actions with little conservation value, and towards actions with clear and desired conservation benefits.
- Retain a simple permit option for developments impacting small numbers of tortoises, but replace the current standard relocation and incidental take permits with a gopher tortoise conservation permit.
- Consolidate the administration of gopher tortoise permitting into one FWC organizational unit to streamline the permit review process.
- Establish an equitable mitigation contribution structure for all permits.
- Create a single web-based application system that serves to initiate all gopher tortoise permit applications.
- Provide permit options that do not allow entombment of gopher tortoises except in very rare and extraordinary circumstances (cases where there is an immediate danger to the public's health and/or safety or in direct response to an official declaration of emergency by the Governor or other local authority).

- Design a permit system that gives applicants a suite of options to address their respective gopher tortoise mitigation needs, including an improved mechanism for authorizing persons to assist in relocation and authorizing recipient sites.
- Promote responsible, humane relocation or on-site accommodation of burrow commensals encountered during gopher tortoise relocation efforts.
- Require all relocation of gopher tortoises to be done in a responsible, humane manner.
- Design a permit system that operates effectively and efficiently to minimize FWC staffing requirements and provides optimal customer service and conservation benefit.

The intent of the proposed permitting system is to shift staff resources away from actions with little conservation value and towards actions with clear and desired conservation

*The intent of the proposed permitting system is to shift staff resources away from actions with little conservation value, and towards actions with clear and desired conservation benefits.*

benefits. More than 5,000 permits have been previously issued to allow the movement of gopher tortoises out of the construction footprint to alternate locations either within the property owned by the development interests (on-site) or away from the property (off-site). A lack of

suitable and available off-site properties, coupled with concerns about the spread of disease, has resulted in a large number of permits being issued that did not specifically require gopher tortoises to be moved (relocated). These permits have historically been called “incidental take” permits. Under these incidental take permits, voluntary relocations have successfully moved thousands of tortoises out of harm’s way, and efforts continue to find additional ways to relocate tortoises away from permitted sites. However, many tortoises have also been entombed under the incidental take permit process (which in most cases did not require tortoises to be relocated out of harm’s way). These mortalities have understandably generated concerns over the humane treatment of tortoises and how these direct mortalities contribute to overall population declines (Chapter 3, Measurable Conservation Objective 4). As a result, FWC drafted and implemented an interim incidental take policy that requires relocation of tortoises on development sites where incidental take permits are issued for submitted applications that were not complete by July 30, 2007. This policy will remain in effect until the new permitting system is approved and implemented. Concerns have also been raised that this permit option does not provide adequate funding to FWC to purchase enough protected habitat for tortoises (Chapter 3, Measurable Conservation Objective 2). The proposed permitting system takes a new approach to addressing these concerns.

The FWC proposes a multi-tiered approach to permitting actions involving gopher tortoises. This new system will retain a simple permit option for developments impacting small numbers of tortoises, but replace the current standard relocation and incidental take permits with a new gopher tortoise conservation permit. Entombment would not be allowed as a part of the gopher tortoise conservation permit. Emergency permits would be used to address circumstances where there is an immediate danger to the public’s health and/or safety or in direct response to an official declaration of emergency by the Governor or other local

authority. New permits would be available for individuals seeking authorization to provide relocation services as needed for development projects and for designating recipient sites in advance of actual gopher tortoise impacts being identified. The proposed permitting system is illustrated in Figure 2.

The FWC proposes to consolidate the administration of gopher tortoise permitting into a single FWC organizational unit to streamline the permit review process. More efficient issuance of permits will also be accomplished through an on-line permitting application process, with some permits requiring less staff review than others. The FWC is also interested in facilitating partnerships with local governments to more efficiently address permitting needs in rapidly developing areas. The FWC will provide training assistance to local governments for this purpose. These partnerships will not replace FWC permitting authority, but will focus on making the best use of resources available to ensure gopher tortoise conservation goals are met. The local government coordination section of this plan contains more details on this topic.

*Mitigation contributions will vary based on the overall value of the gopher tortoise conservation action being permitted. The contribution amount will be directly related to the number of gopher tortoises impacted.*

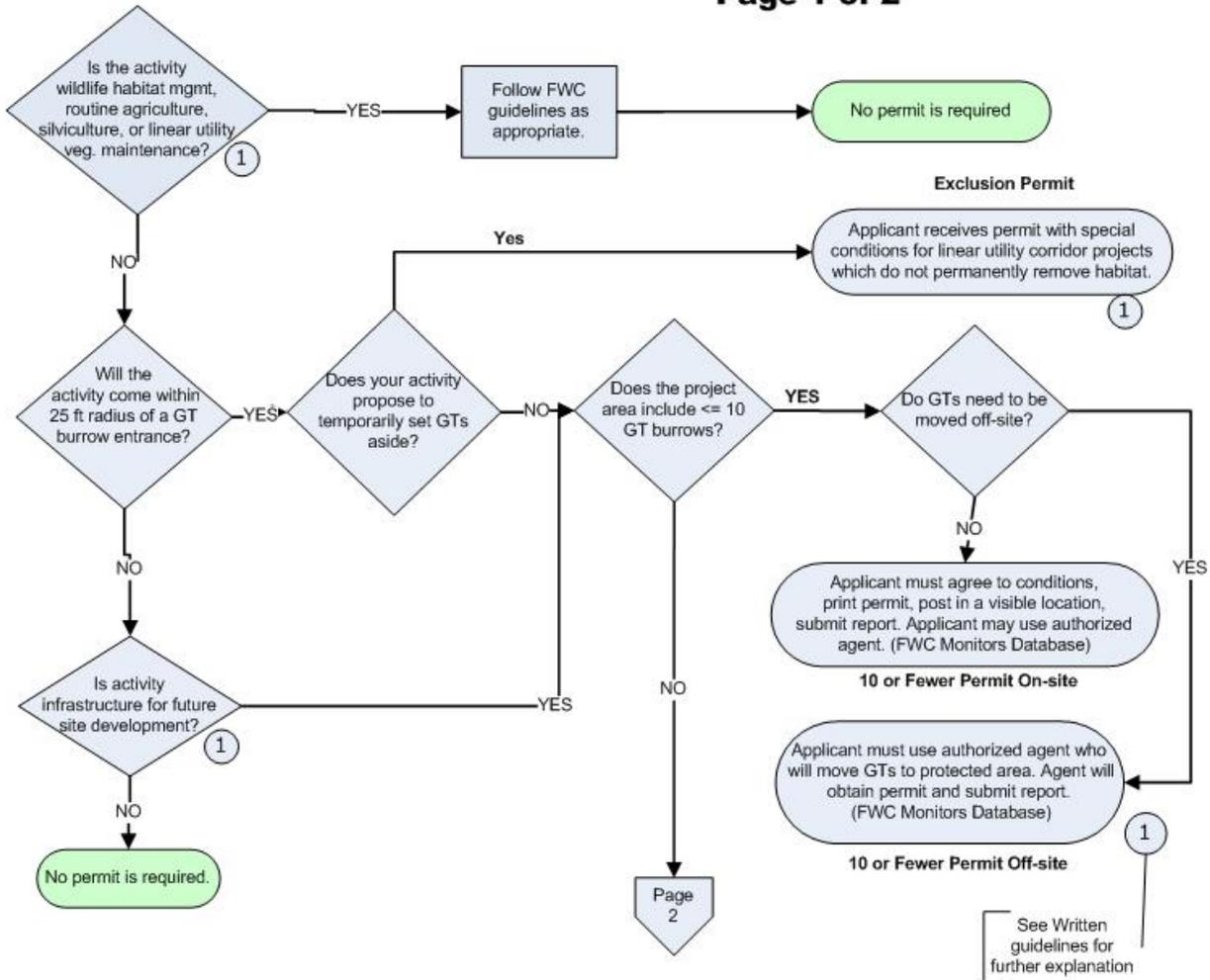
Mitigation for the loss of tortoises and their habitat has been accomplished as a part of the existing permit system. The most common tool has been the collection of mitigation contributions from permittees into the Land Acquisition Trust Fund. These contributions have been used by FWC to acquire lands with existing gopher tortoise populations and to manage the acquired land; over 26,000 acres have been protected through this permitting program since 1991. Some public lands have been used as relocation sites where existing habitat was suitable for gopher tortoises but was unoccupied or occupied at low densities. Private landowners have also accepted gopher tortoises, sometimes in consideration of payments from developers, onto lands with suitable habitats. These lands may have long- or short-term protection from development through conservation easements or other management agreements. No comprehensive analysis of the management of these lands and the fate of gopher tortoises moved to them has been conducted.

Under this new permitting system, a mitigation contribution will be required for all permits, including those which were previously issued at no cost. A new variable scale for mitigation contributions will be implemented, based on the overall value of the gopher tortoise conservation action being permitted. The contribution will be set based on the number of gopher tortoises impacted (simply determined by counting the number of burrows and dividing by 2). Preferred conservation actions such as the preservation of quality habitat on-site, restocking or otherwise responsibly relocating tortoises to long-term protected lands (public or private), or temporarily setting gopher tortoises aside while installing linear utility lines, will require a lower contributions. The least preferred options, such as rescue relocations to unprotected sites, emergency take without relocation, or relocations after settlement of a law enforcement case (after-the-fact), will require higher contributions, which increase accordingly. A flat mitigation contribution will be collected for the first 5 gopher tortoises

impacted (10 burrows impacted) on each project site. Additional mitigation contributions for sites supporting more than 10 tortoise burrows will be applicable. All mitigation contributions will be reserved for support of gopher tortoise conservation actions.

# Proposed Gopher Tortoise Permitting System

Page 1 of 2

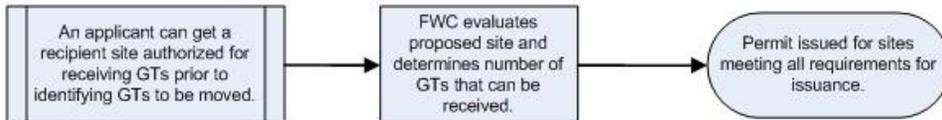


## Certification Permits

### Authorized Agent Permit



### Recipient Area Process



7/19/2007

## Proposed Gopher Tortoise Permitting System

Page 2 of 2

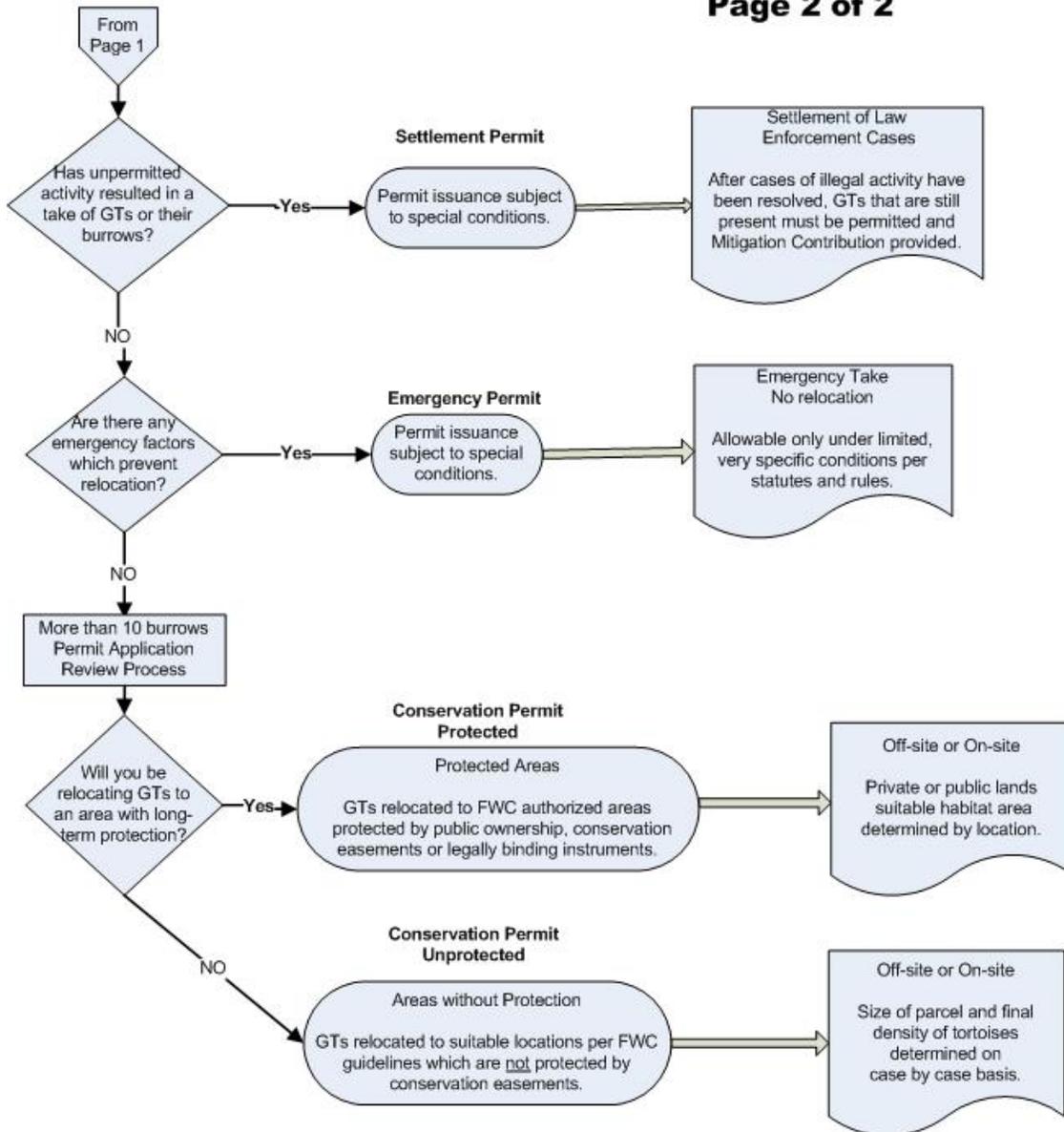


Figure 2. Proposed gopher tortoise permitting system process map.

July 19, 2007

### ***Proposed Permitting System***

As is currently the case, permits will not be required for actions that occur more than 25 feet (radius) from the entrance to any gopher tortoise burrow. If there are gopher tortoise burrows located within 25 feet of development activity that are not on the actual property being developed, those burrows must still be considered as a part of the permit application review process. Appropriate conservation actions will be determined for these during the permit review. Permits will also typically not be required for activities on public or private lands that are conducted to improve habitat for native wildlife, including prescribed burning, mowing, disking, or roller-chopping; or for ongoing agricultural, silvicultural, or linear utility vegetation maintenance. However, these actions would be subject to a permit when they are directly related to, or are a precursor to, future development of the property. These exemptions from permitting are specified more fully in the burrow rule policy statement (Appendix 3).

Small size development projects impacting 10 or fewer burrows (5 or fewer tortoises) have historically represented a small percentage of the total number of gopher tortoises impacted through the permitting system. On average, approximately 1,200 permits for relocation of 5 or fewer gopher tortoises (approximately 1,400 gopher tortoises per year) have been issued annually since implementation of the current permitting system. A number of stakeholders have voiced concerns that many more gopher tortoises may have been harmed historically by projects that were built on small lots. In order to address this issue, specific educational actions have been proposed in the outreach section of this plan. As a part of local government coordination, FWC will work cooperatively with local governments to address this issue. If future cooperative agreements are entered into between FWC and local governments where specific small size development projects are addressed and accommodations are made to receive gopher tortoises relocated from these projects, then the 10 or fewer burrows permit option called for in this plan may be revisited in order to ensure that single family homes and all other development projects which impact 10 or fewer burrows are not adversely impacted financially.

- 10 or Fewer Burrows
  - On-site Relocation for Properties with 10 or Fewer Burrows - This permit authorizes landowners to conduct relocation of gopher tortoises to an on-site location which is still within the property boundaries for this development. (This is equivalent to the 5 or fewer tortoises permit previously offered.) They may obtain the assistance of an authorized gopher tortoise relocation agent for this activity.
    - FWC mitigation contribution - \$200
  - Off-site Relocation for Properties with 10 or Fewer Burrows - This permit authorizes gopher tortoises to be relocated off the development property to a protected area. The permittee must select an authorized gopher tortoise relocation agent to assist with this move. Authorized gopher tortoise relocation agents must have their own permission from FWC for relocating

tortoises and may assist in obtaining all permit approvals for this type of action. The level of protection required at the off-site location may be of a short- or long-term duration (as defined in the glossary) depending on the option selected by the landowner.

- FWC mitigation contribution - \$200
- Certification Permits - Pre-approval Authorizations
  - Authorized Gopher Tortoise Relocation Agent - This permit would pre-approve/register individuals to operate as authorized tortoise relocation agents. Qualifications for issuance of this permit will be developed prior to implementing the new permitting system. (See Appendix 4 for a draft list of qualifications). Upon receiving this approval, individuals must still obtain site-specific permission from FWC to perform either on-site or off-site relocation on the behalf of any landowner. An authorized agent may provide services when 10 or fewer burrows exist as well as for greater numbers of burrows and tortoises. The agent must relocate tortoises to approved recipient sites as specified in the site permission. An authorized agent may work under any previously issued permit so long as FWC is given notification prior to any work being performed.
    - FWC mitigation contribution - \$500 (one-time)
  - Authorized Recipient Sites - This permit authorizes private landowners and public entities to receive and maintain gopher tortoises within designated and managed short- or long-term protected sites. The specific site criteria for issuing this type of permit will be determined prior to implementing this new permit system. Estimated minimum acreage (*i.e.*, a patch of habitat) for preserving a viable population of gopher tortoises has been cited as 25-50 acres (Cox *et al.* 1989), 50-100 acres (Eubanks *et al.* 2002), and, most recently, 250 acres (McCoy and Mushinsky in press). Recognizing that larger patches will likely have considerably more conservation value over the long term, recipient sites of hundreds of acres are certainly the most desirable. However, large, protected sites that can accommodate additional gopher tortoises are not always readily available; therefore, FWC urges that recipient sites be  $\geq 200$  acres, but will allow recipient sites  $\geq 40$  acres that meet other necessary criteria (Appendix 5). Minimum size acreage will be determined based on the specified purpose of the recipient site (*e.g.*, restocking for a viable population; receiving tortoises from small sites on an as-needed basis; holding tortoises that have been confirmed for exposure to pathogens, are symptomatic, or otherwise not able to be relocated elsewhere). Other factors will include the level of protection being provided, the on-site management proposed, and the geographic location. In extreme southern Florida (*e.g.*, south of State Road 80), where suitable protected habitat may be limited and

confined to relatively smaller patches, sites >25 acres will be considered and evaluated on a site by site basis to retain local tortoise populations.

- FWC mitigation contribution - \$500 (one time)
- Conservation Permit for On-site or Off-site Relocation for Properties with more than 10 Burrows Impacted - Protected Areas - This permit authorizes on-site or off-site relocation of larger numbers of tortoises to long-term protected areas:
  - On privately or publicly owned lands with suitable habitat. An area of  $\geq 40$  acres of suitable habitat is preferred; however, smaller areas (25 acres or more) may be considered on a site by site basis within the southern portion of the state to retain local tortoise populations.
    - FWC mitigation contribution - \$200 for the first 5 tortoises, \$300 for each tortoise thereafter.
- Conservation Permit for On-site or Off-site Relocation for Properties with more than 10 Burrows Impacted – Unprotected Areas – This permit authorizes on-site or off-site relocation of larger numbers of tortoises to areas without long-term protection by conservation easements.
  - On privately owned lands with suitable habitat. An area of  $\geq 40$  acres of suitable habitat is preferred; however, smaller areas (25 acres or more) may be considered on a site by site basis within the southern portion of the state to retain local tortoise populations.
    - FWC mitigation contribution - \$200 for the first 5 tortoises, \$3,000 for each tortoise thereafter.
- Temporary Exclusion – This category is specifically reserved for construction of major utility corridors in a linear fashion which involves capturing tortoises and excluding them from the footprint of construction for a temporary period of time. The post-construction habitat must be able to support the tortoises that were temporarily excluded.
  - FWC mitigation contribution - \$100-\$300 per tortoise
- Emergency Take Without Relocation - The new permit system will focus on options which provide actual conservation benefits for tortoises. However, there may be extraordinary circumstances where there is a need to authorize direct take of tortoises without relocation. For this reason, FWC will issue these permits only under very limited and specific circumstances in cases where there is an immediate danger to the public's health and/or safety or in direct response to an official declaration of emergency by the Governor or other local authority.
  - FWC mitigation contribution - \$4,000 per tortoise

- Authorized Relocation Post Settlement of Law Enforcement Case - This permit authorizes on-site or off-site relocation of gopher tortoises that are still present on sites where an illegal activity (required permits were not obtained) has been resolved.
  - FWC mitigation contribution - \$4,000 for each tortoise located on the remainder of the site. Possible additional payments will be as ordered by the courts for any tortoises taken without permit.

It is important to note that the process for issuance of permits by FWC for scientific research, education, and other specific purposes does not change as a result of the implementation of this new permit system.

### ***Guidelines***

Many of the permitting actions called for in this plan will be further detailed and explained through guidelines which are not formally adopted by rule. Current relocation guidelines will be revamped and updated to reflect the new permitting system outlined in this management plan. The new permitting and relocation guidelines will be drafted upon formal approval of this plan by FWC Commissioners. A general overview of guideline topics (but which is not all inclusive) is as follows:

- Rules protecting gopher tortoises and burrows.
- Additional details regarding permit options.
- Best management practices when permits are not required (*e.g.*, agriculture).
- Survey techniques and requirements for both donor and recipient sites.
- Humane capture, transport, handling (including marking and measuring), and release of relocated tortoises.
- Cold weather and other temporal concerns.
- Recipient site selection (details and elaboration of Appendix 5; including habitat criteria; stocking densities; carrying capacity determination).
- Recipient site protection, management, and monitoring (including financial assurances and commitments).
- Commensal concerns during tortoise relocations.

Table 2. Proposed timeline for implementing permitting actions.

<b>Proposed Permitting Actions</b>	<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>	<b>Year Four</b>	<b>Year Five</b>
<b>A) Draft new guidelines</b>					
Revise guidelines as required by the management plan (update methods for surveying, capturing, monitoring, etc.).					
Distribute permitting guidelines and coordinate with Florida Association of Environmental Professionals to establish a guideline implementation training program.					
<b>B) Develop FWC staffing and implementation strategy</b>					
Conduct workload analysis of permitting (administrative and biological) and law enforcement staffs, based on management plan and revised guidelines.					
Develop staffing strategy to implement permit system.					
Train staff to administer the new permit system.					
<b>C) Develop and implement web site permitting portal</b>					
Modify current on-line permit program (develop additional applications; revise web site layout and content).					
Develop enhanced database to track: Percentage permit options used Certified recipient sites Permit reporting data					
Develop a permit system to accommodate the on-line permit portal.					
Develop and maintain user survey to obtain feedback on usefulness of the web site and permit system.					
<b>D) Generate reports using the database</b>					
Create reports that identify which permit option is most used, recipient site management actions taken, number of tortoises relocated, etc.					

### **Local Government Coordination**

The Florida Fish and Wildlife Conservation Commission (FWC) has the sole constitutional authority and duty to manage wildlife, including gopher tortoises, in the state of Florida. Accordingly, the role of local governments (as well as other state agencies) in the regulation and management of wildlife, including the gopher tortoise, must be well-defined and limited. However, coordination between FWC and local governments in implementing components of this plan is essential to FWC's successful conservation and management of this species.

Local governments, and regional or state agencies (*e.g.*, water management districts), often are the first to conduct site inspections of properties where clearing or building permits are being sought. These on-site inspections typically occur early in the permit process and provide the opportunity to confirm the presence or absence of gopher tortoises, and to inform landowners and builders about required FWC permits and authorizations. This action by local governments or other agencies provides a mechanism to assure that necessary FWC permits can be issued earlier in the permit approval process, prior to local government land clearing or building permits being issued.

Local governments and other agencies also play a substantial role in gopher tortoise conservation and management by providing protected and managed areas for gopher tortoises (*i.e.*, by maintaining habitat for existing gopher tortoise populations, making suitable habitat available as gopher tortoise recipient sites, and restoring lands with potential gopher tortoise habitat to act as future recipient sites). A number of local governments either have created, or are in various stages of creating, habitat acquisition programs. These programs can provide important assistance for achievement of this plan's goals and objectives through the acquisition and management of gopher tortoise habitat. Despite important successes by some local governments, most still lack sufficient funds to restore and manage (through mechanical means and prescribed fire) the vast majority of their lands as conservation areas for gopher tortoises and other wildlife. As a result, lands protected by local governments can become unsuitable for gopher tortoises, burrow commensals, and other upland wildlife over time. Additionally, local governments may lack the information necessary to make important decisions including: what lands under their protection have suitable habitat for displaced gopher tortoises; what lands are in need of restocking; and what levels of habitat management or restoration are needed to maintain resident gopher tortoise populations or make lands suitable for gopher tortoise restocking.

Coordination between local governments and FWC will be crucial in efforts to increase funding for habitat acquisition and management. The FWC will encourage local governments to support FWC efforts to assure adequate funding within the Florida Forever successor program for the acquisition and management of listed species habitat, including management of existing publicly owned or controlled land.

The FWC will coordinate with local governments to help ensure that local acquisition programs, and their implementing ordinances and policies, are: (1) consistent with the goals and objectives of this gopher tortoise management plan; and (2) focus on core acquisition

priorities for gopher tortoises, listed burrow commensals, and other important wildlife species.

The FWC will also implement a management needs database to prioritize local government lands in need of management assistance. Priority lands listed in this database will receive management assistance through the creation of a prescribed fire strike team program (Chapter 4, Habitat Management). These strike teams will provide technical assistance and support for both mechanical management and fire management of upland habitats.

Effective cooperation between FWC and local governments can streamline FWC permit review process, improve regulatory compliance, and improve management of county and city-owned or controlled lands for gopher tortoises and other upland wildlife.

FWC will assist and encourage local governments to:

- Stay current with FWC regulations related to gopher tortoises and other listed species. Staff involved with all aspects of development review and planning should be familiar with these regulations.
- Provide information to landowners, builders, and the general public about this plan and FWC regulatory prohibitions and permit options. These efforts will help promote compliance with FWC regulations and understanding of FWC incentives available to landowners (Chapter 4, Outreach and Education; Incentives).
- Include a question on clearing and building permit applications as to what listed species surveys have been conducted on the property.
- Inspect parcels that are undergoing development review for the presence or absence of gopher tortoises and, when gopher tortoise burrows are present (as confirmed through site visits by trained county staff, FWC staff, or environmental consultant reports/data), require listed species surveys before issuance of clearing or building permits. Or, at a minimum, notify FWC staff of sites where burrows have been documented to help insure compliance with FWC gopher tortoise rules and guidelines.
- Consider assisting FWC with verification of gopher tortoise surveys on proposed development sites to ensure compliance with FWC guidelines for such surveys. In many cases, such assistance can serve to reduce FWC permit processing time.
- Consider requiring issuance of FWC gopher tortoise relocation permits early in a project's permit approval process before issuing local government clearing or building permits.
- Notify FWC of wildlife complaints regarding potential FWC rule violations through FWC's wildlife alert number. Coordinate with FWC law enforcement in providing supporting information for FWC law enforcement investigations.

- Identify, protect, manage, and restore important gopher tortoise habitat on lands owned or controlled by local governments and state agencies, and monitor resident tortoise populations on these protected lands.
- Establish recipient sites for relocation of gopher tortoises.
- Establish, within land development codes, incentives that will enhance local government's ability to acquire gopher tortoise habitat and manage lands under their control.
- Use Memorandums of Understanding with FWC to implement any of the above actions.

FWC will:

- Create outreach materials for local governments, landowners, and the general public to foster better understanding and compliance with this plan and FWC regulations, including FWC incentives for landowners to promote this plan's conservation objectives (Chapter 4, Outreach and Education; Incentives).
- Create prescribed fire strike team program to assist with management of gopher tortoise habitat on lands protected through local government acquisition programs that lack sufficient staff to conduct burns or other habitat management on their own.
- Lead efforts to attain additional funding through the Florida Forever successor program to allow local and state governments to purchase and manage additional conservation lands for gopher tortoises and other wildlife to meet plan goals and objectives.
- Consider creative solutions to assist local governments in obtaining recipient site permits (*e.g.*, assist with gopher tortoise surveys) on lands they own or manage which are potential gopher tortoise recipient sites.
- Identify and prioritize potentially suitable sites on publicly owned or controlled land that are in need of habitat restoration through use of FWC management needs database.
- Consider opportunities within the new gopher tortoise permitting system to provide incentives to local governments to set aside conservation lands as potential restocking or otherwise responsible relocation sites for gopher tortoises.
- Assist local governments in establishing incentives in land development codes to better restore and manage publicly owned or controlled land to provide habitat for gopher tortoises and other upland wildlife.

- Schedule workshops with local governments. Such workshops will involve in-depth dialogue on key gopher tortoise conservation issues including:
  - An overview of tortoise biology and habitat needs.
  - An overview of the revised FWC gopher tortoise permitting system.
  - The important role of local governments in improving compliance with FWC gopher tortoise permitting system.
  - Improving coordination between local governments and FWC law enforcement.
  - An overview of procedures to establish recipient sites for gopher tortoises and burrow commensals.
  - Management of tortoise recipient sites, determining carrying capacity, and requesting assistance from FWC’s prescribed fire strike teams.
  - Formalizing partnerships with FWC through Memorandums of Understanding.

Table 3. Proposed timeline for implementing local government coordination actions.

<b>Proposed Local Government Coordination Actions</b>	<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>	<b>Year Four</b>	<b>Year Five</b>
Develop educational materials for local governments, homeowners, landowners, etc.					
Coordinate with local governments and state agencies in requesting funding for habitat management, acquisition, and restoration through the Florida Forever successor program.					
Conduct workshops with local governments to enhance gopher tortoise conservation at the local level.					
Create management needs database.					
Implement prescribed fire strike team program.					
Begin drafting Memorandums of Understanding with local governments.					

**Law Enforcement**

The Florida Fish and Wildlife Conservation Commission (FWC) Division of Law Enforcement (LE) will help ensure that all entities developing property within gopher tortoise habitat comply with the new permit system and abide by the Florida Statutes and FWC rules, policies, guidelines, and permits which protect the species. Accordingly, a law enforcement protocol has been drafted (Appendix 6) which outlines appropriate steps for conducting investigations. A law enforcement policy (Appendix 3) will also assist officers with enforcement of the new burrow rule. A training manual will be developed, and training will be conducted by qualified personnel for officers in the field as well as in the recruit academy.

The LE will work closely with all counties to help build partnerships for enforcement of regulations and detection of violations. Local governments can assist FWC by: (1) issuing clearing or building permits only after protected species issues have been addressed, and (2) checking for tortoise burrows and posted permits on development parcels to ensure that state regulations have been followed.

Primary enforcement will still result from LE proactive patrol and responding to complaints of destruction of gopher tortoises and/or their burrows without a permit. Officers will determine if a permit has been issued and if an investigation is warranted. Investigations may result in the landowner or other responsible party receiving either a warning or citation. In instances where a citation is issued, the case will be referred to the state attorney’s office for formal charges. Ultimately, the landowner must apply for a settlement permit (Chapter 4, Proposed Permitting System), if the investigation reveals illegal activity which requires mitigation. These permits will require higher mitigation contributions than other permit types.

Additionally, LE will work to ensure that those in possession of valid tortoise conservation permits adhere to, and abide by, the specific terms and conditions of the permit and FWC guidelines. Violators may be warned or cited and may face possible suspension, revocation, or non-renewal of their current permit(s) as well as loss of future permit privileges.

Table 4. Proposed timeline for implementing law enforcement actions.

<b>Proposed Law Enforcement Actions</b>	<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>	<b>Year Four</b>	<b>Year Five</b>
Develop training/reference manual on gopher tortoises and associated burrow commensals for FWC officers and state attorneys offices, which will include, but not be limited to, the following information about gopher tortoises: rules, law enforcement protocols, natural history, permitting guidelines, and pertinent definitions.					
Conduct training sessions for LE field officers.					
Conduct training sessions at LE recruit academy.					
Coordinate with county planning/environmental offices regarding gopher tortoise permit compliance and enforcement issues.					
Conduct proactive patrols and efficient response to complaints regarding gopher tortoises and development.					

### **Habitat Preservation**

The measurable objective to preserve an additional 615,000 acres by 2022 sets the bar high for habitat acquisition and other forms of permanent protection. Accomplishing this objective will require close partnerships among regional, state, and federal agencies; local governments; and non-governmental organizations (NGOs). Protecting habitat through conservation easements will also figure prominently in achieving this objective. For the latter option to work effectively, viable economic landowner incentives will need to be realized, particularly related to the relocating of tortoises on privately owned lands. Actions that address this objective include:

- Collaborate with the Acquisition and Restoration Council (ARC) to promote state land acquisition projects that acquire and/or protect upland communities important to listed wildlife such as the gopher tortoise and associated commensals.
- Emphasize acquisition of severely imperiled upland habitats such as sandhill, scrub, and coastal dunes, as well as other gopher tortoise habitats (particularly those with viable populations), by coordinating with the following:
  - Department of Environmental Protection
  - Water Management Districts
  - County environmental offices
  - Florida Natural Areas Inventory
  - The Nature Conservancy and Trust for Public Land
- Acquire suitable upland habitats that are in need of restoration, restore the necessary ecological components for that habitat type, and restock tortoises if populations are severely depleted (based on the habitat, relative to the site's carrying capacity).
- Increase habitat connectivity by acquiring and/or protecting upland habitats that are adjacent to other preserved lands or that serve as corridors to link preserves.
- Whenever possible, acquire uplands with adjoining or integrated wetland communities to provide habitat for burrow commensals.
- Create economic incentives for private landowners to place their properties under conservation easements to receive displaced tortoises (Chapter 4, Incentives).

Table 5. Proposed timeline for implementing habitat preservation actions.

<b>Proposed Habitat Preservation Actions</b>	<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>	<b>Year Four</b>	<b>Year Five</b>
Collaborate with the ARC to promote state land acquisition projects that acquire and/or protect upland communities important to listed wildlife such as the gopher tortoise.					
Work with local governments and NGOs to emphasize acquisition of severely imperiled upland habitats such as sandhill, scrub, and coastal dunes.					
Encourage land acquisition of suitable upland habitats that are in need of restoration.					
Increase habitat connectivity by acquiring and/or protecting upland habitats that are adjacent to other preserved lands.					

**Habitat Management**

This plan places great importance on the ability of protected lands to support gopher tortoise populations at levels that will ensure the long-term security of the species. Currently, the 1.34 million acres of potential gopher tortoise habitat in public ownership represents 40% of the estimated 3.32 million acres of gopher tortoise habitat remaining in the state. Lands managed by Florida Fish and Wildlife Conservation Commission (FWC) include 128,000 acres of gopher tortoise habitat or 10% of the statewide public land total. With such an important portion of existing gopher tortoise habitat falling under public ownership, public agencies bear a significant responsibility for undertaking appropriate habitat management.

Public lands afford a high level of security to “at risk” populations of wildlife because of statutory requirements and provisions for long-term management funding. Consequently, this plan advocates increased management focus and intensity on public lands that are capable of supporting the habitat and life history requirements of the gopher tortoise. There is concern that current land management funding levels are insufficient to achieve desired levels of upland habitat management on publicly owned lands. A recent analysis performed by a working team of the Gopher Tortoise Stakeholder’s group comprised of agency and private land management professionals suggests this shortfall at \$104 million in funding over the next 15 years. Successful implementation of this plan may require a legislative commitment to supply management agencies with the necessary personnel, equipment, and funding to undertake required management actions.

*Maintaining habitat conditions preferred by gopher tortoises requires a commitment by resource managers to plan and initiate vegetation management practices.*

Gopher tortoises tend to be habitat generalists, and will occupy most upland plant communities that contain relatively well-drained soils for burrowing, and sufficient herbs and grasses for forage. Likewise, burrow commensals are upland dependent, with certain species requiring temporary ponds for breeding. Historically, the recurrence of lightning-ignited fire was pivotal in setting back vegetative succession and shaping species composition and structure of Florida's upland plant communities. The frequency and periodicity of these fires provided a competitive advantage to fire tolerant vegetation, resulting in open pine stands and lush ground cover, conditions well-suited to the life history needs of the gopher tortoise.

The regular application of prescribed burning is critical for the maintenance of habitat conditions preferred by the gopher tortoise. Prescribed burning reduces shrub and hardwood encroachment, and stimulates growth of tortoise forage plants such as grasses, forbs, and legumes. The physical result of fire on tree and shrub species is to reduce canopy cover. Heat stress caused by prescribed burning will trim the lower limbs of pine and hardwood trees and induce mortality among young, stressed, and diseased trees. This allows greater sunlight penetration to reach ground level which promotes establishment of understory species used by the tortoise as forage and is also important for proper egg incubation in gopher tortoises. Burning during the early growing season (April – June) causes even more pronounced vegetative responses when compared to burning conducted during the period of plant dormancy. These early growing season burns stimulate flowering in many warm season grasses, increase species composition among understory plants, and result in higher understory biomass production.

*By thinning pine trees and using prescribed fire to foster open, grassy habitat conditions, managers can be assured that application of these practices will not only benefit the gopher tortoise, but a vast segment of Florida's wildlife that also inhabit upland communities.*

Increased urbanization and societal intolerance of prescribed burning represent serious threats to gopher tortoise populations and their habitat. Consequently, maintaining habitat conditions preferred by gopher tortoises requires a commitment by resource managers to plan and initiate vegetation management practices. By thinning pine trees and using prescribed fire to foster open, grassy habitat conditions, managers can be assured that application of these practices will not only benefit the gopher tortoise, but a vast segment of Florida's wildlife that also inhabit upland communities.

The following parameters help define optimal conditions for tortoise habitats in Florida:

- Maintain upland forested pine and hardwood canopy cover below 60% in order to stimulate production of forbs, grasses, and other tortoise forage plants.
- Maintain herbaceous groundcover, including grasses, legumes, and forbs, at 50% or greater.

- Apply prescribed fire every 5 years or less to stimulate growth and diversity of tortoise forage items.

The FWC has direct management authority for approximately 1.46 million acres within the wildlife management area (WMA) system. Approximately 128,000 acres, slightly less than 10%, is considered potential gopher tortoise habitat. The following measures will be implemented by FWC for the purpose of optimizing gopher tortoise carrying capacity on lands within the WMA system.

- Implement appropriate habitat management practices on upland natural plant communities to restore community dynamics and functions.
- Develop a prescribed fire database that records total area of fire-maintained communities, backlog acreage not in fire-maintenance condition, annual burn acreage, and season of burn.
- Develop a management treatment database to record mechanical, chemical, and prescribed burning applications undertaken to improve canopy and ground cover conditions.
- Develop a vegetation monitoring database to track understory and vegetative responses to prescribed management activities.

Proactive tortoise habitat management on both public and private lands requires application of aggressive land management activities to optimize conditions for gopher tortoise foraging (diverse herbaceous ground cover) and reproduction (open, sunlit sites for nesting). The following land management practices are considered effective for improving habitat quality and should be incorporated into the management framework for public and private conservation lands:

- Recommend to the Acquisition and Restoration Council (ARC) that Land Management Reviews of state managed lands include a separate assessment to determine if upland habitat management is consistent with the goals and objectives of gopher tortoise conservation.
- Apply prescribed burning at appropriate seasons and frequency to reduce pine and hardwood canopy and midstory cover, promote canopy openings, and stimulate development of herbaceous ground cover (Table 6).
- Pine and hardwood timber harvest and various forms of mechanical and chemical vegetation control should be considered in order to achieve specific habitat and vegetation objectives or enhance degraded habitat.
- Avoid or minimize roller-chopping and other intensive heavy equipment use in areas with high burrow concentrations, unless there is no other alternative to reducing saw palmetto (*Serenoa repens*) or other shrub cover.

- Control infestations of cogongrass and other invasive exotic plants which can reduce native plant species composition or interfere with the application of habitat management practices such as mowing and prescribed burning.
- Apply ground cover restoration techniques on degraded and agriculturally disturbed sites to restore natural plant community functions and create suitable habitat for use by gopher tortoises and associated commensal species.
- Develop a management needs database to identify and prioritize local government and state lands in need of assistance with management activities. This online database and web site would allow landowners and land managers to request assistance with management activities via the web.
- Develop prescribed fire strike team program to implement management activities on lands listed in the management needs database. Strike teams will be capable of conducting site preparation activities (such as fire lines and roller chopping) in addition to using prescribed fire techniques. Over the long-term, the technical assistance provided by the strike teams should enable many landowners to create their own self-sustaining habitat management programs. An important focus of the team will be application of prescribed fire near the wildland-urban interface.

Table 6. General guidelines for plant communities commonly used by the gopher tortoise including associated fire frequency, and parameters and related values used to define optimum gopher tortoise habitat in Florida.

<b>Plant Community</b>	<b>Fire Regime</b>	<b>Max. % Canopy Cover</b>	<b>Max. % Shrub Cover</b>	<b>Min. % Ground Cover</b>
Dry Prairie	1-3 yrs	< 10	< 10	50
Sandhill/Upland Pine Forest	2-5 yrs	50	30	40
Flatwoods	2-5 yrs	60	50	50
Scrubby Flatwoods	3-7 yrs	40	60	30
Oak Scrub	7-12 yrs	40	60	15

Table 7. Proposed timeline for implementing habitat management actions.

<b>Proposed Habitat Management Actions</b>	<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>	<b>Year Four</b>	<b>Year Five</b>
Implement appropriate habitat management practices on upland natural plant communities to restore community dynamics and functions on lands managed by FWC.					
Develop a prescribed fire database.					
Recommend to the ARC that Land Management Reviews of state-managed lands include a separate assessment to determine if upland habitat management is consistent with the goals and objectives of gopher tortoise conservation.					
Create a management needs database.					
Create prescribed fire strike team program.					
Develop a management treatment database.					
Develop a vegetation monitoring database.					

**Population Management**

Preserving and managing gopher tortoise habitats are key components in achieving the conservation goal; however, addressing the needs of tortoise populations themselves also plays a role in the success of a long-term species conservation plan. In general, resource managers undertake activities to enhance the required burrowing, foraging, and nesting habitat, with the understanding that tortoise individuals and populations will be benefited through improved nutrition, increased fecundity, and positive effects on growth rates and age to sexual maturity. However, as populations become more fragmented and as urbanization results in an ever-decreasing habitat base and ever-increasing number of displaced gopher tortoises, managers will need to take a more direct, hands-on, approach to conserving this imperiled species.

Restocking of other imperiled species is generally undertaken with surplus individuals from protected populations. However, in the case of gopher tortoises, drastically reducing the mortality of individuals on development sites necessitates actions that unite Measurable Conservation Objectives 3 and 4, (*i.e.*, restock tortoises where needed, and responsibly relocate or otherwise accommodate displaced tortoises to prevent their entombment). Much of the current intense development pressure occurs in peninsular Florida and therefore presents the dilemma of whether to relocate tortoises displaced by development in the peninsula to available, protected, restocking sites in extreme northwest

Florida. The Florida Panhandle is relatively rich in protected lands, but many tortoise populations are depleted; therefore, restocking will be a prime action there. The restocking strategy presented in this plan is to relocate gopher tortoises to sites which can benefit from the restoration of this keystone species. The focus will be on establishing viable populations on protected, well-managed lands.

Restocking gopher tortoises to restore severely depleted populations will likely be the preferred population management tool, just as prescribed fire is the premier habitat management tool.

*Restocking gopher tortoises to restore severely depleted populations will likely be the preferred population management tool, just as prescribed fire is the premier habitat management tool.*

Restocking imparts a conservation value through deliberate and planned relocations of wild gopher tortoises into protected, managed, suitable habitat where resident densities are extremely low and where the tortoises' future survival and long-term population viability are very likely. Restocking is a form of responsible relocation; however, tortoises may also be responsibly relocated to sites with resident tortoises where the carrying capacity has been increased through habitat management to provide sufficient forage for additional tortoises. Two key elements of responsible relocation involve soft release or other techniques to enhance site fidelity, and a firm commitment for long-term habitat management to sustain the increased tortoise density. This emphasis on enhanced site fidelity, long-term protection and management of the recipient site, and conservation value to the species differentiates restocking and other responsible relocations from rescue relocation, which seeks primarily to remove tortoises from impending, human-caused harm. Such rescued individuals may go to unprotected, relatively small, or inadequately managed, sites; however, in some cases, an educational benefit may be realized by having tortoises remain within, or close to, human communities. Specific population management actions include the following:

- Prioritize protected gopher tortoise populations in terms of their significance for maintaining tortoise populations long-term. Realizing the limitations of manpower and money, high priority sites will become the focus of habitat or population management activities. The continued well-being of these focal populations will be pivotal in conserving tortoises statewide, regionally, or locally. A detailed hierarchy of current conservation lands, by region and county, will be created and updated on a regular basis.
- Coordinate with federal, state, regional, and local agencies/governments to identify and protect regionally significant tortoise populations, especially those in imperiled upland communities like sandhill, scrub, and coastal dunes.
- Restock tortoises on protected, managed lands where populations have been severely depleted or eliminated (*e.g.*, various public lands in the Florida Panhandle where past heavy human predation has decimated tortoise populations).
- Encourage private landowners, whose populations have been similarly depleted, to place their properties under conservation easement and allow restocking of gopher

tortoises, affording an economic benefit to the landowners and a conservation benefit to this species. In areas where tortoise densities are known or suspected to be low (*e.g.*, the Panhandle), identify and contact owners of multi-hundred acre landholdings to explain this option for increasing revenue, maintaining wildlife habitat, and bolstering the local tortoise resource.

- Survey FWC-controlled wildlife management areas (WMAs) to determine if suitable restocking sites exist, and equally important, identify sites where release of additional tortoises is not warranted due to possible adverse effects on resident populations. A draft survey methodology is provided in Appendix 7, and employs a 3-tiered approach of geographic information system (GIS) determination of potential habitat, the managers' knowledge of relative tortoise abundance, and burrow surveys to determine resident tortoise densities.
- Allow peninsular tortoises to be restocked experimentally in the Panhandle, with stringent follow-up to determine if reproduction is adversely affected or to detect any behavioral differences that could have long-term impacts on population growth and well-being.
- Coordinate with Georgia, Alabama, and other states to help retain or enhance populations of this keystone species throughout its range by exploring options to restock displaced Florida tortoises (due to development) to select public lands where populations have been severely depleted or eliminated. Collaboration with the receiving state would include periodic post-relocation burrow surveys and, preferably, initial intensive follow-up using mark-recapture or radio-telemetry.
- Evaluate the effectiveness of predator exclusion and other management practices that improve tortoise recruitment and survival. In extreme cases where hatchling success is documented to be unusually low or where sustained juvenile mortality is occurring, consider head-start programs where juveniles are protected until large enough to minimize the predation risk.
- Partner with other agencies, local governments, and non-governmental organizations (NGOs) to identify sites, both regionally and locally, that can accommodate rescued and displaced tortoises that may not be part of a coordinated restocking effort.

Table 8. Proposed timeline for implementing population management actions.

<b>Proposed Population Management Actions</b>	<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>	<b>Year Four</b>	<b>Year Five</b>
Restock tortoises on protected, managed lands where populations have been severely depleted or eliminated.					
Survey lands where FWC is the lead management agency to determine if suitable restocking sites exist.					
Develop a pilot project to evaluate the effectiveness of restocking peninsular tortoises to the Panhandle.					
Identify and prioritize protected gopher tortoise populations in terms of their significance for maintaining tortoise populations long-term.					
Contact relevant agencies and NGOs to initiate discussions regarding protection and management of specific, high-priority tortoise populations.					
Identify and contact owners of large, Panhandle landholdings to discuss conservation value and economic benefits associated with the restocking of tortoises.					
Coordinate with Georgia, Alabama, and other states to explore options for restocking of displaced Florida tortoises to select public lands where populations have been severely depleted or eliminated.					
Evaluate the effectiveness of predator exclusion and other management practices that improve tortoise recruitment and survival.					
Partner with other agencies, local governments, and NGOs to identify sites, both regionally and locally, that can accommodate rescued and displaced tortoises that may not be part of a coordinated restocking effort.					

## Disease Management

Infectious disease is now widely recognized as a factor in the survival of wildlife populations. The effects of disease can be increased when populations are fragmented or stressed by human activity. Gopher tortoises are known to be subject to several infectious diseases that potentially affect their survival (*e.g.*, upper respiratory tract disease [URTD], iridovirus, herpesvirus). Previous attempts to control the spread of upper respiratory tract disease by requiring serological testing of a sample of tortoises prior to relocation were recognized as ineffective, and the requirement was suspended in August 2006. However, appropriate study and management of disease is necessary to achieve the plan's goals and objectives. Specific disease management actions include the following:

- Establish a gopher tortoise disease group, including active researchers, veterinarians, and pathologists, to advise the Florida Fish and Wildlife Conservation Commission (FWC) on disease management.
- Create a health screening protocol (including diagnostic tests when warranted to achieve specific objectives) for field application during capture and relocation of gopher tortoises.
- Articulate a clear policy and guidelines on the proper disposition of tortoises that field health screens suggest are actively diseased or possibly infectious.
- Provide policy support from FWC for any landowner (private or agency) that desires disease testing of tortoises to be released at a particular site.
- Create a disease response contingency plan to apply in instances of apparently large-scale or catastrophic disease outbreaks.
- Establish an educational campaign to warn the public of the risks of transmitting infectious agents when gopher tortoises are moved illegally (Chapter 4, Outreach and Education).
- Conduct research on tortoise disease, including identification, testing, transmission, and lethal and sublethal population effects (Chapter 4, Future Research).
- Monitor tortoise populations known to have high incidence of disease to determine effects, and conduct follow-up assessments of die-off events (Chapter 4, Monitoring).
- Establish a procedure for carcass recovery and pathological investigation of sick and dead tortoises.
- Identify populations and localities where known diseases like URTD appear to be absent or in low incidence.

Table 9. Proposed timeline for implementing disease management actions.

<b>Disease Management</b>	<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>	<b>Year Four</b>	<b>Year Five</b>
Establish a gopher tortoise disease group to advise FWC.					
Create a health screening protocol for field application during tortoise capture and release.					
Articulate clear policy and guidelines regarding disposition of diseased or potentially infectious tortoises.					
Provide policy support for landowners that desire disease testing prior to release of tortoises on their recipient sites.					
Create a contingency plan for large-scale disease outbreaks.					
Establish a procedure for carcass recovery and pathological investigations of sick and dead tortoises.					
Identify populations where known diseases like URTD appear to be absent or low incidence.					

### **Incentives**

One of the greatest challenges to reducing gopher tortoise mortality on development sites will be identifying sufficient future recipient areas for the tortoises displaced each year by development. Public lands alone cannot meet this demand; it will take the collaboration of private property owners. Implementation of this management plan will require the cooperation of many agencies and partners outside the Florida Fish and Wildlife Conservation Commission (FWC). The plan is structured to provide incentives to partners to encourage their action and participation. These incentives are intended to promote an increase in the acreage of protected and managed tortoise habitat (Chapter 3, Measurable Conservation Objectives 1 and 2), and focus FWC permitting efforts on those activities providing the best long-term conservation benefits to the species. Available incentives can be categorized as either being associated with the revised permit system or through state and federally administered landowner assistance programs.

#### ***Permit-Based Incentives***

Permit-based incentives can be divided into 3 categories: (1) those that waive permit requirements for activities that are specifically intended to improve habitat for native wildlife (*e.g.*, prescribed burning); (2) those that authorize increased stocking densities on approved recipient sites exceeding minimum habitat quality criteria; and (3) those requiring smaller mitigation contributions for responsible relocations.

Gopher tortoise permit requirements will continue to be waived on public or private lands for activities that are specifically intended to improve habitat for native wildlife. These activities generally include prescribed burning, mowing, roller-chopping, and tree stand thinning. However, permits are required when these activities are conducted as a precursor to development.

Higher stocking densities will be allowed on recipient sites that exhibit desirable tortoise habitat attributes, such as those containing well-drained soils, open or sparse tree canopy, or a healthy groundcover of herbaceous plants. Habitat criteria necessary for higher stocking densities will be outlined in gopher tortoise permitting guidelines.

The new permit system will require smaller mitigation contributions from permittees that responsibly relocate tortoises to protected private or publicly owned lands. This economic incentive should help guide developers towards mitigation that reduces mortality of tortoises on development sites and provides long-term conservation benefits.

### ***Safe Harbor Agreement***

The Safe Harbor Agreement (SHA) has the potential to increase the value of landowner incentives, although their application to gopher tortoise conservation is just now being explored. In principle, a SHA allows an agency to assure a landowner that successful land management conservation will not subject the landowner to increased property-use restrictions if the landowner agrees to perform specific activities that enhance the habitat. The agreement is a contract between an agency and landowner, specifying an agreed baseline level of regulated wildlife that the landowner will not be able to impact without obtaining a permit. Further, the agency agrees not to penalize the landowner should changes in their land use practices increase the regulated species numbers above the agreed baseline level. This gives landowners certainty about future regulatory responsibilities which assures landowners that their management activities which encourage wildlife will not cause future regulatory burden. A risk of creating a SHA is that conservation benefits created under the agreement can be reversed if the landowner chooses to change land use. However, widespread application of the SHA suggests this occurs in only a small number of cases and the freedom from fear of future regulatory jeopardy fosters cooperative wildlife management in many examples. The SHA has been notably successful in supporting private conservation areas for red-cockaded woodpeckers (*Picoides borealis*) and is just beginning to be used in Florida.

The application of the SHA to gopher tortoise management is conceptual at this time, but could involve agreements covering recipient sites for rescue relocation, changes in land use of on-site tortoise conservation reserves, and transfers of 'credit' for preserved gopher habitat among sites. The plan proposes to review the operation of the SHA in other species and locations, and explore the application of the SHA in the context of the management plan actions.

### ***Landowner Assistance Programs***

The FWC administers or assists other agencies with the application of several landowner incentive programs for wildlife conservation goals. Among these are the Forest Stewardship Program, Wildlife Habitat Incentives Program, Environmental Quality Incentives Program, Landowners Incentives Program, Partners for Fish and Wildlife Program, Common Species Common, and the Conservation Reserves Program (Appendix 8). Together, these programs make several million dollars available each year to landowners as cost share for specified expenditures associated with their voluntary participation in wildlife conservation and management on private lands.

The FWC provides technical guidance and review to focus and approve the distribution of these cost share funds for specified wildlife management activities. The FWC will coordinate internally with its landowner assistance program to enhance the application of these programs on appropriate privately owned uplands for gopher tortoise conservation. This program will include technical advice and outreach to landowners on opportunities for establishment of reserves, revenue generation as gopher tortoise recipient sites, and technical and financial assistance with habitat management (*e.g.*, prescribed burning, vegetation management). The FWC is currently creating improved outreach and evaluation of landowner needs and preferences to increase the effectiveness of this program. Gopher tortoise conservation goals and objectives will be integrated into this program.

New tax reduction incentives have been proposed within Florida and the U.S. Congress that would encourage greater conservation of gopher tortoise habitat. In Florida, proposals have been made to expand existing agricultural or “green-belt” property tax reduction so that they would also apply to properties being preserved and managed to enhance the conservation of state listed species. The U.S. Congress is currently evaluating proposals to provide federal income tax credits for land management expenses that benefit federally listed species. The approval and implementation of one or both of these programs could greatly increase acreage of private lands that are protected and managed for gopher tortoises and other listed species.

Table 10. Proposed timeline for incentives actions.

<b>Proposed Incentives Actions</b>	<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>	<b>Year Four</b>	<b>Year Five</b>
Draft and distribute guidelines for habitat quality criteria that would allow higher tortoise stocking densities on certified recipient sites.					
Assess the effectiveness of permit-based incentives to achieve their proportion of the management plan conservation objectives. Evaluate the need for any revisions.					
Coordinate internally with FWC staff that provides technical assistance and outreach to private landowners to increase the acreage of tortoise habitat managed on private lands.					
Review the use of SHAs for other imperiled species and explore their potential for conserving gopher tortoises.					

**Monitoring**

Monitoring serves a variety of purposes in this plan, including tracking progress towards conservation objectives, assessing declines in gopher tortoise populations using geographic information system (GIS) analysis, and directly monitoring the health and stability of tortoise populations on key protected areas. Monitoring is divided into 8 categories below.

***Acquisition of Public Lands***

The Florida Fish and Wildlife Conservation Commission (FWC), other agencies and local governments acquire upland habitat through a variety of different programs (Chapter 3, Measurable Conservation Objective 2). Acquired acres of habitat suitable for gopher tortoises will be tracked as described below.

- Each year, FWC will total the number of acres of gopher tortoise habitat acquired with its share of Florida Forever Land Acquisition Program funds and those from any successor state environmental lands acquisition program. Additionally, FWC will contact other agencies participating in this program to estimate their annual acquisition of potential tortoise habitat.
- FWC will contact non-governmental organizations (NGOs) every year to obtain estimates of gopher tortoise habitat permanently protected through their acquisitions.

- FWC will contact local governments every year to obtain an estimated acreage of potential gopher tortoise habitat acquired by them.

### ***Protected Acres of Gopher Tortoise Habitat on Private Lands***

Acquisition of new public lands is one of several methods for permanently preserving gopher tortoise habitat. Conservation easements can also be used to protect private lands from future development and are an important component to the conservation objectives of this plan (Chapter 3, Measurable Conservation Objective 2). Acres acquired will be totaled each year. This information will be used to track progress towards plan objectives and identify properties where assistance with management activities may be needed.

- FWC will continually track the number of acres of private lands protected through the gopher tortoise permitting system.
- Each year, FWC will coordinate internally and with other agencies and organizations to assess the acreages of private lands protected under conservation easements through other programs.

### ***Habitat Management Actions***

Management of gopher tortoise habitat maintains the landscape at an early successional stage where canopy and shrub cover is minimal. This allows growth of herbaceous forage essential to the long-term survival of tortoises. Prescribed fire and mechanical treatment of tree and shrub layers are the primary tools of wildlife managers.

Tracking management actions recognizes landowners who are meeting management plan objectives (generally, targeted fire intervals of 5 years or less, with some exceptions). Tracking management needs helps identify and prioritize lands where financial or technical assistance is required to improve habitat quality for tortoises.

- Monitor and maintain a prescribed fire database.
- FWC will monitor and maintain a management treatment database of habitat management actions performed on lands under its control.
- FWC will maintain a vegetation monitoring database to track vegetation measurements on lands under its control (*i.e.*, Objective-based Vegetation Management).
- FWC will maintain and monitor a management needs database for external partners to track and prioritize public and private lands in need of management assistance. Prescribed fire strike teams will provide technical assistance and implement management actions on lands listed in the management needs database (Chapter 4, Habitat Management).

- As a member of the Acquisition and Restoration Council (ARC), FWC will contribute to the development of effective land management and monitoring plans that help protect, maintain, and recover gopher tortoises and their habitats.

### ***Monitoring Relocated Tortoises***

FWC will track the number of tortoises relocated through the gopher tortoise permitting system. Objective 4 of this plan aims to increase relocations to protected, managed, suitable habitats (“responsible relocations” and “restocking”) and therefore reduce “rescue relocations” to unprotected areas (see glossary for definitions). As more protected recipient areas become available, it may be possible in some areas to greatly reduce or eliminate rescue relocations which only have short-term conservation value.

### ***Long-term Monitoring of Recipient Sites***

Monitoring the number of tortoises moved to protected sites is the first step in an ongoing process of long-term monitoring of recipient areas. Landowners with recipient sites under conservation easement will be required to submit a gopher tortoise survey and land management report. Included with this survey will be information on habitat management activities which have occurred on the property as well as estimates of habitat variables such as percent canopy cover and percent herbaceous ground cover. Following receipt of this information, FWC will conduct site visits on these properties to verify accuracy of tortoise surveys and confirm that appropriate management activities have taken place. Monitoring requirements and minimum habitat criteria will be outlined in FWC gopher tortoise permitting guidelines. FWC will require reports and conduct site visits of these properties at least once every 3 years.

### ***Gopher Tortoise Population Status and Habitat Loss***

Current technological innovations, such as GIS, can provide indirect estimates of tortoise habitat and will likely serve as a key tool when assessing the tortoise’s listed species status. More direct population monitoring of important gopher tortoise preserves will help ensure that any declines are detected early and resources are focused on determining the root causes of such declines.

- Periodic GIS assessments will be conducted to determine the acreages of potential tortoise habitat; these assessments will then be compared to the 2003 data to assess habitat losses due to urbanization or other permanently altered human landscapes.
- Selected protected lands will be identified as monitoring sites to enhance the long-term viability of tortoise populations in these areas. The frequency of these assessments will be every 5 years. Declining numbers or productivity of tortoises on designated preserves will necessitate further research to determine possible causes (*e.g.*, diseases, lack of appropriate management) and remedies.

- Monitoring sites on selected protected lands, and possibly other areas, will be used to ground truth GIS assessments of estimated gopher tortoise habitat acreages and gopher tortoise numbers. Such assessments will also serve to detect areas where release of additional tortoises is not warranted and where restocking depleted populations would serve a conservation function. A protocol for assessing the potential suitability of FWC managed areas as restocking sites has been drafted (Appendix 7).
- FWC will coordinate with wildlife veterinarians at the University of Florida and other disease experts to draft a protocol for monitoring upper respiratory tract disease (URTD) and other diseases on selected protected lands. A statewide gopher tortoise disease incidence and mortality database showing the distribution of URTD exposure and other detected diseases (herpesvirus, iridovirus) will be maintained.

#### ***Gopher Tortoise Permits Issued***

- Maintain a gopher tortoise permitting system which effectively meets all permitting application, review, issuance, and reporting needs. Permitting information will be accessible by local governments, other state agencies, and the public.

#### ***Monitoring the Overall Success of the Gopher Tortoise Management Plan***

- FWC will meet annually with interested stakeholders to review progress made towards management plan goals and objectives. FWC will receive input on all aspects of the plan and report back to stakeholders on changes to be implemented.

Table 11. Proposed timeline for implementing monitoring actions.

<b>Proposed Monitoring Actions</b>	<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>	<b>Year Four</b>	<b>Year Five</b>
<b>A) Public Lands Acquisition</b>					
Track the number of acres of gopher tortoise habitat acquired under the Florida Forever Program or its successor.					
Estimate the number of acres of gopher tortoise habitat permanently protected by NGOs.					
Estimate the number of acres of gopher tortoise habitat acquired by local government.					
<b>B) Protected Private Lands</b>					
Monitor the number of acres of private lands protected.					
<b>C) Habitat Management</b>					
Maintain FWC management treatment, and vegetation monitoring databases.					
Maintain prescribed fire database.					
Maintain a management needs database.					
<b>D) Relocation</b>					
Monitor the number of tortoises relocated to protected versus unprotected sites.					
<b>E) Long-term Monitoring of Recipient Sites</b>					
Conduct follow-up survey of habitat management on recipient sites.					
<b>F) Population Status and Habitat Loss</b>					
Draft a protocol for monitoring URTD and other diseases on protected lands.					
Conduct periodic GIS assessments to monitor the rate of tortoise habitat losses.					
Monitor selected tortoise habitat to enhance the long-term viability of tortoise populations in these areas.					
Conduct ground truthing assessments on FWC managed lands to calibrate GIS-based gopher tortoise habitat assessments.					
<b>G) Monitor Overall Success of Plan</b>					
Meet annually with stakeholders.					

**Education and Outreach**

An active and sustained conservation stewardship education, outreach, and media relations program is necessary to keep the public informed about this high-profile and ecologically important species. Educating landowners, developers, and other interest groups about the crucial link between wildlife and habitat is particularly challenging in a state with thousands of new residents each year. The Florida Fish and Wildlife Conservation Commission (FWC) will target education and outreach to specific interest groups (*e.g.*, landowners, land managers, developers, governmental agencies/offices and land use planners, rehabilitators, state attorneys, educators, environmental writers, and news reporters) with the theme “Save Space for Wildlife”. This theme focuses on the devastating impacts human population growth and related activities can have on wildlife and its habitat unless wildlife management planning is an inherent part of the growth and development process.

Table 12. Proposed timeline for implementing education and outreach actions.

<b>Proposed Education and Outreach Actions</b>	<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>	<b>Year Four</b>	<b>Year Five</b>
<b>A) Developers, Consultants, Land Clearing Companies, Permitting Agencies/Offices, and Land Use Planners</b>					
Create fact sheets on gopher tortoise mitigation options; permitting applications, regulations and policies; economic and public relations benefits; and innovative solutions. Include information on temporary relocation of tortoises and habitat maintenance on utility line right-of-ways. Also, expand distribution of “Got Gophers, Get Permits” posters.					
Host local workshops on tortoise mitigation and conservation.					
<b>B) State Attorneys and FWC Law Enforcement</b>					
Educate appropriate staff in state attorneys offices about gopher tortoises, to include but not limited to: rules, permitting guidelines, law enforcement protocols, and pertinent definitions, using the training/reference manual developed by FWC law enforcement in Chapter 4, Law Enforcement; Table 4, Proposed Law Enforcement Actions.					

Table 12. continued

<b>Proposed Education and Outreach Actions</b>	<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>	<b>Year Four</b>	<b>Year Five</b>
<b>C) Homeowners</b>					
Create brochure on “Living with Gopher Tortoises” for landowners who have gopher tortoises on their property or that may want to accommodate displaced tortoises.					
Create “A Buyer’s Guide to Homes with Natural Assets”: a booklet highlighting communities which were developed with wildlife or other natural assets in mind.					
<b>D) General Public</b>					
Create a “Save Space for Wildlife” public awareness campaign (e.g., web site, print ad, exhibits, 30-second promotional spots).					
Create a public awareness campaign to warn of the risks of transmitting infectious agents when gopher tortoises are moved illegally.					
<b>E) Educators and Students</b>					
Create gopher tortoise conservation session at annual educators’ workshops.					
Create electronic field trip activity guide regarding gopher tortoise conservation.					
Create activity guide regarding gopher tortoise conservation.					
<b>F) Rehabilitators</b>					
Create fact sheet on proper housing, handling, record keeping, and release guidelines.					
<b>G) Land Managers</b>					
Create user-friendly field guide on managing tortoise habitats, with photographs to illustrate desired conditions.					
<b>H) Media</b>					
Create press releases, and media or public relations campaigns, addressing the above actions, as appropriate; and distribute to newspapers, radio, television, professional and trade publications, web sites, and other information outlets as identified.					

## **Future Research**

Much information on gopher tortoises has been gleaned during the last 3 decades. Pioneering research by Walter Auffenberg and Richard Franz in the early 1970s and by J. Larry Landers and colleagues in the late 1970s laid the framework for research that followed (Berish 2001). Based on discussions at a range-wide gopher tortoise status workshop in 2003 (Smith *et al.* 2006), topics such as fecundity, adult sex ratios, seasonal activity, home range size, and known predators, have been well-documented in a general sense; nevertheless, there may be circumstances where additional site-specific studies are warranted. Other topics, such as growth rates and age/size at sexual maturity, have also been studied, but will likely need further investigation due to variations among regions and sites. Yet, despite the recent focus and numerous studies on this species by the Florida Fish and Wildlife Conservation Commission (FWC) and other biologists, there are facets of gopher tortoise life history and ecology that remain poorly understood. Patterns of population demographics and habitat use over time are not easily characterized in this long-lived, burrowing species. Active pursuit of research on the following topics, and on others as they arise, is critical to our understanding of this species, and the results will help guide and refine recommended management actions:

### ***Long-term Population Dynamics and Habitat Use***

Specific research needs include determining immigration/emigration and turnover in resident, undisturbed populations; viability of populations over time; variations in burrow occupancy rates relative to season and habitat; forage and nutritional needs that affect movements (*e.g.*, why do tortoises select particular plants at a particular time?); and the specific habitat needs of hatchling and juvenile tortoises. Especially needed for possible use in monitoring is quantification of the relationship between burrow occupancy rate and habitat quality.

### ***Minimum Population Size Needed to Maintain a Functional Population***

Recommendations for minimum preserve size have varied in the literature (Cox *et al.* 1987; Eubanks *et al.* 2002; Mushinsky *et al.* 2006; McCoy and Mushinsky in press) and a minimum population size of 50 has been previously used to help determine preserve size (Cox *et al.* 1987). However, more definitive studies, looking at both minimum population size, age structure within a population, and associated preserve size, are needed to help conserve tortoises in developing areas.

### ***Best Burn Regimes for Various Habitats and Best Alternative Management Methods Where Fire is Precluded***

Because of changes in movements and burrow usage associated with habitat improvement (Moler and Berish 2001), burrow surveys alone will not suffice to refine optimal burn regimes for tortoises. Radio-instrumentation of tortoises will be necessary to understand initial and subsequent response of tortoises to various fire frequencies and seasons; additionally, differences in fecundity and other reproductive parameters under

various burn regimes should be assessed. Similarly, best practices need to be identified for those urbanizing areas where fire will be limited or prohibited.

### ***Tortoise Response to Restoration of Longleaf Pine on Silvicultural Lands***

The U.S. Forest Service has requested the assistance of FWC in determining both initial and subsequent tortoise response to timber removal and planting of longleaf pine. This request was prompted by a recent restoration in Ocala National Forest where cursory burrow surveys revealed a possible tortoise decline post-restoration; however, interpretation of this general finding was confounded by suspected human predation and observed non-human mammalian predation on the site. Proposed research would include habitat assessment and radio-instrumentation of tortoises prior to and following site restoration.

### ***Methods to Enhance Site Fidelity on Restocking Sites***

Previous studies (Lohofener and Lohmeier 1986, Tuberville *et al.* 2005) have indicated increased site fidelity by temporarily enclosing relocated tortoises. Further assessments of the effectiveness of temporary enclosures (*i.e.*, soft-release) should be undertaken through radio-instrumentation of tortoises released by various methods (*e.g.*, immediate release on surface, placement in abandoned burrow, placement in burrow created by researcher, and temporary placement within enclosures before release). Minimum confinement duration, optimal size of enclosures, and effectiveness of enclosure materials (*e.g.*, silt fence, wire fence, hay bales) should also be investigated. Other factors that could potentially affect site fidelity include season of release, habitat similarity between donor and recipient site, and sex ratios of tortoises.

A recent follow-up of a restocking in southern Florida 17 years after the tortoises were released revealed that the retention rate (*i.e.*, site fidelity) of relocated gopher tortoises changes over time, with relatively low retention during the first year post-relocation but nearly 100% retention in subsequent years (Ashton and Burke 2007). The researchers advocated relocating a large number of individuals ( $\geq 100$ , if possible) to sites with high habitat quality and a firm management commitment. Additional follow-ups of previously relocated populations should be undertaken.

### ***Impacts of Herbicides on Tortoises***

Physiological studies would focus on toxicology and possible endocrine disruption by herbicides. Field investigations should determine the effectiveness of herbicides in removing exotic species and producing suitable tortoise habitat.

### ***Impacts of Exotic Wildlife on Tortoises***

Although some insights have been gleaned regarding the impacts of species that have been introduced or have expanded their ranges into the Southeast (*e.g.*, armadillo, coyote, fire ant), little is known about the effects of exotic lizards, especially tegus and monitor lizards, on gopher tortoise populations. Predation by monitor lizards (Owens *et al.* 2005) has been documented, and tegus have been observed using gopher tortoise burrows

(Enge *et al.* 2006b). Studies need to be undertaken to evaluate the effects of these lizards and other exotic reptiles and mammals on Florida's tortoise populations.

### ***Long-term Effects of URTD on Tortoise Populations***

Two previous field studies have addressed this topic (Berish *et al.*, unpublished data; Brown *et al.*, unpublished data). Data from the recently completed University of Florida study are presently being analyzed and will likely identify additional gaps in our understanding of this disease's impact on tortoise populations under various natural and anthropogenic conditions. Other related areas of research include determination of correlations between positive blood tests for exposure to mycoplasma and ability to transmit disease. Complete health assessments of exposed and unexposed tortoises will also be essential to understanding the disease's effect on individuals and populations.

### ***Refinement of Genetic Differences in Florida Tortoise Populations***

Two recent studies (Osentoski and Lamb 1995; Schwartz and Karl 2006) have addressed gopher tortoise genetics; but gaps remain in our knowledge, particularly within the Florida Panhandle. Future research should focus on those areas not sampled in the previous studies.

Real-world effects of mixing tortoises from different genotypic assemblages may be gleaned through carefully designed and monitored restocking experiments, using peninsular tortoises relocated to the Panhandle. An anecdotal report based on captive specimens has generated some concern that south Florida tortoises may fail to reproduce at more northern climes (P. Moler, personal communication); thus, effects on reproduction and other life history attributes should be studied by undertaking such pilot restockings.

### ***Recolonization of Restocking Sites by Commensal Species***

Few follow-up surveys of gopher tortoise relocations have looked at whether burrow commensals, particularly listed species, have recolonized recipient sites. Although FWC conservation goal and objectives focus on the gopher tortoise, this reptile's role as a keystone species cannot be ignored. Burrow cameras and live traps could be used to sample insects and vertebrates over time. In some cases, commensals may be relocated with the tortoises and their survival can be monitored as well.

### ***Effectiveness of Retaining or Relocating Tortoises on Sites Undergoing Development***

Although properly conducted off-site relocations likely offer a better long-term prognosis for displaced tortoises, there may be occasions where retaining the local tortoise resource warrants retention of individuals or populations on properties that are being developed. Follow-up surveys of tortoises inhabiting burrows where development stayed outside the 25-foot radius, tortoises moved aside out of harm's way, and tortoises moved into designated preserves (both those with and without passive recreational activities) should be conducted to determine effects of this mitigation option.

Table 13. Proposed timeline for implementing research actions.

<b>Proposed Research Actions</b>	<b>Year One</b>	<b>Year Two</b>	<b>Year Three</b>	<b>Year Four</b>	<b>Year Five</b>
<b>A) Population Dynamics and Habitat Use</b>					
Determine immigration/emigration and population turnover in resident, undisturbed populations over time.					
Assess genetic differences in Florida’s tortoise populations, with emphasis on filling in knowledge gaps for the Panhandle.					
Conduct surveys of tortoises inhabiting burrows on sites undergoing development and of tortoises retained in on-site preserves.					
Evaluate variations in burrow occupancy rates relative to season and habitats.					
Evaluate minimum population size needed to maintain a functional population.					
Evaluate the viability of populations over time.					
Identify specific habitat needs of hatchlings and juvenile tortoises.					
Evaluate forage and nutritional needs that affect movements, habitat use, and health.					
Determine correlations between positive blood tests for exposure to mycoplasma and ability to transmit URTD in wild populations; investigate long-term health of exposed and unexposed tortoises.					
Identify impacts of exotic wildlife on tortoise populations.					
Evaluate recolonization of restocking sites by commensal species.					
<b>B) Best Management Practices</b>					
Evaluate methods to enhance tortoise site fidelity on restocking sites.					
Identify best practices for areas where fire is prohibited or limited.					
Evaluate impacts of herbicides on tortoises.					
Investigate initial and subsequent response of tortoises to various fire frequencies and seasons.					
Evaluate tortoise response to restoration of longleaf pine on silvicultural sites.					

**CHAPTER 5: IMPLEMENTATION STRATEGY**

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 (NGOs); business interests; and the public. Within government, the Florida Fish and Wildlife Conservation Commission (FWC) recognizes that a number of agencies have important roles in gopher tortoise conservation. 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 NGOs. Close coordination with the Florida Department of Environmental Protection, Department of Community Affairs, and local governments will be required to address the significant problems associated with habitat loss and management.

Complex natural resource problems cannot be solved by government alone. Collaboration and cooperation with the private sector and support from the public will be necessary for the long-term successful implementation of this management plan in Florida. The FWC believes the private sector business interests and NGOs can play a significant leadership role in helping achieve habitat protection and conservation outreach and education objectives.

In this regard, FWC plans to continue to work with the Gopher Tortoise Stakeholder Group as long as the group feels this interaction is productive and valued by the membership. The Gopher Tortoise Stakeholder Group members (Appendix 9) have provided input on the content of the gopher tortoise management plan throughout its development. The FWC recognizes this valuable contribution and will continue to solicit input and support as the plan is approved and implemented.

The FWC's Species Conservation Planning Section within the Division of Habitat and Species Conservation will be responsible for overseeing implementation of this plan including scheduled 5-year revisions and updates. The FWC recognizes there are many opportunities within the agency for the divisions and offices to work together to assist in the recovery of the gopher tortoise. Some areas within FWC where staff will work to improve those efforts are listed below:

- Provide input into the Florida Forever land purchases, putting the focus on lands important to listed species' recovery.
- As a member of the Acquisition and Restoration Council, contribute to the drafting of land management plans that will help protect, maintain, and recover species, particularly listed ones.
- Develop an agency approach to environmental commenting that integrates consideration of all wildlife.
- Work with FWC Legislative Affairs Office to review relevant proposed bills during the legislative session to ensure gopher tortoise protection is maintained. Meet with

Legislative Affairs staff after each session to determine and understand the final outcome and intent of any tortoise-related legislation.

### **Time Frame for Completing Actions**

For ease of understanding, Chapter 4 presents a series of tables that contain proposed management actions and associated timelines for sequencing work during the first 5-year action cycle of this plan. For example, Table 12 (Chapter 4, Education and Outreach) presents a listing of education and outreach actions and sequencing timelines. Where funding or staffing is limited, the timeframe for beginning and completing work will be adjusted to accomplish the greatest conservation benefit for the species.

**CHAPTER 6: ECONOMIC, SOCIAL, AND ECOLOGICAL IMPACTS**

**Potentially Affected Parties**

Gopher tortoises affect people primarily due to their shared occupancy of well-drained, upland habitats. Areas with deep, well-drained soil are preferred both for gopher tortoise burrows and people’s homes and associated development, bringing them into contact and conflict. In earlier times, tortoises were relished as food by some rural people, and depletion of tortoise populations in some areas is due to this cause. Currently, human consumption of tortoises is thought to be sporadic and localized, and the primary interactions result from habitat competition. Tortoises are also charismatic creatures that many people find attractive and appealing or vulnerable. People affected by tortoises, therefore, fall into 3 broad classes: those who are charged with conserving and managing tortoises and their habitat; those who find their economic activities constrained by the presence of tortoises; and those who wish to preserve, conserve, or cherish them in different ways. Table 14 lists broad categories of ‘interest groups’ that were identified by the Florida Fish and Wildlife Conservation Commission (FWC) and stakeholders as the major affected stakeholder parties and which formed the basis for a representative stakeholder group that advised FWC on gopher tortoise conservation and the management plan. A full list of stakeholders is given in Appendix 9.

Table 14. Categories of stakeholders’ interest in gopher tortoise management and conservation.

Primary Industry	Forestry production, mining ( <i>e.g.</i> , phosphate), agriculture, ( <i>e.g.</i> , Florida Farm Bureau, Florida Cattlemen’s Assoc.)
Conservation Organizations	Defenders of Wildlife, Gopher Tortoise Council
Land Development	Florida Chamber of Commerce, Florida Homebuilders Assoc.
Local Government Agencies	County, municipal
Research and Academic	University and private researchers
Commercial Service	Consultants providing gopher management and relocation services
Private Landowners	St. Joe Co., Nokuse Plantation
Military, Federal, or State Land Managers	U.S. Forest Service, FL DEP - Parks, Eglin Air Force Base, water management districts
General Public	Individuals, neighborhood associations
Animal Welfare	Humane Soc. US, ASPCA

## **Social Impacts**

Conflicts among interested stakeholder groups have generated substantial passion and controversy and required active mediation. Public outrage at some elements of gopher tortoise mitigation, such as habitat loss and tortoise entombment by permit, and concerns about undue or even unconstitutional interference with private land use and development rights have resulted in extensive media coverage, and required much effort by FWC. Recognizing the need to manage these conflicts, the preparation of this plan served as an impetus to develop structures for improved communication among FWC and various stakeholder groups. Beginning in July 2005, FWC used its contracted facilitation leadership initiative to assist stakeholders in forming their own forum for discussions, adopting effective governance to facilitate communication and equity among stakeholders, and transmitting stakeholder views and recommendations to FWC. This stakeholder group now operates effectively to discuss issues, review FWC proposals, and recommend alternative or additional possibilities. The management plan proposes to extend this group to serve as a citizen oversight body as FWC and other partners implement the plan.

Humane and animal welfare considerations have emerged as a significant component of the social impact of gopher tortoise regulation. The public, organized animal welfare groups, and media have expressed deep concern over the entombment of tortoises during development. Recently, this concern has been effectively mobilized to ‘rescue’ tortoises from selected sites and relocate them, with the approval of FWC and the voluntary participation of landowners and developers. The plan proposes to provide permit mechanisms to continue this process.

## **Economic Effects**

The economic analysis for the proposed gopher tortoise management plan closely follows the standards established for the Statement of Estimated Regulatory Costs as described in Chapter 120, F.S., Florida Administrative Procedures Act. Cost estimates (based on the best available data) are provided for FWC and the regulated community (Appendix 10) for implementation of the proposed gopher tortoise management plan.

The estimated costs to FWC (excluding expenditures for grants) are as follows:

Startup costs (first year of the plan) \$3,307,783 + \$367,266 (opportunity costs) for a total of \$3,675,049

Recurring/annual costs are estimated at \$2,085,642 + \$6,200 opportunity costs for a total of \$2,091,842

The proposed plan will affect landowners; commercial, industrial, residential, and other land development entities; local governments; the general public; and all other entities who qualify for a permit. Historical records from FWC anticipate approximately 1,500 to 1,600 permits issued on an annual basis across all categories. The majority of entities (approximately 64-75%) will be issued the 10 or fewer burrows permit with a mitigation

contribution of \$200. However, there are several different options for permits, and costs are determined by the permit issued and the number of tortoises on-site. For the remaining 400 permits covering more than 5 tortoises (*i.e.* more than 10 burrows), the estimated additional expense to the regulated community would vary between \$17.08 million and an additional cost of \$70.88 million, depending on which permit options are selected by the applicants. If all permits are distributed evenly between the available permit options, the aggregate additional impact to the regulated community is estimated at \$44.22 million.

## **Ecological Impacts**

### ***Potentially Positive Impacts***

The gopher tortoise's ecological role as a keystone species has been well-documented (Cox *et al.* 1987, Jackson and Milstrey 1989, Witz *et al.* 1991, Kent *et al.* 1997); therefore, in most cases, management actions that enhance tortoise populations will prove beneficial to numerous other vertebrate and invertebrate species. Imperiled species, such as the eastern indigo snake, gopher frog, and Florida mouse, regularly use gopher tortoise burrows. These underground retreats serve as both resting and foraging habitat and allow many species to escape from temperature extremes, predators, or fires. Some invertebrate species are found nowhere else but gopher tortoise burrows.

Restoring gopher tortoise populations enhances biodiversity by providing additional refuges for other wildlife and by influencing patterns of plant colonization and community structure (Kaczor and Harnett 1990). This grazing reptile also serves as a seed dispersal agent for native grasses and forbs (Auffenburg 1969, Landers 1980). The importance of this single species to the ecological welfare of many upland habitats in Florida should not be underestimated.

### ***Potentially Negative Impacts***

Although management for gopher tortoises meshes well with that of many other species, particularly traditional game species, there may be circumstances where creating optimal conditions for gopher tortoises could negatively affect other wildlife. For example, if using fire to manage scrub jay (*Aphelocoma coerulescens*) habitat to benefit tortoises, burning an entire site on a frequent basis may be detrimental to scrub jays; however, this can be offset by burning small areas and leaving a mosaic of unburned habitat. Mowing or roller-chopping in areas where fire is prohibited may benefit gopher tortoises but could adversely affect "sand swimmers" such as sand skinks (*Neoseps reynoldsi*) and blue-tailed mole skinks (*Eumeces egregius lividus*). In cases where another threatened species may be adversely affected by manipulation of habitat for tortoises, decisions will need to be made on a site-specific basis. Whenever more seriously imperiled species (especially those that are restricted by geography or habitat) co-exist with gopher tortoises, land managers should defer to the needs of those rarer species.

Use of some types of temporary enclosures around gopher tortoise recipient sites could affect movements of amphibians to and from breeding ponds. Consideration of

enclosure sizes, types, and locations, in addition to other site-specific management recommendations, should help reduce these short-term effects.

**LITERATURE CITED**

- Alberson, H. C. 1953. "Cracker chicken" hunt. *Florida Wildlife* 7(3):26–27, 31.
- Alford, R. 1980. Population structure of *Gopherus polyphemus* in northern Florida. *Journal of Herpetology* 14:177–182.
- Anderson, C. H. 1949. Gopher hunt. *Florida Wildlife* 3(6):10–11.
- Aresco, M. J., and C. Guyer. 1999. Growth of the tortoise *Gopherus polyphemus* in slash pine plantations of southcentral Alabama. *Herpetologica* 55:499–506.
- Ashton, K. G., and R. L. Burke. 2007. Long-term retention of a relocated population of gopher tortoises. *Journal of Wildlife Management* 71:783-787.
- Ashton, K. G., R. L. Burke, and J. N. Layne. 2007. Geographic variation in body and clutch size of gopher tortoises. *Copeia* 2007:355-363.
- Ashton, P. S., and R. E. Ashton, Jr. 2004. *The gopher tortoise: a life history*. Pineapple Press, Sarasota, Florida. 67pp.
- Ashton, P.S., and R.E. Ashton. In Press. *The Natural History and Management of the Gopher Tortoise (Gopherus polyphemus)*. Krieger Press, Malabar, Florida.
- Ashton, R. E., Jr. 2005. Planning gopher tortoise conservation into the future. Pages 111–119 in W. E. Meshaka, Jr., and K. J. Babbitt, editors. *Amphibians and reptiles: status and conservation in Florida*. Krieger, Malabar, Florida.
- Auffenberg, W. 1969. *Tortoise behavior and survival*. Rand McNally, Chicago, Illinois.
- Auffenberg, W. and R. Franz. 1982. The status and distribution of the gopher tortoise (*Gopherus polyphemus*). Pages 95–126 in R. B. Bury, editor. *North American tortoises: Conservation and ecology*. U.S. Fish and Wildlife Service, Wildlife Research Report 12.
- Auffenberg, W., and J. B. Iverson. 1979. Demography of terrestrial turtles. Pages 541–569 in M. Harless and H. Morlock, editors. *Turtles: Perspectives and Research*. Wiley-International, New York.
- Basiotis, K. A., H. R. Mushinsky, and E. D. McCoy. 2005. Do gopher tortoises (*Gopherus polyphemus*) consume exotic cogongrass (*Imperata cylindrica*)? Results of a feeding experiment. Abstract in Joint Meeting of the 21st Annual Meeting of the American Elasmobranch Society, 85th Annual Meeting of the American Society of Ichthyologists and Herpetologists, 63rd Annual Meeting of the Herpetologists' League, and the 48th Annual Meeting of the Society for the Study of Amphibians and Reptiles; 6–11 July 2005, Tampa, Florida.

- Berish (Diemer), J. E. 1991. Identification of critical gopher tortoise habitat in South Florida. Florida Game and Fresh Water Fish Commission, Bureau of Wildlife Research Final Report Study No. 7539, Tallahassee. 23pp.
- Berish, J. E. 2001. Management considerations for the gopher tortoise in Florida. Florida Fish and Wildlife Conservation Commission Final Report, Tallahassee. 44pp.
- Breining, D. R., P. A. Schmalzer, and C. R. Hinkle. 1994. Gopher tortoise (*Gopherus polyphemus*) densities in coastal scrub and slash pine flatwoods in Florida. *Journal of Herpetology* 28:60–65.
- Brown, D. R., I. M. Schumacher, G. S. McLaughlin, L. D. Wendland, M. B. Brown, P. A. Klein, and E. R. Jacobson. 2002. Application of diagnostic tests for mycoplasmal infections of desert and gopher tortoises, with management considerations. *Chelonian Conservation and Biology* 4:497–507.
- Brown, M. B., G. S. McLaughlin, P. A. Klein, B. C. Crenshaw, I. M. Schumacher, D. R. Brown, and E. R. Jacobson. 1999. Upper respiratory tract disease in the gopher tortoise is caused by *Mycoplasma agassizii*. *Journal of Clinical Microbiology* 37:2262–2269.
- Butler, J. A., and T. W. Hull. 1996. Reproduction of the tortoise, *Gopherus polyphemus*, in northeastern Florida. *Journal of Herpetology* 30:14–18.
- Butler, J. A., and S. Sowell. 1996. Survivorship and predation of hatchling and yearling gopher tortoises, *Gopherus polyphemus*. *Journal of Herpetology* 30:455–458.
- Causey, M. K., and C. A. Cude. 1978. Feral dog predation of the gopher tortoise, *Gopherus polyphemus*, in southeast Alabama. *Herpetological Review* 9:94–95.
- Cox, J., D. Inkley, and R. Kautz. 1987. Ecology and habitat protection needs of gopher tortoise (*Gopherus polyphemus*) populations found on lands slated for large-scale development in Florida. Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program Technical Report No. 4, Tallahassee. 75pp.
- Diemer, J. E. 1986. The ecology and management of the gopher tortoise in the southeastern United States. *Herpetologica* 42:125–133.
- Diemer, J. E. 1987. The status of the gopher tortoise in Florida. Pages 72-83 in R. Odom, K. Riddleberger, and J. Osier, editors. *Proceedings of the Third Southeastern Nongame and Endangered Wildlife Symposium*. Georgia Department of Natural Resources, Game and Fish Division, Atlanta.
- Diemer, J. E. 1992a. Demography of the tortoise *Gopherus polyphemus* in northern Florida. *Journal of Herpetology* 26:281-289.
- Diemer, J. E. 1992b. Home range and movements of the tortoise *Gopherus polyphemus* in northern Florida. *Journal of Herpetology* 26:158–162.

- Diemer, J. E., and C. T. Moore. 1994. Reproduction of gopher tortoises in north-central Florida. Pages 129-137 in R. B. Bury and D. Germano, editors. Biology of North American tortoises. U.S. Department of Interior, National Biological Survey, Fish and Wildlife Research 13.
- Diemer Berish, J. E., L. D. Wendland, and C. A. Gates. 2000. Distribution and prevalence of upper respiratory tract disease in gopher tortoises in Florida. *Journal of Herpetology* 34:5-12.
- Douglass, J. F., and C. E. Winegarner. 1977. Predators of eggs and young of the gopher tortoise, *Gopherus polyphemus* (Reptilia, Testudines, Testudinidae) in southern Florida. *Journal of Herpetology* 11:236-238.
- Enge, K. M., K. L. Krysko, K. R. Hankins, T. S. Campbell, and F. W. King. 2004. Status of the Nile monitor (*Varanus niloticus*) in southwestern Florida. *Southeastern Naturalist* 3:571-582.
- Enge, K. M., J. E. Berish, R. Bolt, A. Dziergowski, and H. R. Mushinsky. 2006a. Biological status report - gopher tortoise. Florida Fish and Wildlife Conservation Commission, Tallahassee.
- Enge, K. M., B. W. Kaiser, and R. B. Dickerson. 2006b. Another large exotic lizard in Florida, the Argentine black and white tegu. Abstract in Proceedings of the 28<sup>th</sup> Gopher Tortoise Council Meeting, 26-29 October 2006, Valdosta, Georgia.
- Epperson, D. M., and C. D. Heise. 2003. Nesting and hatchling ecology of gopher tortoises (*Gopherus polyphemus*) in southern Mississippi. *Journal of Herpetology* 37:315-324.
- Ernst, C. H., and R. W. Barbour. 1972. Turtles of the United States. University Press of Kentucky, Lexington, Kentucky, USA. 347pp.
- Eubanks, J. O., J. W. Hollister, C. Guyer, and W. K. Michener. 2002. Reserve area requirements for gopher tortoises (*Gopherus polyphemus*). *Chelonian Conservation and Biology* 4:464-471.
- Fisher, G. C. 1917. "Gopher pulling" in Florida. *American Museum Journal* 17:291-293.
- Fitzpatrick, J. W., and G. E. Woolfenden. 1978. Red-tailed hawk preys on juvenile gopher tortoises. *Florida Field Naturalist* 6:49.
- Franz, R., and W. Auffenberg. 1978. The gopher tortoise: a declining species. Pages 61-63 in R. Odum and L. Landers, editors. Proceedings of the Rare and Endangered Wildlife Symposium. Georgia Department of Natural Resources, Game and Fish Division Technical Bulletin WL4, Atlanta.

- Garner, J. H., and J. L. Landers. 1981. Foods and habitat of the gopher tortoise in southwestern Georgia. *Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies* 35:120–133.
- Gates, C. A., M. J. Allen, J. E. Diemer Berish, D. M. Stillwaugh, Jr., and S. R. Shattler. 2002. Characterization of a gopher tortoise mortality event in west-central Florida. *Florida Scientist* 65:185–197.
- Gruver, B.J. 2002. Petition to reclassify the gopher tortoise (*Gopherus polyphemus*) as a Threatened Species in Florida. Florida Fish and Wildlife Conservation Commission. Tallahassee. 4 pp.
- Hallinan, T. 1923. Observations made in Duval County, northern Florida, on the gopher tortoise (*Gopherus polyphemus*). *Copeia* 1923:11–20.
- Hansen, K. 1963. The burrow of the gopher tortoise. *Journal of the Florida Academy of Sciences* 26:353–360.
- Harcourt, H. 1889. Home life in Florida. John P. Morton and Company, Louisville, Kentucky. 433pp.
- Hawkins, R. Z., and R. L. Burke. 1989. Of pens, pullers and pets: problems of gopher tortoise relocation. Page 99 in J. E. Diemer, D. R. Jackson, J. L. Landers, J. N. Layne, and D. A. Wood, editors. *Proceedings of the Gopher Tortoise Relocation Symposium*. Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program Technical Report No. 5, Tallahassee.
- Hicklin, J. R. 1994. The effects of Brazilian pepper (*Schinus terebinthifolius*) on gopher tortoise (*Gopherus polyphemus*) habitat utilization. M.S. Thesis, Florida Atlantic University, Boca Raton. 41pp.
- Hutt, A. 1967. The gopher tortoise, a versatile vegetarian. *Florida Wildlife* 21(7):20–24.
- Iverson, J. B. 1980. The reproductive biology of *Gopherus polyphemus*. *American Midland Naturalist* 103:353-359.
- Jackson, D. R., and E. G. Milstrey. 1989. The fauna of gopher tortoise burrows. Pages 86–98 in J. E. Diemer, D. R. Jackson, J. L. Landers, J. N. Layne, and D. A. Wood, editors. *Proceedings of the Gopher Tortoise Relocation Symposium*. Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program Technical Report No. 5, Tallahassee.
- Johnson, V. M., C. Guyer, and M. D. Boglioli. 2007. Phenology of attempted matings in gopher tortoises. *Copeia* 2007:490-495.

- Kaczor, S.A., and D.C. Harnett. 1990. Gopher tortoise (*Gopherus polyphemus*) effects on soils and vegetation in a Florida sandhill community. *American Midland Naturalist* 123:100-111.
- Kent, D. M., M. A. Langston, and D. W. Hanf. 1997. Observations of vertebrates associated with gopher burrows in Orange County, Florida. *Florida Scientist* 60:197-201.
- Kushlan, J. A., and F. J. Mazzotti. 1984. Environmental effects on a coastal population of gopher tortoises. *Journal of Herpetology* 18:231-239.
- Landers, J. L. 1980. Recent research on the gopher tortoise and its implications. Pages 8-14 *in* R. Franz and R. J. Bryant, editors. *The Dilemma of the Gopher Tortoise--Is There a Solution?* Proceedings of the 1st Annual Meeting, Gopher Tortoise Council.
- Landers, J. L., and J. L. Buckner. 1981. The gopher tortoise: effects of forest management and critical aspects of its ecology. Southlands Experimental Forest Technical Note No. 56. 7pp.
- Landers, J. L., and J. A. Garner. 1981. Status and distribution of the gopher tortoise in Georgia. Pages 45-51 *in* R. Odum and J. Guthrie, editors. *Proceedings of the Non-game and Endangered Wildlife Symposium*. Georgia Department of Natural Resources, Game and Fish Division Technical Bulletin WL5, Atlanta.
- Landers, J. L., J. A. Garner, and W. A. McRae. 1980. Reproduction of the gopher tortoise (*Gopherus polyphemus*). *American Midland Naturalist* 103:353-359.
- Landers, J. L., and D. W. Speake. 1980. Management needs of sandhill reptiles in southern Georgia. *Proceedings of the Annual Conference of Southeastern Fish and Wildlife Agencies* 34:515-529.
- Lohofener, R. 1982. Gopher tortoise ecology and land-use practices in southern Desoto National Forest, Harrison County, Mississippi. Pages 50-74 *in* R. Franz and R. J. Bryant, editors. *The Gopher Tortoise and its sandhill habitat*. Proceedings of the 3rd Annual Meeting of the Gopher Tortoise Council.
- Lohofener, R., and L. Lohmeier. 1986. Experiments with gopher tortoise (*Gopherus polyphemus*) relocation in southern Mississippi. *Herpetological Review* 17: 37, 39-40.
- Macdonald, L. A., and H. R. Mushinsky. 1988. Foraging ecology of the gopher tortoise, *Gopherus polyphemus*, in a sandhill habitat. *Herpetologica* 44:345-353.
- Main, M. B., S. F. Coates, and G. M. Allen. 2000. Coyote distribution in Florida extends southward. *Florida Field Naturalist* 28:201-203.
- Matthews, E. L. 1979. The gopher. *Florida Wildlife* 32(5):38-40.

- McCoy, E. D., and H. R. Mushinsky. 1992a. Studying a species in decline: changes in populations of the gopher tortoise on federal lands in Florida. *Florida Scientist* 55:116–125.
- McCoy, E. D., and H. R. Mushinsky. 1992b. Studying a species in decline: Gopher tortoises and the dilemma of “correction factors.” *Herpetologica* 48:402–407.
- McCoy, E. D., and H. R. Mushinsky. 1995. The demography of *Gopherus polyphemus* (Daudin) in relation to size of available habitat. Project Report. Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program, Tallahassee. 71pp.
- McCoy, E. D., and H. R. Mushinsky. In Press. Estimates of minimum patch size depend on the method of estimation and the condition of the habitat. *Ecology*.
- McCoy, E. D., H. R. Mushinsky, and J. K. Lindzey. 2005. Population consequences of upper respiratory tract disease on gopher tortoises. Final Report. Florida Fish and Wildlife Conservation Commission, Tallahassee. 44pp.
- McLaughlin, G. S. 1997. Upper respiratory tract disease in gopher tortoises, *Gopherus polyphemus*: pathology, immune responses, transmission, and implications for conservation and management. Dissertation, University of Florida, Gainesville. 110pp.
- McRae, W. A., J. L. Landers, and J. A. Garner. 1981. Movement patterns and home range of the gopher tortoise. *American Midland Naturalist* 106:165–179.
- Mickler, L. E. 1986. Gopher stew. *North Florida Living* 6(1):68, 77.
- Miller, P. S. 2001. Preliminary population viability assessment for the Gopher Tortoise (*Gopherus polyphemus*) in Florida. Conservation Breeding Specialist Group, Apple Valley, Minnesota. 45pp.
- Moler, P.M., and J.E. Berish. 2001. An assessment of options for survey and monitoring of gopher tortoises on Commission-managed lands. Florida Fish and Wildlife Conservation Commission. Unpublished report. 16 pp.
- Mushinsky, H. R., and E. D. McCoy. 1994. Comparison of gopher tortoise populations on islands and on the mainland in Florida. Pages 39–48, in R. B. Bury and D. J. Germano, editors. *Biology of North American tortoises*. U.S. Department of the Interior, National Biological Survey, Fish and Wildlife Research 13.
- Mushinsky, H. R., D. S. Wilson, and E. D. McCoy. 1994. Growth and sexual dimorphism of *Gopherus polyphemus* in central Florida. *Herpetologica* 50:119–128.
- Mushinsky, H. R., E. D. McCoy, J. E. Berish, R. E. Ashton, Jr., and D. S. Wilson. 2006. *Gopherus polyphemus* - gopher tortoise. In P. A. Meylan, editor. *Biology and conservation of Florida’s turtles*. Chelonian Research Monographs No. 3, pp. 350-375.

- Osentoski, M.F., and T. Lamb. 1995. Intraspecific phylogeography of the gopher tortoise, *Gopherus polyphemus*: RFLP analysis of amplified mtDNA segments. *Molecular Ecology* 4: 709-718.
- Owens, A. K., K. L. Krysko, and G. L. Heinrich. 2005. *Gopherus polyphemus* (Gopher Tortoise). Predation. *Herpetological Review* 36:57–58.
- Pike, D. A. 2006. Movement, habitat use, and growth of hatchling gopher tortoises, *Gopherus polyphemus*. *Copeia* 2006:68-76.
- Pike, D. A., and R. A. Seigel. 2006. Survivorship of hatchling tortoises at three geographic localities. *Herpetologica* 62:125-131.
- Rabatsky, A., and B. Blihovde. 2002. Gopher tortoise die-off at Rock Springs Run State Reserve, Lake County, Florida. *Turtle and Tortoise Newsletter* No. 6:27-28.
- Schwartz, T.S., and S.A. Karl. 2005. Population and conservation genetics of the gopher tortoise (*Gopherus polyphemus*). *Conservation Genetics* 6: 917-928.
- Seigel, R. A., R. B. Smith, and N. A. Seigel. 2003. Swine flu or 1918 pandemic? Upper respiratory tract disease and sudden mortality of gopher tortoises (*Gopherus polyphemus*) on a protected habitat in Florida. *Journal of Herpetology* 37:137-144.
- Shilling, D. G., T. A. Bewick, J. F. Gaffney, S. K. McDonald, C. A. Chase, and E. R. R. L. Johnson. 1997. Ecology, physiology, and management of cogongrass (*Imperata cylindrical*). Final Report. Florida Institute of Phosphate Research, Bartow, Florida.
- Smith, H. T., and R. M. Engeman. 2002. An extraordinary raccoon, *Procyon lotor*, density at an urban park. *Canadian Field-Naturalist* 116:636–639.
- Smith, L. L. 1997. Survivorship of hatchling gopher tortoises in north-central Florida. Pages 100–103 in *Conservation, Restoration, and Management of Tortoises and Turtles*. New York Turtle and Tortoise Society.
- Smith, L. L., T. D. Tuberville, and R. A. Seigel. 2006. Workshop on the ecology, status, and management of the gopher tortoise (*Gopherus polyphemus*), Joseph W. Jones Ecological Research Center, 16-17 January 2003: final results and recommendations. *Chelonian Conservation and Biology* 5: 326-330.
- Smith, R. B., D. R. Breininger, and V. L. Larson. 1997. Home range characteristics of radiotagged gopher tortoises on Kennedy Space Center, Florida. *Chelonian Conservation and Biology* 2:358–362.
- Smith, R. B., R. A. Seigel, and K. R. Smith. 1998. Occurrence of upper respiratory tract disease in gopher tortoise populations in Florida and Mississippi. *Journal of Herpetology* 32:426–430.

- Taylor, R. W., Jr. 1982. Human predation on the gopher tortoise (*Gopherus polyphemus*) in north-central Florida. Bulletin of the Florida State Museum, Biological Sciences 28:79–102.
- Tuberville, T.D., Clark, E.E., Buhlmann, K.A., Gibbons, J.W. 2005. Translocation as a conservation tool: site fidelity and movement of repatriated gopher tortoises (*Gopherus polyphemus*). Animal Conservation 8: 349-358.
- Witz, B. W., D. S. Wilson, and M. D. Palmer. 1991. Distribution of *Gopherus polyphemus* and its vertebrate symbionts in three burrow categories. American Midland Naturalist 126:152–158.
- Witz, B. W., D. S. Wilson, and M. D. Palmer. 1992. Estimating population size and hatchling mortality of *Gopherus polyphemus*. Florida Scientist 55:14–19.

**APPENDICES****APPENDIX 1. History of Gopher Tortoise Regulations in Florida**

- 1972 Ban on sale and export
- 1973 Possession limit of 10
- 1975 Listed as threatened species
- 1976 Possession limit of 5
- 1978 Ban on introduction of toxic substances into burrows
- 1979 Listing revised: Listed as Species of Special Concern
- 1980 Closed season from April 1 to June 30
- 1982 Ban on export revoked
- 1984 Closed season from January 2 to June 30
  - Ban on bucket traps and snares
  - Relocation policy statement issued
- 1985 Closed season from January 2 to September 30
  - Possession limit of 2
  - Harvest prohibited south of line designated by SR 72 and 70
  - Interim relocation protocol issued
  - Gopher tortoise race guidelines issued
- 1986 Harvest prohibited in 3 national forests
  - Use of paint to mark turtle shells prohibited
  - Revised relocation protocol issued
- 1987 Habitat protection guidelines for large-scale developments issued
- 1988 Harvest prohibited statewide
  - Revised relocation guidelines issued
- 1989 Gopher tortoise races prohibited
- 1991 Relocation on property, incidental take permit process, URTD monitoring
- 1992 Clarification issued regarding taking of tortoises on developments
- 2001 Major revision modifying guidelines
- 2006 Rule protecting tortoise burrows passed
  - Modification of upper respiratory tract disease and incidental take policies
- 2007 Interim incidental take policy implemented

**APPENDIX 2. Proposed Rule Revisions**

The following are the relevant portions of Commission rules 68A-27.004, F.A.C., and 68A-27.005, F.A.C., with proposed additions shown as underlined text and proposed deletions struck through are provided below:

68A-27.004 Designation of Threatened Species; Prohibitions; Permits.

(1) The following species, listed prior to June 23, 1999, are hereby declared to be threatened, and shall be afforded the protective provisions specified.

.....

(2) The gopher tortoise (*Gopherus polyphemus*), the listing status having been revised after June 23, 1999, is hereby declared to be threatened, and shall be afforded the protective provisions specified in this subsection. No person shall take, attempt to take, pursue, hunt, harass, capture, possess, sell or transport any gopher tortoise (*Gopherus polyphemus*) or parts thereof or their eggs, or molest, damage, or destroy gopher tortoise burrows, except as authorized by Commission permit or when complying with Commission approved guidelines for specific actions which may impact gopher tortoises and their burrows. A gopher tortoise burrow is a tunnel with a cross-section that closely approximates the shape of a gopher tortoise. Permits will be issued based upon whether issuance would further management plan goals and objectives.

68A-27.005 Designation of Species of Special Concern; Prohibitions; Permits.

(1) The following species are hereby declared to be of special concern, and shall be afforded the protective provisions specified.

.....

(b) The following species were listed prior to January 1, 2001, and have been further categorized by the numbers in parentheses under the following criteria: (1) has a significant vulnerability to habitat modification, environmental alteration, human disturbance, or human exploitation which, in the foreseeable future, may result in its becoming a threatened species unless appropriate protective or management techniques are initiated or maintained; (2) may already meet certain criteria for designation as a threatened species but for which conclusive data are limited or lacking; (3) may occupy such an unusually vital or essential ecological niche that should it decline significantly in numbers or distribution other species would be adversely affected to a significant degree; (4) has not sufficiently recovered from past population depletion, and (5) occurs as a population either intentionally introduced or being experimentally managed to attain specific objectives, and the species of special concern prohibitions in Rule 68A-27.002, F.A.C., shall not apply to species so designated, provided that the intentional killing, attempting to kill, possession or sale of such species is prohibited.

.....

~~17. Gopher tortoise (*Gopherus polyphemus*) (1, 2, 3). The definition of take set forth in subsection (3) of this rule shall apply to gopher tortoises.~~  
[renumber subsequent sub-paragraphs]

.....

~~(3) No person shall take, attempt to take, pursue, hunt, harass, capture, possess, sell or transport any gopher tortoise (*Gopherus polyphemus*) or parts thereof or their eggs, or take or attempt to take gopher tortoise burrows, except as authorized by Commission permit. For the purpose of this definition of take, a gopher tortoise burrow is a tunnel with a cross-section that closely approximates the shape of a gopher tortoise.~~

**APPENDIX 3. Burrow Rule Policy**

**Draft Executive Director's Policy Statement  
Gopher Tortoise Burrow Rule Enforcement  
For Agricultural, Silvicultural, and Wildlife Management Activities  
Revised January 24, 2007**

This policy is for the purpose of enforcement of Chapter 68A-27., relating to gopher tortoises with respect to agricultural and silvicultural activities or activities intended to improve native wildlife habitat. The adoption of the Gopher Tortoise Burrow rule does not expand pre-existing gopher tortoise regulatory prohibitions or change existing policy or practice.

An illegal take of a gopher tortoise burrow includes, but is not limited to, damaging, collapsing or covering a gopher tortoise burrow from land clearing, bulldozing, grading, paving, or building construction associated with land development, without a permit issued under Chapter 68A, Florida Administrative Code.

Gopher tortoise or gopher tortoise burrow permits are not required to conduct agricultural activities, silvicultural activities, or activities intended to improve native wildlife habitat. Such activities include, but are not limited to, tilling, planting, mowing, harvesting, prescribed burning, mowing, disking, roller-chopping, and tree-cutting.

The prohibitions related to gopher tortoise burrows will not be applied when a landowner can demonstrate that those burrows are no longer used by gopher tortoises by conducting a gopher tortoise survey in accordance with the Florida Fish and Wildlife Conservation Commission's (FWC) guidelines.

As stated in Chapter 68A-27., "gopher tortoise burrow" is defined as a tunnel in the ground with a cross-section that closely approximates the shape of a gopher tortoise.

Solely for the purpose of this policy, the presence of one or more of the following characteristics indicates that gopher tortoises or gopher tortoise burrows may be present:

- (a) Ground surrounding a burrow entrance shows evidence of gopher tortoise activity including but not limited to presence of a gopher tortoise; gopher tortoise eggs or egg shell fragments; impressions from the bottom shell of the tortoise; foot-prints or tracks left by tortoises; scat; obvious feeding trails radiating out and extending into surrounding vegetation;
- (b) Sand mound from the burrow excavation apparent at the burrow entrance;
- (c) Located in well-drained to moderately well-drained, sandy soils;
- (d) Located in sandhill, scrub, coastal dunes, flatwoods, dry prairie, dry hammock communities, or any disturbed version of these plant communities (such as, but not limited to, pastures, old fields, yards, power line corridors, roadsides);
- (e) Other burrows with the shape defined above, and with one or more of the characteristics described in (a)-(d) above, located on the site or in proximity on adjacent property.

*This policy will remain in effect until replaced with policy or rule.*

**APPENDIX 4. Draft Criteria for Authorized Gopher Tortoise Relocation Agents**

Survey, capture, and relocation of gopher tortoises involve specialized technical skills and knowledge to ensure accuracy of surveys; minimize detrimental effects, inhumane treatment, or death of tortoises; and to optimize successful relocation. To ensure that individuals engaged in gopher tortoise relocation activities have necessary skills and knowledge, the Florida Fish and Wildlife Conservation Commission (FWC) proposes to initiate a type of certification process for authorized relocation agents. Possession of this permit will authorize the holders and delegates working under their direct supervision to undertake activities with gopher tortoises authorized under tortoise relocation permits (*e.g.*, 10 or fewer burrows, conservation permits for relocation to protected or unprotected sites). Having an authorized agent should streamline and expedite issuance of other tortoise permits because basic information on the agent would already be known to FWC and there would be an assumption of competence. This permit would be conditioned so that it could be withdrawn or not renewed in cases where agents or their delegates violated FWC rules, policies, or guidelines concerning gopher tortoises; engaged in unethical or illegal behavior; and/or falsified tortoise permit applications or monitoring reports.

Issuance and denial of permits for authorized relocation agents will follow FWC and Florida statute and rule regarding occupational licenses and authorizations. Permits will be issued for a period of 4 years and be renewable by mail to FWC.

Applicants for this permit will provide standard information about their place of business; contact information; affidavit that applicant has no previous wildlife violations in Florida; and proof of knowledge and experience in handling gopher tortoises, wildlife surveys, and other appropriate information by any of the following means:

- Documented successful application for gopher tortoise relocation permits over the last 4 years with no permits denied or withdrawn for violation of permit conditions, malfeasance, or falsification.
- Satisfactory completion of any instructional course offered by private or commercial entities approved by FWC\* for this purpose (modeled on hunter safety requirement).
- Satisfactory completion of a training course offered by FWC for this purpose (modeled on requirements for alligator harvest).
- Not less than one year of substantial practical experience (to consist of no less than 1,000 hours) conducting gopher tortoise surveys and relocation under the supervision of a holder of an authorized relocation agent permit (documentation supported by work record and affidavit: modeled after venomous reptile and dangerous captive wildlife permit).
- Certified Wildlife Biologist.
- Professional certification by any industry body or trade group established for this purpose in the future and approved by FWC\*.

\* Issuance of permits and approval of courses for certification shall be at the discretion of the Executive Director or his delegate.

**APPENDIX 5. Draft Criteria for Responsible Relocation and Restocking of Gopher Tortoises****Criteria for Site Suitability and Stocking Rate Determination****1. Application for Site Certification**

Florida Fish and Wildlife Conservation Commission (FWC) must receive and approve an application for Site Certification before authorization can be given for responsible relocation and restocking of gopher tortoises. For the application to be found sufficient, the following elements must be included:

- A. **Certification:** Applicant must certify by signature that the information and supporting documents submitted are complete and accurate.
- B. **Location map and directions to the site:** Must provide sufficient detail to allow vehicular access.
- C. **Most current digital orthoquad photograph of the subject site:** Scale of 1 inch = 800 feet, or smaller.
- D. **Parcel identification:** Must provide project name and address, latitude/longitude coordinates, parcel identification number (PID # can be obtained from the county property appraiser's office) and proof of ownership.
- E. **Description of Habitat:** Provide a table summarizing existing land uses (*i.e.*, vegetation community types) and soil types by acres for both total parcel and for all areas proposed for relocation/restocking. Use standard, accepted land use descriptions (*e.g.*, Florida Department of Transportation [DOT]; Florida Land Use, Cover and Forms Classification System [FLUCFCS]; Florida Natural Areas Inventory [FNAI]; or FWC Center for Biogeographic Spatial Assessment) and standard soils type classification used by the Natural Resource Conservation Service (NRCS); both generally are available on-line from Water Management Districts. Attach maps showing the property boundaries, proposed relocation/restocking sites and the distribution of land uses and soil types across the site.
- F. **Current tortoise population and density:** Information should include sampling methodologies, how these figures were calculated, and a map depicting current distribution of tortoise burrows within the site.
- G. **Requested stocking rate:** Indicate both the number of additional tortoises requested for release on the site and the final, post-relocation tortoise density that would result. To calculate current tortoise population and density (above) and requested stocking rate, only consider tortoises greater than or equal to 130 mm in carapace length. Eggs and juvenile tortoises are not considered in these calculations because of their low survivorship and minimal effect on the recipient site forage base.

- H. **Enclosure Methodology:** Indicate if tortoises will be temporarily enclosed at the recipient site for a “soft release” and if not, why. Describe the proposed confinement duration, size of enclosure(s), tortoise densities, enclosure material and method of installation. Show proposed enclosure locations on a map of the site.
- I. **Draft conservation easement:** Should conform to the standard format available from FWC (Attachment 1); any changes to the standard must be provided with all proposed additions underlined and all proposed deletions indicated by ‘strike-throughs’; should include a survey and legal description, and title search/commitment.
- J. **Management plan:** Should contain the following: both qualitative and quantitative baseline information that describes existing conditions; goals of future management actions; specific activities to be implemented; remedial actions if proposed activities do not achieve desired results; estimate of annual management budget for the site.

## 2. **Site Suitability Criteria**

To receive FWC certification, candidate properties must meet site suitability criteria for size, soil, and habitat. Site suitability criteria are divided into 2 classes, *Acceptable* (minimum acceptable standards) and *Desirable* (highly desirable features).

A. **Size:** Relocation/restocking sites must contain a minimum of 40 acres of contiguous suitable uplands that meet the *Acceptable* criteria for soil and vegetation. Sites containing greater than 200 acres of contiguous suitable upland habitat satisfy the threshold for *Desirable* criteria. Uplands are considered contiguous if 2 or more upland communities occur within a distance of 1,000 feet, and there is no physical obstacle (*e.g.*, paved road open to the public, railroad bed, impenetrable fence, river, lake) to prevent tortoise movement to other upland areas within the relocation/restocking site.

B. **Soils:** Soils that meet *Acceptable* criteria are moderately well-drained to excessively drained, with a depth to water table (DWT) value of 45 cm (1.5 feet) or greater. For sites in flatwoods, land cover maps should be overlain on soils maps to help differentiate hydric areas from more mesic or xeric areas; site visits by FWC may also be required. Poorly drained soils with a DWT greater than 30 cm (1 foot) may meet the *Acceptable* criteria, provided that the proposed site contains augmentation features (*i.e.*, spoil piles or berms) or is drained by ditches, etc. *Desirable* criteria: 150 cm (5 ft) to water table; well-drained. Site-specific soil information can be obtained by referring to the NRCS Soil Survey for the appropriate county.

C. **Vegetation Features:** Sites with *Acceptable* habitat features are those that contain (1) average herbaceous cover of at least 30%, and (2) average canopy cover of 60% or less. Sites with average herbaceous cover greater than 50% and average canopy cover less than 40% meet the *Desirable* criteria threshold. Herbaceous cover (low-growing, soft-stemmed plants) should include broadleaf grasses—and preferably grass-like asters (sunflower family)

and legumes (bean family). Photographs of suitable forage will be provided to help guide applicants.

D. **Supplemental Stocking Criteria:** Proposed relocation/restocking sites may be awarded a 0.5 tortoise per acre increase in stocking rate if FWC determines that the site has enhanced conservation value by: (1) is adjacent to existing public or private conservation lands; (2) the site boundaries are 100% within a designated Strategic Habitat Conservation Area; or (3) at least 75% of the relocation/restocking site is vegetated with one or more native upland plant communities such as sandhill, scrub, scrubby flatwoods, or dry prairies.

E. **Baseline Densities:** The application must include a baseline gopher tortoise density estimate for the proposed relocation/restocking site. Supporting information should include potential reasons for low tortoise densities (*e.g.*, past harvest; previous—but now rectified—inadequate habitat management). The burrow survey used to generate this estimate must be performed within 6 months of the date of application. A map showing the site boundaries, transect locations, and corresponding tortoise densities will serve as the baseline for future monitoring efforts (see management plan requirements).

### 3. **Determining Stocking Rates**

A. **Site Evaluation Stocking Rate:** The site evaluation stocking rate is defined as the maximum allowable density as determined by the scoring process depicted in Table 1. A site that meets all three *Acceptable* criteria will be assigned a stocking rate of 2.0 tortoises per acre. Stocking rates may increase in increments of 0.5 individual per acre for each *Desirable* criteria that is met up to a maximum of 4 per acre. See Table 1 below.

B. **Determination of Final Stocking Rate:** The final stocking rate for an approved restocking site equals the site evaluation stocking rate minus the baseline density, *i.e.*,  
FINAL stocking rate = (site evaluation stocking rate) - (baseline density)

C. **Stocking Rate Adjustment:** Operators may request that a stocking rate be increased by 0.5 individuals per acre by providing documentation to FWC that (1) the site is below carrying capacity, (2) the site has been properly managed to support the proposed stocking rate, and (3) the total stocking rate following the requested increase does not exceed 4.0 individuals per acre.

**Table 1. Acceptable and Desirable criteria thresholds for selected site characteristics**

Site Characteristic	Acceptable Criteria	Desirable Criteria
Size	> 40 ac	> 200 ac
Soil	> 45 cm depth to water table (DWT), with land cover verification for flatwoods sites >30 cm (S. Florida; augmented)	>150 cm (DWT)
Habitat	> 30% herb cover < 60% canopy cover	>50% herb cover <40% canopy cover
Enhanced Conservation Value		Adjacent to protected land, or in Strategic Habitat Conservation Area, or $\geq$ 75% native upland community  (maximum of 0.5)
Stocking Rate	2.0 (requires all above criteria be satisfied)	0.5 for each site characteristic that is satisfied up to a maximum of 2.0 additional (4/acre max)

4. **Site Management Plan: Minimum Requirements**

Gopher tortoise habitat requires active management. A detailed, long-term management plan, therefore, is a vital part of gopher tortoise conservation efforts on FWC-certified relocation/restocking sites.

Below is a list of the major habitat management elements that are required as part of the application package:

- A. **Base map:** Indicate property boundaries, land use cover types, management units and baseline density transect locations with corresponding density values.
- B. **Tree canopy management activities/timelines:** Describe practices and treatment intervals that will be used to maintain canopy cover at 60% or less.
- C. **Ground cover management activities/timelines:** Describe practices and treatment intervals that will be used to maintain herbaceous ground cover at 30% or more; if applicable, include treatment practices for problematic exotic plants (see [www.fleppc.org](http://www.fleppc.org) for species list).
- D. **Compatibility of proposed land uses:** Describe what types of land uses are proposed for the site, and how agriculture and silviculture, if applicable, would be conducted to foster the open canopy and herbaceous ground cover noted above.

- E. **Other habitat enhancement/augmentation proposed:** Describe proactive measures that could enhance tortoise site fidelity, *e.g.*, berms, spoil piles, forage plantings, fencing.
- F. **Tortoise population and habitat monitoring:** Relocation/restocking site operators are required to submit the results of habitat and tortoise density reports to FWC every 3 years; guidelines regarding survey methods, and a template for the report, will be provided.
- G. **Financial responsibility:**

### **Financial Assurance of Management**

When FWC issues a permit for activities that impact species, the permittee may be required, as part of the mitigation, to protect property and habitat. Typically, the permit will require the permittees or their successor to actively manage the property in a way that will enhance or maintain the property.

The FWC needs to determine what mechanism or mechanisms will be acceptable to ensure that funding will be available for the management of the mitigation property. Below are examples of commonly used assurance options:

- (a) Trust agreement;
- (b) Deposit of cash or cash equivalent into an escrow account;
- (c) Irrevocable letter of credit;
- (d) Performance bond;
- (e) An audited annual financial statement;
- (f) Guarantee bond;
- (g) Insurance certificate;
- (h) Community Development District funding; or
- (i) Deed covenants and restrictions;

Each of these options provides different levels of assurance to FWC and burden on the applicant/permittee. Some may not be well suited for ensuring adequate funding of perpetual management, but may still be appropriate as an interim guarantee in conjunction with another option.

ATTACHMENT 1

[NOTE TO PREPARERS: PLEASE USE “TRACK CHANGES” WHEN YOU REVISE THIS FORM FOR SUMMITAL TO FWC. IF YOU DO NOT USE “TRACK CHANGES” FWC REVIEW OF THE FORM MAY BE SIGNIFICANTLY SLOWED.]

This instrument prepared by:

After recording please return the document to Grantee:  
 Florida Fish and Wildlife Conservation Commission  
 ATTN: Rick McCann  
 620 South Meridian Street, Tallahassee  
 FL 32399-1600

CONSERVATION EASEMENT

THIS DEED OF CONSERVATION EASEMENT is given this \_\_\_\_ day of \_\_\_\_\_ 200\_ by \_\_\_\_\_, a Florida corporation whose mailing address is \_\_\_\_\_, (“Grantor”) to the Florida Fish and Wildlife Conservation Commission, an agency of the State of Florida, with its principal office at 620 South Meridian Street, Tallahassee, FL 32399-1600 (“Grantee”).

The parties agree as follows:

WITNESSETH

WHEREAS, the Grantor is the owner of certain lands situated in \_\_\_\_\_ County, Florida, hereinafter referred to as the “Property”, more specifically described in Exhibit A attached hereto and incorporated herein by this reference; and

WHEREAS, the property possesses natural, scenic, open space, wildlife preservation and conservation values (collectively, “conservation values”) of great importance to Grantor, the people of \_\_\_\_\_ County, and the people of the State of Florida; and

WHEREAS, the specific conservation values of the Property are documented as part of the Habitat Management Plan pertaining to the Property, dated \_\_\_\_\_ (“Plan”), part of which is entitled the “Baseline Documentation”. A copy of the Plan is attached hereto as Exhibit B, and incorporated herein by reference. The Baseline Documentation is an accurate representation of the Property at the time of this grant and is intended to serve as an objective information baseline for monitoring compliance with the terms of this grant; and

WHEREAS, Grantor intends that the conservation values of the Property be preserved and maintained by the continuation of land use patterns, including, without limitation, those relating to \_\_\_ [e.g., farming, ranching, or timber production] existing at the time of this grant, that do not significantly impair or interfere with those values; and

WHEREAS, Grantor further intends, as owner of the Property, to convey to Grantee the right to preserve and protect the conservation values of the Property in perpetuity; and

WHEREAS, Grantee is a state public agency, part of whose mission is the conservation, preservation, protection or enhancement of lands such as the Property; and

WHEREAS, the Grantor, in consideration of the issuance by the Grantee of Permit No. \_\_\_\_\_ issued by the Grantee on \_\_\_\_\_ (“Permit”) in favor of the Grantor for the

incidental take of listed wildlife species, is required to grant and secure the enforcement of a perpetual conservation easement pertaining to the Property.

NOW THEREFORE, consistent with the issuance of the Permit, Grantor hereby grants, creates, and establishes a perpetual conservation easement upon the Property described in Exhibit A, which shall run with the land and be binding upon the Grantor, its heirs, successors and assigns, and remain in full force and effect forever.

1. Purpose. The purpose of this Conservation Easement is to ensure that the Property or part thereof as described in this Conservation Easement shall be protected forever and used as conservation areas, consistent with the Habitat Management Plan (“Plan”). The parties intend that this Conservation Easement will confine the use of the Property to such uses as are consistent with the purpose of this Conservation Easement.

2. Rights of Grantee. To accomplish the purpose of this Conservation Easement the following rights are conveyed to Grantee:

a. To preserve and protect the conservation values of the Property as defined in this Conservation Easement;

b. To enter upon the Property at reasonable times and upon reasonable notice to the Grantor in order to engage in activities consistent with this Conservation Easement, to monitor Grantor’s compliance with this Conservation Easement, and to otherwise enforce the terms of this Conservation Easement; provided that Grantee shall not unreasonably interfere with Grantor’s use and quiet enjoyment of the Property; and

c. To prevent any activity on or use of the Property that is inconsistent with the purpose of this Conservation Easement, and to require the restoration of such areas or features of the Property that may be damaged by any inconsistent activity or use.

3. Grantor’s Reserved Rights. Grantor reserves to itself, its heirs, successors or assigns all rights as owner of the Property including the right to engage in all uses of the Property that are not expressly prohibited herein and are not inconsistent with the purpose of this Conservation Easement.

4. Prohibited Uses. Unless expressly authorized in accordance with the Plan (Exhibit B), the following are prohibited activities on the Property:

a. Construction or placing of buildings, roads, signs, billboards or other advertising, utilities or other structures on or above the ground.

b. Dumping or placing of soil or other substance or material as landfill or dumping of trash, waste, or unsightly or offensive materials.

c. Removal or destruction of trees, shrubs, or other vegetation.

d. Excavation, dredging, or removal of loam, peat, gravel, soil, rock or other material substance in such manner as to affect the surface.

e. Surface use except for purposes that permit the land or water areas to remain in their existing natural condition.

f. Activities detrimental to drainage, flood control, water conservation, erosion control, soil conservation, or fish and wildlife habitat preservation.

g. Act or uses detrimental to such retention of land or water areas in their existing natural condition.

h. Acts or uses detrimental to the preservation of the structural integrity or physical appearance of sites or properties of historical, architectural, archaeological, or culture significance.

i. Alteration of the Property except in compliance with the Plan.

5. No Public Access. No right of access by the general public to any portion of the Property is conveyed by this Conservation Easement.

6. Expenses; Taxes. Grantor retains all responsibilities and shall bear all costs and liabilities of any kind related to the ownership, operation, upkeep, and maintenance of the Property, including the maintenance of adequate comprehensive general liability insurance coverage. Such responsibilities and costs shall include those associated with the management activities discussed in the Plan. Grantor shall keep the Property free of any liens arising out of any work performed for, materials furnished to, or obligations incurred by Grantor. Grantor shall pay before delinquency all taxes, assessments, fee, and charges of whatever description levied on or assessed against the Property by competent authority, and shall furnish Grantee with satisfactory evidence of payment upon request.

7. Costs of Enforcement. Any costs incurred by Grantee in enforcing the terms of this easement against Grantor, including, without limitation, costs of suit and attorney's fees, and any costs of restoration necessitated by Grantor's violation of the terms of this Easement, shall be borne by Grantor.

8. Liability. Grantor and its successors shall hold harmless, indemnify and defend Grantee from and against all liabilities, penalties, costs, losses, damages, expenses causes of action, claims, demands or judgments, including attorneys fees, arising from or in any way connected with: 1) injury to or the death of any person, or physical damage to any property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Property, regardless of cause, 2) costs and liabilities of any kind related to the ownership, operation, upkeep and maintenance of the Property, including but not limited to the maintenance of adequate comprehensive general liability coverage, payment of taxes, and keeping the Property free of liens; and 3) the existence or administration of this Conservation Easement.

9. Remedies. If Grantee determines that Grantor or successors are in violation of the terms of this Conservation Easement, it may take any of the following actions, after 30 day written notice to Grantor or successors to correct the violation: 1) Grantee may itself correct the violation, including but not limited to restoration of any portion of the Property affected to the condition that existed prior to the violation, and demand payment from Grantor for all costs associated with such action; 2) Grantee may bring an action at law or in equity in a court of competent jurisdiction to enforce the terms of this Conservation Easement, for specific performance, to temporarily or permanently enjoin the violation, recover damages for violation of this Conservation Easement, including but not limited to the costs of restoration, and any other damages permitted by law. In any enforcement action Grantee shall not be required to prove either actual damages or the inadequacy of otherwise available remedies. Grantee's remedies shall be cumulative and shall be in addition to all remedies now or hereafter existing at law or in equity. As part of the consideration for this Conservation Easement, the parties hereby waive trial by jury in any action brought by either party pertaining to any matter whatsoever arising out of or in any way connected with this Conservation Easement.

10. Waiver. Grantor intends that enforcement of the terms and provisions of the Conservation Easement and the Plan shall be at the discretion of Grantee and that any forbearance on behalf of Grantee to exercise its rights hereunder in the event of any breach hereof by Grantor, its heirs, successors, personal representatives or assigns shall not be deemed or construed to be a waiver of Grantee's rights hereunder in the event of a subsequent breach. Grantor hereby waives any defense of laches, estoppel, or prescription.

11. Assignment. Grantee agrees that it will hold this Conservation Easement exclusively for conservation purposes and that it will not assign its rights and obligations under this Conservation Easement except to another organization qualified to hold such interests under the applicable state and federal laws and committed to holding this Conservation Easement exclusively for conservation purposes. Not later than thirty (30) days after recordation in the Public records of \_\_\_\_\_ County,

Florida of an instrument transferring the title to the property, which is the subject of this easement, Grantor agrees to give written notice to Grantee of such transfer.

12. Severability. If any provision of this Conservation Easement or the application thereof to any person or circumstance is found to be invalid, the remainder of the provisions of this Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

13. Notices; References. All notices, consents approvals or other communications hereunder shall be in writing and shall be deemed properly given as of the second business day after mailing if sent by United State certified mail, return receipt requested, or by overnight mail service (e.g. FedEx, UPS), addressed to the appropriate party or successor-in-interest, at the address above set forth or such new addresses as either party may in writing deliver to the other. References in this Conservation Easement to the Grantor or Grantee include their successors-in-interest.

14. Venue; Waiver of Jury Trial. This Conservation Easement has been delivered in the State of Florida and shall be construed in accordance with the laws of Florida. As part of the consideration for this Conservation Easement, the parties hereby waive trial by jury in any action or proceeding brought by any party against any other party pertaining to any matter whatsoever arising out of or in any way connected with this Conservation Easement.

15. Amendment. This Conservation Easement may be amended, altered, released or revoked only by written agreement between the parties hereto, their successors or assigns.

16. Subordination of Liens. Grantor agrees that if the Property is subject to a mortgage lien or any other form of lien or security pertaining to the Property, Grantor shall provide recorded or recordable documentation to verify that such lien or security interest is subordinate to this Conservation Easement.

17. Recording. This Easement shall be recorded in the same manner as any other instrument asserting title to real property.

TO HAVE AND TO HOLD unto grantee, its respective successors and assigns forever. The covenants, terms, conditions, restrictions and purposes imposed with this easement shall not only be binding upon Grantor but also its agents, personal representatives, heirs, assigns and all other successors to it in interest and shall continue as a servitude running in perpetuity with the Property.

IN WITNESS WHEREOF Grantor has set its hand on the day and year first above written.

Signed, sealed and delivered  
In our presence as witnesses:

\_\_\_\_\_  
[Corporate name]

By: \_\_\_\_\_

Name: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

\_\_\_\_\_

Name: \_\_\_\_\_

STATE OF FLORIDA  
COUNTY OF FLAGLER

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 200\_ by \_\_\_\_\_, the \_\_\_\_\_ of, a Florida corporation, on behalf of the corporation. The above-named individual is personally known to me or produced \_\_\_\_\_ as identification.

\_\_\_\_\_  
Notary Public State of Florida  
Commission No:  
Commission expires:

GRANTEE'S ACCEPTANCE

The Florida Fish and Wildlife Conservation Commission hereby accepts the foregoing Conservation Easement.

FLORIDA FISH AND WILDLIFE  
CONSERVATION COMMISSION

By: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date: \_\_\_\_\_

Approved as to form and legal sufficiency:

\_\_\_\_\_  
FWC Attorney

## APPENDIX 6. Draft FWC Law Enforcement Protocol for Responding to Complaints of Gopher Tortoises on Development Sites

### DRAFT PROTOCOL FOR FWC OFFICER RESPONSE TO GOPHER TORTOISE COMPLAINTS

**Citizen complaints.** Scenario: An officer receives a complaint that the destruction of gopher tortoise(s) and/or burrow(s) is on going.

- The officer calls the communication center and relays the complaint information to the dispatcher.
- The communications center gives the officer an Offense Number.
- The officer responds to the location.
  - **Land has not been excavated, graded, or contoured.**
    - Communicate with complainant, notify of disposition.
    - Close out the complaint.
  - **Land has been excavated, graded, or contoured.**
    - **Officer determines no tortoises or burrows are or were present in the excavated, graded, or contoured area or any other portion of the project site.**
      - Communicate with complainant, notify of disposition.
      - Close out the complaint.
    - **Officer determines tortoises or burrows are present within an area of the project planned to be excavated, graded, or contoured. However, no burrows or tortoises have been destroyed in the area already excavated, graded or contoured.**
      - Officer checks for appropriate permit posted on-site.
        - Permit posted.
          - Communicate with complainant, notify of disposition.
          - Close out the complaint.
        - Permit not posted on-site.
          - Officer contacts developer to locate permit.
            - Developer produces appropriate permit.
              - Citation or warning appropriate for not posting (misdemeanor).
              - Communicate with complainant, notify of disposition.
              - Close out the complaint.
            - Developer cannot produce permit.
              - Officer advises developer that a permit will be required to continue excavating, grading, or contouring to avoid being cited.
              - Officer advises developer to contact the Regional Nongame Biologist for permitting options.
              - Communicate with complainant, notify of disposition.
              - Close out the complaint.

- **Officer determines tortoises or burrows are or were present in the excavated, graded, or contoured area.**
  - Officer determines that activity is agriculture, silviculture or other non-permitted activity (refer to Burrow Rule Policy).
    - Permit not required.
    - Communicate with complainant, notify of disposition.
    - Close out the complaint.
  - Officer checks for appropriate permit posted on-site (required).
    - Permit posted.
    - Permit not posted on-site.
      - Officer contacts developer to locate permit.
        - Developer produces appropriate permit.
          - Citation or warning appropriate for not posting (misdemeanor).
          - Communicate with complainant, notify of disposition.
          - Close out the complaint.
        - Developer cannot produce permit.
          - Officer advises developer to cease operations due to pending investigation.
          - Officer notifies Regional Nongame Biologist of investigation.
          - Officer advises developer to contact the Regional Nongame Biologist for permitting options.
          - Officer advises complainant of ongoing investigation.
          - Officer develops investigative package (witness statements, environmental surveys, photographs, etc.) and submits to the state attorney's office\* with recommendations:
            - Charge/Not Charge (responsible party - developer, landowner, consultant, equipment operator, etc.).
            - Type of sentence.
            - Allow issuance of appropriate permit with state attorney's concurrence that this will not effect prosecution.
          - Officer advises Regional Nongame Biologist of case disposition.

\*A campaign by local officers to educate state attorney's and their assistants on the importance of gopher tortoise and tortoise habitat protection is vital to successful prosecution.

## SUPPORTING INFORMATION FOR FWC OFFICERS RESPONDING TO GOPHER TORTOISE COMPLAINTS

***No Permit Required Options for Sites where Gopher Tortoises are Present***

1. Gopher Tortoise permits are not required on properties where building construction, bulldozing, paving, clearing, or grading will NOT occur.
2. Gopher Tortoise or Gopher Tortoise Burrow permits are not required to conduct agriculture, silviculture or other activities intended to improve native wildlife habitat. Such activities include, but are not limited to, tilling, planting, mowing, harvesting, prescribed burning, disking, roller-chopping or tree cutting (reference Burrow Rule Policy).
3. Gopher Tortoise permits are not required where burrow entrances and the area within 25 feet surrounding burrow entrances will not be disturbed (does not apply to development site). Single-family homeowner activities such as mowing grass, gardening, and landscaping that do not significantly impact the burrow and do not require a permit.
4. No building construction, bulldozing, paving, clearing, or grading should occur on sites where tortoises are present and burrows are to be impacted, even if burrows can be temporarily avoided (25 feet). Sites where such activities occur before permits have been issued or before relocations have been completed will be charged the maximum Species Conservation permit fee (25%) and work will be stopped on-site until such permit has been obtained and fees have been paid.

**Definition of Gopher Tortoise Burrows**

Gopher tortoise burrow is defined as a tunnel in the ground with a cross-section that closely approximates the shape of a gopher tortoise.

**Supporting burrow characteristics:**

- A. Ground surrounding the burrow entrance may show evidence of gopher tortoise activity included, but not limited to presence of a gopher tortoise, gopher tortoise eggs or egg shell fragments, impressions from the bottom shell of the tortoise, foot prints or tracks left by tortoise, scat, obvious feeding trails radiating out and extending into surrounding vegetation.
- B. Sand mound from the burrow excavation apparent at the burrow entrance.
- C. Burrows located in extremely well drained to moderately well drained, sandy soils.
- D. Burrows located in sandhill, scrub, coastal dunes, dry flatwoods, dry prairie, dry hammock, and any disturbed version of these habitats (*e.g.*, pastures, old fields, yards, power line corridors, roadsides).
- E. Other burrows with the shape defined above and with one or more of the characteristics described in (a)-(d) above, located on the site or in proximity on adjacent property.

**TRAINING RECOMMENDATIONS:**

- A training manual for implementation of the policy, protocol, and guidelines will be developed and training will be conducted by qualified personnel for officers in the field as well as in the recruit academy.

**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.

## 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

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.

- 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  $\div$  No. Transects  $\div 2$

#### Justification for Recommended Protocol

- 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

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 (Lohoefer and Lohmeier 1984; McCoy and Mushinsky 1991, 1992a). 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 1992b, 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 1992b, 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.

- 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 ( $\leq$  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.

- 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).*

- 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  $\geq 98\%$  of large burrows ( $\geq 20$  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.

- 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).

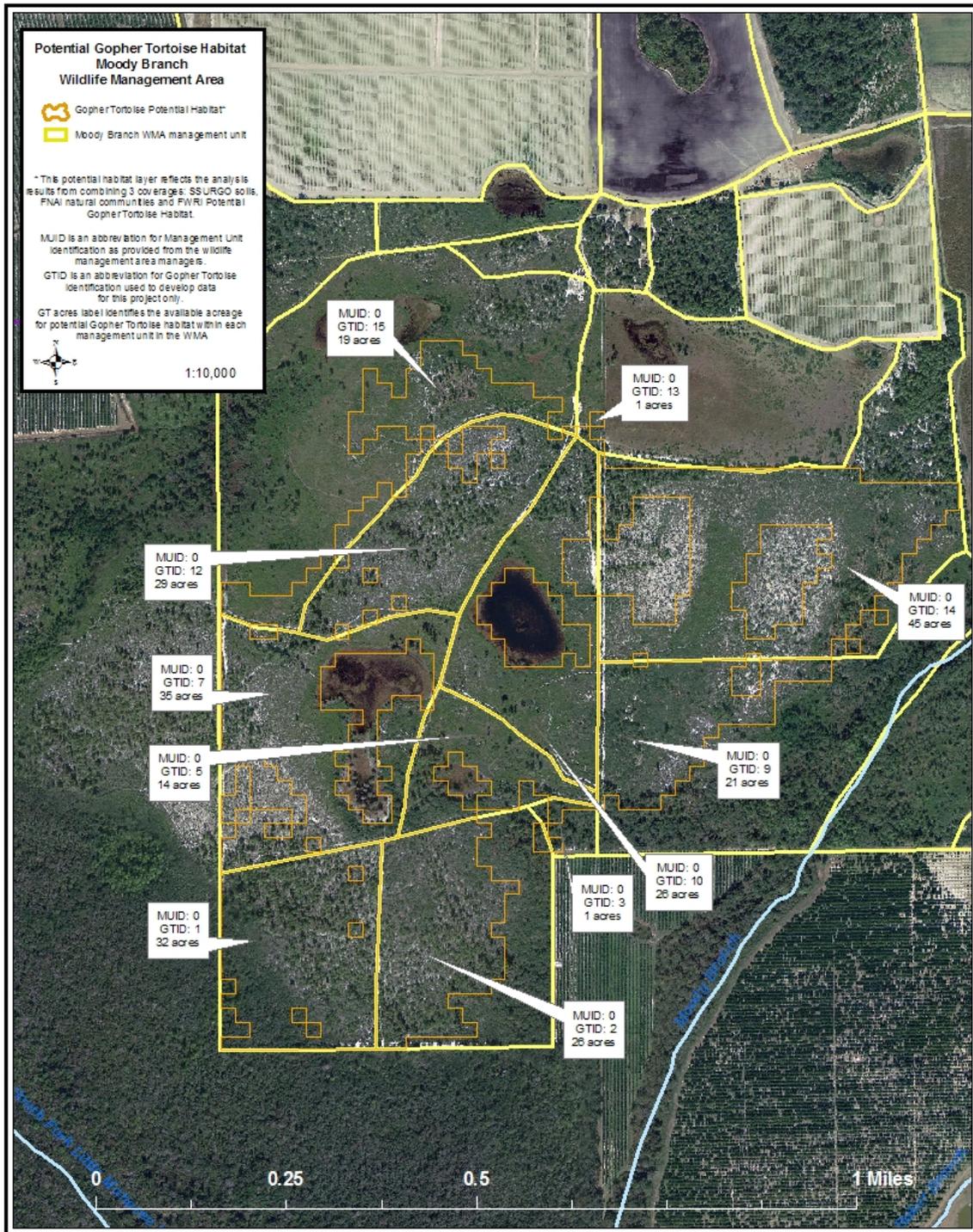
**LITERATURE CITED**

- Ashton, R. E., Jr., and P. S. Ashton. 2001. *Gopherus polyphemus* (gopher tortoise). Use of abandoned burrows by juveniles. *Herpetological Review* 32:185–186.
- Ashton, R. E., Jr., and P. S. Ashton. *In Press*. The Natural History and Management of the Gopher Tortoise (*Gopherus polyphemus* Daudin). Krieger Press, Malabar, Florida.
- Auffenberg, W., and R. Franz. 1982. The status and distribution of the gopher tortoise (*Gopherus polyphemus*). Pages 95–126 in R. B. Bury, editor. North American tortoises: conservation and ecology. U.S. Fish and Wildlife Service Wildlife Research Report No. 12.
- Breining, D. R., P. A. Schmalzer, and C. R. Hinkle. 1991. Estimating occupancy of gopher tortoise (*Gopherus polyphemus*) burrows in coastal scrub and slash pine flatwoods. *Journal of Herpetology* 25:317–321.
- Burke, R. 1989. Burrow-to-tortoise conversion factors: comparison of three gopher tortoise survey techniques. *Herpetological Review* 20:92–94.
- Burke, R. L., and J. Cox. 1988. A survey method for measuring gopher tortoise density and habitat distribution. Pages 205–215 in R. C. Szaro, K. E. Severson, and D. R. Patton, technical coordinators. Proceedings of the symposium on the management of reptiles, amphibians, and small mammals in North America. U.S. Forest Service General Technical Report RM-166.
- Carthy, R. R., M. K. Oli, J. B. Wooding, J. E. Berish, and W. D. Meyer. 2005. Analysis of gopher tortoise population estimation techniques. Final report for U.S. Army Corps of Engineers. ERDC/CERL TR-05-27, Engineer Research and Development Center, Construction Engineering Research Laboratory, Champaign, Illinois, USA. 35 pp. ([http://owwww.cecer.army.mil/techreports/Meyer\\_AnalysisTortoise/Meyer\\_Analysis\\_of\\_Tortoise\\_Population.pdf](http://owwww.cecer.army.mil/techreports/Meyer_AnalysisTortoise/Meyer_Analysis_of_Tortoise_Population.pdf))
- Cox, J., D. Inkley, and R. Kautz. 1987. Ecology and habitat protection needs of gopher tortoise (*Gopherus polyphemus*) populations found on lands slated for large-scale development in Florida. Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program Technical Report No. 4. 75pp.
- Diemer, J. E. 1992. Demography of the tortoise *Gopherus polyphemus* in northern Florida. *Journal of Herpetology* 26:281–289.
- Enge, K. M., and N. J. Douglass. 2000. Easement Documentation Report (Volume II: vertebrate surveys) for Fisheating Creek Ecosystem–Phase I, Glades County, Florida. Prepared for the Conservation and Recreational Lands Program and the Division of State Lands, Florida Department of Environmental Protection. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida. 72pp.

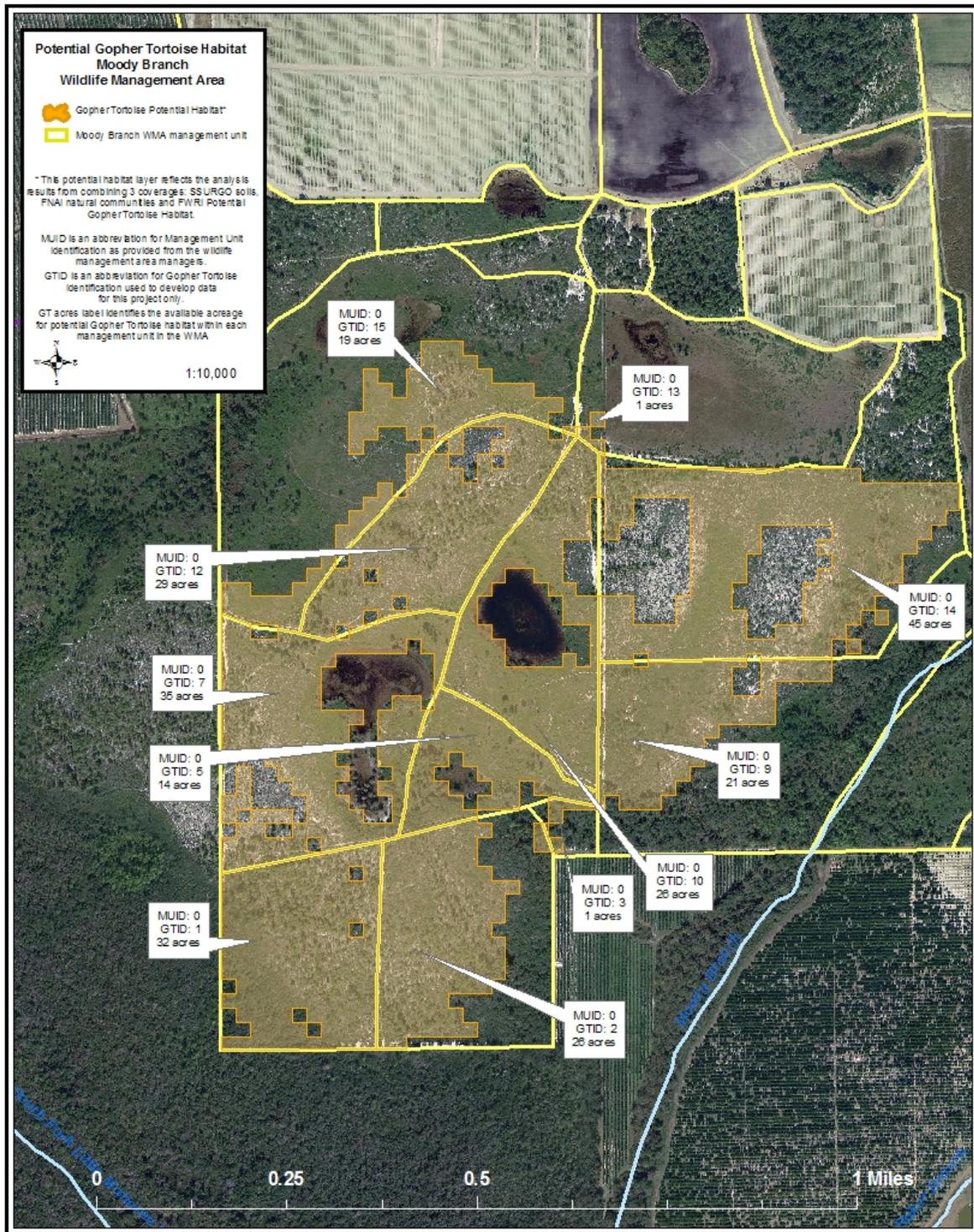
- Lohofener, R., and L. Lohmeier. 1984. The status of *Gopherus polyphemus* (Testudines: Testudinidae) west of the Tombigbee and Mobile rivers. A report on research presented to the U.S. Fish and Wildlife Service in conjunction with a petition to list the gopher tortoise west of the Tombigbee and Mobile rivers as an endangered species without critical habitat. 104pp.
- Mann, T. M. 1993. Tortoise densities and burrow occupancy rates for gopher tortoises on selected sites in Mississippi. Mississippi Department of Wildlife, Fisheries, and Parks, Jackson, Mississippi. ? pp.
- McCoy, E. D., and H. R. Mushinsky. 1991. A survey of gopher tortoise populations residing on twelve state parks in Florida. Florida Department of Natural Resources Technical Report No. 1, Tallahassee, Florida. 78pp.
- McCoy, E. D., and H. R. Mushinsky. 1992a. Studying a species in decline: changes in populations of the gopher tortoise on federal lands in Florida. Florida Scientist 55:116–125.
- McCoy, E. D., and H. R. Mushinsky. 1992b. Studying a species in decline: gopher tortoises and the dilemma of "correction factors." Herpetologica 48:402–407.
- McCoy, E. D., and H. R. Mushinsky. 1995. The demography of *Gopherus polyphemus* (Daudin) in relation to size of available habitat. Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program Project Report, Tallahassee, Florida. 71pp.
- Moler, P., and J. Berish. 2001. An assessment of options for survey and monitoring of gopher tortoises on Commission-managed lands. Florida Fish and Wildlife Conservation Commission, Bureau of Wildlife Diversity Conservation, Gainesville, Florida. 16pp.
- Smith, L. L. 1992. Nesting ecology, female home range and activity patterns, and hatchling survivorship in the gopher tortoise (*Gopherus polyphemus*). M.S. Thesis, University of Florida, Gainesville, Florida. 106pp.
- Smith, R. B., T. D. Tuberville, A. L. Chambers, K. M. Herpich, and J. E. Berish. 2005. Gopher tortoise burrow surveys: external characteristics, burrow cameras, and truth. Applied Herpetology 2:161–170.
- Tuberville, T. D., and M. E. Dorcas. 2001. Winter survey of a gopher tortoise population in South Carolina. Chelonian Conservation and Biology 4:182–186.
- Witz, B. W., D. S. Wilson, and M. D. Palmer. 1991. Distribution of *Gopherus polyphemus* and its vertebrate symbionts in three burrow categories. American Midland Naturalist 126:152–158.



**Fig. 1.** Photographs of active gopher tortoise burrows.

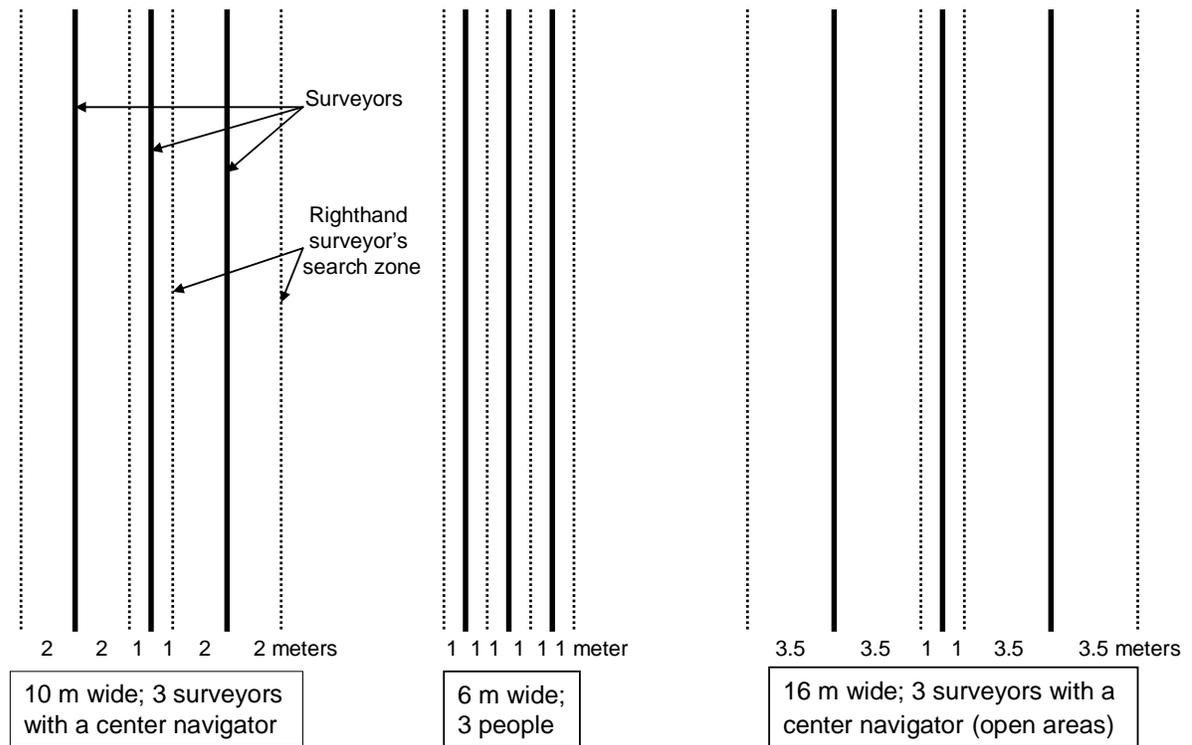


**Fig. 2.** First map of a representative WMA showing potential high-quality gopher tortoise habitat outlined in gold, plus acreages of tortoise habitat per management unit.



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





**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.



**Fig. 6.** Photographs of inactive gopher tortoise burrows.

**APPENDIX 8. Landowner Assistance Programs – Details and Application Contacts**

LANDOWNER ASSISTANCE PROGRAMS

Program	Description	Contact
<b>Forest Stewardship Program (FSP)</b>	The FSP seeks to help private landowners develop a plan designed to increase the economic value of their forestland while maintaining its environmental integrity for future generations. Stewardship is based on the multiple-use land strategy.	<u>Contact your county forester or a Habitat and Species Conservation HSC), Scientific Services biologist</u>
<b>Wildlife Habitat Incentives Program (WHIP)</b>	Administered by U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). Provides both technical assistance and up to 75 percent cost-share assistance to establish and improve fish and wildlife habitat.	Contact your local <b>District Conservationist</b> through the nearest USDA Service Center
<b>Environmental Quality Incentives Program (EQIP)</b>	Administered by USDA’s NRCS. Provides both technical assistance and up to 50 percent cost-share assistance to farmers and ranchers who face threats to soil, water, air, and related natural resources.	Contact your local <b>District Conservationist</b> through the nearest USDA Service Center
<b>Landowner Incentives Program (LIP)</b>	The purpose of LIP is to improve habitat conditions for threatened or endangered species on private lands. Cost-share assistance is 50 percent.	Visit the web site: <u><a href="http://www.myfwc.com/lip">www.myfwc.com/lip</a></u>
<b>Partners for Fish and Wildlife Program (PFW)</b>	Administered by the U.S. Fish and Wildlife Service. Provides technical and up to 50 percent cost-share assistance to private landowners and other partners who conduct habitat restoration and improvement activities on their land. The focus of the program in Florida is on restoration of native habitats, restoration of degraded streams and wetlands, and eradication of invasive, exotic species.	Contact an HSC Scientific Services biologist
<b>Common Species Common (CSC)</b>	The purpose is to improve habitat conditions for wildlife by focusing conservation on high priority habitats outlined in FWC Comprehensive Wildlife Conservation Strategy.	Contact an HSC Scientific Services biologist
<b>Conservation Reserves Program (CRP)</b>	Administered by USDA’s Farm Service Agency (FSA). Provides annual rental payments and cost-share assistance to establish long-term, resource conserving covers on eligible farmland.	Contact your local <b>FSA</b> office through the nearest USDA Service Center

**APPENDIX 9. Stakeholders**

Gopher Tortoise Stakeholders Group. Individuals on the stakeholder contact list and with access to the stakeholders public SharePoint site and individuals who participated in stakeholder meetings June 2005 - December 2006. \* indicates member of the group steering committee.

		Affiliation	Dierolf	Amy	Progress Energy
Acevedo	Jennifer	Crossroads environmental.com	Dineen	Caroleen	Broad and Cassel
Alger	Yvette	St. Lucie Co.	Dinkins	Matt	King Engineering
Angel	Patty		Dombrova	Louis	
Ard	Sam	AS Law/FI Cattlemen's Assoc	Duggins	Gail	
Aresco *	Matthew	Nokuse Plantation	Dutton	Mike	Alachua Co.
Ashton *	Ray	Gopher Tortoise Conservation Initiative	Dziergowski	Annie	US FWS
Auerbach	Simon		Eagan *	Rebecca	
Avis	Craig	Citrus Hill	Elaine	Akers	Tortuga Consulting
Baker	Jonathan A.		Elegant	Justin	Petros Law
Barlow	C	Miller Leg Inc.	EPI FL		EPI FL
Barnwell	Mary	SWFWMD	Evans	McLane	Earthbalance
Becker *	Chris	DEP-State Parks	Exum	Jay	Glating.com
Bevan *	Laura	HSUS			
Bierly *	Jim		Farnsworth *	Susan	Citrus Co.
Bishop	T	St. John's Co.	Fickett	Alan	
Bittner	R	BDA Inc.	Foote	Jerris	SC Gov.
Blihovde *	Boyd	Gopher Tortoise Council	Framer	Robert	Gowebco.com
Bolt	Rebecca	KSC EMS /NASA	Fuller	Manley	FL Wildlife Federation
Braem	Sally	DEP	Gault	Kathleen	Eglin AFB (DOF)
Brewer	Jan	St. Johns Co.	Gentry	R.	FHBA Inc.
Brown	Dan	UF Vet	George	Cheryl	Packaging Corp
Brown	Kris		Gery	Al	St Lucie Co.
Brown	Mary	UF Vet	Godley *	Steve	FL Home Builders Assoc.
Burgeson *	Barbara	Collier Co.	Gordon*	David	Quest Ecology
Burnaman	Ross		Gordon	Doria '	The Nature Conservancy
Bush	Michael	St. Lucie Co.	Gornicki	Phil	FL Forestry Assoc.
Carlson	C.		Gosa *	Mary Ann	FL Farm Bureau
Carpenter	Cheryl	CN Environmental	Griep *	Skip	US Forest Service
Caruso	Kristin		Griffiths	Bev	
Charles	James	LLW Law	Griffy	Bill	ECS Inc.
Claridge	Kevin	FL DEP	Grubbs	'Sarah	Seminole Tribe of FL
Clark	Jeff				
Clark	Roger	Lee Co.	Hamilton	Timothy	ESINC
Clarkson	Chan		Hand	George	
Clementi *	Rosanne G.	SSEI Inc.	Handley *	Jim	FL Beef Cattlemen's Assoc.
Cockerel	Pat	FL Farm Bureau	Handy	Vivienne	Queso Ecology
Collier	J	GT Law	Heckler	Courtney	Seminole Tribe of FL
Collins	Joe		Heinrich *	George	
Concoby *	Ronald E	Mosaic Phosphate Co.	Henderson	Clay	H.K. Law
Connolly	Tom	Gopher Tortoise Consultants	Hicks	Charles	HC. Hicks Law
Conway	Linda	Consultant	Hobgood *	Jennifer	HSUS
Duever			Hodgson	Ann	Audubon Soc FL
Corona	Matthew and Hope		Hofstetter	S	Alachua Co.
Crowe	Thad	Clay Co.	Holley	Roz	Coastal Wildlife Club Inc.
Czerwinski	Michael G.	Czerwinski Consulting	Hooker	Allan	ERS Environmental
D	Dawn	Hernando Co.	Jackson	Dale	FL Natural Areas Inventory
Dalton	T	Avid Engineering	Jacobson	Elliott	UF School Vet Med.
Daniel	Ilke	HSUS Vero Beach	Kaiser *	Bernard	Hillsborough Co.
Davis *	MC	Nokuse Plantation	Kantor	Imre	
Deal	Melinda	Earthbalance	Karsen	Hank	
Derheimer	Suzanne	Charlotte Co.	Karsen	Sharon	
Dickson	David	ESA Inc.			

Katz	Wilma		Rizzo	Mike	Volusia Co.
Kautz	Randy S	BDA Inc.	Robertson	Clayton	VHB Inc.
Kerr	William W.	CFL Inc.	Robertson	Preston	FL Wildlife Federation
Kesler	Reeve	Envtl Consulting Group	Rossi	R	
Kintner	S.	Volusia Co.	Savage	Anne	Disney Wild Kingdom
Kiser	C	H.K. Law	Schiller	Laurel	
Krebs	J		Schmittler	Craig	Wilson Miller.com
Landon	Joan	LMA Inc.	Schultz	Carolyn	Advanced-eco
Layman	Bruce	Wilson Miller Engineering	Sekerak *	Carrie	UF Forest Svc- Ocala Nat. Forest.
Lewis	Robin	Save Our Scrub Inc.	Shackelton	Eve	Bats from Ocala
Lites	Bill	Glatting	Sharpe	Vicki	FL DOT
Littlejohn	Chuck	FL Land Council	Shea *	Steve	St Joe Co.
Locke	K	Volusia Co.	Silk	Sherry	ASPCA
Logan	Tom	BDA Inc.	Siniawski	Norman	
Lyon	Casey	Volusia Co.	Skidmore	B.	King Engineering.com
			Sliester	Randal	Volusia Co.
Macdonald *	Laurie	Defenders of Wildlife	Small	Parks	FL DEP- State parks
Maidhof	Gary	Citrus Co.	Smith *	Lora	Jones Center
Maltby	D		Songer	K	Avid Eng.
Matthews	F.	HGS Law	Spears	K	Orlando Sentinel
McAlpine	Davd	McAlpine Envtl.	Spengler	J	Ecological cs.com
Mccooy	Earl	U SF	Stodola	Ann	Clay Co.
McGlincy *	Joe	FL Forestry Assoc.	Sulkers	Rachael	ES INC.
Meco	Mary	Mecomary@aol.com	Sullivan	Julie	PBS & J
Media arts		mediaarts@earthlink.net	Sumpter	D	Peer inc.org
Miller	Darla	MSCW Inc.	Tatum	Vickie	NCASI
Mish	Bob	rdmish@msn.com	Telfer	Tim	Flagler Co.
Morris	Julie	Charlotte Co.	Thomson	Walt	The Nature Conservancy
Moyers	Jim	St Joe Co.	Tonjes	Stephen	FL DOT
Munsch	Lisa M.	PBSJ Inc.	Too far inc		
Munson	Greg	DEP	Trebatoski	Kim	Lee Co.
Mushinsky	Henry	USF	Tvofilat	Marcia	Pappas Metcalfe Inc.
Nelson	Meg	Nokuse Plantation	Tyner	Ray	Cl.palm-coast
Newman	Christian M.	Pandion systems.com	Ura	C.	osceola.org
Osterhoudt	Matt	SC Gov	Walton	Lee	Biol. Research Assocs.
Palmer *	Michael D.	King Engineering	Weaver	Natalie	
Parent	Maureen		Wendland *	Lorrie	UF School vetmed.
Parham	David	Panhandle Energy	Willcox	A.	UF-Wifl Ecol
Peacock	Byron	Peacock Consulting Group	Witt	Terry	Chronicle online
Pennington	D	1000 Friends of Florida	Wooding	John	MSN Inc.
Powell	Barbara Jean	Everglades Coalition	Wraithmell	J	FL Audubon
Pulver	Dinah	News Journal	Zable	Terrence J.	PBSJ Inc.
Ramsey	Kristina	Broad and Cassel	Zremski	Becky	Sarasota Def. of Animals
Reese	M	For the people.com			
Reese	Mr.	ECG Inc.			
Reynolds	Gayle	Reynolds Design			
Rice	Roger	Attorney			
Rillstone *	Douglas	FL Chamber Commerce/Developers Assoc.			

**APPENDIX 10. Statement of Estimated Regulatory Cost to Implement the Gopher Tortoise Management Plan**

Florida Fish and Wildlife Conservation Commission  
 Fish and Wildlife Research Institute  
 Socioeconomic Assessment  
 July 2007

## I. Introduction

The Gopher Tortoise Management Plan provides the framework for conserving and managing the gopher tortoise (*Gopherus polyphemus*) in Florida. 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” to a “threatened” species.

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) inches 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 southeastern Coastal Plain from southeastern South Carolina to extreme southeastern Louisiana. 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 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 one tortoise generation (31 years), the rate of decline is less than the percentage decline which defines the current listing category (*i.e.*, <50% over three 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 as follows:

- (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 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 measurable conservation objectives involve habitat management, habitat preservation, restocking gopher tortoises where needed and decreasing gopher tortoise mortality on development sites.

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.

## **II. Background Information, Assumptions and Historical Data**

### ***Land Acquisition***

Under the existing incidental take permit, the mitigation contribution per acre of gopher tortoise habitat has not been revised by FWC in almost 3 years. Over this time, the cost of acquiring tracts of gopher tortoise habitat for conservation purposes has increased dramatically. Gopher tortoise incidental take permits currently require the submittal of between \$5,859 and \$7,657 per mitigation acre. The amounts include a 7.3% trust fund administrative fee (\$427 to \$559 respectively), \$1,000 to fund the acquired lands management endowment, and assumes that about 25% of lands purchased in large tracts contain habitats unsuitable for tortoises. Therefore, the per-acre mitigation contribution is based on an estimated actual cost of acquired land which ranges between \$3,323 and \$4,574 per acre depending on the location of the acquisition. These figures are currently substantially below actual land acquisition costs. Given this, future mitigation contributions will be dedicated to carrying out the goals and objectives of the Gopher Tortoise Management Plan and not solely dedicated to land acquisition.

### ***Cost Estimates***

Cost estimates for FWC were provided by agency staff. These cost estimates are based on the hourly average wage of FWC staff, consultant fees for deliverables, hourly wage

of consultants, project deliverables by consultants, hours required to complete projects, etc.

***FWC Permit Volume for Fiscal Year June 2005 – July 2006***

5 or Fewer Tortoises Relocated On-site: 1,053 permits; 1,300 tortoises.

Standard Relocation: 110 permits; 4,000 tortoises (including 5 or fewer tortoises: 32 permits; 100 tortoises).

Incidental Take: 435 permits; 12,000 tortoises (including 5 or fewer tortoises: 147 permits; 374 tortoises).

Total Permits Issued: 1,598

***Cost Estimates – Relocation***

Dr. James Perran Ross of the University of Florida, Gainesville, sent a cost questionnaire to 30 consultants that relocate gopher tortoises. The expressed purpose of this questionnaire was to identify costs to the regulated community associated with the proposed Gopher Tortoise Management Plan. A summary of the questionnaire findings follow:

<b>Cost Category</b>	<b>Average Cost</b>	<b>Range of Costs</b>
Survey of Tortoises	\$163	\$15 - \$1,000
Permit Application	\$200	\$125 - \$600
Capture of Tortoises	\$486	\$150 - \$1,000
Fencing Enclosure	\$249	\$250 - \$1,250
Recipient Site Fee	\$943	\$450 - \$2,000

Additional cost data were provided by the program staff of FWC's Division of Habitat and Species Conservation (HSC), Planning Section.

***Opportunity Cost – FWC***

To understand the true cost of any action requires the identification and measurement of "opportunity costs". Opportunity costs are often referred to as "hidden costs". They are frequently omitted from cost studies because opportunity costs are not something for which one writes a check, but are still cost issues. Put another way, the true cost of something is what one gives up to get it.

Scarcity of resources (including time) is a fundamental economic consideration. Scarcity necessitates trade-offs, and trade-offs result in opportunity costs. Although the cost of a good or service often is thought of in terms of dollars, the opportunity cost of a decision is based on what must be given up (the next best alternative) as a result of the decision. Any decision that requires a choice between two or more options has an opportunity cost.

The estimated opportunity costs for the first year of operation (startup) are estimated to be \$367,266 and drop to \$6,200 annually thereafter (minus grant research projects). The average hourly wage for FWC Divisions of Law Enforcement and Habitat and Species Conservation is approximately \$19 per hour (hourly wage provided by the Office of Human Resources, FWC).

Lost opportunities (what must be given up) for this application are a measure of lost hours (\$367,266 divided by \$19 per hour = 19,330 lost hours or 9.67 FTE). These opportunity costs in terms of hours and FTE will move forward through the first year of the proposed management plan.

### ***Estimated Costs New Positions – First Year Start Up***

The cost estimate for a new contract (OPS) Biological Scientist III was determined by taking the base salary for the Biological Scientist III position and adding 16% for health insurance. This position, unlike the FTE positions listed below, would be a limited 3-year position. This person will schedule, organize, and lead all local government workshops as described in Chapter 4, Local Government Coordination.

The cost estimates for 8 new FTE were developed by identifying the base salary for each position (base salary information provided by the Office of Human Resources, FWC). Additionally, benefits, expenses, OCO (Operating Capital Outlay), and overhead were factored into the assessment to estimate the true cost of these positions. Benefits were calculated at 32% (Office of the Budget Director, FWC), and overhead was calculated at 16.9% (Bureau of Accounting, FWC).

A standard expense, and OCO, and human resource service assessment package, developed by Office of Policy and Budget in conjunction with the Department of Management Services, was applied in calculating the costs for new positions.

***Base Salaries by Position Title:***

Position:	Base Salary:
4 Biological Scientist III - permitting	\$36,467
1 Biological Scientist IV - database management	\$43,507
2 Staff Assistant - permitting; coordinator assistant	\$23,483
1 Biological Administrator II - gopher tortoise coordinator	\$46,381

## Basic Calculations:

Salary + Benefits (benefits calculated at 32%)

Plus Expense + OCO (professional at \$11,215, support staff at \$9,503)

Plus Overhead at 16.9%

***Cost Estimates by Position Title:*****Biological Scientist III**

Base Salary	\$36,467
Benefits (32%)	\$11,669
Expense + OCO (professional)	\$11,215
Overhead (16.9%)	\$10,030
Total for Position	\$69,381
<b>Grand Total 4 Positions</b>	<b>\$277,524</b>

**Biological Scientist IV**

Base Salary	\$43,507
Benefits (32%)	\$13,922
Expense + OCO (professional)	\$11,215
Overhead (16.9%)	\$11,600
<b>Total for Position</b>	<b>\$80,244</b>

**Staff Assistant**

Base Salary	\$23,483
Benefits (32%)	\$7,514
Expenses + OCO (support staff)	\$9,503
Overhead (16.9%)	\$6,844
Total for Position	\$47,344
<b>Grand Total 2 Positions</b>	<b>\$94,688</b>

**Biological Administrator II**

Base Salary	\$46,381
Benefits (32%)	\$14,842
Expenses + OCO	\$11,215
Overhead (16.9%)	\$12,242
<b>Total for Position:</b>	<b>\$84,680</b>

**Summary:**

<b>1 Biological Scientist III (OPS)</b>	<b>\$45,521</b>
4 Biological Scientist III	\$277,524
1 Biological Scientist IV	\$80,244
2 Staff Assistant	\$94,688
1 Biological Administrator II	\$84,680
<b>Grand Total for all Positions:</b>	<b>\$582,657</b>

***Estimated Recurring Annual Costs - New Positions***

These estimates do not include cost of living adjustments, raises, or replacement of equipment.

**Biological Scientist III (OPS)**

Salary + Benefits	\$45,521
<b>Total for Position</b>	<b>\$45,521</b>

**Biological Scientist III**

Salary + Benefits	\$48,136
Expenses minus nonrecurring	\$6,489
Overhead	\$9,231
<i>Total for Position</i>	<i>\$63,856</i>
<b>Grand Total 4 Positions</b>	<b>\$255,424</b>

**Biological Scientist IV**

Salary + Benefits	\$57,429
Expense minus nonrecurring	\$6,489
Overhead	\$10,802
<b>Total for Position</b>	<b>\$74,720</b>

**Staff Assistant**

Salary + Benefits	\$30,997
Expenses minus nonrecurring	\$5,270
Overhead	\$6,129
<i>Total for Position</i>	<i>\$42,396</i>
<b>Grand Total 2 Positions</b>	<b>\$84,792</b>

**Biological Administrator II**

Salary + Benefits	\$61,223
Expenses minus nonrecurring	\$6,489
Overhead	\$11,443
<b>Total for Position</b>	<b>\$79,155</b>

**Summary:**

Biological Scientist III (OPS)	\$45,521
Biological Scientist III	\$255,924
Biological Scientist IV	\$74,720
Staff Assistant	\$84,792
Biological Administrator II	\$79,155
<b>Grand Total for all Positions</b>	<b>\$540,112</b>

**III. Cost Estimates**

This report follows standards established in Chapter 120, F.S. to provide a good faith estimate of costs associated with rulemaking. The report presents a cost analysis of the proposed Gopher Tortoise Management Plan following these standards.

***A Good Faith Estimate of the Cost to FWC***

The FWC will incur costs to adopt the proposed Gopher Tortoise Management Plan conservation actions. Each of these conservation actions have specific timelines and costs associated with them. These costs include salary for existing FWC staff who work to implement the proposed Gopher Tortoise Management Plan, plus additional staff needed for full implementation, cost of materials, travel, contractual agreements with consultants, and infrastructure requirements.

The estimated cost to FWC to implement these conservation actions are summarized in Tables 1 and 2. Additional cost details for each conservation action follows Tables 1 and 2, respectively.

Table 1. Estimated implementation costs to FWC<sup>1</sup>.

<b>Conservation Action</b>	<b>Start Up Costs</b>	<b>Opportunity Costs</b>	<b>Recurring Annual Costs</b>	<b>Recurring Opportunity Costs</b>
1		\$79,626 <sup>2</sup>		
2	Unknown Cost			
3		\$3,710		
4	\$456,892	\$4,500	\$419,371	
5	\$2,848	\$5,330		
6,7,8,9,11	\$550,000	\$50,000	\$50,000	

Table 1. continued

10	Unknown Cost			
12	\$1,350,000		\$1,350,000	
13		\$35,000		\$5,000
14	\$65,521		\$65,521	
15	\$3,000		\$3,000	
16	\$15,000	\$2,200		
17		\$117,040		
18	\$129,632		\$16,000	
19	Unknown Cost			
20	\$150,000	\$25,000	\$25,000	
21	\$350,000	\$25,000	\$25,000	
22	\$35,000			
23	\$130,000		\$130,000	
24	\$2,500			
25	\$5,000	\$4,400		
26	\$2,500			
27	\$10,000			
28	\$25,500	\$5,600		
29	\$750	\$1,200	\$750	\$1,200
30	\$3,500	\$4,000	\$1,000	
31	\$20,000	\$4,200		
32	\$140	\$460		
Total	\$3,307,783	\$367,266	\$2,085,642	\$6,200

<sup>1</sup> Table 1 cost estimates do not include the one time expenditures for grants.

<sup>2</sup> This action item includes a total cost of \$107,103 of which \$79,626 are opportunity costs and \$27,504 are sunk costs assigned to the legal office.

Startup Cost - initial first year of operation

Total Estimated Cost:  
 Start Up: \$3,307,783  
 Opportunity Costs: \$367,266  
 Total: \$3,675,049

Recurring/Annual Costs - after the initial first year of operation

Estimated Recurring Costs:  
 Recurring/Annual: \$2,085,642  
 Opportunity Cost: \$6,200  
 Total: \$2,091,842

1. Revise guidelines as required by the management plan (update methodologies for surveying, monitoring, capturing, etc).

Estimated Cost:

FWC Staff: 460 hours - \$79,626 (opportunity cost)

FWC Staff: 288 hours - \$27,504 (legal - sunk cost)

Total: \$107,103 (\$79,626 opportunity cost and \$27,504 sunk cost)

2. Distribution of permitting guidelines and coordination with Florida Association of Environmental Professionals to establish guidelines for the implementation program.

Cost unknown

3. Conduct workshop analysis of permitting (administrative and biological) and law enforcement staffs based on management plan and revised guidelines.

Estimated Cost:

FWC Staff: 200 hours - \$18,552 over 5 years

Estimated Annual Cost: \$3,710 (opportunity cost)

4. Staffing to implement permitting system.

Estimated Cost:

*Start Up:*

Development Cost: \$4,500 - existing FWC staff (opportunity cost)

FWC Staff: \$456,892 - new staff

*Recurring:*

FWC Staff: \$419,371

5. Train staff and administer new permit system.

Estimated Cost:

FWC Staff: \$5,330 (opportunity cost)

4 Training Events: \$2,848 (transportation cost)

6. Develop and maintain enhanced databases to track permit options used. Certify recipient sites and permit reporting data (cost estimates are reflected as part of action item #7).

7. Modify current on-line permit program (develop additional applications, revise web site layout).

Estimated Cost:

*Start Up:*

Outsource Development: \$350,000

FWC Staff: \$25,000 per year for program maintenance (opportunity cost)

*Recurring:*

FWC Staff: \$25,000 per year for program maintenance (opportunity cost)

8. Develop a permit system to accommodate the on-line permit portal. (cost estimates are reflected as part of action item #9)
9. Develop web site permitting portal which effectively meets all permitting applications.

Estimated Cost:

*Start Up:*

Outsource Development: \$200,000

FWC Staff: \$25,000 per year for program maintenance (opportunity cost)

*Recurring:*

FWC Staff: \$25,000 per year for program maintenance (opportunity cost)

10. Develop and maintain user survey to obtain feedback on usefulness of the web site and permit system.

Cost Unknown

11. Generate reports using database.

Cost included in action items #6, 7, 8 and 9

12. Create Prescribed Fire Strike Team program.

Estimated Cost:

*Start Up:*

Outsource: \$1,350,000 per 10,000 acres burned each year

*Recurring:*

Outsource: \$1,350,000 per 10,000 acres burned each year

13. Develop Management Needs Database to identify local preserves in need of management.

Estimated Cost:

*Start Up:*

FWC Staff: \$30,000 development (opportunity cost)

FWC Staff: \$5,000 per year for program maintenance (opportunity cost)

*Recurring:*

FWC Staff: \$5,000 per year for program maintenance (opportunity cost)

14. Develop workshop program for local governments seeking to improve compliance with state rules.

Estimated Cost:

*Start Up:*

FWC Staff: \$45,521

Workshop: \$4,000 per event x 5 events - \$20,000

*Recurring:*

FWC Staff: \$45,521

Workshop: \$4,000 per event x 5 events - \$20,000

15. Provide outreach materials to local governments to foster better communications/coordination.

Estimated Cost:

*Start Up:*

Materials: \$3,000

*Recurring:*

Materials: \$3,000

16. Create internal FWC notebook with fact sheet on tortoises, complaint protocol for law enforcement, tortoise mitigation options, permitting guidelines, definitions, glossary and coordination with state attorney's.

Estimated Cost:

Materials: 1,000 manuals - \$15,000

FWC Staff: \$2,200 (opportunity cost)

17. Train 19 FWC lieutenants to instruct approximately 700 FWC field officers and academy recruits.

Estimated Cost:

FWC Staff: \$117,040 (opportunity cost)

18. Vehicle Purchase.

Estimated Cost:

*Start Up:*

Vehicle Per Unit: \$28,408 x 4 - \$113,632

Gasoline: 4,000 gallons per year at \$3 per gallon - \$12,000

Maintenance Per Unit: \$1,000 per year x 4 - \$4,000

*Recurring:*

Gasoline: 4,000 gallons per year at \$3 per gallon = \$12,000

Maintenance Per Unit Cost: \$1,000 per year x 4 = \$4,000

19. Develop a Prescribed Fire Database that records total area of fire maintained communities.
- Estimated Cost:  
Already being developed internally for FWC. Cost unknown to develop and maintain database for external (non-FWC) actions.
20. Develop a Management Treatment Database.
- Estimated Cost:  
*Start Up:*  
Outsource Development: \$150,000  
FWC Staff: \$25,000 for program maintenance (opportunity cost)  
*Recurring:*  
FWC Staff: \$25,000 for program maintenance
21. Develop a Vegetation Monitoring Database.
- Estimated Cost:  
*Start Up:*  
Outsource Development: \$350,000  
FWC Staff: \$25,000 for program maintenance (opportunity cost)  
*Recurring:*  
FWC Staff: \$25,000 for program maintenance
22. Develop a pilot project to evaluate the effectiveness of restocking peninsular tortoises to the Panhandle.
- Estimated Cost:  
Nokuse Plantation Restocking Study: Three 25-acre enclosures at \$35,000  
Annual Maintenance Cost: unknown
23. Conduct GIS assessments every 5 years to determine the acreages of potential tortoise habitat.
- Estimated Cost:  
*Start Up:*  
Outsource: \$130,000  
*Recurring:*  
Outsource: \$130,000
24. Create fact sheets on tortoise mitigation options, permitting applications, regulations and policies.
- Estimated Cost:  
Materials: \$500  
Outsource: \$2,000 for graphic artist and writer/editor  
Total: \$2,500

25. Create brochure entitled “Living with Gopher Tortoises”.

Estimated Cost:

FWC Staff: 240 hours - \$4,400 (opportunity cost)

Outsource: \$5,000 for graphic design services

Total: \$9,400

26. Create brochure entitled “Before You Build”.

Estimated Cost:

Outsource: \$2,500 (15,000 to 20,000 copies) for printing

27. Create a “Habitat Management Field Guide”.

Estimated Cost:

Outsource: \$10,000 for printing

28. Create “Buyers Guide to Homes with Natural Assets”.

Estimated Cost:

Outsource: \$25,000 for freelance writer and printing

Distribution Cost: \$500

FWC Staff: 320 hours - \$5,600 (opportunity cost)

Total: \$31,100

29. Create gopher tortoise conservation session at annual educator’s workshops. Cost estimated over 2 years.

Estimated Cost:

*Start Up:*

FWC Travel: \$750

FWC Staff: 60 hours - \$1,200 (opportunity cost)

*Recurring:*

FWC Travel: \$750

FWC Staff: 60 hours - \$1,200 (opportunity cost)

30. Create electronic field trip activity guide.

Estimated Cost:

*Start Up:*

Outsource: \$3,500 - e-field trip hosting company

FWC Staff: 200 hours - \$4,000 (opportunity cost)

*Recurring:*

Outsource: \$1,000 - e-field trip hosting company

31. Create and activity guide for gopher tortoise conservation.

Estimated Cost:  
 Outsource: \$10,000 - write and develop activity lessons  
 Outsource: \$10,000 - printing  
 FWC Staff: 240 hours - \$4,200 (opportunity cost)  
 Total: \$24,200

32. Create rehabilitator’s fact sheet.

Estimated Cost:  
 Materials: \$140  
 FWC Staff: 25 hours - \$460 (opportunity cost)  
 Total: \$600

**Estimated Grant Costs**

Table 2. Estimated grant costs - one time expenditures.

<b>Conservation Action</b>	<b>Estimated Cost of Grant</b>	<b>Opportunity Cost<sup>1</sup></b>
1	\$60,000	\$9,800
2	\$75,000	\$1,500
3	\$200,000	\$1,500
4	\$45,000	\$1,500
5	\$45,000	\$1,500
6	\$75,000	\$1,500
7	\$75,000	\$1,500
8	\$12,000	\$1,500
9	\$45,000	\$1,500
10	\$250,000	\$1,500
11	\$100,000	\$1,500
12	\$450,000	\$1,500
13	\$300,000	\$1,500
14	\$85,000	\$1,500
<b>Total</b>	<b>\$1,817,000</b>	<b>\$29,300</b>

<sup>1</sup> The estimate of opportunity costs are reflected in the development of Request for Proposal by FWC staff calculated at \$25 per hour multiplied by 60 hours of labor with the exception of Conservation Action 1.

1. Save Space for Wildlife – public awareness campaign.

Estimated Cost:  
 Grant Request: \$60,000  
 FWC Staff: \$9,800 (opportunity cost)

2. Tortoise population immigration/emigration and population turnover.  
Estimated Cost: \$75,000
3. Assess genetic differences in tortoise populations with emphasis on filling in knowledge gaps in the Panhandle.  
Estimated Cost: \$200,000
4. Conduct surveys of tortoises inhabiting burrows on sites undergoing development.  
Estimated Cost: \$45,000
5. Identify specific habitat needs of hatchlings and juvenile tortoises.  
Estimated Cost: \$45,000
6. Evaluate forage and nutritional needs that affect movements, habitat use and health.  
Estimated Cost: \$75,000
7. Evaluate re-colonization of restocking sites by commensal species.  
Estimated Cost: \$75,000
8. Evaluate methods to enhance tortoise site fidelity on restocking sites.  
Estimated Cost:  
FWC Split Restocking Study: \$12,000 – one 56 acre parcel
9. Identify best management practices for areas where fire is prohibited or limited.  
Estimated Cost: \$45,000
10. Evaluate impacts of herbicides on tortoises.  
Estimated Cost: \$250,000
11. Investigate initial and subsequent response of tortoises to various fire frequencies and seasons.  
Estimated Cost: \$100,000
12. Evaluate tortoise response to restoration on longleaf pine on silviculture sites.  
Estimated Cost: \$450,000

13. Evaluate minimum population size needed to maintain a functional population.

Estimated Cost: \$300,000

14. Identify impacts of exotic wildlife on tortoise populations.

Estimated Cost: \$85,000

#### **IV. The Regulated Community**

The primary purpose of this analysis is to provide a reasonable estimate of costs, or more precisely, a quantification of costs to the regulated community. Quantifying costs involves determining “how many” in order to determine “how much” it will cost.

The proposed Gopher Tortoise Management Plan is a self-selecting process based on several permit options. The key variable of “how many” is directly related to how many gopher tortoises occur on a development site, which ultimately determines “how much” it will cost to obtain a permit.

The key variable of “how many”, however, is missing from this analysis because the proposed permitting system is new and there are no historical permit equivalent data upon which to project future cost estimates. Given this, the cost estimates provided in this analysis are based on the professional judgment and experience of FWC staff.

More precise estimates of cost may be attempted after cost data have been recorded over a 3-year period.

Summary of findings:

- The current permit program cost to the regulated community is \$21.3 million.
- The cost to the regulated community for the proposed Gopher Tortoise Management Plan is estimated as follows:
  - Best Case Scenario: \$17.08 million
  - Median Estimate: \$44.22 million
  - Worst Case Scenario: \$70.88 million
- New costs vary between \$17.08 million (a reduction below existing costs) and \$70.88 million (worst case).
- When permit applicants choose to relocate gopher tortoises to protected areas, between 74-89% of the associated costs would be paid to environmental consultants or private landowners for the services provided, not FWC. Alternatively, when permit applicants choose to relocate gopher tortoises to unprotected areas, the FWC permit costs more because gopher tortoises are being moved to areas with no long-term conservation protection. The monies submitted to FWC would be used to implement the Gopher Tortoise Management Plan and help meet its goals and objectives.

Table 3. Summary of estimated costs to regulated community for current and proposed FWC gopher tortoise relocation permits by type

Current Permit Types	5 or fewer Single family or Standard Relocation	Old 5 or Fewer Incidental Take	Standard Relocation On-site or Off-site (protected or not)				More than 5 Incidental Take	Totals
Estimate of Average Number of Permits	1,053	147	110				288	1,598
Amount Paid to FWC for 05-06 Year (total )	0	\$642,000	0	0	0	0	\$11,727,000	\$12,369,000
Median Estimated Cost to Permittee Current System (40 tortoises per permit)	Unk	Unk	\$32,000	\$72,000	\$32,000	\$72,000	\$52,000	n/a
Estimated Total Cost for Current Permitting System	Unk	\$642,000	\$3,520,000 to \$7,920,000 depending on option				\$14,976,000	estimate of \$21,338,000
Proposed New Permit Type	10 or fewer burrows	10 or fewer burrows	Conservation Permit On-site Protected	Conservation Permit Off-site Protected	Conservation Permit On-site Unprotected	Conservation Permit Off-site Unprotected	N/A	
Proposed Cost to Permittee (includes FWC payment) Under New Plan (total of all permits for first 2 columns, based on 40 tortoises for rest)	\$210,600	\$29,400	\$42,700	\$82,700	\$137,200	\$177,200	n/a	n/a
Increase or Savings	\$210,600	(\$612,600)	\$10,700	\$10,700	\$105,200	\$105,200	n/a	n/a
Cost Difference for Old Incidental Take Permittee Picking Options Under New System	n/a	n/a	(\$9,300)	\$30,700	\$85,200	\$125,200	n/a	n/a
Median Estimated Total Costs to Permittees Under New Permitting (even split)	\$210,600	\$29,400	\$4,270,000	\$8,270,000	\$13,720,000	\$17,720,000	n/a	\$44,220,000
NOTE: Costs for 5 or fewer permits do not include the cost for relocation because relocation costs vary significantly between private sector providers.								

**A) A Good Faith Estimate of the Number of Individuals and Entities Likely to be Required to Comply with the Proposed Gopher Tortoise Management Plan, Including a General Description of the Types of Individuals Likely to be Affected by the Proposed Management Plan.**

The proposed Gopher Tortoise Management Plan will affect landowners, restaurants, schools, hospitals, development entities, housing construction, land development, general public, and all entities who qualify for a particular permit. Agriculture and silviculture will not be required to secure a permit (the exception being activities conducted as a precursor to development).

**B) A Good Faith Estimate of the Transactional Costs Likely to be Incurred by Individuals and Entities, Including Local Government Entities, Required to Comply with the Requirements of the Proposed Gopher Tortoise Management Plan.**

As used in this section, “transactional costs” are direct costs that are readily ascertainable based on standard business practices, including filing fees, the cost of obtaining a license, the cost of equipment required to be installed or used, procedures required to be employed in complying with the proposed Gopher Tortoise Management Plan, additional operating costs incurred, and the cost of monitoring and reporting.

The narrative for this section of the report will follow the format of identifying the Gopher Tortoise Management Plan’s permit options followed by a good faith estimate of costs based on available data.

**10 or Fewer Burrows - On-site Relocation  
Mitigation Contribution - \$200**

The permit is estimated to represent on a yearly basis between 64-75% of all permits issued. Currently, 64% of applicants select the on-site five or fewer tortoise special relocation permit. Another 11% of the issued permits (standard relocation or incidental take) addressed sites with five or fewer permits that will either use this new option or relocate gopher tortoises off-site.

The estimated cost for the On-site Relocation – 10 or Fewer Burrows is net neutral to the regulated community. The 147 incidental take permits issued over the past year for sites containing five or fewer gopher tortoises contributed a total of \$642,000 to FWC Land Acquisition Trust Fund. If the estimated 1,200 permits issued each year under the new permit process each contribute \$200, they will contribute \$240,000 which is less than the regulated community currently expends. Any costs that permittees paid in the past to have gopher tortoises moved should be similarly encountered in the future; however, due to the small number of tortoises for each permit, no estimate was made for this in the analysis. Additional costs to the regulated community will be incurred due to relocation costs associated with the 374 tortoises previously covered under incidental take permits that were not moved. It is not known how many of them were relocated under the issued incidental take permits. Under the proposed permit process, all permittees will be required to contribute at least a small amount towards habitat conservation.

**10 or Fewer Burrows - Off-site Relocation  
Requires Authorized Agent  
Mitigation Contribution - \$200**

It is anticipated that this permit will represent approximately 11% of all permits issued on a yearly basis or approximately 200 permits per year. Some members of the regulated community will select this option, while others will select the on-site relocation permit option discussed above.

**Conservation Permit - On-site or Off-site Relocation for Properties with more than 10 Burrows Impacted**

This permit authorizes on-site or off-site relocation of larger numbers of tortoises to long-term protected areas.

Under the current gopher tortoise relocation process, there are no financial incentives to encourage the relocation of tortoises to lands with long-term protection and management (*i.e.*, publicly owned conservation lands or private lands under a perpetual conservation easement). Less than 1/3 of tortoises relocated under existing standard relocation permits process are placed on lands with guaranteed long-term protection.

The proposed permit system will provide financial incentives for permittees to provide long-term tortoise conservation benefits by relocating gopher tortoises to sites with guaranteed long-term protection and management. The proposed permit system would reduce the specified amount of monetary contributions required for gopher tortoise habitat conservation by at least 80% for average permits that require relocation of tortoises to protected sites, thereby providing greater long-term conservation benefits to the species. These incentives should result in a much higher percentage of permits being issued under the option which provides greater tortoise conservation benefits, and fewer permits issued under the Conservation Permit for Unprotected Areas.

FWC estimates approximately 20-25% of all permits will likely be processed under the Conservation Permit for Protected Areas. However, approximately 85-90% of all gopher tortoises covered under FWC permits will likely be permitted under this option.

The cost to the regulated community is based on the following:

The average number of tortoises impacted within sites currently permitted under the standard relocation or incidental take permits (subtracting out those with five or fewer tortoises that would qualify for a 10 or Fewer Burrow Permit under the new process) is 40. Under the existing permit process, the estimated cost to a permittee would be:

- a) On-site Relocation Permit  
40 tortoises x \$800 - estimated tortoise relocation cost - \$32,000

## b) Off-site Relocation Permit

40 tortoises x \$1,800 - estimated tortoise relocation cost - \$72,000

## c) Incidental Take Permit

40 tortoises x \$1,300 per tortoise - \$52,000

About 70% of permits currently issued for sites containing more than 5 tortoises are incidental take permits. The remaining 30% currently pay relocation costs only and do not provide a mitigation contribution to FWC. Therefore, the average expense, assuming equal numbers of relocation permits go off-site and on-site, to the regulated community to implement a permit under the current system is approximately \$52,000. With approximately 400 permits issued annually under these permit categories and the incidental take permits issued for parcels with 5 or fewer tortoises, the total expense for the regulated community for permits is estimated to be \$21.3 million.

Under the proposed permit system, the average cost for the different permit options would be:

a) **Conservation Permit – Protected Area Off-site – Private or Public Lands**

\$72,000 (relocation cost) + \$200 (first 5 tortoises) + 35 tortoises x \$300 per tortoise = \$82,700

b) **Conservation Permit – Protected Area On-site**

\$32,000 + \$200 + (35 x \$300) = \$42,700

c) **Conservation Permit – Unprotected Area – Off-site**

\$72,000 + \$200 + (35 x \$3,000) = \$177,200

d) **Conservation Permit – Unprotected Area – On-site**

\$32,000 + \$200 + (35 x \$3,000) = \$137,200

Depending on the distribution of those 400 permits between the various options, the total expense to the regulated community for implementing permits under the proposed permit system would range between a theoretical net savings of \$4.22 million if all applicants selected the Conservation Permits to Protected On-site Areas. An additional cost of \$49.58 million would accrue if all applicants selected the Conservation Permits to Unprotected Off-site Areas. If the permits were equally divided between the proposed new Conservation Permit options, the total additional expense for implementing 400 permits would be \$23.42 million.

Financial incentives through lower monetary expenditures will be provided to permittees to encourage them to select permit options where tortoises are relocated to protected and managed private or publicly owned tortoise habitats and thus achieve management goals for the long-term conservation of the species. Most of the monetary expenditures associated with the regulated community implementing the Conservation Permit options moving tortoises to protected areas will be associated with either paying environmental consultants to relocate tortoises or compensating landowners that receive the tortoises.

Higher amounts of mitigation funds would be received by FWC if permittees chose the Conservation Permit options which relocate tortoises to habitats that are not protected long-term (perpetual conservation easement of public ownership and management). These additional funds will be used by FWC to achieve the habitat protection goals of the management plan.

**Exclusion Permit for Linear Utility Corridors**  
**Mitigation Contribution: \$100 - \$300 per tortoise**

**Emergency Permit - Without Relocation** - The new permit system will focus on options which provide actual conservation benefits to gopher tortoises. The FWC will issue this permit only under limited and specific circumstances in cases where there is an immediate danger to the public's health and/or safety or in direct response to an official declaration of emergency by the Governor or other local authority.

**Mitigation Contribution - \$4,000 per tortoise**

**Settlement Permit** - This permit authorizes on-site or off-site relocation of gopher tortoises that are still present on sites where cases of illegal activity have been resolved.

**Mitigation Contribution - \$4,000 per tortoise**