

Implementation of the Gopher Tortoise Management 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. Historically, permit records from FWC indicate that approximately 1,500 to 1,600 permits were issued on an annual basis across all categories (effecting approximately 14,800 tortoises). However, since plan implementation, the economy of Florida has suffered from a significant downturn and the number of gopher tortoise permits issued as such has also changed. Since the new permitting framework outlined in the 2007 plan was implemented, approximately 150-500 permits have been issued across all permit categories (effecting approximately 3,800 tortoises). The majority of regulated entities (approximately 63%) are 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.

The total estimated five year direct cost to the regulated community is estimated at \$35 million. Looking at the net of mitigation contributions and private third-party vendor revenues, there is a transfer of \$7.4 million over the five year period from the public sector to the private sector. This will result in a net increase of 1.7 new private sector jobs annually and a shift of 15.9 public sector jobs to the private sector per year for a total of 8.5 new private sector jobs in five years. On the revenue side, FWC will see \$5.6 million in total revenue (\$3.2 million from the private sector and \$2.4 million from government agencies). In terms of economic growth, the Gopher Tortoise Management Plan will result in a net annual growth of \$437,784 or \$2.8 million in five years. See Appendix 9 of this plan for the full economic analysis of this plan.

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 only in 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, when 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 egregious 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 rare 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.

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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 development sites
- 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
- 2007 Listing revised: Listed as Threatened; Gopher Tortoise Management Plan approved
- 2008 Gopher Tortoise Permitting Guidelines approved
- 2009 Issuance of Standard Relocation and Incidental Take permits ends;
Permitting Guidelines approved in 2008 are fully implemented (April 2009)

APPENDIX 2. Gopher Tortoise Enforcement Policy

Florida Fish and Wildlife Conservation Commission
620 South Meridian Street, Tallahassee, FL 32399



POLICY ; POSITION ; GUIDELINE .

TITLE: **Gopher Tortoise enforcement**

APPROVAL AUTHORITY: OFFICE OF EXECUTIVE DIRECTOR

DATE:

GENERAL POLICY STATEMENT

Agricultural, Silvicultural, and Wildlife management activities

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 with respect to agricultural and silvicultural activities.

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.

Burrow prohibition

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 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;

3/6/2008

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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.



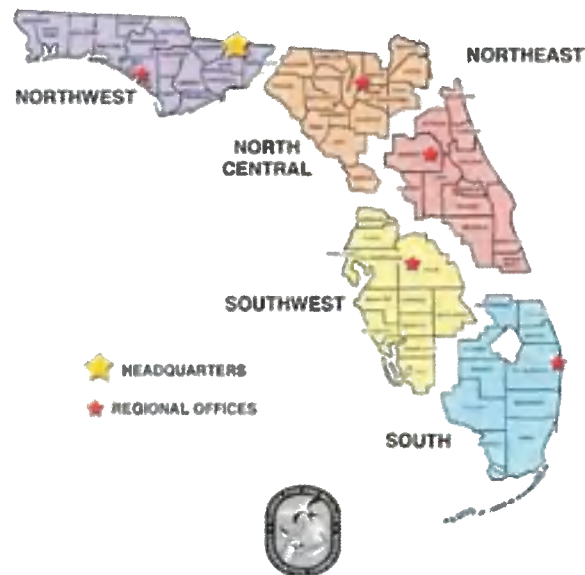
Kenneth Haddad, Executive Director

3/6/08

date

APPENDIX 3. FWC Regional Map and Contact Information

Florida Fish and Wildlife Conservation Commission
DIVISION OF HABITAT AND SPECIES CONSERVATION
GOPHER TORTOISE CONTACT INFORMATION



For inquiries related to the Gopher Tortoise Management Plan, please contact:

Gopher Tortoise Management Plan Coordinator
Division of Habitat and Species Conservation
Species Conservation Planning Section
Florida Fish and Wildlife Conservation Commission
620 South Meridian Street (Mail Station 2A)
Tallahassee, Florida 32399-1600
(850)921-1019; Fax: (850)921-1847

**For specific inquiries related to gopher tortoise permitting requirements and status,
please contact:**

Gopher Tortoise Permit Coordinator
Division of Habitat and Species Conservation
Species Conservation Planning Section
Florida Fish and Wildlife Conservation Commission
620 South Meridian Street (Mail Station 2A)
Tallahassee, Florida 32399-1600
(850)921-1031; Fax: (850)488-5297
MyFWC.com/GopherTortoise

APPENDIX 4. Gopher Tortoise Priority Habitat by FWC Region

The regional priority habitat maps identify public and privately owned property that has suitable gopher tortoise habitat. The criteria for identifying primary and secondary gopher tortoise habitats are consistent with the habitat criteria used to evaluate gopher tortoise recipient sites (*acceptable* and *desirable*) as outlined in the Gopher Tortoise Permitting Guidelines. The variables considered include: vegetation, canopy cover, and soils with a water table depth greater than 1.5 ft. Larger, contiguous habitat patches can provide the highest conservation value for gopher tortoises, therefore; the FWC identified all gopher tortoise habitat patches greater than 200 acres. The habitat patches that contain the specified habitat characteristics were then separated into primary (desirable) and secondary (acceptable) gopher tortoise habitat.

The Gopher Tortoise Priority Habitat maps were created to identify geographic areas in Florida that may have the highest conservation benefit potential for gopher tortoises. The maps will be utilized to guide FWC's implementation of conservation-based incentives to public and private landowners who can manage and conserve high quality gopher tortoise habitat. Landowners who possess land located within identified *primary* and *secondary* gopher tortoise habitat may be eligible for increased incentives to assist in managing and conserving gopher tortoises and associated commensal species.

Potential Primary and Secondary Habitat Florida Fish and Wildlife Conservation Commission

The original Regional Gopher Tortoise Habitat Model (RGTHM) was created by Tom Hoctor and Suzanne Beyeler of the Center for Landscape and Conservation Planning, University of Florida. The RGTHM contained select vegetation, canopy data and soils with water table depth greater than 6.5 ft. The FWC modified the original RGTHM using all original vegetation habitat with additional beach and dune habitat. The vegetation habitat was then combined with the selected canopy grids and further selected for soils with a water table depth greater than 1.5 ft:

- **Class 1** – Primary habitat and soils with water table depth greater than 6.5ft
- **Class 2** – Primary habitat and soils with water table depth 1.5 to 6.5ft
- **Class 3** – Secondary habitat and soils with water table depth greater than 6.5ft
- **Class 4** – Secondary habitat and soils with water table depth 1.5 to 6.5ft
- **Class 5** – Other potential primary habitat: Florida sandhill, scrub, dry prairie (FNAI data) and beach/dune and other beach communities (Southeast Gap Analysis Project – SEGAP)
- **Class 6** – Pasture secondary habitat and soils with water table depth greater than 6.5ft
- **Class 7** – Pasture secondary habitat and soils with water table depth 1.5 to 6.5ft

Description of additional files created or used

Primary Gopher Tortoise Habitat

This spatial data set contains the Modified Regional Gopher Tortoise Habitat, Group 4 = (1, 5 classes) with patches greater than 200 acres.

- **Primary Habitat** was defined as areas that contain appropriate habitat types that have a canopy closure of < 65% and are located on non-hydric soils are at least moderately well drained, flood occasionally or less, and have a water table depth greater than 6.5 ft deep or have a water table depth between 1.5 ft and 6.5ft.

Secondary Gopher Tortoise Habitat

This spatial data contains the Modified Regional Gopher Tortoise Habitat, Group 1 = all habitat (1, 2, 3, 4, 5, 6, 7 classes) with patches greater than 200 acres.

- **Secondary Habitat** was defined as areas that contain appropriate habitat types that have canopy closure $\geq 65\%$ and are located on non-hydric soils, are at least moderately well drained, flood occasionally or less, and have a water table depth greater than 6.5ft deep or have a water table depth between 1.5ft and 6.5ft.

FWC Regions

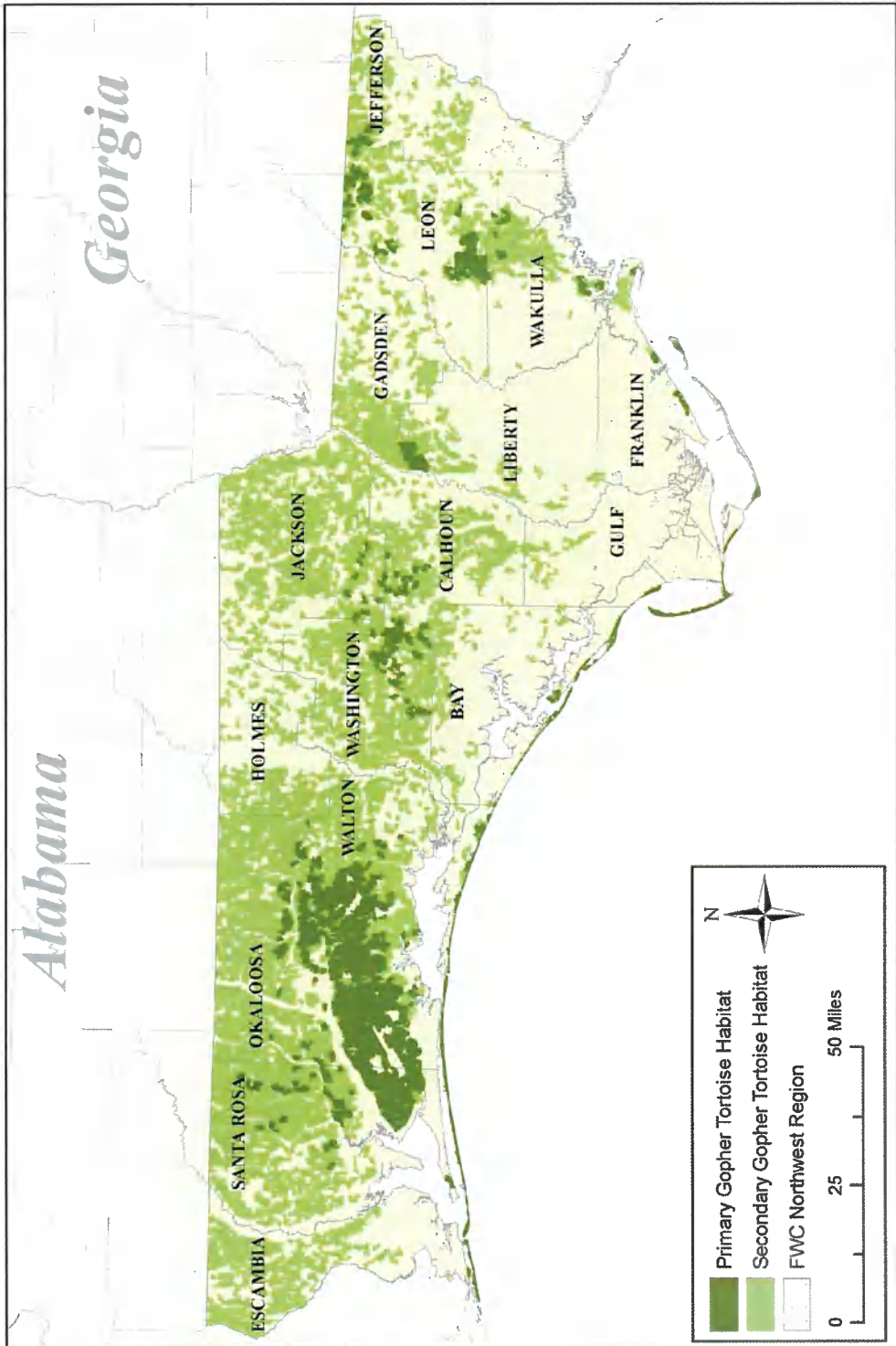
The shape file contains Florida Fish and Wildlife Conservation Commission regional boundaries.

Project data used

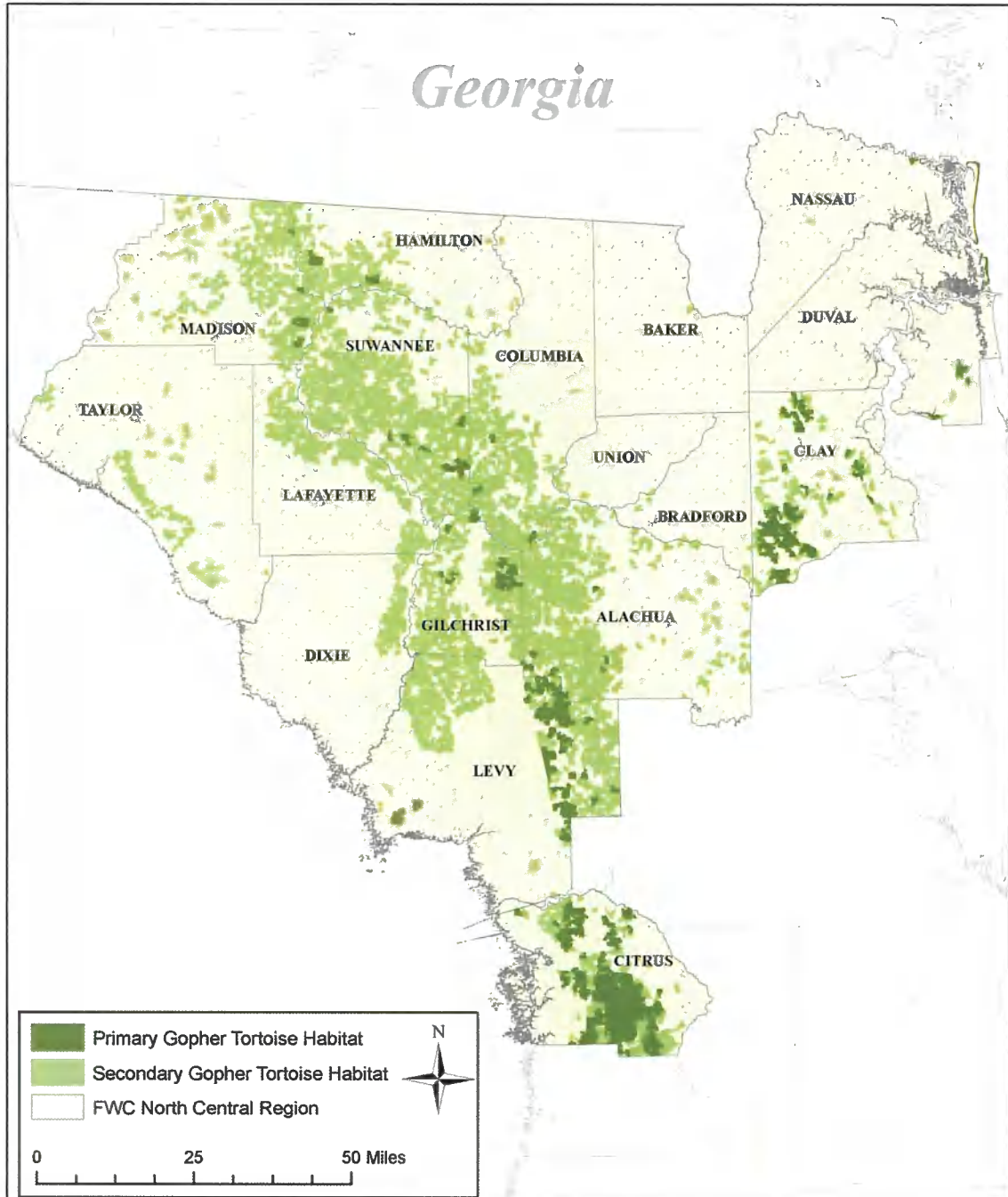
- SSURGO and STATSGO - soils data from USDA - NRCS
- National Wetlands Inventory dataset – used to eliminate all wetlands - USFWS
- National Land Cover Database - 2001 Tree Canopy data from USGS
- Southeastern Gap Analysis Program (SEGAP) land cover data (vegetation) - Biodiversity and Spatial Information Center, USGS North Carolina Cooperative Fish and Wildlife Research Unit, NC State University
- Florida Natural Areas Inventory habitat data (Florida sandhill, scrub, dry prairie)
- Parcel (2009, 2010) data used to locate Potential habitat on large landowners property



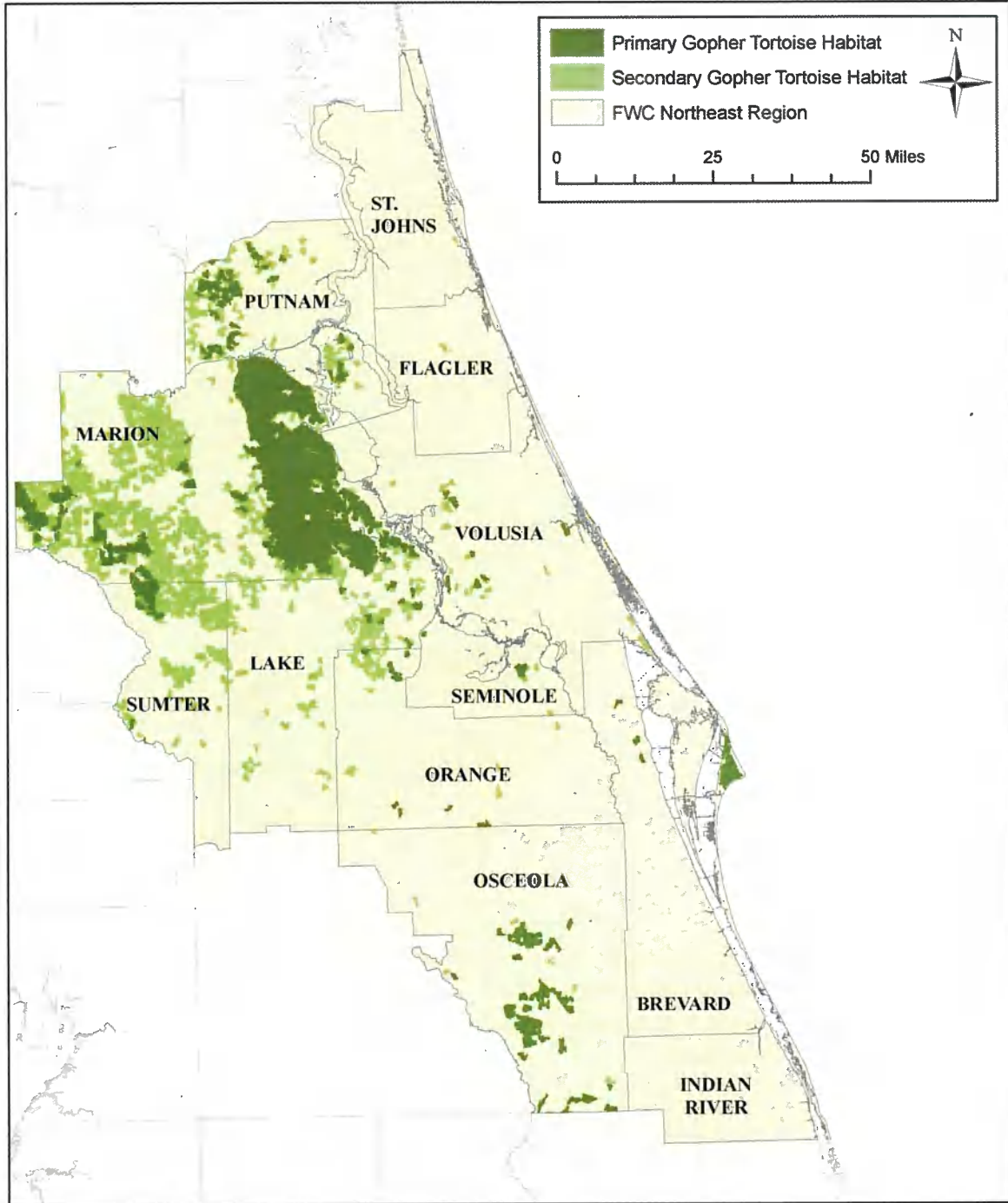
FWC Northwest Region
Gopher Tortoise Priority Habitat
Patches Greater than 200 Acres



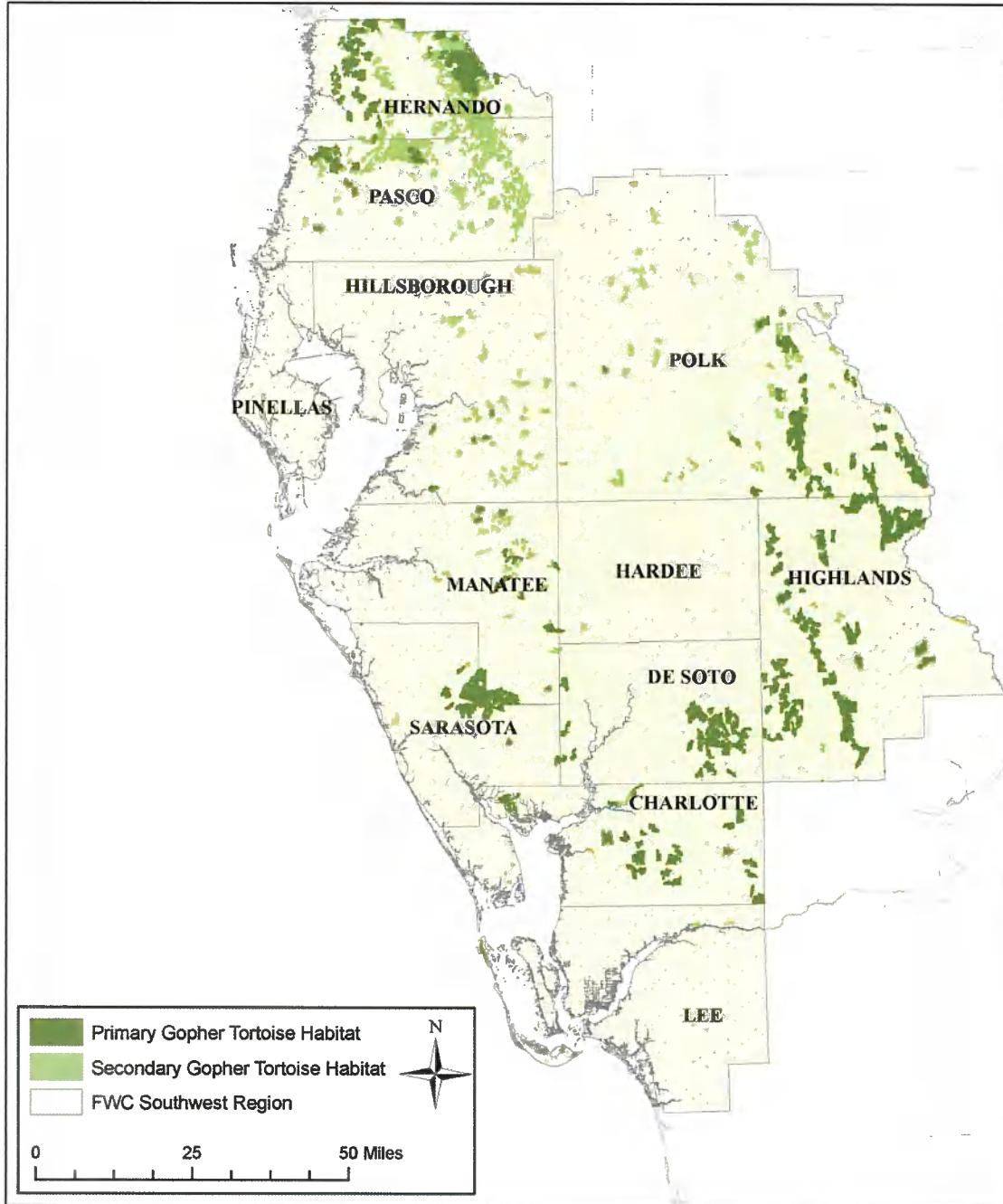
FWC North Central Region
Gopher Tortoise Priority Habitat
Patches Greater than 200 Acres



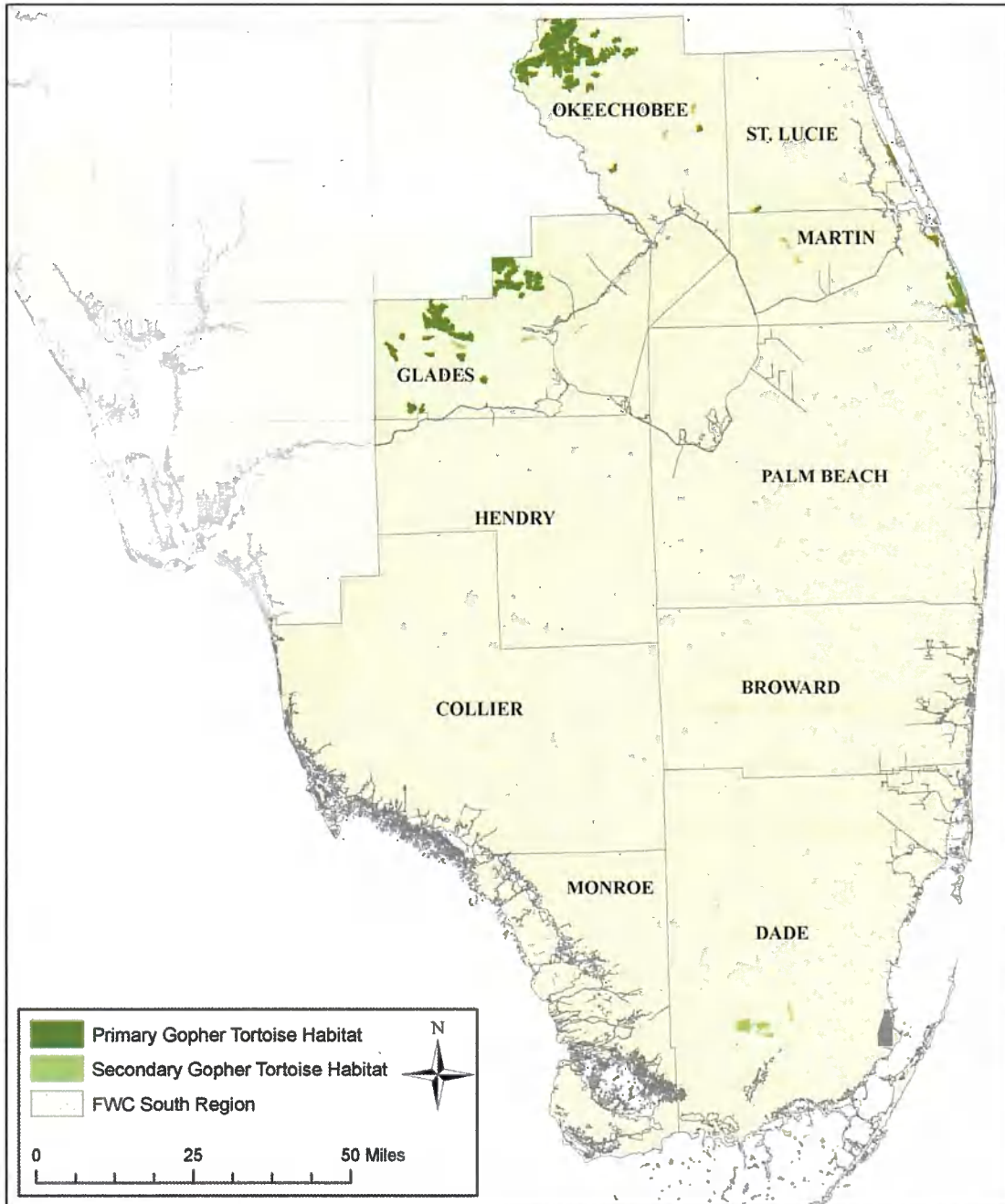
FWC Northeast Region Gopher Tortoise Priority Habitat Patches Greater than 200 Acres



FWC Southwest Region Gopher Tortoise Priority Habitat Patches Greater than 200 Acres

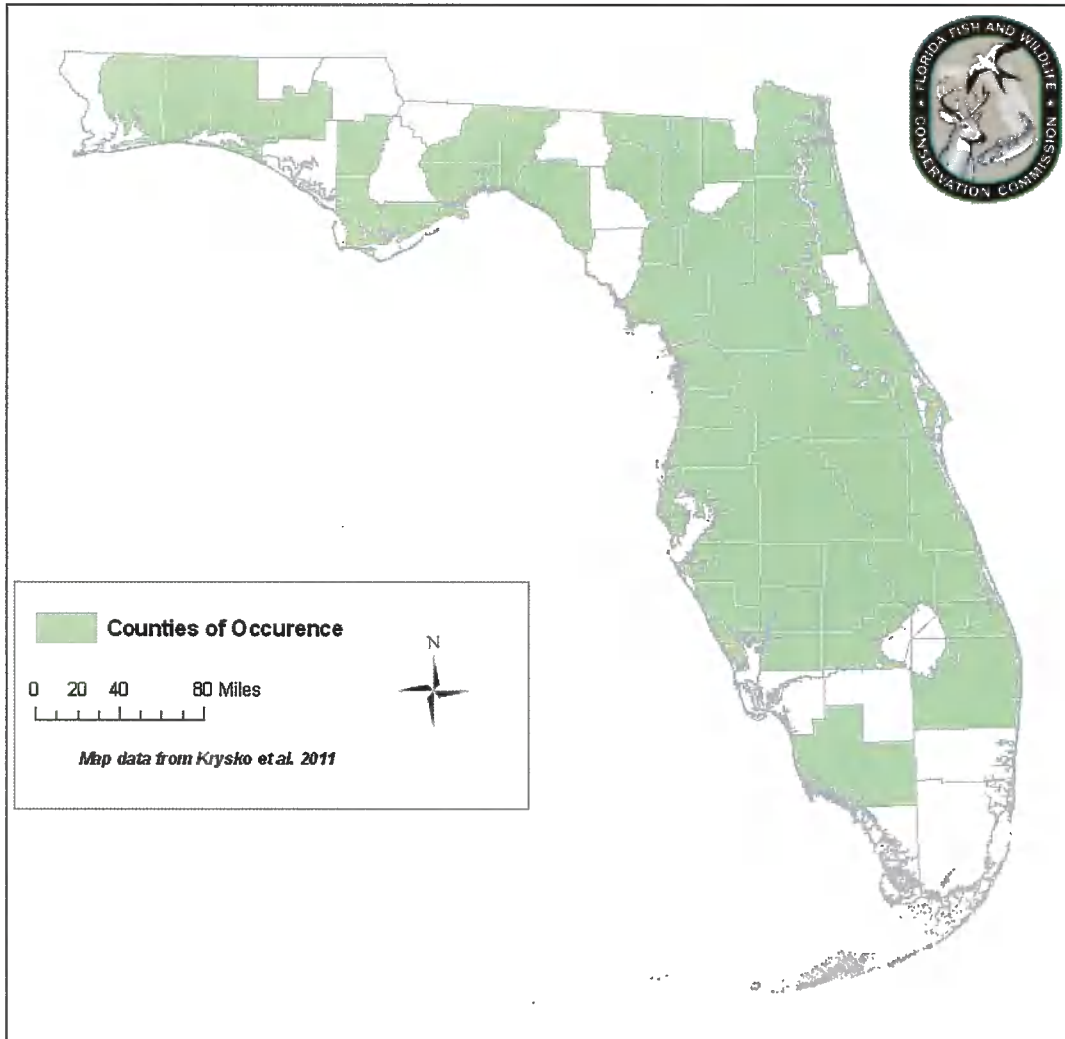


FWC South Region
Gopher Tortoise Priority Habitat
Patches Greater than 200 Acres

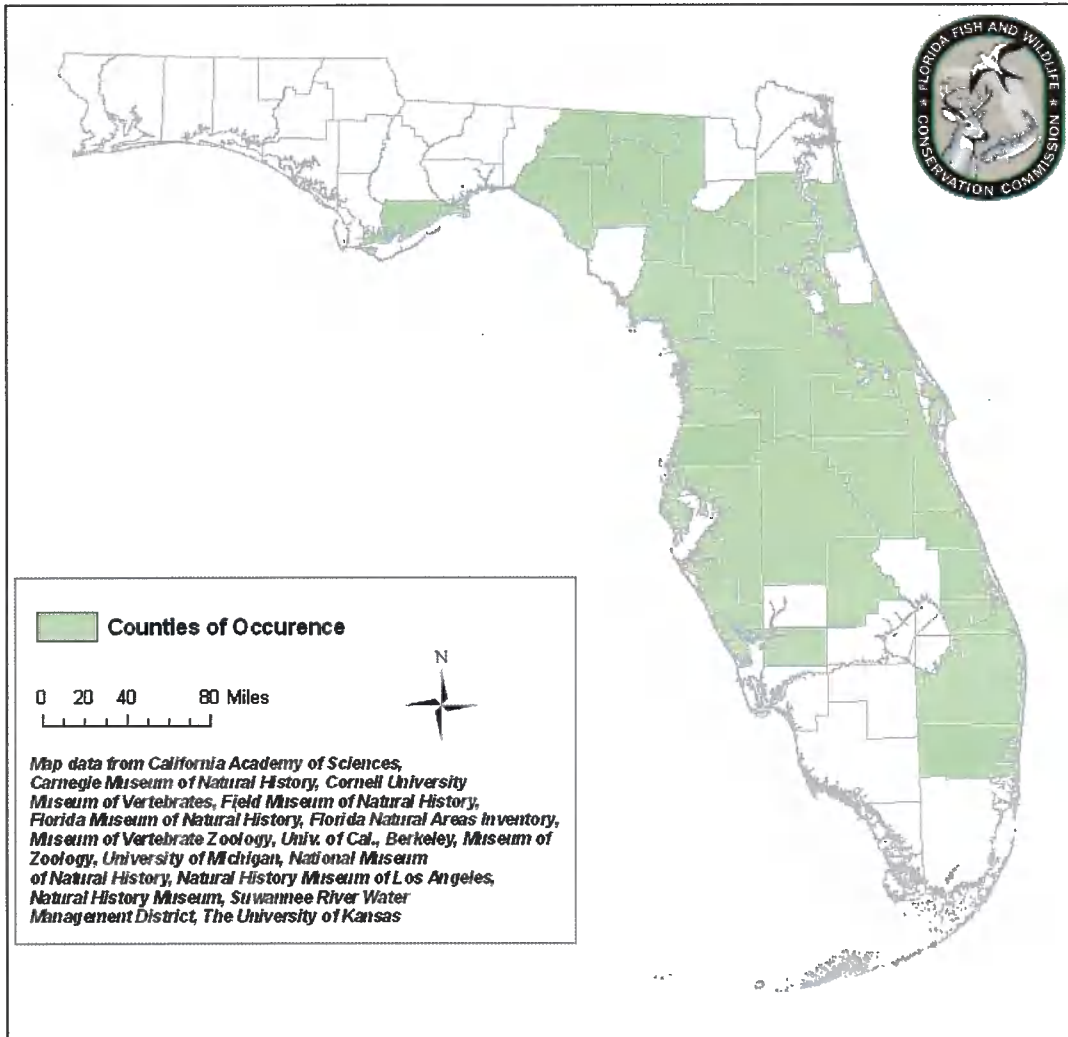


APPENDIX 5. Gopher Tortoise Priority Commensal Species County Distribution Maps

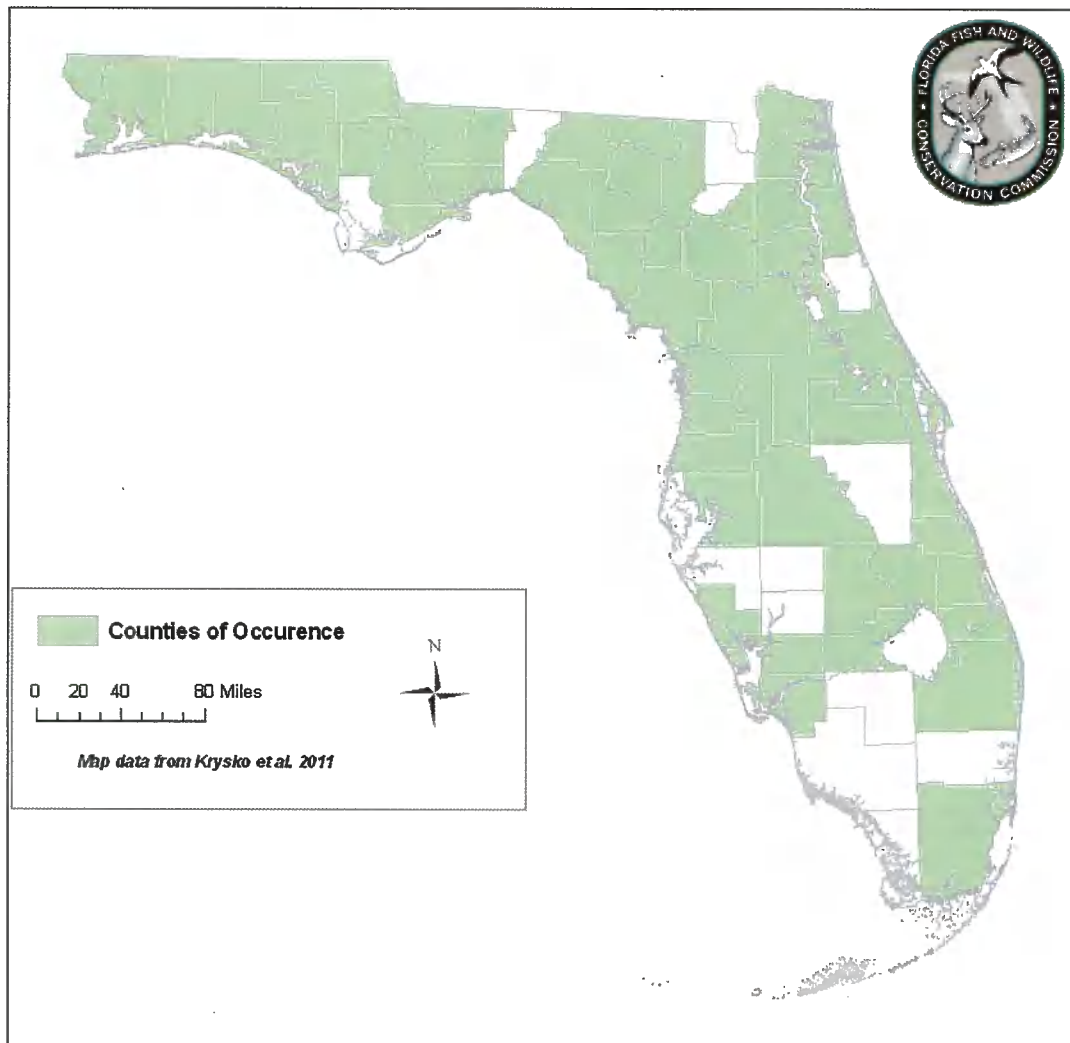
**Gopher Frog
(*Lithobates capito*)
Florida County Distribution**



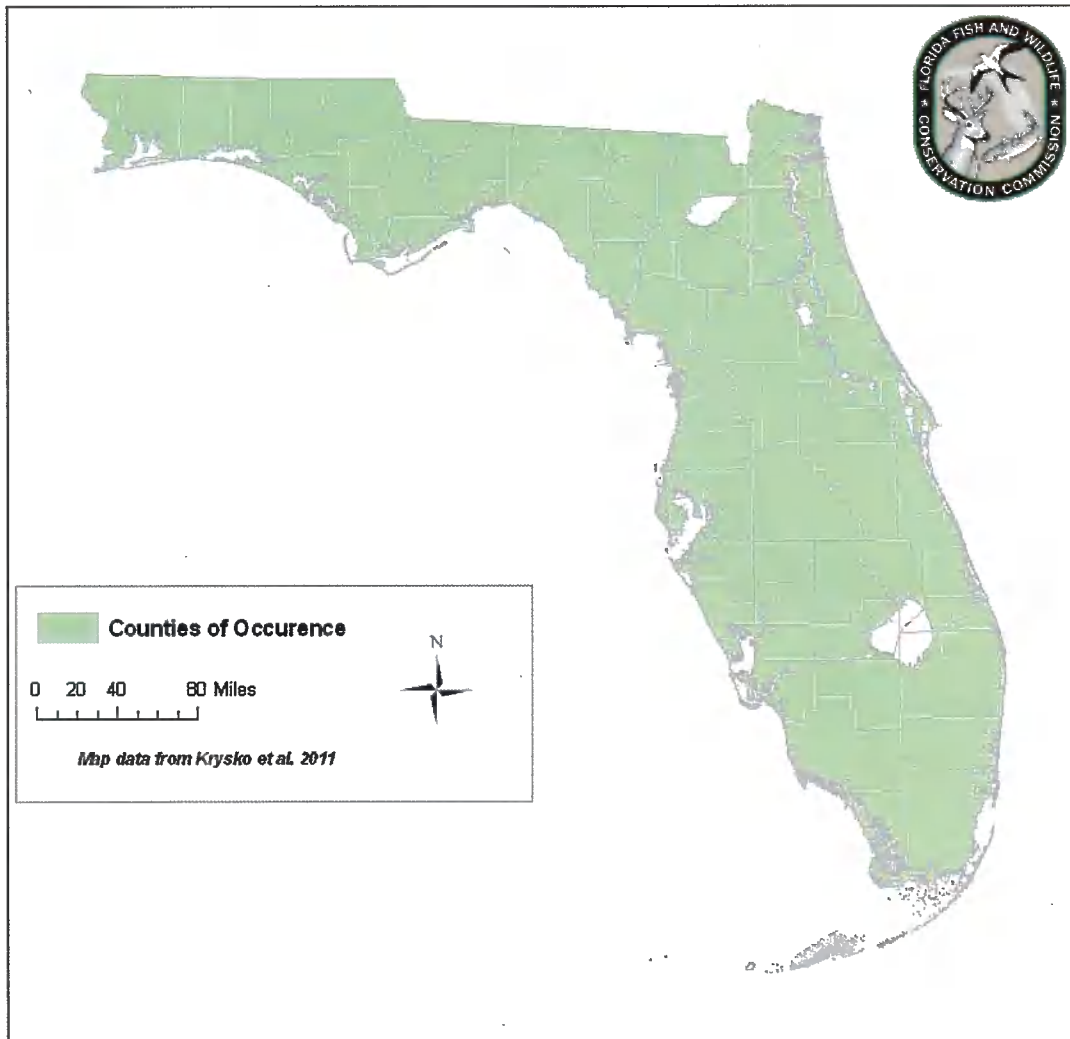
**Florida Mouse
(*Podomys floridanus*)
Florida County Distribution**



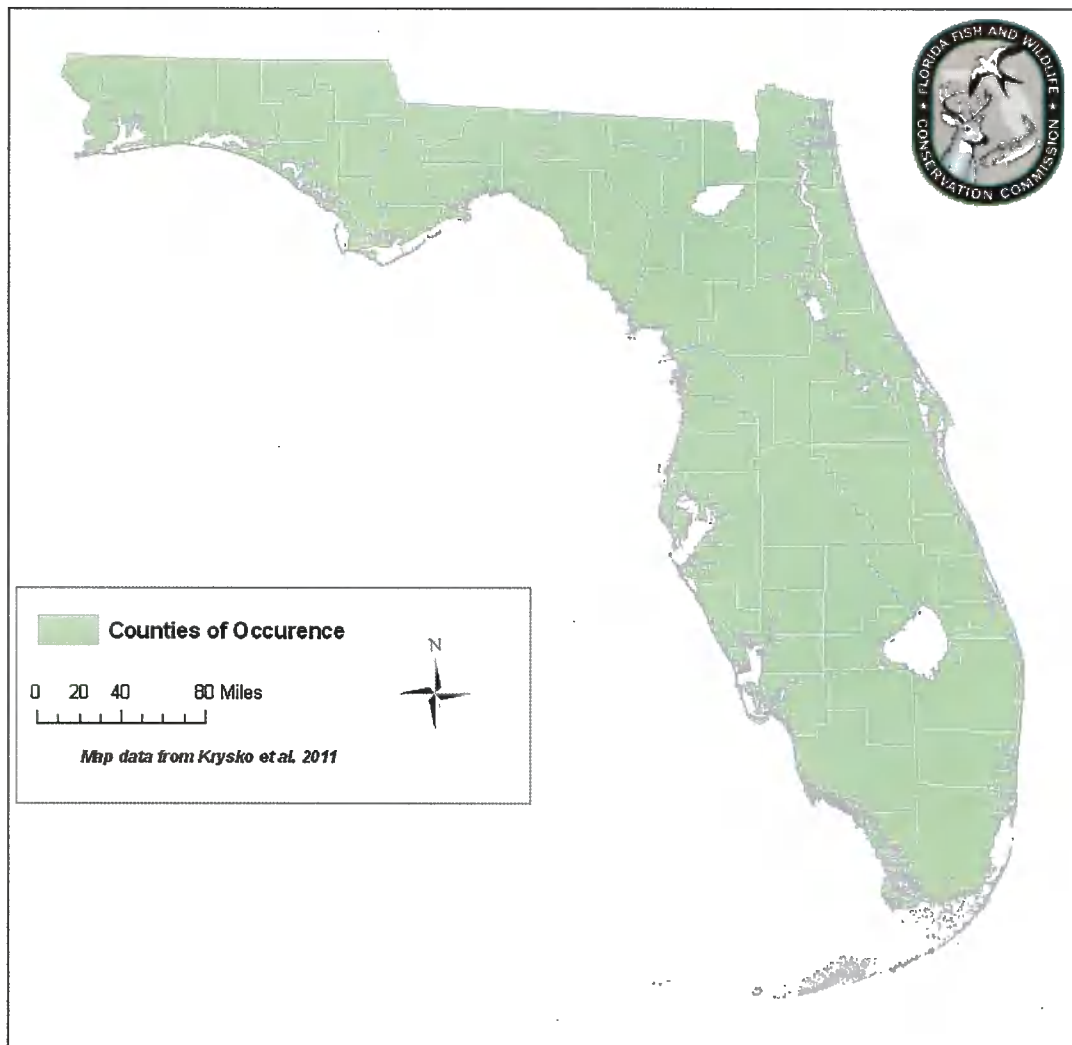
**Florida Pine Snake
(*Pituophis melanoleucus*)
Florida County Distribution**



**Eastern Indigo Snake
(*Drymarchon couperi*)
Florida County Distribution**



**Eastern Diamondback Rattlesnake
(*Crotalus adamanteus*)
Florida County Distribution**



Spiders--Araneae	<i>Philodromus</i> sp.	A Crab Spider	A
Spiders--Araneae	<i>Phrurotimpus</i> sp.	A Sac Spider	A
Spiders--Araneae	<i>Pirata</i> sp.	A Pirate Wolf Spider	A
Spiders--Araneae	<i>Pirata spiniger</i>	A Pirate Wolf Spider	F
Spiders--Araneae	<i>Rabidosa rabida</i>	A Wolf Spider	A
Spiders--Araneae	<i>Scotinella</i> sp.	A Sac Spider	A
Spiders--Araneae	<i>Sosippus janus</i>	A Wolf Spider	F
Spiders--Araneae	<i>Sosippus</i> sp.	A Wolf Spider	A
Spiders--Araneae	<i>Steatoda</i> sp.	A Cobweb Weaver Spider	A
Spiders--Araneae	<i>Thioclina</i> sp.	A Jumping Spider	A
Spiders--Araneae	<i>Trachelas</i> sp.	A Sac Spider	A
Spiders--Araneae	<i>Uloborus</i> sp.	A Cribellate Orb Weaver Spider	A
Spiders--Araneae	<i>Ummidia</i> sp.	A Trapdoor Spider	A
Spiders--Araneae	<i>Xysticus</i> sp.	A Ground Crab Spider	A
Spiders--Araneae	<i>Zelotes limnophilus</i>	A Gnaphosid Spider	A
Harvestmen--Opiliones	<i>Crosbyella</i> sp.	A Harvestman	C/F
Harvestmen--Opiliones	<i>Leiobunum bimaculatum</i>	A Harvestman	A
Harvestmen--Opiliones	<i>Vonones ornata</i>	A Harvestman	A
Pseudoscorpions--Pseudoscorpionida	<i>Chelanops affinis</i>	A Pseudoscorpion	C
Whip Scorpions and Kin-- Thelyphonida	<i>Mastigoproctus giganteus</i>	A Giant Whip Scorpion	A
Mites and Ticks--Acari	<i>Aeroppia floridana</i>	A Soil Mite	A
Mites and Ticks--Acari	<i>Alliphis</i> sp.	A Predaceous Mite	C?
Mites and Ticks--Acari	<i>Alloodamaeus</i> sp.	A Soil Mite	A
Mites and Ticks--Acari	<i>Amblyomma maculatum</i>	Gulf Coast Tick	A
Mites and Ticks--Acari	<i>Amblyomma tuberculatum</i>	Gopher Tortoise Tick	P
Mites and Ticks--Acari	<i>Anchrolaelaps fahrenheitzi</i>	A Parasitic Mite	C

Mites and Ticks--Acari	<i>Brachysternum</i> sp.	A Phoretic Mite	C
Mites and Ticks--Acari	<i>Eremgeozetes</i> sp.	A Soil Mite	A
Mites and Ticks--Acari	<i>Eucheyletia bishoppi</i> Baker	A Predaceous Mite	C
Mites and Ticks--Acari	<i>Eutrombicula cinnabaris</i>	A Chigger Mite	A
Mites and Ticks--Acari	<i>Haemolaelaps glascowi</i>	A Parasitic Mite	C
Mites and Ticks--Acari	<i>Hypoaspis (Gaeolaelaps)</i> sp.	A Parasitic Mite	C
Mites and Ticks--Acari	<i>Ixodes scapularis</i>	Black-legged Tick	A
Mites and Ticks--Acari	<i>Lanibelba pini</i>	A Soil Mite	A
Mites and Ticks--Acari	<i>Liodes floridensis</i>	A Soil Mite	A
Mites and Ticks--Acari	<i>Macrocheles dimidiatus</i> s. lat.	A Predaceous Mite	C
Mites and Ticks--Acari	<i>Macrocheles</i> sp. 1	A Predaceous Mite	C
Mites and Ticks--Acari	<i>Macrocheles</i> sp. 2	A Predaceous Mite	C
Mites and Ticks--Acari	<i>Macrocheles</i> sp. 3	A Predaceous Mite	C
Mites and Ticks--Acari	<i>Microcaeculus</i> n. sp.	A Rake-legged Mite	F
Mites and Ticks--Acari	<i>Nothrus carolinae</i>	A Soil Mite	A
Mites and Ticks--Acari	<i>Ornithodoros turicata americanus</i>	Relapsing Fever Tick	P
Mites and Ticks--Acari	<i>Ornithonyssus bacoti</i>	Tropical Rat Mite	C
Mites and Ticks--Acari	<i>Parasecia gurneyi</i>	A Chigger Mite	A
Mites and Ticks--Acari	<i>Pilogalumna</i> aff. <i>P. tenuiclava</i>	A Soil Mite	A
Mites and Ticks--Acari	<i>Prolistophorus sparsilineatus</i>	A Fur Mite	C
Mites and Ticks--Acari	<i>Rhysotritia ardua</i>	A Soil Mite	A
Mites and Ticks--Acari	<i>Schelorbates</i> sp.	A Soil Mite	A
Mites and Ticks--Acari	<i>Tectocephus</i> sp.	A Soil Mite	A
Mites and Ticks--Acari	trombidid sp. 1	A Parasitic Insect Mite	A
Mites and Ticks--Acari	trombidid sp. 2	A Parasitic Insect Mite	A
Mites and Ticks--Acari	<i>Walchia americana</i>	A Chigger Mite	A
Mites and Ticks--Acari	<i>Xylobates</i> sp.	A Soil Mite	A

APPENDIX 6. Invertebrates Associated with Gopher Tortoises

This list of invertebrates that have been recorded in association with gopher tortoises is primarily based upon the following references, although with supplementation from various other sources: Jackson and Milstrey 1989, Knizley 1997, and Lago 1991. Categories of the relationship to the tortoise are as follows: A=accidental or casual, C=facultative commensal, F=frequently associated, O=obligate commensal, P=parasitic on tortoises, S=obligate scavenger; not a burrow commensal.

Group	Taxon	Common Name	Category
Snails and Slugs--Gastropoda	<i>Glyphyalinia dalliana</i>	A Land Snail	A
Snails and Slugs--Gastropoda	<i>Glyphyalinia indentata</i>	A Land Snail	A
Snails and Slugs--Gastropoda	<i>Hawaiiia minuscula</i>	A Land Snail	A
Snails and Slugs--Gastropoda	<i>Praticolella bakeri</i>	Ridge Scrubsnail	A
Snails and Slugs--Gastropoda	<i>Ventridens cerinoideus</i>	Wax Dome Snail	F
Snails and Slugs--Gastropoda	<i>Zonitoides arboreus</i>	A Land Snail	A
Isopods--Isopoda	<i>Armadillium vulgare</i>	A Pillbug	A
Isopods--Isopoda	<i>Porcellio virgatus</i>	A Woodlouse	A
Decapoda--Crayfish and Kin	<i>Procambarus</i> cf. <i>P. alleni</i>	A Crayfish	A
Snails and Slugs--Gastropoda	<i>Leidyula floridana</i>	Florida Leatherleaf Slug	A
Centipedes--Chilopoda	Lithobiomorpha sp.	A Stone Centipede	F
Centipedes--Chilopoda	Scolopendromorpha sp.	A Centipede	F
Millipedes--Diplopoda	<i>Abacion</i> sp.	A Millipede	F
Millipedes--Diplopoda	<i>Chicobolus spingerus</i>	Florida Ivory Millipede	F
Millipedes--Diplopoda	<i>Narceus</i> sp.	A Millipede	F
Spiders--Araneae	<i>Achaearanea porteri</i>	A Cobweb Weaver Spider	A
Spiders--Araneae	<i>Agelenopsis</i> sp.	A Grass Spider	A
Spiders--Araneae	<i>Anasaitis canosa</i>	A Jumping Spider	A
Spiders--Araneae	<i>Callilepis</i> sp.	A Gnaphosid Spider	A
Spiders--Araneae	<i>Castianeira gertschi</i>	Gertsch Ant Mimic Spider	A

Spiders--Araneae	<i>Castianeira trilineata</i>	An Ant Mimic Spider	A
Spiders--Araneae	<i>Ceratielus</i> cf. <i>C. paludigera</i>	A Sheetweb Spider	A
Spiders--Araneae	<i>Ceratinops crenata</i>	A Sheetweb Spider	A
Spiders--Araneae	<i>Corinna</i> sp.	A Spider	A
Spiders--Araneae	<i>Dictyna</i> sp.	A Dictynid Spider	A
Spiders--Araneae	<i>Eperigone</i> sp.	A Sheetweb Spider	A
Spiders--Araneae	<i>Florinda coccinea</i>	A Sheetweb Spider	A
Spiders--Araneae	<i>Gnaphosa sericata</i>	A Gnaphosid Spider	A
Spiders--Araneae	<i>Habronattus</i> n. sp.	A Jumping Spider	A
Spiders--Araneae	<i>Habronattus</i> sp.	A Jumping Spider	A
Spiders--Araneae	<i>Hibana</i> sp.	An Anyphaenid Spider	A
Spiders--Araneae	<i>Hogna carolinensis</i>	A Wolf Spider	F
Spiders--Araneae	<i>Hypsosinga rubens</i>	An Orb Weaver Spider	A
Spiders--Araneae	<i>Isohogna timuqua</i>	A Wolf Spider	F
Spiders--Araneae	<i>Latrodectus mactans</i>	Southern Black Widow	F
Spiders--Araneae	<i>Lepthyphantes</i> sp.	A Sheetweb Spider	A
Spiders--Araneae	<i>Lycosa</i> sp.	A Wolf Spider	A
Spiders--Araneae	<i>Metaltella simoni</i>	A Spider	A
Spiders--Araneae	<i>Naphrys bufoides</i>	A Jumping Spider	A
Spiders--Araneae	<i>Naphrys</i> sp.	A Jumping Spider	A
Spiders--Araneae	<i>Naphrys xerophilum</i>	A Jumping Spider	A
Spiders--Araneae	<i>Neoantisteaalachua</i>	A Funnel Weaver Spider	A
Spiders--Araneae	<i>Neoantistea magna</i>	A Funnel Weaver Spider	A
Spiders--Araneae	<i>Neoantistea</i> sp.	A Funnel Weaver Spider	A
Spiders--Araneae	<i>Neospintharus</i> cf. <i>A. trigonum?</i>	A Dewdrop Spider	A
Spiders--Araneae	<i>Ozyptila</i> sp.	A Leaf Litter Crab Spider	A
Spiders--Araneae	<i>Parasteatoda tepidariorum</i>	Common House Spider	A

Grasshoppers, Crickets, and Kin-- Orthoptera	<i>Ceuthophilus divergens</i>	A Camel Cricket	F
Grasshoppers, Crickets, and Kin-- Orthoptera	<i>Ceuthophilus latibuli</i>	A Camel Cricket	F
Grasshoppers, Crickets, and Kin-- Orthoptera	<i>Ceuthophilus walkeri</i>	A Camel Cricket	C/F
Grasshoppers, Crickets, and Kin-- Orthoptera	tetrigid sp.	A Pygmy Grasshopper	A
Walking Sticks--Phasmatodea	<i>Anisomorpha buprestoides</i>	Southern Two-Striped Walkingstick	A
Cockroaches--Blattodea	<i>Parcoblatta</i> sp.	A Wood Cockroach	F
True Bugs--Heteroptera	<i>Cydnoides</i> sp.	An Ebony Bug	A
True Bugs--Heteroptera	<i>Phytocoris</i> sp.	A Plant Bug	A
True Bugs--Heteroptera	<i>Ploiaria carolina</i>	A Thread-legged Bug	A
True Bugs--Heteroptera	<i>Tominotus communis</i>	A Burrowing Bug	F
Ant Lions, Lacewings and Kin-- Neuroptera	<i>Glenurus gratis</i>	An Antlion	C/F
Ant Lions, Lacewings and Kin-- Neuroptera	<i>Myrmeleon carolinus</i>	An Antlion	A
Ant Lions, Lacewings and Kin-- Neuroptera	<i>Myrmeleon mobilus</i>	An Antlion	A
Beetles--Coleoptera	<i>Acrona</i> sp.	A Rove Beetle	A
Beetles--Coleoptera	<i>Acrostilicus hospes</i>	A Rove Beetle	C
Beetles--Coleoptera	<i>Acrotona picescens</i>	A Rove Beetle	A
Beetles--Coleoptera	<i>Acrotrichisp.</i>	A Feather-winged Beetle	C?
Beetles--Coleoptera	<i>Alloblackburneus troglodytes</i>	Little Gopher Tortoise Scarab Beetle	O
Beetles--Coleoptera	alticine sp.	A Flea Beetle	A
Beetles--Coleoptera	<i>Anthicus ictericus</i>	An Antlike Flower Beetle	A
Beetles--Coleoptera	<i>Astenus linearis</i>	A Rove Beetle	A

Beetles--Coleoptera	<i>Ataenius cylindrus</i>	A Scarab Beetle	F
Beetles--Coleoptera	<i>Ataenius exiguus</i>	A Scarab Beetle	A
Beetles--Coleoptera	<i>Ataenius miamii</i>	A Scarab Beetle	F
Beetles--Coleoptera	<i>Ataenius ovatulus</i>	A Scarab Beetle	F
Beetles--Coleoptera	<i>Ataenius platensis</i>	A Scarab Beetle	A
Beetles--Coleoptera	<i>Ateuchus lecontei</i>	A Scarab Beetle	A
Beetles--Coleoptera	<i>Atheta macrops</i>	A Rove Beetle	A
Beetles--Coleoptera	<i>Atheta</i> sp.	A Rove Beetle	A
Beetles--Coleoptera	Blaptini sp.	A Darkling Beetle	A
Beetles--Coleoptera	<i>Bledius wudus</i>	A Rove Beetle	F
Beetles--Coleoptera	carabid sp. 1	A Ground Beetle	A
Beetles--Coleoptera	carabid sp. 2	A Ground Beetle	A
Beetles--Coleoptera	cardiophorine sp.	A Click Beetle	A
Beetles--Coleoptera	cf. <i>Mycetochara</i> sp.	A Comb-clawed Beetle	F
Beetles--Coleoptera	<i>Chelyoxenus xerobatis</i>	Gopher Tortoise Hister Beetle	O
Beetles--Coleoptera	ciid sp.	A Minute Tree Fungus Beetle	A
Beetles--Coleoptera	<i>Conoderus</i> sp.	A Click Beetle	A
Beetles--Coleoptera	<i>Copris gopheri</i>	Gopher Tortoise Copris Beetle	O
Beetles--Coleoptera	<i>Cryptocephalus</i> sp. 1	A Case-bearing Leaf Beetle	F
Beetles--Coleoptera	<i>Cryptocephalus</i> sp. 2	A Case-bearing Leaf Beetle	F
Beetles--Coleoptera	cucujid sp. 1	A Flat Bark Beetle	A
Beetles--Coleoptera	cucujid sp. 2	A Flat Bark Beetle	A
Beetles--Coleoptera	curculionid sp. 1	A Weevil	A
Beetles--Coleoptera	curculionid sp. 2	A Weevil	A
Beetles--Coleoptera	<i>Diplotaxis bidentata</i>	A Scarab Beetle	A
Beetles--Coleoptera	Elaterini sp.	A Click Beetle	A
Beetles--Coleoptera	<i>Gabronithus mgogoricus</i>	A Rove Beetle	A

Beetles--Coleoptera	<i>Geomysaprinus floridae</i>	Equal-clawed Gopher Tortoise Hister Beetle	O
Beetles--Coleoptera	<i>Haroldiataenius saramari</i>	A Scarab Beetle	F
Beetles--Coleoptera	histerid sp. 1	A Clown Beetle	F
Beetles--Coleoptera	histerid sp. 2	A Clown Beetle	F
Beetles--Coleoptera	histerid sp. 3	A Clown Beetle	F
Beetles--Coleoptera	histerid sp. 4	A Clown Beetle	F
Beetles--Coleoptera	<i>Hypocaccus ferrugineus</i>	A Clown Beetle	C/F
Beetles--Coleoptera	<i>Ips avulsus</i>	Small Southern Pine Engraver	A
Beetles--Coleoptera	lathridiid sp.	A Minute Brown Scavenger Beetle	A
Beetles--Coleoptera	<i>Lathrobium dimidiata</i>	A Rove Beetle	A
Beetles--Coleoptera	<i>Megalopinus rufipes</i>	A Rove Beetle	A
Beetles--Coleoptera	<i>Neohypnus melanops</i>	A Rove Beetle	A
Beetles--Coleoptera	<i>Nossidium</i> sp.	A Feather-winged Beetle	A
Beetles--Coleoptera	<i>Onthophagus polyphemi polyphemi</i>	Punctate Gopher Tortoise Onthophagus Beetle	O
Beetles--Coleoptera	<i>Onthophagus polyphemi sparsisetosus</i>	Smooth Gopher Tortoise Onthophagus Beetle	O
Beetles--Coleoptera	<i>Onthophagus tuberculifrons</i>	A Scarab Beetle	A
Beetles--Coleoptera	<i>Paederus littoreus</i>	A Rove Beetle	A
Beetles--Coleoptera	<i>Parataenius simulator</i>	A Scarab Beetle	F
Beetles--Coleoptera	<i>Pasimachus subsulcatus</i>	A Ground Beetle	A
Beetles--Coleoptera	phalacrid sp.	A Shining Flower Beetle	A
Beetles--Coleoptera	<i>Phanaeus igneus</i>	A Rainbow Scarab Beetle	A
Beetles--Coleoptera	<i>Phanerota carinata</i> or <i>P. fasciata</i>	A Rove Beetle	A
Beetles--Coleoptera	<i>Phelister rouzeti</i>	A Clown Beetle	A
Beetles--Coleoptera	<i>Philonthus cautus</i>	A Rove Beetle	A
Beetles--Coleoptera	<i>Philonthus gopheri</i>	Gopher Tortoise Rove Beetle	O

Beetles--Coleoptera	<i>Philonthus testudo</i>	Western Gopher Tortoise Rove Beetle	O
Beetles--Coleoptera	<i>Pinophilus confusus</i>	A Rove Beetle	A
Beetles--Coleoptera	pselaphine sp.	An Ant-loving Rove Beetle	F
Beetles--Coleoptera	ptiliid sp.	A Feather-winged Beetle	A
Beetles--Coleoptera	<i>Ptomaphagus consobrinus</i>	A Small Carrion Beetle	A
Beetles--Coleoptera	<i>Ptomaphagus texana</i>	A Small Carrion Beetle	C
Beetles--Coleoptera	<i>Ptomaphagus ulkei?</i>	A Small Carrion Beetle	A
Beetles--Coleoptera	rhyzophagid sp.	A Root-eating Beetle	A
Beetles--Coleoptera	<i>Sepedophilus basalis</i>	A Rove Beetle	F
Beetles--Coleoptera	<i>Sepedophilus kitelevi</i>	A Rove Beetle	F
Beetles--Coleoptera	tenebrionid sp. 1	A Darkling Beetle	A
Beetles--Coleoptera	tenebrionid sp. 2	A Darkling Beetle	A
Beetles--Coleoptera	tenebrionid sp. 3	A Darkling Beetle	A
Beetles--Coleoptera	tenebrionid sp. 4	A Darkling Beetle	A
Beetles--Coleoptera	Thinobius sp.	A Rove Beetle	A
Beetles--Coleoptera	throsoid sp. 1	A False Metallic Wood-boring Beetle	A
Beetles--Coleoptera	throsoid sp. 2	A False Metallic Wood-boring Beetle	A
Beetles--Coleoptera	<i>Cercyon pygmaeus</i>	A Water Scavenger Beetle	A
Beetles--Coleoptera	<i>Aphodius rubeolus</i>	A Scarab Beetle	A
Beetles--Coleoptera	<i>Aphodius stercorosus</i>	A Scarab Beetle	A
Beetles--Coleoptera	<i>Ataenius fattigi</i>	A Scarab Beetle	A
Beetles--Coleoptera	<i>Alenochora notula</i>	A Rove Beetle	A
Beetles--Coleoptera	<i>Anotylus</i> sp.	A Spiny-legged Rove Beetle	A
Beetles--Coleoptera	Falgaria dissecta	A Rove Beetle	A
Beetles--Coleoptera	<i>Lithocaris</i> sp.	A Rove Beetle	A
Beetles--Coleoptera	<i>Mycetoporus</i> sp.	A Rove Beetle	A

Moths and Butterflies--Lepidoptera	Acrolophus pholeter	Gopher Tortoise Acrolophus Moth	O
Moths and Butterflies--Lepidoptera	<i>Acrolophus</i> sp.	A Tubeworm Moth	F
Moths and Butterflies--Lepidoptera	<i>Ceratophaga vicinella</i>	Gopher Tortoise Shell Moth	S
Moths and Butterflies--Lepidoptera	<i>Euclea delphinii (pupa)</i>	Spiny Oak-slug Moth	A
Moths and Butterflies--Lepidoptera	<i>Idia gopheri</i>	Gopher Tortoise Noctuid Moth	O
Flies--Diptera	<i>Apocephalus</i> n. sp.	An Ant-decapitating Fly	A
Flies--Diptera	<i>Apocephalus tenuipes</i>	An Ant-decapitating Fly	A
Flies--Diptera	<i>Arareta</i> sp.	A Gall Gnat	A
Flies--Diptera	<i>Arenagena</i> n. sp.	A Stiletto Fly	C
Flies--Diptera	<i>Asilus</i> n. sp.	A Robber Fly	C
Flies--Diptera	<i>Bitheca agarica</i>	A Lesser Dung Fly	A
Flies--Diptera	<i>Brachyneura</i> sp.	A Dark-winged Fungus Gnat	A
Flies--Diptera	<i>Bradysia</i> sp.	A Dark-winged Fungus Gnat	A
Flies--Diptera	<i>Bradysia</i> sp. aff. <i>B. coprophila</i>	A Dark-winged Fungus Gnat	A
Flies--Diptera	<i>Bromeloecia winnemardi</i>	A Lesser Dung Fly	A
Flies--Diptera	<i>Cecidomyia</i> sp.	A Gall Gnat	A
Flies--Diptera	cecidomyiid new genus n. sp.	A Gall Gnat	A
Flies--Diptera	Cecidomyiidi sp. 1	A Gall Gnat	A
Flies--Diptera	Cecidomyiidi sp. 2	A Gall Gnat	A
Flies--Diptera	Cecidomyiidi sp. 3	A Gall Gnat	A
Flies--Diptera	Cecidomyiidi sp. 4	A Gall Gnat	A
Flies--Diptera	Cecidomyiidi sp. 5	A Gall Gnat	A
Flies--Diptera	Cecidomyiidi sp. 6	A Gall Gnat	A
Flies--Diptera	Cecidomyiidi sp. 7	A Gall Gnat	A
Flies--Diptera	Cecidomyiidi sp. 8	A Gall Gnat	A
Flies--Diptera	Cecidomyiine sp.	A Gall Gnat	A
Flies--Diptera	<i>Chrysorus</i> sp.	A Long-legged Fly	A

Flies--Diptera	<i>Claspettomysia</i> sp.	A Gall Gnat	A
Flies--Diptera	<i>Clinodiplosis</i> sp. 1	A Gall Gnat	A
Flies--Diptera	<i>Clinodiplosis</i> sp. 2	A Gall Gnat	A
Flies--Diptera	<i>Condylostylus</i> sp.	A Long-legged Fly	A
Flies--Diptera	<i>Conioscinella triorbiculata</i>	A Frit Fly	A
Flies--Diptera	<i>Contarinia</i> sp.	A Gall Gnat	A
Flies--Diptera	<i>Coproica</i> n. sp. aff. <i>C. ferruginata</i>	A Lesser Dung Fly	C
Flies--Diptera	<i>Corynoptera</i> sp.	A Dark-winged Fungus Gnat	A
Flies--Diptera	<i>Cycloptelus pictipennis</i>	A Stilleto Fly	A
Flies--Diptera	<i>Dilophus sayi</i>	A March Fly	A
Flies--Diptera	<i>Dohrniphora</i> aff. <i>D. perplexa</i>	A Hump-backed or Scuttle Fly	A
Flies--Diptera	<i>Dohrniphora perplexa</i>	A Hump-backed or Scuttle Fly	A
Flies--Diptera	<i>Drapetis</i> sp. 1	Tortoise Burrow Dance Fly	O
Flies--Diptera	<i>Drapetis</i> sp. 2	A Dance Fly	C
Flies--Diptera	<i>Drosophila guttifera</i>	A Vinegar Fly	A
Flies--Diptera	<i>Epidapus</i> sp.	A Dark-winged Fungus Gnat	A
Flies--Diptera	<i>Eutrichota gopheri</i>	Gopher Tortoise Burrow Fly	O
Flies--Diptera	<i>Gymnopternus</i> sp.	A Long-legged Fly	A
Flies--Diptera	<i>Liohippелates pusio</i>	A Frit Fly	A
Flies--Diptera	<i>Ledomyia</i> sp.	A Gall Gnat	A
Flies--Diptera	<i>Lestermia</i>	A Gall Gnat	A
Flies--Diptera	<i>Litolinga tergisa</i>	A Stilleto Fly	A
Flies--Diptera	<i>Lobodiplosis</i> sp.	A Gall Gnat	A
Flies--Diptera	<i>Machinus polyphemi</i>	Gopher Tortoise Robber Fly	O
Flies--Diptera	<i>Megaselia miniana</i>	A Hump-backed or Scuttle Fly	A
Flies--Diptera	<i>Megaselia</i> sp. 1	A Hump-backed or Scuttle Fly	F
Flies--Diptera	<i>Megaselia</i> sp. 2	A Hump-backed or Scuttle Fly	F

Flies--Diptera	<i>Megaselia</i> sp. 3	A Hump-backed or Scuttle Fly	F
Flies--Diptera	<i>Milichiella</i> n. sp. aff. <i>M. arcuata</i>	A Freeloader Fly	C
Flies--Diptera	<i>Muscidae unident.</i> sp. 1	A Fly	F?
Flies--Diptera	<i>Nephrotoma</i> sp. (<i>larvae</i>)	A Tiger Crane Fly	F
Flies--Diptera	<i>Ozodiceromyia notata</i>	A Stilleto Fly	F
Flies--Diptera	<i>Ozodiceromyia</i> sp.	A Stilleto Fly	A
Flies--Diptera	<i>Phronia</i> sp.	A Fungus Gnat	A
Flies--Diptera	<i>Porricondyla</i> sp.	A Gall Gnat	A
Flies--Diptera	porricondylinae new genus n. sp.	A Gall Gnat	A
Flies--Diptera	porricondylinae sp.	A Gall Gnat	A
Flies--Diptera	<i>Pterogramma</i> sp. 1	A Lesser Dung Fly	A
Flies--Diptera	<i>Pterogramma</i> sp. 2	A Lesser Dung Fly	A
Flies--Diptera	<i>Resseliella</i> sp. 1	A Gall Gnat	A
Flies--Diptera	<i>Resseliella</i> sp. 2	A Gall Gnat	A
Flies--Diptera	<i>Rhegmoclemina (Neorhegmoclemina)</i> <i>bisaccatum</i>	A Minute Black Scavenger Fly	C
Flies--Diptera	<i>Rymosia</i> sp.	A Fungus Gnat	A
Flies--Diptera	<i>Sarcophaga cistudinis</i>	A Flesh Fly	A
Flies--Diptera	<i>Schizomyia</i> sp.	A Gall Gnat	A
Flies--Diptera	<i>Spelobia</i> sp.	A Lesser Dung Fly	C
Flies--Diptera	<i>Tricimba melanchiolica</i>	A Frit Fly	A
Flies--Diptera	<i>Rachispoda</i> sp.	A Lesser Dung Fly	A
Fleas--Siphonoptera	<i>Polygenus floridamus</i>	A Flea	C
Ants, Wasps, and Kin--Hymenoptera	<i>alysiinae</i> sp. 1	A Parasitic Wasp	C
Ants, Wasps, and Kin--Hymenoptera	<i>alysiinae</i> sp. 2	A Parasitic Wasp	C
Ants, Wasps, and Kin--Hymenoptera	<i>Anoplius atrox</i>	A Spider Wasp	F?
Ants, Wasps, and Kin--Hymenoptera	<i>Aphaenogaster ashmeadi</i>	Ashmead's Long-legged Ant	A

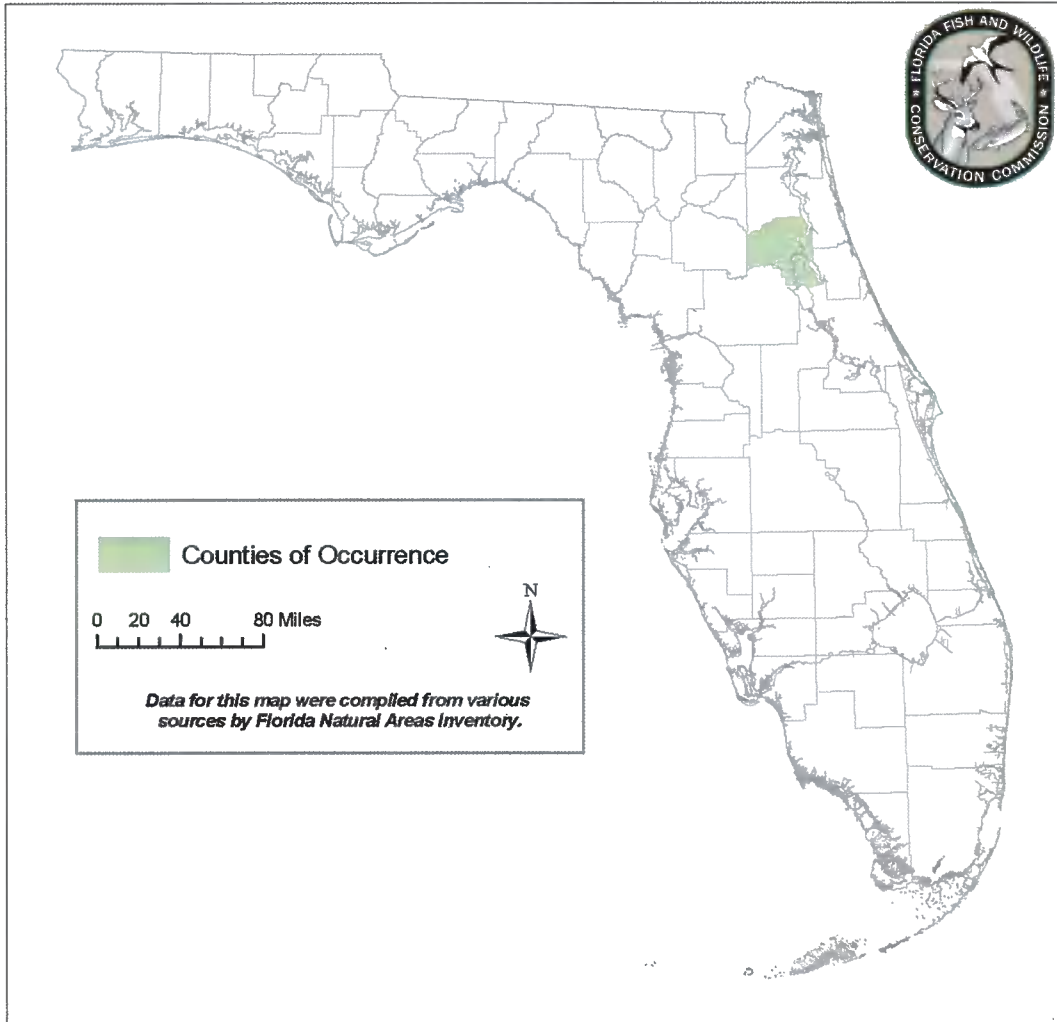
Ants, Wasps, and Kin--Hymenoptera	<i>Aphaenogaster carolinensis</i>	Carolina Long-legged Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Aphaenogaster fulva</i>	Ridge-backed Long-legged Ant	F
Ants, Wasps, and Kin--Hymenoptera	<i>Aphaenogaster rudis</i>	A Long-legged Ant	A
Ants, Wasps, and Kin--Hymenoptera	bethylid sp.	A Parasitic Wasp	C
Ants, Wasps, and Kin--Hymenoptera	braconine sp. 1	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	braconine sp. 2	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	<i>Calopompilus</i> sp.	A Spider Wasp	A
Ants, Wasps, and Kin--Hymenoptera	<i>Camponotus castaneus</i>	Chesnut Colored Carpenter Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Crematogaster ashmeadi</i>	An Acrobat Ant	F
Ants, Wasps, and Kin--Hymenoptera	<i>Cyphomyrmex rimosus</i>	Larger Little Fungus Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Dasymutilla</i> sp.	A Velvet Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Dialictus</i> sp.	A Sweat Bee	A
Ants, Wasps, and Kin--Hymenoptera	diapriid sp.	A Parasitic Wasp	C?
Ants, Wasps, and Kin--Hymenoptera	<i>Dorymyrmex</i> sp.	A Pyramid Ant	F
Ants, Wasps, and Kin--Hymenoptera	dryinid sp.	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	encyrtid sp. 1	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	encyrtid sp. 2	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	encyrtid sp. 3	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	encyrtid sp. 4	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	eucoilid sp. 1	A Parasitic Wasp	C?
Ants, Wasps, and Kin--Hymenoptera	eucoilid sp. 2	A Parasitic Wasp	C?
Ants, Wasps, and Kin--Hymenoptera	eulophid sp. 1	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	eulophid sp. 2	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	eulophid sp. 3	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	eulophid sp. 4	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	eulophid sp. 5	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	eupelmid sp. 1	A Parasitic Wasp	A

Ants, Wasps, and Kin--Hymenoptera	eupelmid sp. 2	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	<i>Forelius pruinosus</i>	Frosty Odorous Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Formica pallidefulva</i>	Variable Fleet Formica	A
Ants, Wasps, and Kin--Hymenoptera	<i>Habropoda laboriosa</i>	Southeastern Blueberry Bee	A
Ants, Wasps, and Kin--Hymenoptera	<i>Hypoponera opacior</i>	Common Mini-ponerine	F
Ants, Wasps, and Kin--Hymenoptera	<i>Hypoponera punctatissima</i>	Panropical Mini-ponerine	A
Ants, Wasps, and Kin--Hymenoptera	<i>Liris sp.</i>	A Square-headed Wasp	A
Ants, Wasps, and Kin--Hymenoptera	microgastrine sp. 1	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	<i>Nyländeria arenivaga</i>	Sand-loving Crazy Ant	F
Ants, Wasps, and Kin--Hymenoptera	<i>Nyländeria faisonensis</i>	Woodland Crazy Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Nyländeria parvula</i>	Northern Crazy Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Odontomachus brunneus</i>	Southeastern Snapping Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Pheidole adrianoi</i>	Adrian's Big-headed Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Pheidole anastasioi</i>	A Big-headed Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Pheidole diversipilosa</i>	A Big-headed Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Pheidole metallescens</i>	Metallic Big-headed Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Pheidole morrissi</i>	Morris's Big-headed Ant	A
Ants, Wasps, and Kin--Hymenoptera	platygastriid sp. 1	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	platygastriid sp. 2	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	platygastriid sp. 3	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	platygastriid sp. 4	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	platygastriid sp. 5	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	<i>Pogonomyrmex badius</i>	Florida Harvester Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Prenolepis imparis</i>	False Honey Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Proceratium pergandei</i>	Pergande's Egg-eating Ant	A
Ants, Wasps, and Kin--Hymenoptera	pteromalid sp. 1	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	pteromalid sp. 2	A Parasitic Wasp	A

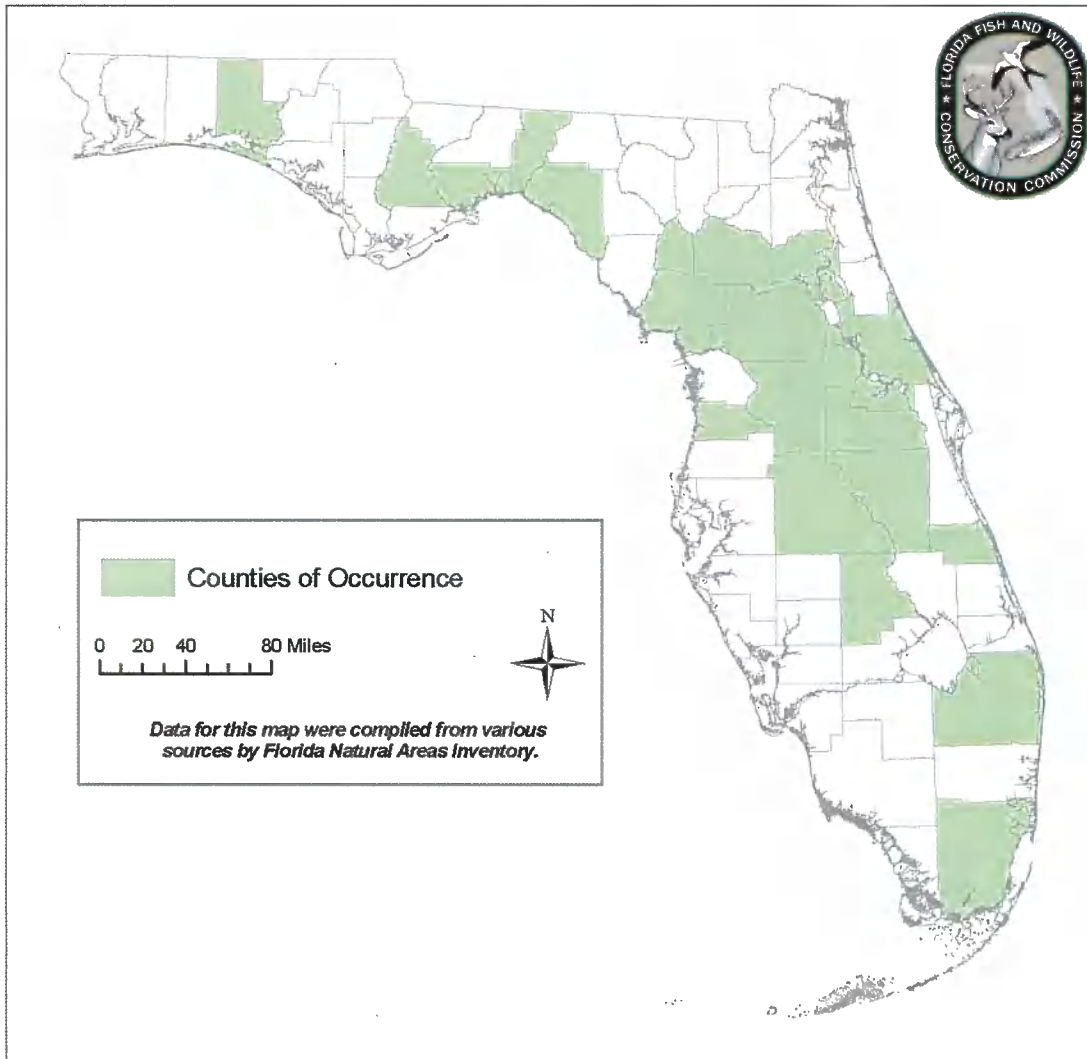
Ants, Wasps, and Kin--Hymenoptera	pteromalid sp. 3	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	pteromalid sp. 4	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	scelionid sp. 1	A Parasitic Wasp	C?
Ants, Wasps, and Kin--Hymenoptera	scelionid sp. 2	A Parasitic Wasp	C?
Ants, Wasps, and Kin--Hymenoptera	<i>Solenopsis invicta</i>	Red Imported Fire Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Solenopsis nickersoni</i>	Nickerson's Thief Ant	A
Ants, Wasps, and Kin--Hymenoptera	<i>Solenopsis pergandei</i>	Pergande's Thief Ant	F
Ants, Wasps, and Kin--Hymenoptera	sphacid sp.	A Parasitic Wasp	A
Ants, Wasps, and Kin--Hymenoptera	<i>Strumigenys louisianae</i>	Louisiana Pygmy Snapping Ant	A

Select Invertebrate Distribution Maps

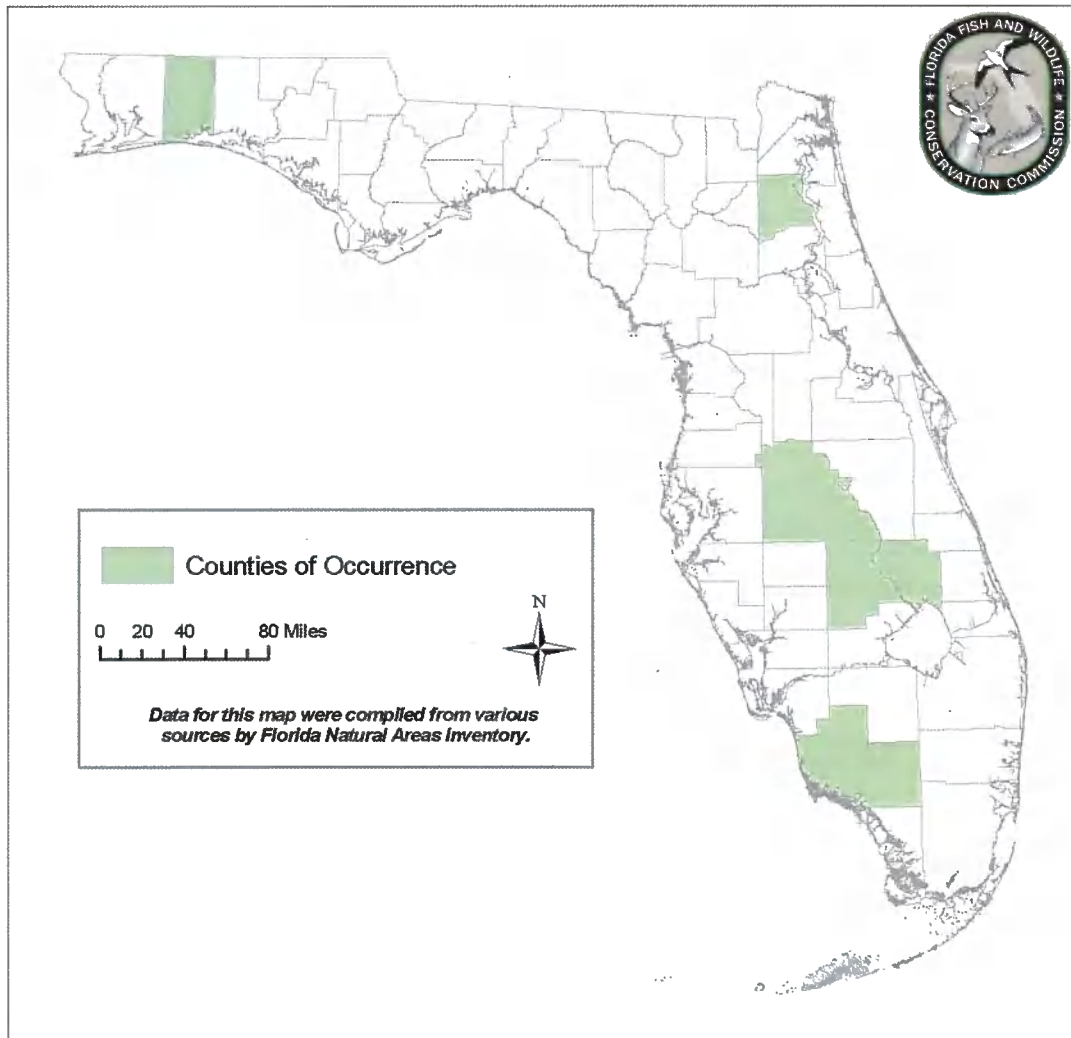
**Gopher Tortoise Acrolophus Moth
(*Acrolophus pholeter*)
Florida County Distribution**



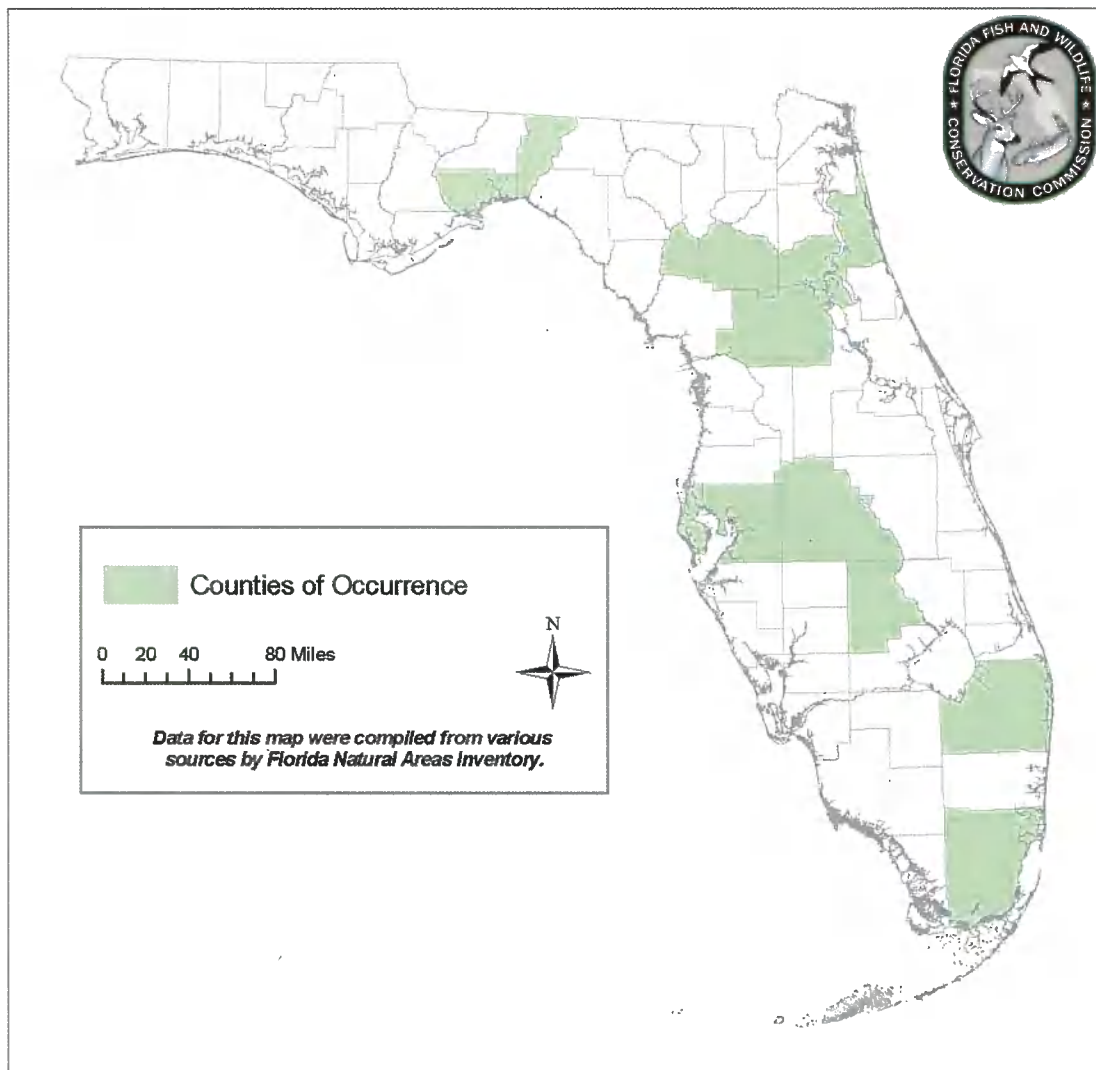
**Little Gopher Tortoise Scarab Beetle
(*Alloblackburneus troglodytes*)
Florida County Distribution**



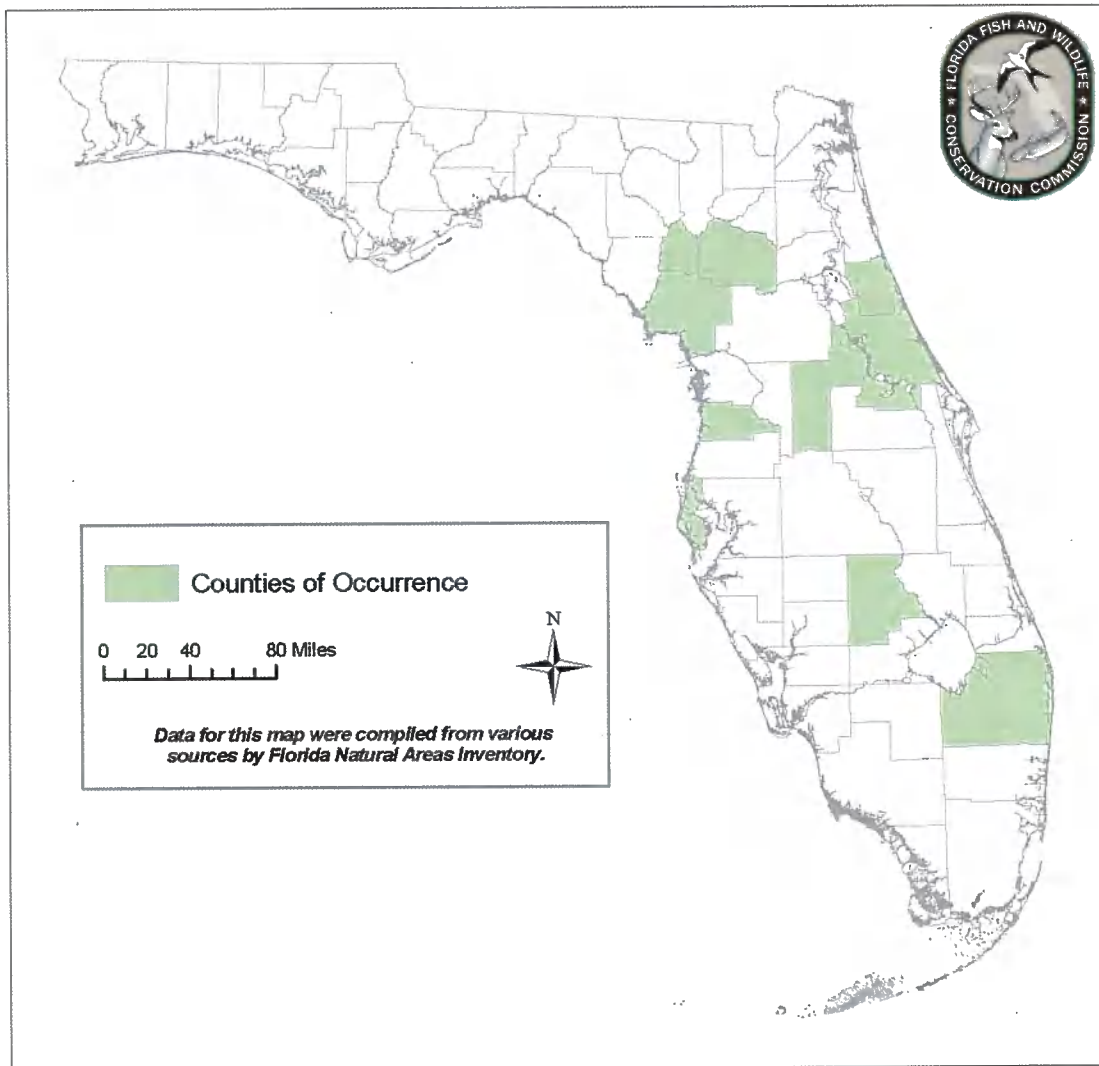
Gopher Tortoise Shell Moth (*Ceratophaga vicinella*) Florida County Distribution



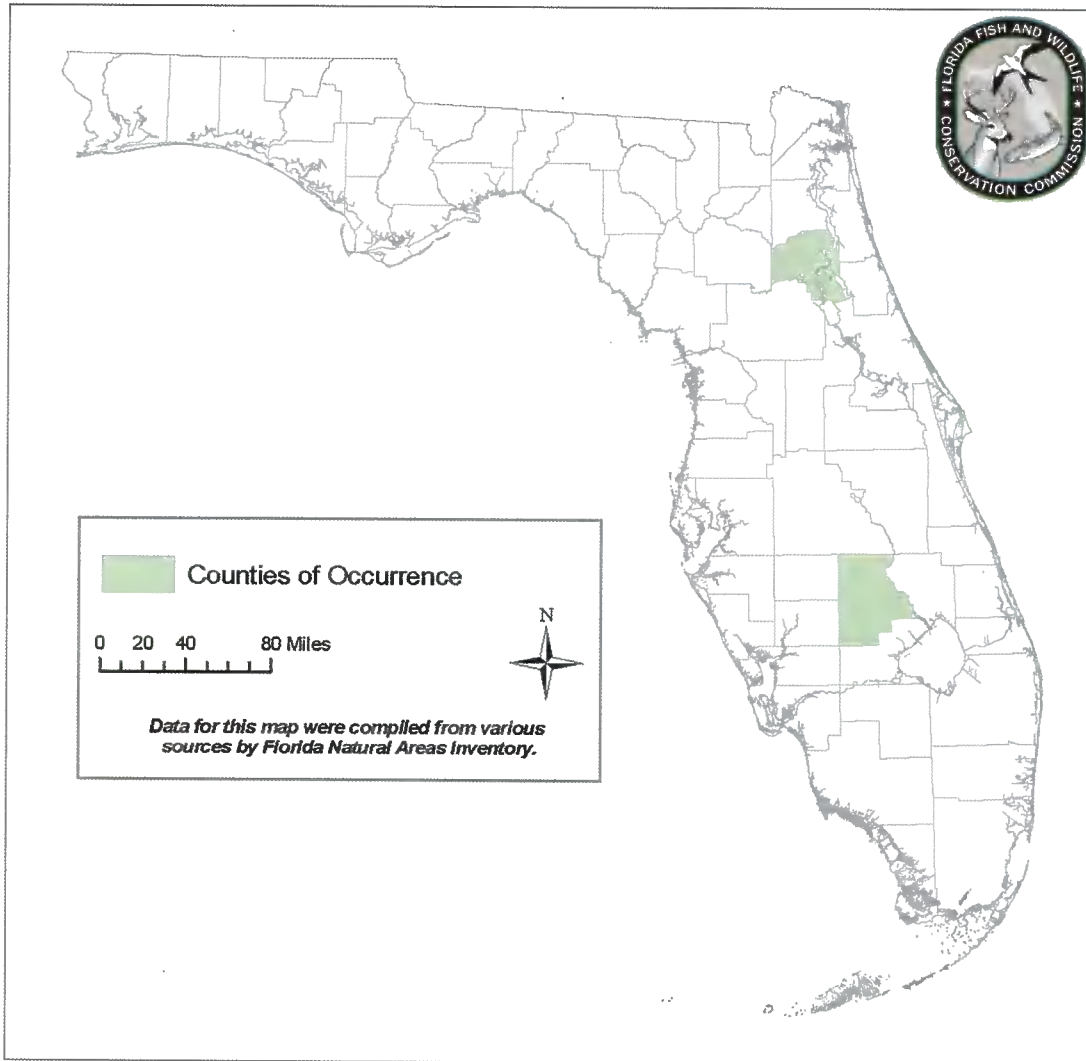
Gopher Tortoise Hister Beetle (*Chelyoxenus xerobatis*) Florida County Distribution



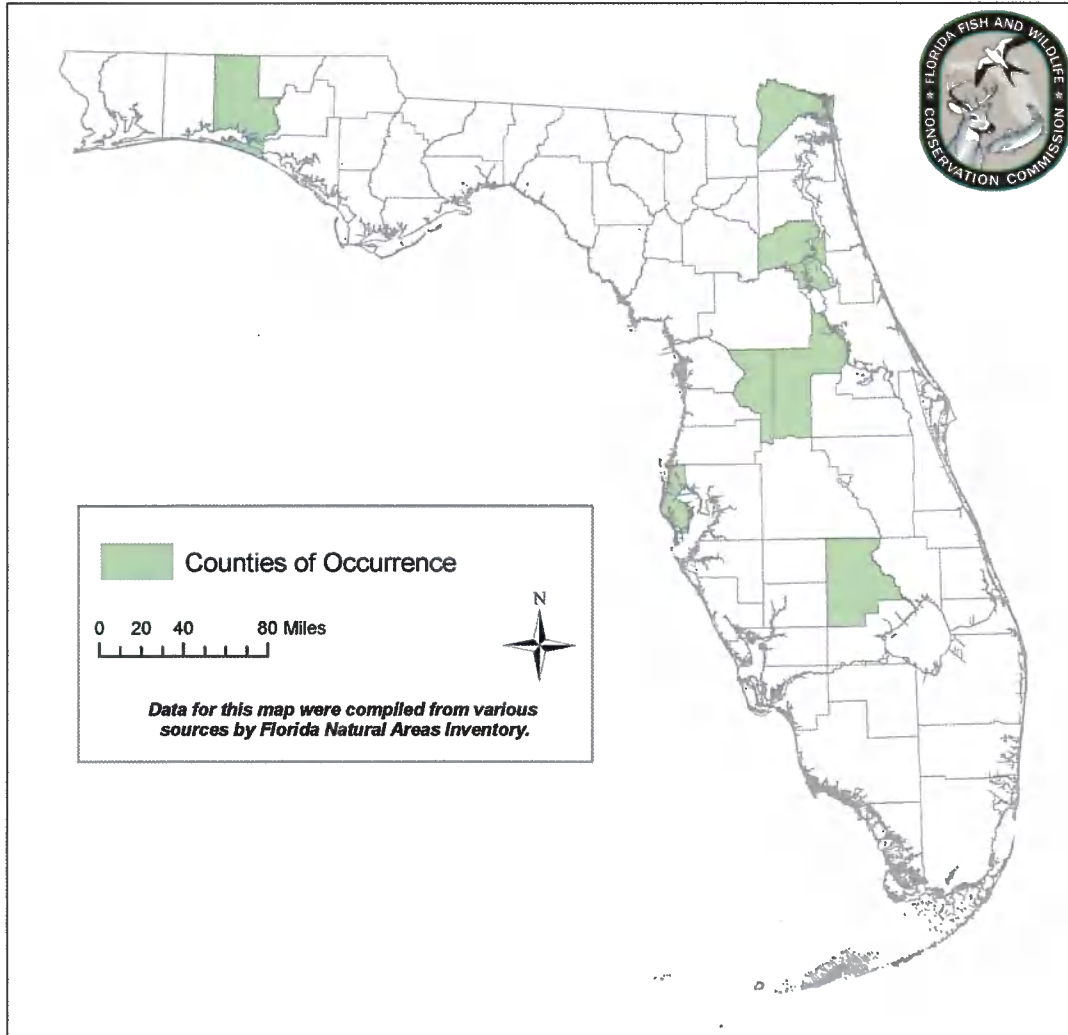
**Gopher Tortoise Copris Beetle
(*Copris gopheri*)
Florida County Distribution**



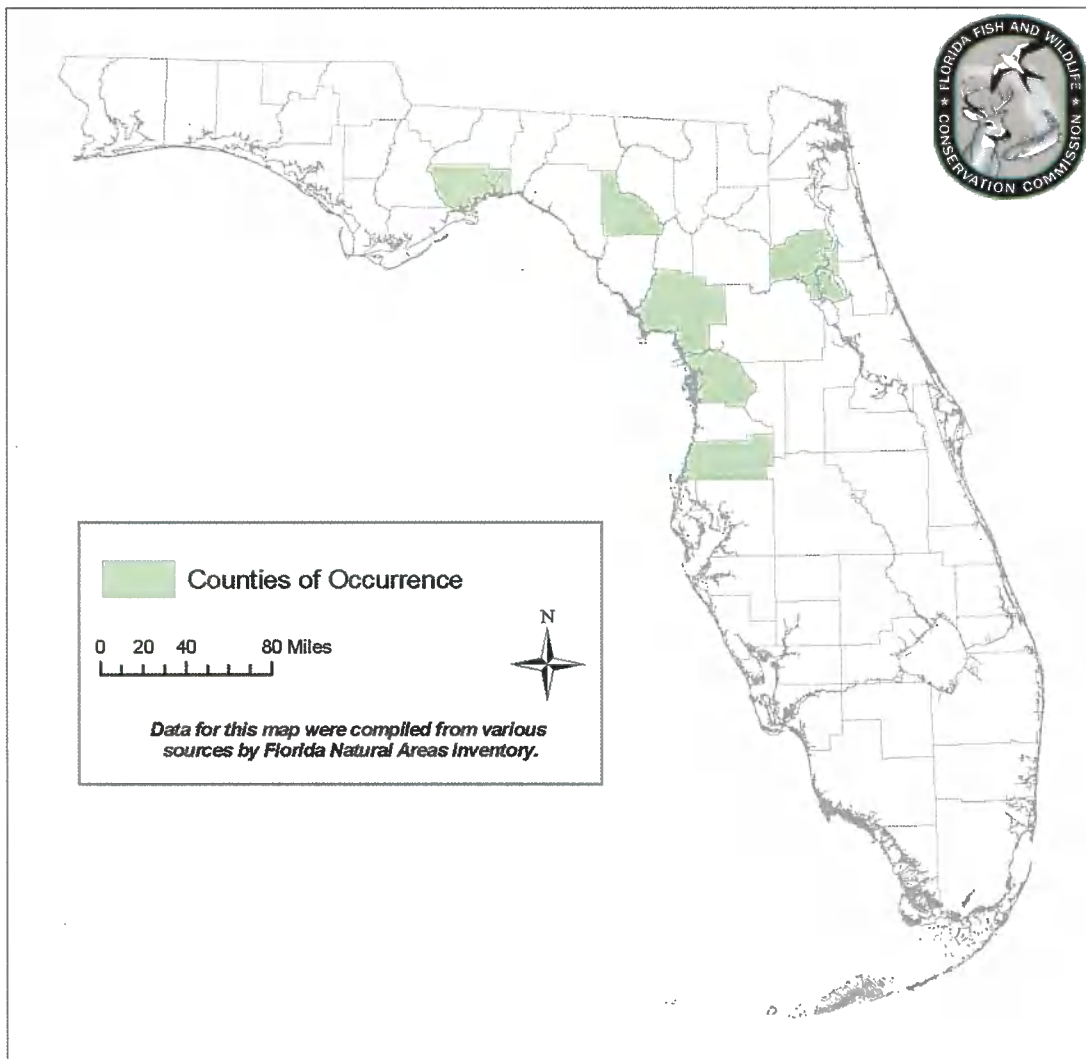
**Tortoise Burrow Dance Fly
(*Drapetis n. sp.*)
Florida County Distribution**



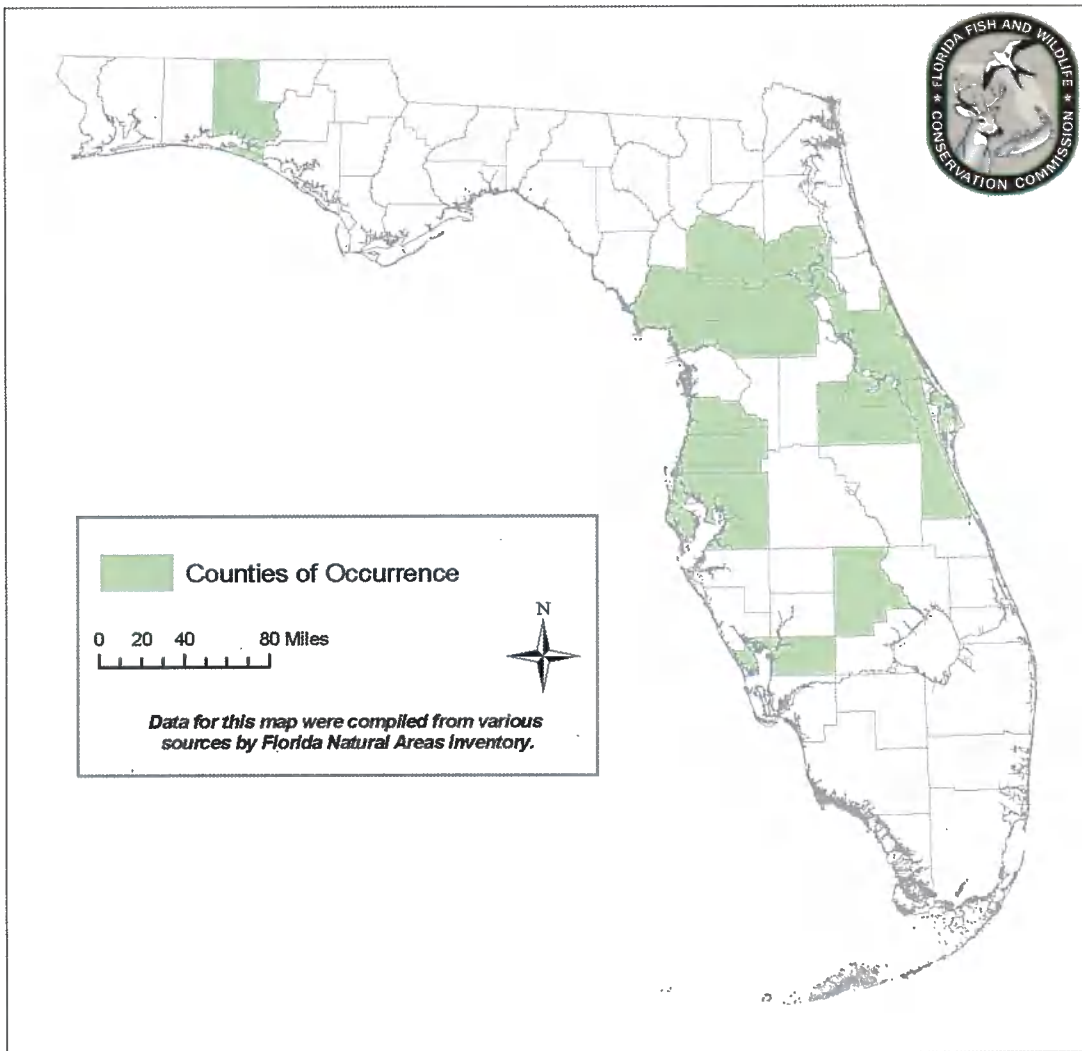
Gopher Tortoise Burrow Fly (*Eutrichota gopheri*) Florida County Distribution



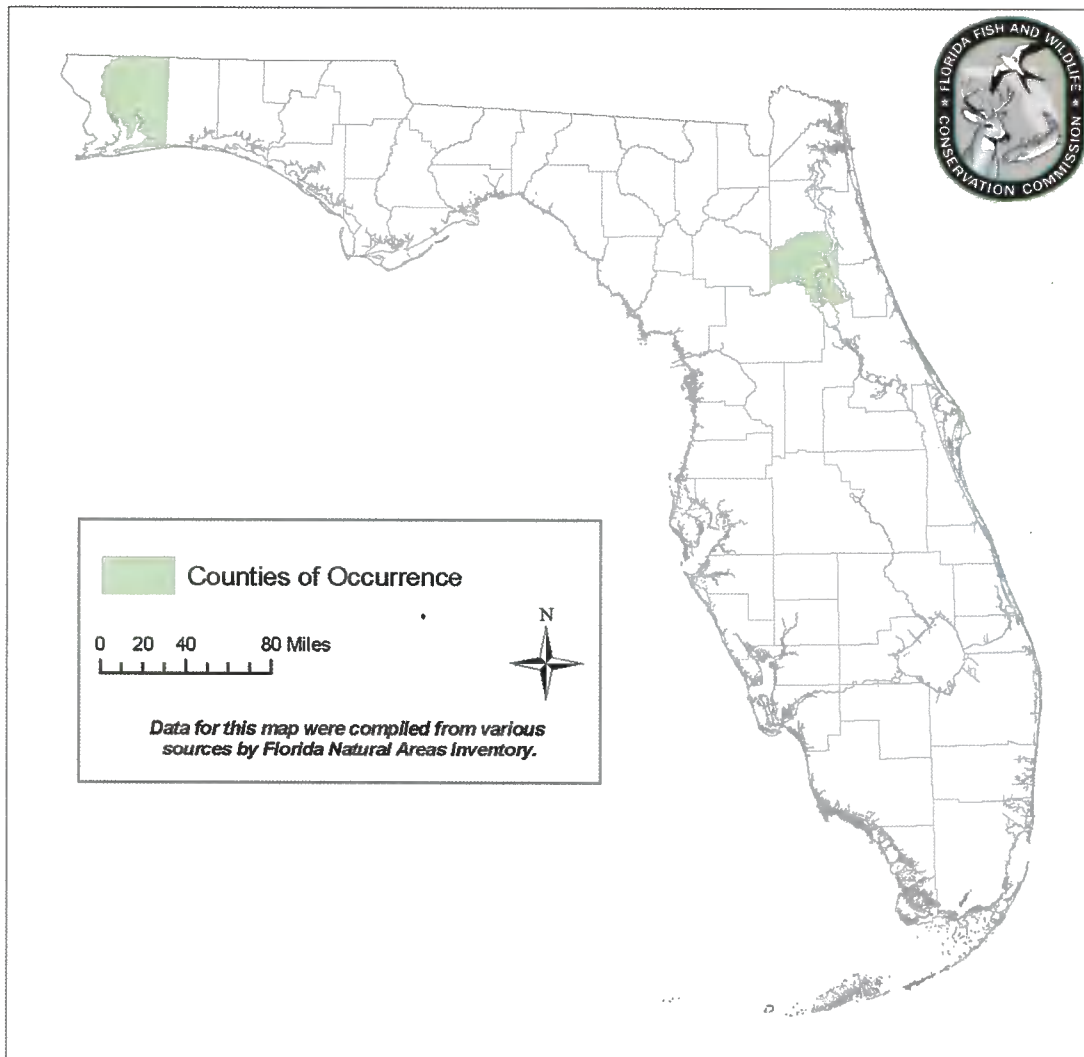
**Equal-clawed Gopher Tortoise Hister Beetle
(*Geomysaprinus floridae*)
Florida County Distribution**



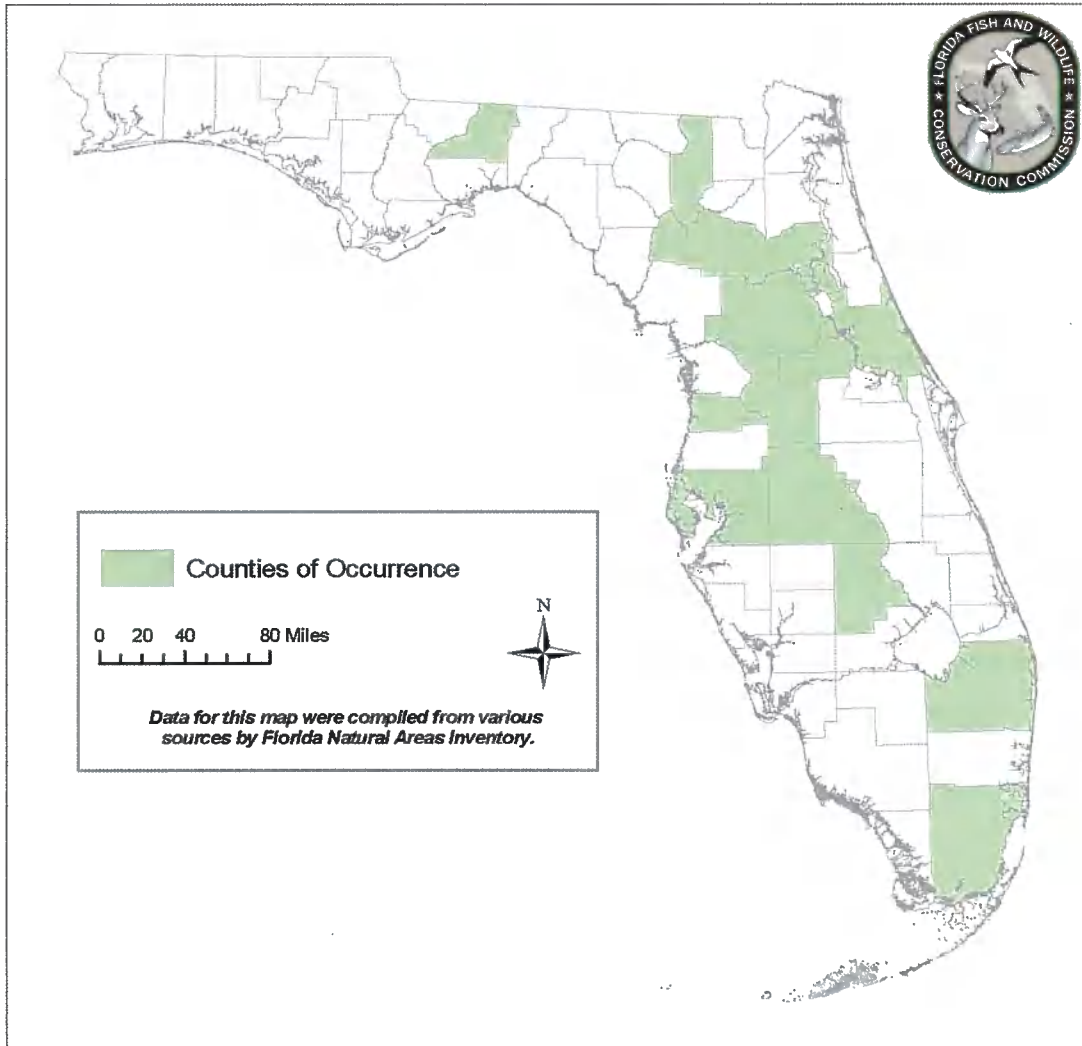
**Gopher Tortoise Noctuid Moth
(*Idia gopheri*)
Florida County Distribution**



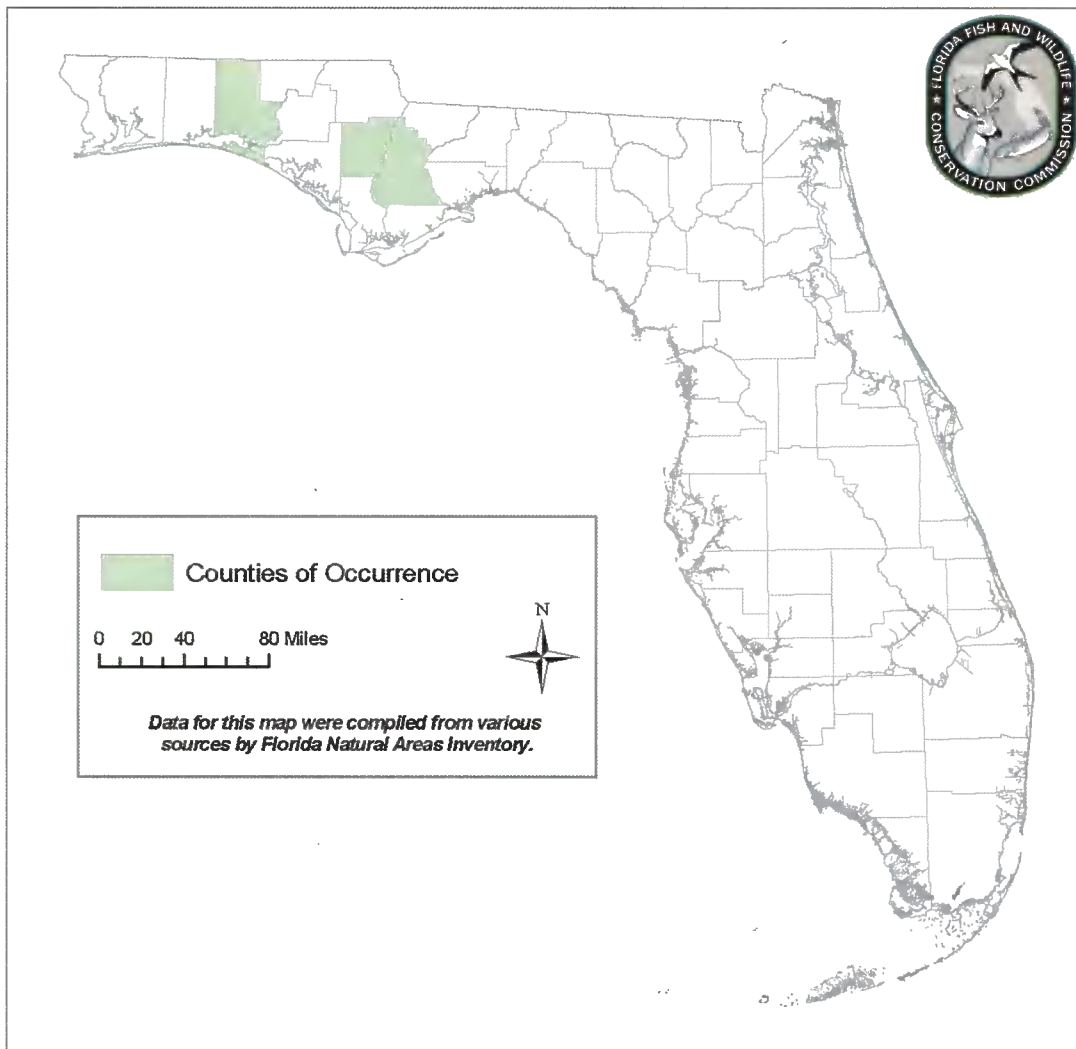
Gopher Tortoise Robber Fly (*Machimus polyphemi*) Florida County Distribution



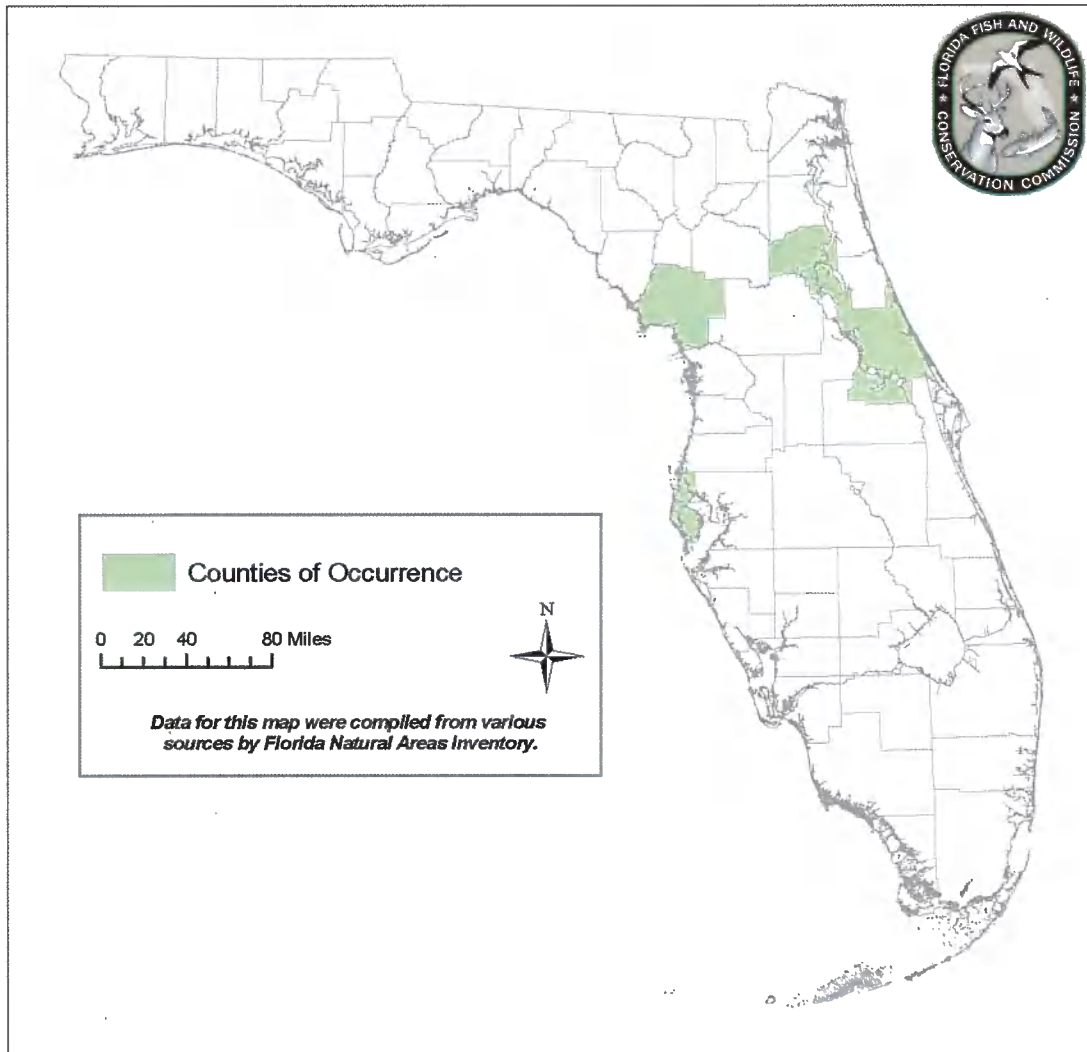
**Punctate Gopher Tortoise Onthophagus Beetle
(*Onthophagus polyphemi polyphemi*)
Florida County Distribution**



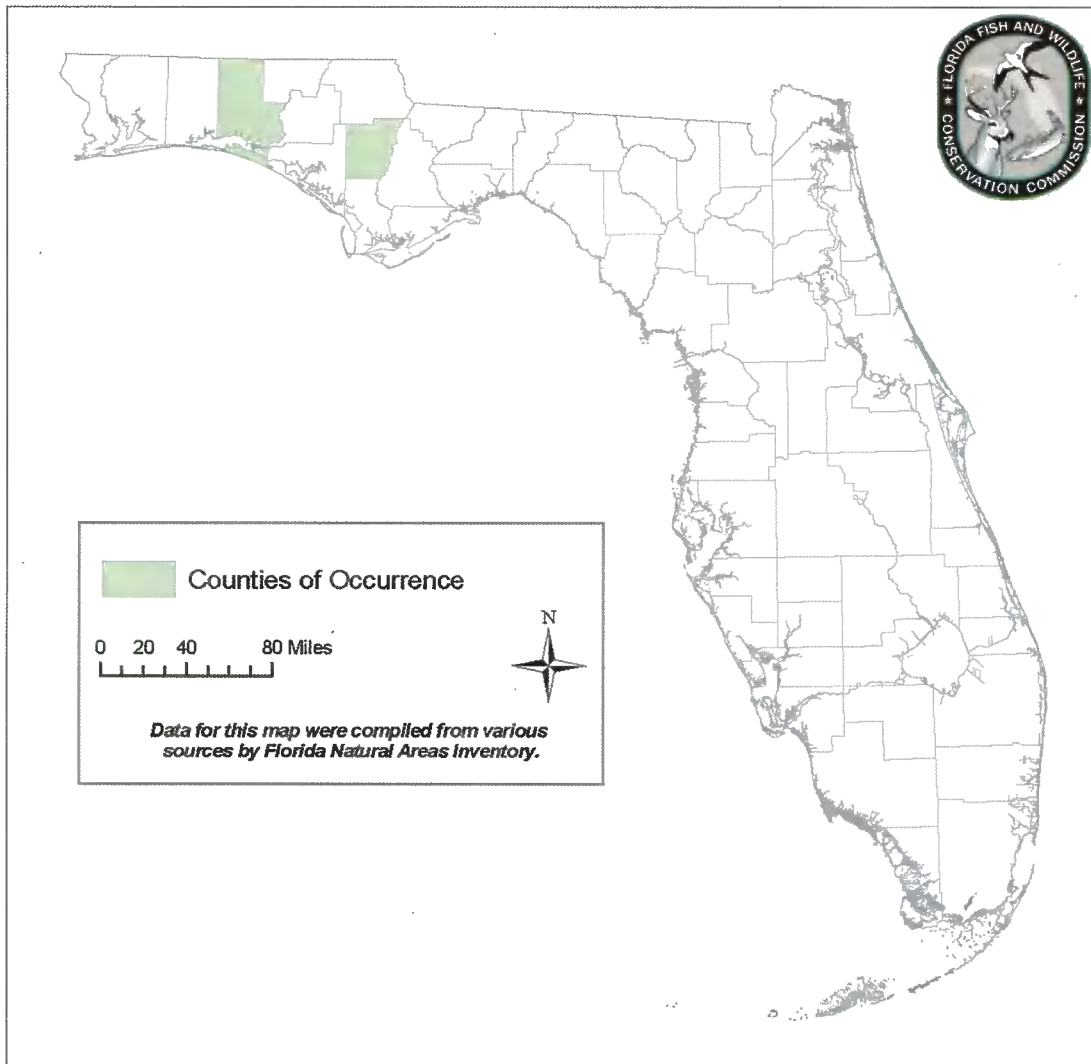
**Smooth Gopher Tortoise *Onthophagus* Beetle
(*Onthophagus polyphemi sparsisetosus*)
Florida County Distribution**



**Gopher Tortoise Rove Beetle
(*Philonthus gopheri*)
Florida County Distribution**



**Western Gopher Tortoise Rove Beetle
(*Philonthus testudo*)
Florida County Distribution**



APPENDIX 7. Conservation-based Incentive Opportunities

Gopher tortoises are an essential wildlife species. They are considered a keystone species because the burrows they dig become home to more than 350 other species, known as commensals. A decline in the number of gopher tortoises results in a decline in the number of commensals. Conservation-based incentives are available to assist private landowners with managing important habitat for wildlife, protecting habitat into the future, and possibly provide opportunities for landowners to generate revenue for conserving important species, such as the gopher tortoise. *Gopher tortoise conservation depends on the participation of private and public land owners.*

Program	Description	Contact
Landowner Assistance Program (LAP)	The purpose of LAP is to provide assistance that may include technical, financial, educational, and various forms of recognition that seek to award landowners who manage their lands properly for wildlife. The LAP website provides all pertinent information for landowners needing habitat management, land use planning, or other wildlife related assistance.	Visit the web site: MyFWC.com/lap
Forest Stewardship Program (FSP)	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. Visit the Florida Forest Stewardship website at: http://www.sfrc.ufl.edu/Extension/florida_forestry_information/additional_pages/forest_stewardship_program.html	Find your FFS County Forester at http://www.fl-dof.com/field_operations/county_foresters/index.html
Wildlife Habitat Incentives Program (WHIP)	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.	Locate your nearest USDA Service Center at: http://offices.sc.egov.usda.gov/locator/app?state=fl
Environmental Quality Incentives Program (EQIP)	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 District Conservationist through the nearest USDA Service Center
Partners for Fish and Wildlife Program (PFW)	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	Contact a USFWS PFW Program Coordinator at: http://www.fws.gov/northflorida/Staff3.htm

	streams and wetlands, and eradication of invasive, exotic species. USFWS Partners for Fish and Wildlife link at: http://www.fws.gov/northflorida/partners/	
Common Species Common (CSC)	The purpose is to improve habitat conditions for wildlife by focusing conservation on high priority habitats outlined in FWC Comprehensive Wildlife Conservation Strategy.	Contact a USFWS PFW Program Coordinator at: http://www.fws.gov/northflorida/Staff3.htm
Conservation Reserves Program (CRP)	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 FSA office through the nearest USDA Service Center
Gopher Tortoise Recipient Site Program	The Florida Fish and Wildlife Conservation Commission (FWC) administers the Gopher Tortoise Management Plan and accept applications from eligible landowners who are interested in becoming a gopher tortoise recipient site.	Visit MyFWC.com/GopherTortoise for criteria and more information.
Conservation Easement	A conservation easement is a legal agreement between a landowner and qualified organization that can provide state and federal tax benefits for landowners who permanently protect and manage habitat for listed wildlife species.	Visit landchoices.org/preserve.htm or edis.ifas.ufl.edu/uw194 for more information.
Conservation Banking	Conservation banks are lands containing natural resources that are protected, conserved, and managed habitats for threatened wildlife species. Landowners can generate income, keep large parcels of land intact, and possibly reduce their taxes.	For more information, visit fws.gov/conservation/landowners/conservation-banking.html .
The Farm Bill	The Farm Bill provides a tax deduction for expenses incurred while achieving recommended site-specific management actions during recovery plans for threatened or endangered species listed under the Endangered Species Act (ESA).	For more information, visit fws.gov/conservation/landowners/conservation-banking.html .
Candidate Conservation Agreements with Assurances (CCAA)	CCAA provides additional incentives for non-federal landowners engaging in voluntary proactive conservation with assurances that limit future conservation obligations, and addresses concerns about potential regulatory implications of having a listed species on their land.	For more information, visit fws.gov/conservation/landowners/conservation-banking.html .
Conservation Stewardship Program (CSP)	Provided by U.S. Department of Agriculture’s (USDA) Natural Resource Conservation Service (NRCS), CSP promotes the conservation and improvement of soil,	For more information, visit fl.nrcs.usda.gov/progra

	water, air, energy, plant and animal life on working private and tribal lands by providing incentives to landowners for adopting, improving, and maintaining practices to achieve environmental benefits.	ms/flcsp.html .
Florida Forest Service	The Florida Forest Service provides assistance to private landowners for fire management services such as prescribed burning, fire line maintenance, and longleaf pine restoration through the sale of bare root Longleaf pine tree seedlings.	For more information, visit fl-dof.com/services.html#grants .
Rural and Family Lands Protection Program (RFLPP)	This program specifically addresses the twin concerns of loss of agricultural lands and natural resources through the acquisition of perpetual agricultural protection easement, or conservation easement, for permanent protection of land for agricultural purposes.	For more information, visit fl-dof.com/forest_management/rural_family_lands_index.html .
America's Longleaf Restoration Initiative (ALRI)	The vision of ALRI is to sustain viable longleaf pine ecosystems with the full spectrum of ecological, economic, and social values restored and managed through a voluntary partnership of concerned organizations and individuals.	Visit americaslongleaf.org for more information.
American Forest Foundation	The <i>Pine Ecosystem Conservation Handbook</i> for the Gopher Tortoise in Florida is part of an initiative of the American Forest Foundation's Center for Conservation Solutions bringing together conservation partners and family forest owners to create and preserve forest habitats for the gopher tortoise and other declining wildlife of the southern pine forest.	For more information, visit forestfoundation.org . A limited quantity of these handbooks are available upon request from FWC by calling 850-921-1030.

APPENDIX 8. Stakeholders

Gopher Tortoise Stakeholder Group - Individuals on the stakeholder contact list and with access to the stakeholders' public SharePoint site and individuals who participated in stakeholder meetings November 2007 - July 2012. (* indicates member of the group steering committee.)

Acevedo	Jennifer	Crossroads environmental.com
Adair	Ginger	Volusia County
Alger	Yvette	St. Lucie Co.
Allen	Deedra	Mosaic Phosphate
Angel	Patty	
Anne	Mary	
Ard	Sam	AS Law/FL Cattlemen's Assoc.
Aresco	Matthew	Nokuse Plantation
Ashton	Ray	Ashton Biodiversity
Ashton*	Patricia	Ashton Biodiversity
Auerbach	Simon	
Avis	Craig	Citrus Hill
Baker	Jonathan A.	
Barlow	C	Miller Leg, Inc.
Barnwell	Mary	SWFWMD
Barthle	Larry	
Battillo	Rick	
Becker	Chris	DEP-State Parks
Bevan	Laura	HSUS
Bierly	Jim	
Bishop	T	St. John's Co.
Bittner	R	BDA, Inc.
Bixby	Marjorie	FL DOT
Blalock	David	U.S. Army
Blihovde *	Boyd	Gopher Tortoise Council
Bohls	S	DOACS
Bolt	Rebecca	KSC EMS /NASA
Borak	Sarah	
Boschen	Rick	
Braem	Sally	DEP
Brandenburg	Mark	Miller Legg

Braswell*	Staci	Florida Farm Bureau
Brewer	Jan	St. Johns Co.
Brown	Dan	UF Vet
Brown	Kris	
Brown	Mary	UF Vet
Bukata	B	Jones Edmunds
Bumaman	Ross	
Bush	Michael	St. Lucie Co.
Butler	Joe	UNF
Carlson	C	
Carpenter	Cheryl	CN Environmental
Caruso	Kristin	
Catlett*	Paul	FL National Guard
Charles	James	LLW Law
Claridge	Kevin	FL DEP
Clark	Jeff	
Clark	Roger	Lee Co.
Clarkson	Chan	
Clementi	Rosanne G.	SSEL, Inc.
Cockereel	Pat	FL Farm Bureau
Collazo	Mike	HGS Law
Collier	J	GT Law
Collins	Joe	
Colverson	Pete	
Concoby *	Ronald E.	
Connolly	Patty	
Connolly*	Tom	Gopher Tortoise Consultants
Conway Duever	Linda	Consultant
Crooks	Amber	Conservancy of SW Florida
Cornwell	Katasha	FL DOT
Corona	Matthew and Hope	

Gopher Tortoise Management Plan

Crowe	Thad	Clay Co.
Czerwinski	Michael G.	Czerwinski Consulting
D	Dawn	Hernando Co.
Dalton	T	Avid Engineering
Dangleman*	Danielle	Volusia County
Daniel	Ilka	HSUS
Davis	MC	Nokuse Plantation
Deal	Melinda	Earthbalance
Decrenza	Cheryl	Kleinfelder
Deitschel, DVM*	PJ	
Demers	Dr. Nora	
Demetropoulos	Linda	
Derheimer	Suzanne	Charlotte Co.
Dickson	David	ESA, Inc.
Dierolf	Amy	Progress Energy
Dineen	Caroleen	Broad and Cassel
Dinkins	Matt	King Engineering
Dombrova	Louis	
Doran	Jeff	Florida Forestry Association
Duggins	Gail	
Dutton	Mike	Alachua Co.
Dziergowski	Annie	USFWS
Eagan	Rebecca	
Elegant	Justin	Petros Law
EPI FL		EPI FL
Evans	McLane	Earthbalance
Exum	Jay	Glatting.com
Farnsworth	Susan	Citrus Co.
Fickett	Alan	
Folk	Monica	
Foote	Jerris	SC Gov.
Framer	Robert	Gowebo.com
Friese	Daniel	U.S. Air Force
Fuller	Manley	FL Wildlife Federation
Gates	Cyndi	SWFWMD
Gault	Kathleen	Eglin AFB (DOF)
Gentry	R	FHBA, Inc.
George	Cheryl	Packaging Corp.

Appendices

Gery	Al	St. Lucie Co.
Gibson	Mark	U.S. Navy
Gibson	Susan	U.S. Department of Defense
Glass	David	U.S. Air Force
Godley *	Steve	Cardo-Entrix
Gordon*	Doria	The Nature Conservancy
Gordon	David	Quest Ecology
Gornicki	Phil	FL Forestry Assoc.
Green	Melissa	Birkitt
Griffiths	Bev	
Griffy	Bill	Ecological Consulting Services
Grubbs	Sarah	Seminole Tribe
Hamilton	Timothy	ESINC
Hand	George	
Handley	Jim	FL Beef Cattlemen's Assoc.
Handy	Vivienne	Quest Ecology
Hardin	Dennis	DOACS
Hart	Kit	Plum Creek Timber
Hawkins	Ronnie	
Heckler	Courtney	Seminole Tribe of FL
Heinrich	George	
Henderson	Connie	Kleinfelder
Henderson	Clay	H.K. Law
Hennig*	Melissa	Collier County
Hicks	Charles	HC Hicks Law
Hicks*	Rob	Plum Creek Timber
Hinderliter	Matt	USFWS
Hobgood	Jennifer	HSUS
Hodgson	Ann	Audubon Soc. FL
Hofstetter	S	Alachua Co.
Holley	Roz	Coastal Wildlife Club, Inc.
Holls	MaryAnne	
Hooker	Allan	ERS Environmental
Howe	Andrew	
Jackson	Dale	FL Natural Areas Inventory
Jacobson	Elliott	UF School Vet Med.
Jennings	Steve	DOACS
Jennings	Michael	USFWS

Gopher Tortoise Management Plan

Johnson	A	ERS Environmental
Johnson*	Joel	Scheda Ecol. Assoc.
Kaiser	Drew	Kaiser Consulting
Kaiser *	Bernard	Hillsborough Co.
Kantor	Imre	
Karsen	Hank	
Karsen	Sharon	
Katz	Wilma	
Kaufmann*	Greg	FPS
Kautz	Randy S.	BDA, Inc.
Kelly	Carrie	kimley-horn
Kent*	Carissa	
Kerr	William W.	CFL, Inc.
Kesler	Reeve	Envtl. Consulting Group
Kintner	S	Volusia Co.
Kiser	C	H.K. Law
Knight	Gary	
Krebs	J	
Landon	Joan	LMA, Inc.
Layman	Bruce	Wilson Miller Engineering
Lee	Michael	
Levine	Aaron	
Lewis	Robin	Save Our Scrub, Inc.
Lichtstein	Jason	Akerman
Lites	Bill	Glatting
Littlejohn	Chuck	FL Land Council
Locke	K	Volusia Co.
Logan	Tom	BDA Inc.
Lombardi	D	Hillsborough County
Lowrimore	Steve	Plum Creek Timber
Loy	D	Birkitt
Lyon	Casey	Volusia Co.
Macdonald *	Laurie	Defenders of Wildlife
MacMilliam	Tyler	NWFWMD
Maidhof	Gary	Citrus Co.
Maltby	D	
Martin	Aaron	Lee County
Martinson	Luke	

Appendices

Mason	Susan	Collier County
Mason*	Brigham	Deseret Ranches of Florida
Mathews	Frank	HGS Law
McAlpine	Davd	McAlpine Env'tl.
McCarthy*	Linda	Lykes Ranch
McCoy	Earl	USF
McGlincy *	Joe	FL Forestry Assoc.
McLemore	Jeff	SFWMD
Meco	Mary	
Media arts		
Meketa	C	
Milch	F	ECFRPC
Miller	Stephen	SJRWMD
Miller	Darla	MSCW, Inc.
Minton	J	DRMP
Mish	Bob	
Moore	Jon	FAU
Morris	V	DOACS
Morris*	Julie	
Moyers	Jim	St. Joe Co.
Mrykalo	Robert	
Munsch	Lisa	Atkins Environmental
Munson	Greg	DEP
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Nelson	Meg	Nokuse Plantation
Newman	Christian M.	Pandion systems.com
Ober	Holly	UF
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Palmer *	Michael D.	King Engineering
Parent	Maureen	
Parham	David	Panhandle Energy
Patrick*	Sandra	Mosaic Phosphate
Peacock	Byron	Peacock Consulting Group
Pearson	Daniel	FPS
Pennington	D	1000 Friends of Florida
Powell	Barbara Jean	Everglades Coalition
Pulver	Dinah	News Journal
Ramsey	Kristina	Broad and Cassel

Gopher Tortoise Management Plan

Reese	M	For the people.com
Reese	Mr.	ECG, Inc.
Reynolds	Gayle	Reynolds Design
Rice	Roger	Attorney
Richardson	Wayne	Progress Energy
Rillstone *	Douglas	FL Chamber Commerce/Developers Assoc.
Rizkalla	Carol	
Rizzo	Mike	Volusia Co.
Roach	Dan	Rayonier
Roberts	T	Esciences
Robertson	Clayton	VHB, Inc.
Robertson	Preston	FL Wildlife Federation
Rossi	R	
Roth	Cari	Bryant Miller Olive
Rothermel	Betsy	Archbold
Rubinoff	Jay	U.S. Army Nat'l. Guard
Savage	Amelia	HGS Law
Savage	Anne	Disney Wild Kingdom
Saviak	Carol	
Schiller	Laurel	
Schlageter	C	CPH Engineers
Schmidt	J	Birkitt
Schmittler	Craig	Wilson Miller.com
Schroeder	Bill	
Schultz	Carolyn	Advanced-eco
Sekerak	Carrie	UF Forest Svc- Ocala Nat. Forest
Sexton	H	Kleinfelder
Shackelton	Eve	Bats from Ocala
Sharpe	Vicki	FL DOT
Shea	Steve	St. Joe Co.
Shepherd	Jon	
Silk	Sherry	ASPCA
Silverberg	DJ	Lotspeich Associates
Siniawski	Norman	
Sisk	Jody	zevcohen
Skidmore	B	King Engineering.com
Sliester	Randal	Volusia Co.

Appendices

Small	Parks	FL DEP - State Parks
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Smithem	Jodie	USFWS
Snieckus	Mary	American Forest Foundation
Songer	K	Avid Eng.
Spear	K	Orlando Sentinel
Spengler	J	Ecological cs.com
Stodola	Ann	Clay Co.
Stowe	Matt	FL National Guard
Straub	Leslie	floridawildlifecare
Sulkers	Rachael	ES, Inc.
Sullivan	Joe	
Sumpter	D	Wildlands Conservation
Tatum	Vickie	NCASI
Telfer	Tim	Flagler Co.
Thomson	Walt	
Thorning*	Micah	USFS
Tonjes	Stephen	FL DOT
Townsend	Amy	
Trebatoski	Kim	Lee Co.
Tvofilat	Marcia	Pappas Metcalfe, Inc.
Tyner	Ray	CI.palm-coast
Ura	C	osceola.org
Walton	Lee	Flatwoods Consulting
Weaver	Natalie	
Wendland	Lori	UF School Vet Med.
Wiley	Keith	
Williams	Marshall	U.S. Army
Willcox	A	UF-Wildlife Ecology
Willis	Brannen	
Willsey	Beau	SRWMD
Witt	Terry	Chronicle Online
Wooding	John	MSN, Inc.
Wraithmell	J	FL Audubon
Zable	TJ	Atkins Environmental
Zajicek	Paul	DOACS
Zions	Adam	
Zremski	Becky	Sarasota Def. of Animals

APPENDIX 9. An Economic Analysis of the Gopher Tortoise Management Plan
(September 2007, Revised September 2012)

Prepared for: Florida Fish and Wildlife Conservation Commission, Division of Habitat and Species Conservation

By: Michael Thomas, Ph.D., Environmental Economics Inc. and David Harding, Ph.D., Fish and Wildlife Research Institute

Executive Summary

In compliance with Section 120.54(3) (b), Florida Statutes, a Statement of Estimated Regulatory Cost (SERC) was conducted on the revisions to the five-year Gopher Tortoise Management Plan (GTMP). Costs of implementing the GTMP can be divided into three broad categories; direct costs, opportunity costs, and overall economic impact to Florida. The analysis documents a:

- five year total direct costs of
 - \$3.8 million to the Florida Fish and Wildlife Conservation Commission (FWC); and,
 - \$31.2 million cost to the regulated community, both private and public sectors.
- five year total opportunity costs (non-project redirected funds and/or time) of
 - \$2.0 million to FWC; and,
 - \$3.1 million cost to non-FWC public agencies.
- five year total economic impact to the state of Florida of
 - 79.5 fewer public sector jobs, and a gain of 88 private sector jobs,
 - for a net increase of 8.5 private sector jobs; and,
 - \$2.5 million net increase to Florida's economy.

The five year GTMP revenues are expected to closely match expected cash outflows with:

- \$5.61 million in revenues to FWC
- \$3.8 in direct costs plus matching grant funds of \$1.83 million
- An expected small net shortage of \$71,000 (1.2% of total revenues)

Finally, this SERC only considers the GTMP costs, revenues and the larger economic impact to Florida's economy. It is likely that the plan will also significantly improve Florida's habitat for both the gopher tortoise and the numerous commensals. At this time, there has been no effort to document the economic value of the GTMP, yet it may be significantly greater than its cost. For the next five year revision, it is strongly recommended FWC include an effort to evaluate the plan's potential economic benefits and conduct a benefit cost analysis.

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Introduction and Background

The Florida Fish and Wildlife Conservation Commission (FWC) published its first Gopher Tortoise Management Plan (GTMP) in 2007. The revision (2012) of the 2007 gopher tortoise (*Gopherus polyphemus*) management plan is intended to guide the continued recovery of the gopher tortoise in Florida through 2022. This revision is the second 5-year action cycle of the plan. The original plan documents the listing history of the gopher tortoise in Florida and should be reviewed as a reference document for such information. The GTMP was approved by the FWC Commission in September 2007 and the gopher tortoise was reclassified from a species of special concern to threatened (Chapter 68A-27 F.A.C.).

The status of the gopher tortoise was reviewed according to FWC's listing process (68A-27.0012, F.A.C.), by a five-member biological review panel in June 2005. The status review found that the species met Criterion A (population size reduction) for classification as

a threatened species. The species management plan was developed based on the FWC approved Biological Status Report.

The gopher tortoise is a moderate-sized terrestrial turtle, averaging 23-28cm (9-11in) long. The species is identified by its stumpy, elephantine 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. 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 more than 350 other species (called “commensals”), including some species that are currently state and federally listed in Florida.

The current cause of imperilment of the gopher tortoise, as identified by the final Biological Status Report is the rate of population decline, primarily due to habitat loss. Therefore, the overarching conservation goal for gopher tortoise conservation is to restore and maintain secure, viable populations of gopher tortoises throughout Florida so the species no longer warrants listing. 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) the rate of decline is less than the percentage decline which defines the current listing category (*i.e.*, < 50% over 3 generations to evaluate the threatened designation and potentially delist the species if it does not meet any of the criteria for listing outlined in Chapter 68A-27, Florida Administrative Code.

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

- (1) Minimize the loss of gopher tortoises by 2022 by ensuring humane and responsible translocation of all gopher tortoises from lands proposed for development, minimizing illegal harvest of tortoises, creating best management practices (BMP's) for agricultural and silvicultural lands, implementing guidelines for predator exclusion, reduce loss of tortoises to disease and reduce vehicle-related mortality through education and exclusion measures.
- (2) Increase and improve gopher tortoise habitat by 2022. This will require ongoing management of gopher tortoise habitat on protected lands in addition to restoring degraded lands with potential gopher tortoise habitat. Incentives for habitat management and conservation easements on private lands are also instrumental to conserving the species distribution and maintaining wildlife corridors among undeveloped lands.
- (3) Finance and restore gopher tortoise populations where the species no longer occurs or has been severely depleted on protected suitable lands by 2022. This will require an evaluation of protected lands to determine where gopher tortoises are needed and the quality of habitat. Implementation of a range wide population monitoring protocol to help evaluate the status of the species throughout Florida will help determine where the gopher tortoise needs to be restored.
- (4) Maintain the gopher tortoise's function as a keystone species by 2022 by addressing specific management needs and creating guidelines for translocation of priority commensal species from development sites. Best management practices for priority

commensal species on agricultural and silvicultural lands will also be developed for educating land managers and the general public about the broader role of gopher tortoises as a keystone species.

The revised GTMP presents a suite of conservation strategies and actions that serve to achieve the measurable conservation objectives. These strategies and 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 categories: regulations, permitting, local government coordination, law enforcement, habitat preservation, habitat management, population management, incentives, monitoring, education and outreach, and research. A new section addressing the conservation of commensals is included and contains a suite of actions that help to conserve priority commensals and more than 350 other animal species documented to use gopher tortoise burrows.

Conservation and recovery of the gopher tortoise through 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 stakeholders, it cannot be successfully implemented without significant direct involvement of these agencies and non-governmental organizations.

Review of the Economic Effects

The general goal of a comprehensive effort such as the revised GTMP is to protect and enhance the status of the gopher tortoise in Florida either directly or indirectly for human benefit. Since the GTMP involves an investment of public funds, one gauge of the plan's success can be measured in its economic outcome, such as a comparison of the project's benefits and costs. While a benefit – cost analysis (BCA) is often used as an assessment of public projects, this analysis will consider only costs and not attempt to measure the potential benefits resulting from the GTMP. However, to fully appreciate the potential economic impact of the GTMP it is important to have a clear understanding of both the potential costs and benefits and their relationship to one another.

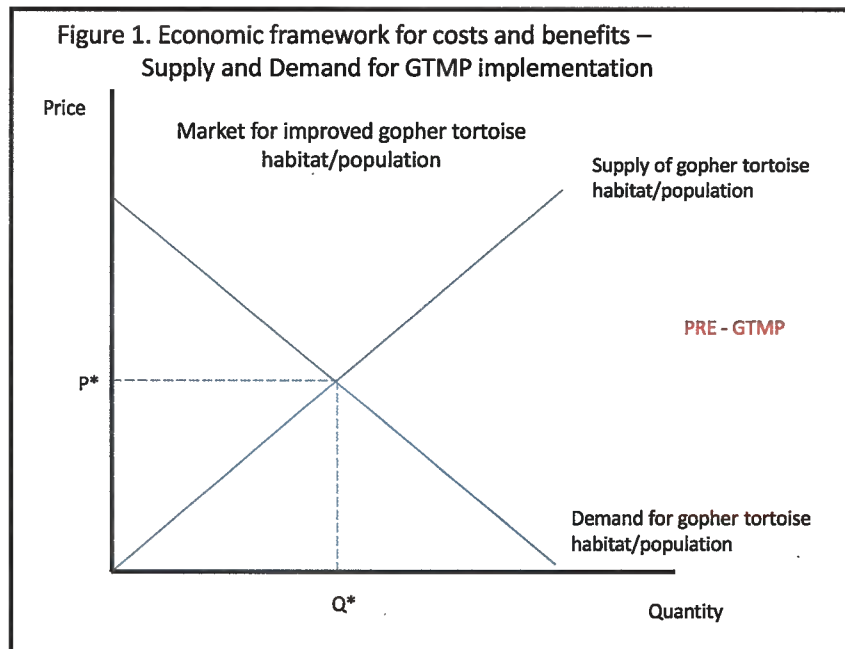
The recent economic and state budgetary retractions provide an even stronger incentive for both the public-at-large and policy makers to spend tax revenues more efficiently. Furthermore, with concern about the effect of regulation on the economy, it is also important to recognize the impact of public policy on the private sector within Florida. Consequently, there is a heightened interest in improving the efficacy of public projects and tracking their effect on the economy at large. To this end, the economics of management plans like the GTMP should be analyzed within the neo-classical economic structure of supply and demand. On the supply side, costs are expenses related to project development and implementation. These include all direct and indirect expenditures necessary to carry out the multiple tasks outlined in the GTMP. These costs are typically covered by public funds and justified by the public nature of the anticipated project benefits. However, cost should also include any value lost to society as a result of implementing the GTMP. On the demand

side, agents with marketable goods and services that benefit from the project will realize a measurable economic gain. Additionally, their gain will ripple indirectly through the economy at large. However, of even greater importance, there are also benefits that lack market value, and often overlooked in typical BCA studies. These include things associated with improved gopher tortoise numbers and habitat, such as improved ecological services and other beneficial non-market activities like improved wildlife viewing, hunting, etc.

To conduct a valid BCA, one must first correctly classify costs and benefits. Unfortunately, there is often confusion over this process, with many studies misclassifying project costs as benefits. One common example of this mistake is when insurance funds expended to restore lost infrastructure, result in economic impacts, which in turn are considered a “benefit” of the recovery. It is not uncommon to see politicians, and even economists, speak of the “benefits” of an economic “rebound” following a disaster recovery effort. Clearly the recovery expenditures are not a net benefit because they were redirected from other productive uses and used to repair functional infrastructure. If it were correct to consider these types of expenditures as beneficial, then it would make sense to pay people to vandalize property because of the positive impact generated by the subsequent repairs. In a similar fashion, public expenditures for capital projects are also erroneously considered benefits to the economy because they create jobs. Again, the funds that generated these “new” jobs were redirected from other useful purposes that in turn led to lost jobs. The reality of these expenditures is that they are project costs and need to be simply classified as such. Ultimately, the true measure of a project’s benefit is the productive output of the capital investment. For example, the building of a public library will create benefits that are measured by the economic value people place on borrowing books and using the many services intrinsic to the library. The cost of the library is measured by the funds required to staff and build the facility and should not be considered as benefits. The jobs linked to these costs are not project benefits and to count them as such would mean one should list the jobs lost by removing the funds from their original source (the tax payer) as project costs.

Benefits and Costs: A Taxonomy

To avoid the common confusion surrounding public expenditures a simple taxonomy may be helpful. When defining benefits, it is important to understand the basics of market economics (supply and demand) which identify the costs related to, and the benefits derived from, the production and use of that good or service. Within a price and quantity framework, the demand for a typical good or service can be represented as a downward sloping line (Figure 1). In the case of gopher tortoise population/habitat, this would indicate that as the price for these items increase, the demand would decrease. In a similar fashion, the supply for a typical good or services can be represented as an upward sloping line, representing a positive cost associated with supplying this item, or that creating more gopher tortoises/habitat will cost more (Figure 1). The point where the supply and demand curves intersect (the level supplied equals the level demanded) represents the optimal or efficient price and level of gopher tortoise population/habitat (see P^* and Q^* in Figure 1). While the shape of the demand and supply curves and optimal levels for items like gopher tortoises are seldom known with exactitude, the graphic still provides the analyst a framework to help define costs and benefits.



Cost can be defined as simply the amount paid or charged for something, or the loss resulting from an action, and can be refined into several subcategories. The funds paid directly for a project (or action) can be termed direct costs and include all direct expenditures. However, most projects also involve costs and/or losses that are less obvious, these can be considered indirect costs. Some of the more important indirect costs include the costs or losses that result by foregoing another action or choice (opportunity cost), a measure of the secondary or “ripple” effect of redirected costs through an economy (economic impacts) and perhaps the most underrepresented of all costs, negative externalities. In the case of negative externalities, these are costs (losses) incurred by third parties not directly related to the project and can include both measureable losses and non-measureable losses, such as lost ecological services. An example of this could be the lost real estate value suffered by home owners adjacent to a noisy new airport, or reduced biodiversity resulting from excessive use of pesticides.

Like any public project, the GTMP entails costs of all types. The direct costs are rather obvious and easily measured. Less obvious, but nonetheless important are opportunity costs. These include the cost of redirecting labor and funds from other useful activities to support the GTMP. Other indirect costs, including the economic impacts of redirecting funds and any negative externalities, are even more obscure, but still worth acknowledging when present. They include the overall ripple effect on the economy-at-large caused by redirecting funds from one business sector to another (economic impact) and any possible externality suffered by unwitting third parties.

Not all costs are easily measurable. In many cases negative externalities are poorly understood and when they involve non-marketable goods and/or services, it is difficult to place a monetary value on their effect. On the other hand, other indirect costs are readily measurable and should be included within a BCA or other economic analyses. The opportunity costs accrued by an agency when it redirects labor and capital is often simple to

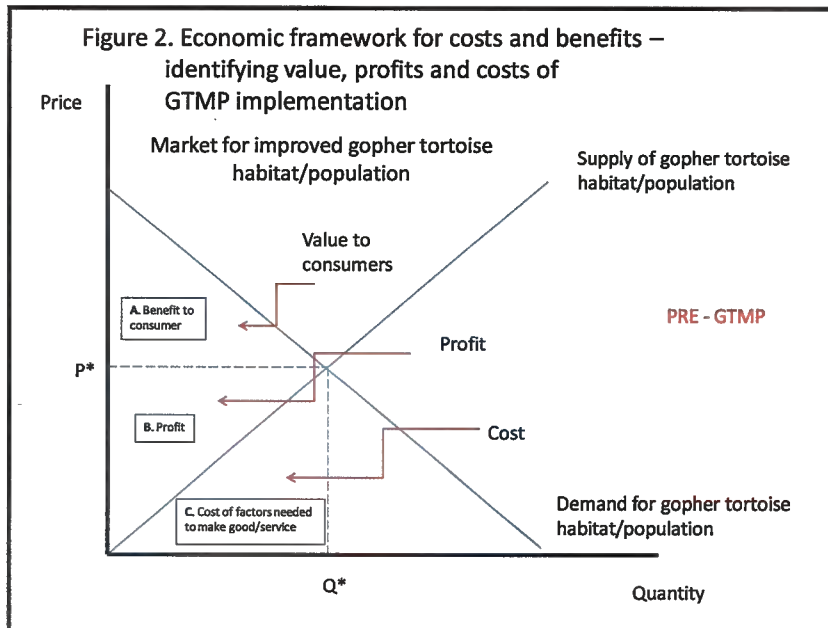
document and should be measured whenever possible. To help guide this effort, Table 1 groups the basic types of costs and their typical availability. This can be viewed as the guiding taxonomy or framework for conducting an economic cost analysis. The taxonomy allows for the systematic accounting for all costs and helps policy makers identify both the strengths and shortcomings in their final report.

Table 1. Taxonomy of Costs (C)

<i>I.</i> Project Development and Implementation Costs	<i>II.</i> Indirect Costs from affected parties and ecological services
<i>I.</i> Direct Costs <i>i.</i> Directly budgeted agency expenditures made for the project (FWC) <i>ii.</i> Direct costs to regulated private firms and non-FWC public agencies	<i>I.</i> Economic impact from successfully implementing the GTMP: impacts on business sectors
Opportunity Costs (not directly identified in project budget) <i>i.</i> Agency costs in labor and capita <i>ii.</i> Outside agency costs in labor and capital	<i>2.</i> Negative externalities from successfully implementing the GTMP: indirect costs <i>iii.</i> Use value Directly measurable <i>iv.</i> Non-use value Indirectly measurable

This report will only consider the project's direct and opportunity costs (CI.1 and CI.2) and the economic impact of redirecting funds within the economic (CII.1). It is likely that the negative externalities resulting from any lost ecological services resulting from the GTMP are insignificant. However, in future cost analyses it would be useful to at least identify the possible sources of these losses, if any.

Costs can be graphically represented in Box C of Figure 2. This box includes all agency direct costs (CI.1), opportunity costs (CI.2) and the economic impact of redirected funds (CII.1). Typically negative externalities (CII.2) are not included. If negative externalities were added to Box C, it would have the effect of shifting the supply curve up and to the left, resulting in higher prices and fewer goods/services supplied.



Benefits can be defined as the improvement in welfare or well-being resulting from an action. Benefits can be valued both directly and indirectly (see Table 2). In the case of direct benefits, there are analytical procedures to measure the impact of these benefits and their ripple effect through an economy. In the case of the GTMP, these benefits include improvements to an economy resulting from the implementation of the GTMP and the restoration of gopher tortoise habitat and populations. There are also indirect benefits that typically lack market value. In this case these benefits include items such as improved ecological services and other non-market amenities such as improved wildlife viewing, hunting, etc.

Table 2. Taxonomy of Benefits (B)

I. Direct Project Benefits from affected ecological services	II. Indirect Benefits from affected ecological services
1. Restored marketable goods/services <ul style="list-style-type: none"> i. Direct effects (\$) ii. Indirect effects (\$) iii. Induced effects (\$) 	1. Restored non-marketable goods/services <ul style="list-style-type: none"> i. Use value Directly measurable ii. Non-use value

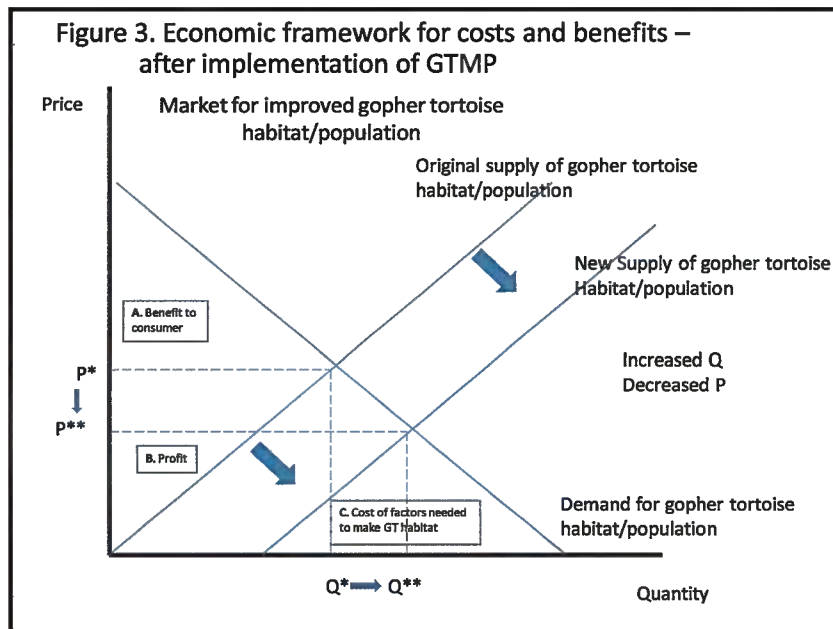
Reporting benefits resulting from the GTMP is not normally required by Florida State Statue and not included in this report. However, in future efforts, it would be useful to estimate these benefits to allow policy makers a more complete picture of the full effect of their management efforts.

Referring back to Figure 2, benefits can be represented graphically by Boxes A and B. The benefit enjoyed by the consumers of the good or service is represented by Box A. This is often referred to as the consumer’s surplus and is the correct measure of the value generated by this good or service to its user(s). This represents the value gopher tortoises

provide to people who value these animals and/or their associated habitat. When the good or service is privately produced, Box B. represents those private profits. In the case of gopher tortoise, there are no profits generated to the regulatory agency and these benefits are captured by the consumers. With publically provided goods and services, it is reasonable to combine Boxes A and B and consider them benefits accrued by the consumer.

A Management Change: The Welfare Effect of GTMP

The welfare change or net benefits resulting from a management plan can be graphically demonstrated by Figure 3. The GTMP results in an increased supply of gopher tortoises and their habitat. This causes a rightward-downward shift in the supply function which lowers the price of tortoises and their habitat, which in turn results in an increase in the use or enjoyment of the additional gopher tortoises and/or their improved habitat (please note the change in Q and P in Figure 3). The final result of implementing the GTMP would be an overall unambiguous increase in benefits enjoyed by those who value gopher tortoises and/or their habitat. The final change in project costs, however, is ambiguous and depends on the final shape of the supply and demand curves. While it may initially entail significant direct and indirect costs, the increase in gopher tortoises and their habitat could change the supply function (curve slope and/or shape) enough to eventually result in either higher or lower long term costs.



Florida law requires a thorough cost analysis, the Statement of Estimated Regulatory Cost (SERC) as prescribed by Section 120.54(3)(b), Florida Statutes (F.S.). This requirement is limited to documenting the incremental changes in costs and do not address the larger welfare picture addressed in Boxes A and B found in Figures 2 and 3. To comply with the SERC format, only the actual direct and appropriate indirect costs will be tracked. This means costs estimates will be limited to items CI.1, CI.2 and CII.1 in Table 1. Cost

estimates are based on the best available data and are provided for FWC and the regulated community.

Direct Costs of the Gopher Tortoise Management Plan (CI.1)

These are the direct costs to maintain the Gopher Tortoise Management Plan. They include the direct costs to the regulating agency (FWC) and direct costs to the regulated firms and non-FWC public agencies. All direct costs are listed in this section.

Direct Costs to FWC (CI.1.i)

The Human Resource Costs (staffing) were developed by identifying the base salary for each position (base salary information and benefits provided by the Office of Human Resources, FWC). Additionally, expenses, OCO (Operating Capital Outlay) and overhead were factored into the assessment to estimate the true cost of each position (Bureau of Accounting, FWC).

FWC Personnel Costs:

The largest reoccurring direct cost for this project is salaries for the staff presently managing the gopher tortoise for FWC. All cost calculations are based on 2011-2012 data and assumed to grow at a 2% rate for the five year period (2013 – 2017). Human resource costs are identified as either OPS or FTE by position title.

Overview: Total positions: 10
 OPS – 4
 FTE – 6
 Actual/Recurring Costs (2011)

OPS Positions:

Biological Scientist III (one position)

Base salary:	\$ 42,240
Benefits:	\$ 655
Expense + OCO	\$ 11,215
Overhead:	<u>\$ 9,145</u>
Total for position:	\$ 63,256

Biological Scientists IV (one position)

Base salary:	\$ 57,366
Benefits:	\$ 831
Expense + OCO	\$ 11,215
Overhead:	<u>\$ 11,730</u>
Total for position:	\$ 81,143

Clerk (one position)

Base salary:	\$ 26,000
Benefits:	\$ 377
Expense + OCO	\$ 9,503
Overhead	<u>\$ 6,064</u>
Total for position:	\$ 41,944

Administrative Assistant II (one position)

Base salary:	\$ 33,280
Benefits:	\$ 482
Expense + OCO	\$ 9,503
Overhead:	<u>\$ 7,312</u>
Total for position:	\$ 50,578

Total four OPS Positions:\$236,921*FTE Positions:*

There are 4 FTE Biological Scientist III positions. They will be identified as position a, b, c and d.

a. Biological Scientists III

Base salary:	\$ 36,468
Benefits:	\$ 10,633
Expense + OCO:	\$ 11,215
Overhead:	<u>\$ 9,855</u>
Total for position:	\$ 68,171

b. Biological Scientists III

Base salary:	\$ 36,468
Benefits:	\$ 11,915
Expense + OCO	\$ 11,215
Overhead:	<u>\$ 10,072</u>
Total for position:	\$ 69,670

c. Biological Scientists III

Base salary:	\$ 36,468
Benefits:	\$ 10,633
Expense + OCO	\$ 11,215
Overhead:	<u>\$ 9,855</u>
Total for position:	\$ 68,171

d. Biological Scientists III

Base salary:	\$ 36,468
Benefits:	\$ 10,633
Expense + OCO	\$ 11,215

Overhead:	<u>\$ 9,855</u>
Total for position:	\$ 68,171

Biological Scientists IV (one position)

Base salary:	\$51,432
Benefits:	\$19,274
Expense + OCO:	\$11,215
Overhead:	<u>\$13,845</u>
Total for position:	\$95,766

Biological Administrator I (one position)

Base Salary:	\$43,507
Benefits:	\$20,096
Expense + OCO:	\$11,215
Overhead:	<u>\$12,644</u>
Total for position:	\$87,462

Total all FTE Positions:	<u>\$457,411</u>
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Total Personnel Costs (4 OPS + 6 FTE) (for 2011)	\$694,332
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FWC Capital Costs:

Capital costs are all other non-salary expenses. These may vary greatly from year to year, however for the purpose of this report they are assumed to grow at a 2% annual rate.

10 Burrow Scopes @ \$2,500	\$25,000
Software and licenses @ \$5,000	<u>\$5,000</u>
Total Capital Costs:	\$30,000

FWC Total Direct Costs for Five Year Plan

Total direct costs for the five year plan are the sum of personnel and capital costs and based on the 2011 figures. They are assumed to grow at a 2% annual rate to reflect the present level of inflation.

Total Direct Costs = Personnel Costs + Capital Costs

2013 Projected	\$738,818
2014 Projected	\$753,595
2015 Projected	\$768,666
2016 Projected	\$784,040
2017 Projected	<u>\$799,721</u>
Five year total	\$3,844,842
(Note: based on 2011 figure = \$724,332)	

Direct Costs to Private Firms and Non-FWC Public Agencies (CI.1.ii)

The total direct costs to the regulated community are determined by combining the mitigation contributions paid to FWC and an estimate of the cost paid to private third-party vendors to conduct the mitigation actions required by the mitigation permit. Since these mitigation actions are provided by private third-party vendors, they can vary by market conditions and are estimates, not exact figures. Table 3 lists these costs estimates by mitigation category and was provided by Dr. Perran Ross of the University of Florida in 2007. In 2012, these estimates were validated with a follow-up telephone survey conducted by the FWC Species Conservation Planning Section. The mitigation categories and their costs result from a range of actions that are listed in Table 4. Finally, the total direct costs by the private and public sectors are listed in Table 5 and compared across sectors in Figure 4.

Table 3. List of Estimated Costs to Third-Party Vendors by Mitigation Category:

Cost Category	Average Costs*	Range of costs*
Survey of Tortoises	\$168	\$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
*per tortoise		

Table 4. List of Mitigation Actions Required to Estimate Costs

Authorized Tortoise Permits – Training

Relocation Permits – (10 or fewer burrows, conservation, Burrow or Structure Protection, Temporary Exclusion, Disturbed Site)

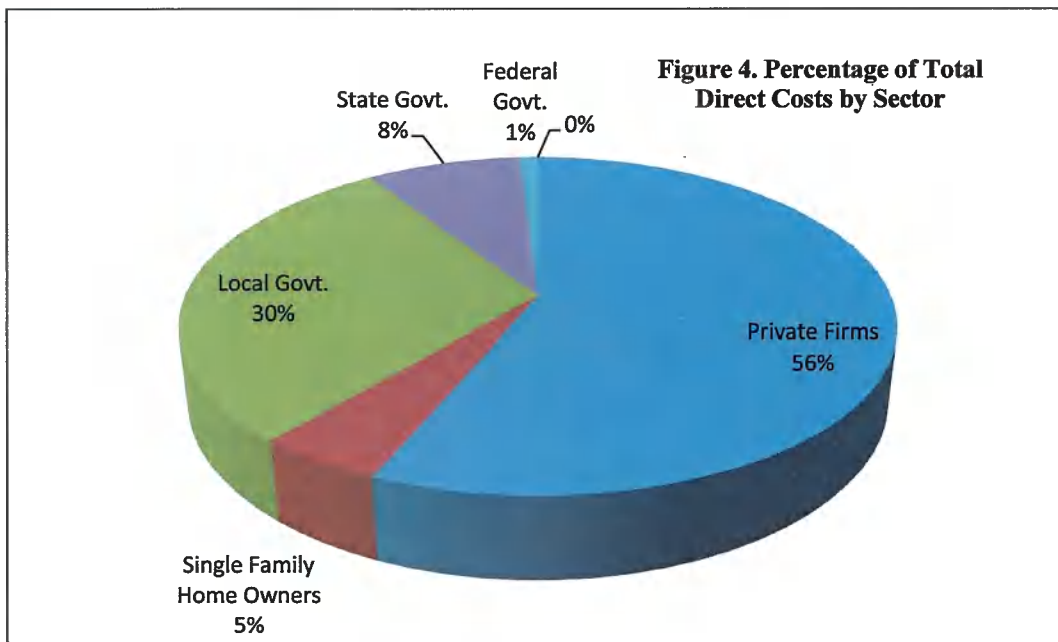
1. Application preparation by consultant when appropriate (authorized agent).
2. Survey of tortoise on the property to be developed (by the authorized agent).
3. Capture (hiring the authorized agent to do and or oversee the work completed along with the costs of renting a backhoe and operator where appropriate).
4. Recipient site fees (when located offsite).

Recipient Site Permits

1. Application and coordination with FWC.
2. Site Survey.
3. Development of the Habitat Management Plan.
4. Easement (attorney fees, time, etc.)
5. Financial Assurance.
6. Additional costs such as fencing.

Table 5. Total Direct Costs to the Regulated Community - Mitigation Contributions Plus Private Third-Party Costs

Permit Type	Private Firms	Single Family Homeowners	Local Govt.	State Govt.	Federal Govt.
Authorized Gopher Tortoise Agent	\$72,468	\$0	\$7,761	\$7,761	\$0
10 or Fewer Burrows	\$202,467	\$173,543	\$99,238	\$23,388	\$0
Conservation	\$2,314,143	\$111,638	\$1,003,568	\$445,768	\$55,426
Temporary Exclusion	\$670,220	\$0	\$587,229	\$0	\$0
Burrow or Structure Protection	\$1,311	\$1,311	\$874	\$874	\$0
Recipient Site	\$44,000	\$0	\$33,000	\$11,000	\$0
Emergency Take	\$0	\$0	\$0	\$0	\$0
Disturbed Site	\$4,546	\$0	\$0	\$0	\$0
Total	\$3,309,157	\$286,493	\$1,731,672	\$488,792	\$55,426



Opportunity Costs of the Gopher Tortoise Management Plan (CI.2)

The opportunity costs of the GTMP can be divided into those related to FWC new initiatives, law enforcement, agency grant match funds and other agency opportunity costs.

To understand the true cost of any action requires the identification and quantification 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 costs in terms of foregone or lost opportunity. Put another way, the true cost of a good or service 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.

This current proposed revision of the Gopher Tortoise Management plan is the second five year action cycle of the plan. The following opportunity cost estimates are to take place during this five year period from 2013-2017.

Hourly rates and hourly rates with benefits of FWC personnel were provided by the Florida Fish and Wildlife Conservation Commission, Office of Human Resources. Data are for the year 2011 and assumed to be unchanged in 2012 (see Table 6 below).

Table 6. Listing of FWC staff participating in the conservation initiatives

Position	Name of person currently in the position (as of August 1, 2012)
Biological Administrator I (FTE)	Deborah Burr
Biological Scientist III (FTE) (4 positions)	Heather Rigney (1); Daphne McCann (2); Eric Seckinger (3); Samantha Dupree (4)
Biological Scientist III (OPS)	Alexandra Perryman
Biological Scientist IV (OPS)	Sarah Power
Clerk (OPS)	David Mulholland
Administrative Assistant II (OPS)	Donna Jones
Computer Programmer - Level 4 (OPS)	Smita Thakare
Deputy General Counsel	Michael Yaun
LE Officers (FTE)	
Law Enforcement Captain (FTE)	
Assistant Section Leader THCR (FTE)	David Johnson
Land Acquisition and Planning Administrator (FTE)	Gary Cochran
Biological Administrator III (FTE)	Joe Prenger
Biological Scientist IV (FTE) ¹	Richard McCann
Biological Scientist IV (FTE) ²	Tom Ostertag
Biological Scientist IV (FTE) ³	Joan Berish
Biological Scientist IV (FTE) ⁴	Beth Stys
Biological Scientist IV (FTE) ⁵	Dan Sullivan
Biological Scientist IV (FTE) ⁶	Melissa Tucker
Biological Scientist IV (FTE) ⁷	Bill Turner
Biological Scientist IV (FTE) ⁸	Dave Cook
Biological Scientist IV (FTE) ⁹	Angela Williams
Interpretive & Conservation Stewardship Programs Section Leader (FTE)	Judy Gillan
Unpaid position	Intern
Art Editor (FTE)	AnnMarie Tavares
Public Relations Specialists	Alicia Wellman
Web Designer	Leeann Feiertag
Web Designer	Jennifer Killingsworth

Conservation Actions – New Initiatives

Conservation actions will serve to achieve the measurable conservation objectives and strategies identified in the proposed revision to the Gopher Tortoise Management plan. 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. The following conservation actions are opportunity costs to the Florida Fish and Wildlife Conservation Commission.

Permitting: Enhance the online permitting system to provide better information and collect documentation on relocation of commensal species.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Computer Programmer 4 OPS	\$46.32	\$37.15	500	\$18,575
Biological Scientists IV OPS	\$27.98			

Work with military partners to develop a template agreement that will be used to implement the categorical exclusion.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV ¹ FTE	\$34.51	\$42.16	80	\$337
Deputy General Counsel	\$49.82			

Evaluate the effectiveness of this categorical exclusion, modify the process if needed.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV ¹ FTE	\$34.51	\$34.51	30	\$1,035

Proposed Local Government Coordination: Provide gopher tortoise habitat assistance funding for habitat management activities on county/city owned conservation lands (annual funding dependant).

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists III OPS	\$22.07	\$22.07	160	\$3,531

Develop incentives for local government staff to obtain training necessary to qualify for an Authorized Gopher Tortoise Agent permit.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists III (OPS)	\$22.07	\$22.07	80	\$1,765

Proposed Law Enforcement Actions: Implement gopher tortoise enforcement component into law enforcement officers' work plans in the Brooksville Ridge area.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Law Enforcement Captain	\$42.19	\$42.19	2 hrs.	\$84.38
Field officers	\$23.91	\$23.91	12 hrs.	\$286.32 Total - \$479.29

Create a fact sheet for LE Dispatch personnel to assist with complainant calls.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Intern				0

Conduct proactive patrols and efficient response to complaints regarding gopher tortoises and development.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Law Enforcement Captain	\$42.19	\$42.19	1 hr.	\$42.19
Field officers	0	0	0	0

Law Enforcement personnel required to engage in training

Staff	Hourly/w benefits	Computation Rate	Hours to Complete	Training Session	Opportunity Costs
Field officers engaged in training	\$23.91	\$23.91	1	216	\$5,146.56

Law Enforcement Academy Recruits engaged in training

Staff	Hourly/w benefits	Computation Rate	Hours to Complete	Training Session	Opportunity Costs
200 Academy Recruits	\$19.00	\$19.00	1	200	\$3,800

Trainer for Law Enforcement Training

Staff	Hourly/w benefits	Computation Rate	Hours to Complete	Opportunity Costs
Biological	\$31.17	\$31.17	Assumes 10 1 hr	\$311.00

Administrator 1 FTE			sessions @40 per session	
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Research calls for service and complaints to prioritize law enforcement efforts.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
LE Captain	\$42.19	\$42.19	2	\$84.38
Field Officers	0	0	0	0

Develop a self study guide to be posted on the LE web page to assist officers with gopher tortoise enforcement methods.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
				Unknown

Proposed Habitat Management Actions: Implement 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.

Staff	Hourly/w benefits	Computation Rate	Hours to Complete	Opportunity Costs
				Unknown

Coordinate with partner organizations to identify and prioritize local government and state lands in need of assistance with management activities.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists III (OPS)	\$22.07	\$22.07	200	\$4,414

Coordinate with FWC's Landowner Assistance Program, and partner agencies to provide support and technical assistance to private landowners for managing gopher tortoise habitat.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Administrator III FTE	\$31.00	\$31.00	100	\$3,100

Proposed Incentives Actions: Implement as appropriate Habitat Conservation Plans (HCPs), conservation banking, and Candidate Conservation Agreements with Assurances (CCAA) to benefit the conservation of gopher tortoises with interested landowners.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost

Biological Scientists IV ² FTE	\$30.22	\$31.00	400	\$12,400
Biological Administrator 1 FTE	\$31.17			

Identify practices and land use changes that result in a positive habitat value for gopher tortoises on agriculture and silviculture lands. Develop a habitat value index to assist landowners with evaluating the identified land use practices.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Administrator III FTE	\$31.00	\$31.00	300	\$9,399

Develop Payment for Ecosystem Services pilot incentive program for landowners.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Administrator I FTE	\$31.17	\$31.17	300	\$9,351

Proposed Population Management: Coordinate with public land management agencies to identify sites that could benefit from either facilitated or directed population restoration.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV ³ FTE	\$36.29	\$36.29	200	\$7,258

Determine best sources of gopher tortoises for restocking on select publicly owned conservation lands.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV ³ FTE	\$36.29	\$36.29	200	\$7,258

Proposed Disease Management: Create a gopher tortoise mortality event database and coordinate with other agencies and local governments to document incidences of unusual or large-scale tortoise die-offs.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV OPS	\$27.98	\$32.00	130	\$4,160

Biological Scientists IV ³ FTE	\$36.29			
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Conduct study to sample serology of tortoises on select recipient sites following multiple relocations to determine exposure status to mycoplasma.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV ³ FTE	\$36.29	\$36.29	200	\$7,258

Provide link on FWC website to *Handbook on Gopher Tortoise (Gopherus polyphemus) Health Evaluation Procedures for Use by Land Managers and Researchers* to assist with determination of tortoise health and illness.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Web Designer ¹	\$27.39	\$27.39	10	\$274

Proposed Monitoring Actions: Create and use a conservation easement database allowing summarization of gopher tortoise habitat preserved by FWC efforts outside of the gopher tortoise permitting process.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV (OPS)	\$27.98	\$27.98	250	\$6,995

FWC will coordinate with other agencies and organizations to assess and record the acreages of private lands protected under conservation easements or through other programs.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV (OPS)	\$27.98	\$27.98	100	\$2,798

Create a form to standardize monitoring data collected from recipient sites.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV (OPS)	\$27.98	\$36.00	150	\$5,400
Computer Programmer 4 (OPS)	\$43.62			

Conduct periodic GIS and permitting data assessments to monitor the rate of gopher tortoise habitat loss.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV ⁴	\$28.11	\$28.11	160	\$4,498

Conduct a GIS analysis on patch sizes 250 acres or greater to include parcels, SHCAs, and Landowner Assistance Program focal areas.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV ⁴	\$28.11	\$28.11	150	\$4,216

Once developed, FWC will implement the monitoring protocol created by the CCA partners when assessing tortoise populations on its lands and work with partner agencies to implement it on all public conservation lands that contain gopher tortoises.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV ⁵ FTE	\$31.84	\$31.84	400	\$12,736

Summarize the number of gopher tortoises relocated annually.

Staff	Hourly/w benefits	Computation Rate	Hours to Complete	Opportunity Cost
Biological Scientists IV (OPS)	\$27.88	\$27.88	50	\$1,399

Create series of maps that include potential habitat maps for commensal species (species richness maps) to aid in identification of areas with highest priority.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV ⁴ FTE	\$28.11	\$28.11	160	\$4,498

Enhancements to the online permitting system will be examined to allow more flexibility in site selection, and to promote more standardized recording of commensal species encounters and relocations.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Computer Programmer 4 (OPS)	\$43.62	\$36.00	150	\$5,400
Biological Scientists IV (OPS)	\$27.98			

FWC will continue to assess and summarize commensal species relocation events.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV (OPS)	\$27.98	\$27.98	50	\$1,399

Proposed Education and Outreach Actions: Create fact sheet on the gopher tortoise's keystone species role and its associated commensal species.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Intern			155	0

Create a tortoise-wise community program, and establish one new community per year. Program can include information on road mortality, role as a keystone species, laws and regulations, appropriate yard plantings, and impacts of pets.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Interpretive Stewardship Programs Section Leader (FTE)	\$33.04	\$27.55	80	\$2,204
Biological Scientists III (OPS)	\$22.07			

Establish one new tortoise-wise community project per year.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists III (OPS)	\$22.07	\$22.81	120	\$2,737
Biological Scientists III ¹ FTE	\$23.56			

Create a presentation and offer it to targeted communities; include distribution of the "Living with Gopher Tortoises" brochure.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Intern				0

Create a gopher tortoise plant list for property owners.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Intern				0

Create web pages on the FWC gopher tortoise website, including a "Save Space for Wildlife" page, a commensals page, and a road mortality issues page.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Web Designer ² FTE	\$20.27	\$20.27	100	\$2,027

Develop and implement a citizen science web portal.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Web Designer ² FTE	\$20.27	\$20.27	300	\$6,081

Investigate use of billboards for messaging.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Interpretive Stewardship Programs Section Leader FTE	\$33.04	\$33.04	Unknown	Unknown

Evaluate educator's packet as the basis for an electronic field trip activity guide regarding gopher tortoise conservation.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Interpretive Stewardship Programs Section Leader FTE	\$33.04	\$33.04	25	\$826

Promote availability of fact sheet on proper housing, handling, record keeping, and release guidelines.

Staff	Hourly/w benefits	Computation Rate	Hours to Complete	Opportunity Cost
Biological Scientists IV ⁹ FTE	\$30.85	\$30.85	25	\$771

Create a fact sheet on gopher tortoise best management practices for agriculture and silviculture.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Intern				0

Create a "safe roads for people and tortoises" card for use by law enforcement for use when stopping motorists.

Staff	Hourly/w	Computation	Hours To	Opportunity
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	benefits	Rate	Complete	Cost
Intern				0

Create a fact sheet to address minimizing road mortality.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Intern				0

Use social media outlets as appropriate to advance gopher tortoise awareness (e.g. Facebook, Twitter, YouTube, and Flickr).

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Web Designer ² FTE	\$20.27	\$20.27	100	\$2,027
Public Relations Specialists	\$20.27			

Proposed Commensal Conservation Actions: Develop effective relocation strategies and guidelines for each species as appropriate.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV ⁶ FTE	\$27.36	\$29.27	500	\$14,635
Biological Scientists IV ⁷ FTE	\$26.70			
Biological Scientists IV ⁸ FTE	\$33.75			

Develop monitoring protocols for priority commensals that are relocated to collect information to inform future management.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV ⁶ FTE	\$27.36	\$29.27	500	\$14,635
Biological Scientists IV ⁷ FTE	\$26.70			
Biological Scientists IV ⁸ FTE	\$33.75			

Identify and prioritize appropriate potential recipient sites for commensal species when relocated.

Staff	Hourly/w	Computation	Hours To	Opportunity
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	benefits	Rate	Complete	Cost
Biological Scientists IV ⁶ FTE	\$27.36	\$29.27	100	\$2,927
Biological Scientists IV ⁷ FTE	\$26.70			
Biological Scientists IV ⁸ FTE	\$33.75			

Determine best protocols for releasing commensals at recipient sites that increase their chance for survival.

Staff	Hourly/w benefits	Computation Rate	Hours To Complete	Opportunity Cost
Biological Scientists IV ⁶ FTE	\$27.36	\$29.27	200	\$5,854
Biological Scientists IV ⁷ FTE	\$26.70			
Biological Scientists IV ⁸ FTE	\$33.75			

Summary of New Initiative Opportunity Costs

In summary, the total FWC opportunity costs for the second five year action cycle of the Gopher Tortoise Management Plan (2013 – 2017) is \$189,407. This is a measure of the indirect agency costs that would be committed to this effort and not available for other FWC functions.

Agency Grant Match Funds

The following opportunity costs are the second five year action cycle FWC funds needed for matching grants for new research and management actions. These are funds that will not be available for alternative FWC purposes.

Proposed Local Government Coordination:

- Provide gopher tortoise habitat assistance funding for habitat management activities on county/city owned conservation lands (annual funding dependant). **Amount: \$150,000**

Proposed Law Enforcement Actions:

- Create a fact sheet for LE Dispatch personnel to assist with complainant calls. **Amount: \$600**
- Develop a self study guide to be posted on the LE web page to assist officers with gopher tortoise enforcement methods. **Amount: \$3,000**

Proposed Habitat Management Actions

- Implement 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. **Amount: \$400,000**
- Coordinate with FWC's Landowner Assistance Program, and partner agencies to provide support and technical assistance to private landowners for managing gopher tortoise habitat. **Amount: \$600,000**

Proposed Incentives Action

- Develop Payment for Ecosystem Services pilot incentive program for landowners. **Amount: \$300,000**

Proposed Monitoring Actions

- Conduct a comprehensive qualitative assessment of gopher tortoise habitat on public conservation lands. **Amount: \$150,000**
- Once developed, FWC will implement the monitoring protocol created by the CCA partners when assessing tortoise populations on its lands and work with partner agencies to implement it on all public conservation lands that contain gopher tortoises. **Amount: \$20,000**

Proposed Education and Outreach Actions

- Create fact sheet on the gopher tortoise's keystone species role and its associated commensal species. **Amount: \$1,000**
- Create a tortoise-wise community program, and establish one new community per year. Program can include information on road mortality, role as a keystone species, laws and regulations, appropriate yard plantings, and impacts of pets. **Amount: \$2,000**
- Create a gopher tortoise plant list for property owners. **Amount: \$600**
- Create videos and 30 second public service announcements on pertinent gopher tortoise topics. **Amount: \$5,000**

- Enhance educator's packet as needed to incorporate new or revised materials. **Amount: \$1,000**
- Train volunteers to offer the educator materials at appropriate venues. **Amount: \$1,000**
- Create a fact sheet on gopher tortoise best management practices for agriculture and silviculture. **Amount: \$600**
- Create a "safe roads for people and tortoises" card for use by law enforcement for use when stopping motorists. **Amount: \$1,200**
- Create a fact sheet to address minimizing road mortality. **Amount: \$600**

Summary of Agency Grant Match Funds

In summary, the total FWC funds needed for grant match projects in the second five year action cycle of the Gopher Tortoise Management Plan (2013 – 2017) is \$1,836,600. This is a measure of the indirect agency costs that would be committed to this effort as grant matches and not available for other FWC functions.

Other Non-FWC Public Agency Opportunity Costs

The following costs estimates are not direct or indirect costs sustained by the Florida Fish and Wildlife Conservation Commission or the state of Florida. They are, however, indirect costs sustained by non-FWC funding authorities for the purpose of providing research grants. These indirect costs are associated with the second five-year action cycle.

Proposed Research Actions

- Determine marking technique for juvenile tortoises that will persist over time. **Amount: \$45,000**
- Find improved method to more accurately determine tortoise age. **Amount: \$150,000**
- Evaluate usefulness of satellite telemetry for intensive monitoring of tortoise movements. **Amount: \$100,000**
- Evaluate minimum patch size and population size needed to maintain a functional population. **Amount: \$300,000**
- Evaluate survival of older juvenile and subadult size classes to help alleviate detection problem associated with hatchling tortoise burrows. **Amount: \$45,000**

- Evaluate best methods to detect hatchling and juvenile burrows, *e.g.*, post-burn surveys; use of canines to locate burrows. **Amount: \$45,000**
- Gather additional data on opportunistic sheltering, use of microhabitats, and dispersal by juvenile tortoises. **Amount: \$45,000**
- Determine if winter burns contribute to calcium depletion in juvenile tortoises. **Amount: \$45,000**
- Determine which factors enhance site fidelity and overall relocation success, *e.g.*, source, number, and size/sex of tortoises; habitat type; season of relocation, etc. **Amount \$50,000**
- Evaluate habitat use and movements in poorly-drained flatwoods, especially in South Florida. **Amount: \$75,000**
- Conduct follow-up studies of tortoises moved under temporary exclusion permits to determine response to temporary displacement along linear, disturbed habitats. **Amount: \$75,000**
- Conduct surveys of the genetic variation to determine subpopulations and the level of gene flow among subpopulations. **Amount: \$200,000**
- Identify habitat characteristics that influence home range sizes, habitat utilization, and species densities in various habitats. **Amount: \$150,000**
- Determine and implement effective methods for surveying priority commensal populations on areas where gopher tortoises are found. **Amount: \$150,000**
- Monitor relocated priority commensals to assess the survivorship and behavior of those individuals and impacts on recipient populations. **Amount: \$200,000**
- Evaluate the disease susceptibility and transmission in advance of relocating priority commensals. **Amount: \$150,000**
- Conduct surveys for invertebrate commensals to determine distributions, habitat, and collect specimens and data for analyses. **Amount: \$100,000**

Summary of Other Agency Opportunity Costs

In summary, the total of non-FWC agency opportunity costs for the second five year action cycle of the Gopher Tortoise Management Plan (2013 – 2017) is \$3,075,000. This is a measure of the indirect non-FWC agency costs that would be committed to this effort and not available for other non-FWC functions.

Permitting and the Economic Impact of the Gopher Tortoise Management Plan CII.1

The gopher tortoise has been protected in Florida for over 30 years, initially as a Species of Special Concern, and since 2007 as a Threatened species. Any activity involving its take has required the prior issuance of an appropriate permit or authorization from the Florida Fish and Wildlife Conservation Commission (FWC). The permitting system for gopher tortoises has been restructured to provide greater conservation benefit to reflect this change in status. A summary of permits can be found in Table 7.

Permitting – Summary

The funds collected via the permitting system (mitigation contributions) constitute a transfer of funds from the regulated community to FWC and provide the income needed to implement the GTMP. Additionally, permitting often requires the regulated community to hire third-party private vendors to complete actions required by the permit (see Tables 3 and 4). The actions of hiring private third-party vendors to meet the conditions of the permit constitute a transfer of funds from the regulated community (both private and government sectors) to the private sector via the third-party vendor. The resulting economic transfers in both directions (private to public and public to private) necessarily cause secondary impacts within the economy that reach beyond the regulated community and the collecting agency. The following section will estimate the economy-wide economic impact resulting from these transfers.

Permitting – A Summary of Permit Type and Corresponding Mitigation Contribution

- **Authorized Agent - \$500** (one-time contribution). Authorized gopher tortoise agents are individuals who are permitted by FWC for some or all of the following activities: surveying, trapping, marking, transporting, and relocating gopher tortoises, and relocating gopher tortoise commensals. Use of an authorized agent is required for: all off-site relocation projects, regardless of capture method; on-site relocation projects that involve the relocation of more than five gopher tortoises (10) burrows; on-site relocation projects that involve any method of capture other than bucket trapping, live trapping, or hand shovel excavation. Some consultants qualify for the authorized agent permit by completing FWC approved training courses at an estimated cost to the consultant of \$1,200. The \$1,200 contribution to complete the FWC approved training courses is a transfer of income to the private sector and is not reverted to FWC.
- **10 or Fewer Burrows** – Tortoises are relocated on-site or off-site. Gopher tortoises relocated off-site under 10 or Fewer Burrows permit cannot be relocated to an unprotected site. The mitigation contribution is \$200.

- **Conservation**
>10 Burrows relocated to long-term protected area, to public conservation lands, or from public projects to contiguous public conservation land. The mitigation contribution is \$200 for the first group of 10 burrows (up to five gopher tortoises) and \$300 for each additional tortoise.
- **Conservation**
>10 burrows relocated to short-term protected area - The mitigation contribution is \$200 for the first group of 10 burrows (up to five gopher tortoises) and \$3,000 for each additional tortoise.
- **Conservation**
>10 burrows relocated to unprotected area - The mitigation contribution is \$3,000 per tortoise.
- **Temporary Exclusion** – Exclusions for more than 6 months must apply for a Conservation permit. The mitigation contributions are \$100 per tortoise (exclusions < 2 months), \$200 per tortoise (exclusions 2 to 4 months), and \$300 per tortoise (exclusions 4 to 6 months).
- **Burrow or Structure Protection** – On-site relocation only. The mitigation contribution is \$25 for up to 2 burrows.
- **Emergency Take** – The mitigation contribution is \$4,000 per tortoise.
- **Disturbed Site** – The Disturbed Site permit may be required in situations where premature disturbance to the vegetation or ground has occurred before gopher tortoise borrow surveys are complete or before gopher tortoise capture and relocation activities have been completed. The mitigation contribution is \$500 additional per tortoise added to the standard mitigation for 10 or Fewer Burrows permits and Temporary Exclusion permits (exclusion 4-6 months only) and \$1,500 additional per tortoise added to the standard mitigation Conservation permit.

Permitting Costs to the Regulated Community

The economic analysis that follows will demonstrate costs to the regulated community based on costs to private firms, single family homes, local govt., state government and the federal government and by permit type. Cost data are for the year 2011. These costs represent a redirected cost within the economy (CII.1 in Table 1). The redirection of funds will have a ripple effect on the economy and its many sectors and reported in Tables 7 – 12 below.

General Background Data (All Permits) - Data are provided where available (see Figure 5 below).

- **Authorized Gopher Tortoise Agent:** In 2011 the Authorized Gopher Tortoise Agent permit comprised 13.20% of all permits issued and there were 68 of these permits issued during the year. The estimated average cost of this permit is \$1,294.12 and the estimated range of total costs is \$500 - \$1,700. Additionally, 45 of the 68 newly permitted Authorized Gopher Tortoise Agents in 2011 were permitted after completing an FWC approved training course. The cost of the training course is approximately \$1,200 and is paid by the individual seeking authorization.
- **10 or Fewer Burrows:** This category comprises 49.71%, or almost one-half of the total number of permits issued in 2011. The total number of permits issued in this category was 256. The estimated average costs and range of costs were not available. There were 1,003 tortoises permitted in this category in 2011.
- **Conservation:** Within this category, Conservation permits comprised 27.38% of all permits issued in 2011. The estimated average cost is \$27,879 and the estimated range of costs for this permit is \$13,371 - \$72,116. There were 3,522 tortoises permitted and 2,083 tortoises relocated in this category in 2011.
- **Temporary Exclusion for Major Utility Corridors:** There were 30 permits issued in 2011. This category represents 5.83% of all permits issued by FWC in 2011. The estimated average cost for this permit is estimated at \$41,915 and the estimated range of costs is \$18,511 - \$107,433. There were 2,123 tortoises permitted in 2011 within this category.
- **Burrow or Structure Protection:** In 2011 this category of permit represented 1.94% of all permits issued. There were 10 permits issued and 13 tortoises permitted and relocated.
- **Recipient Site:** This category represents 1.55 % of all permits issued in 2011. The estimated average costs for this permit was \$11,000 and the range of costs is estimated at \$6,500 - \$25,000. There were 8 permits issued in 2011.
- **Emergency Take:** This category of permit is highly variable based on emergencies like hurricanes, etc. Currently, there are no data available for this category.
- **Disturbed Site:** This category represented 0.39% of all permits issued in 2011 and there were only 2 permits issued during the year. The average costs are estimated at \$2,273 and the range of costs is estimated at \$2,005 - \$6,150. There were 4 tortoises permitted in 2011.

Comparison of Permits by Type and Total Costs

Half (50%) of all permits issued in 2011 were for the 10 or Fewer Burrows permit which represented only 5% of the total costs to the regulated community. The Conservation permit represented 28% of all permits issued in 2011 and accounts for 59% of the total costs for members of the regulated community. Additionally, the Temporary Exclusion permit represented only 5% of all permits issued but 32% of the costs paid by the regulated community. This permit is highly variable and costs are directly related to utility corridor development (Figs. 5 and 6).

Figure 5. Percentage of Permits by Type

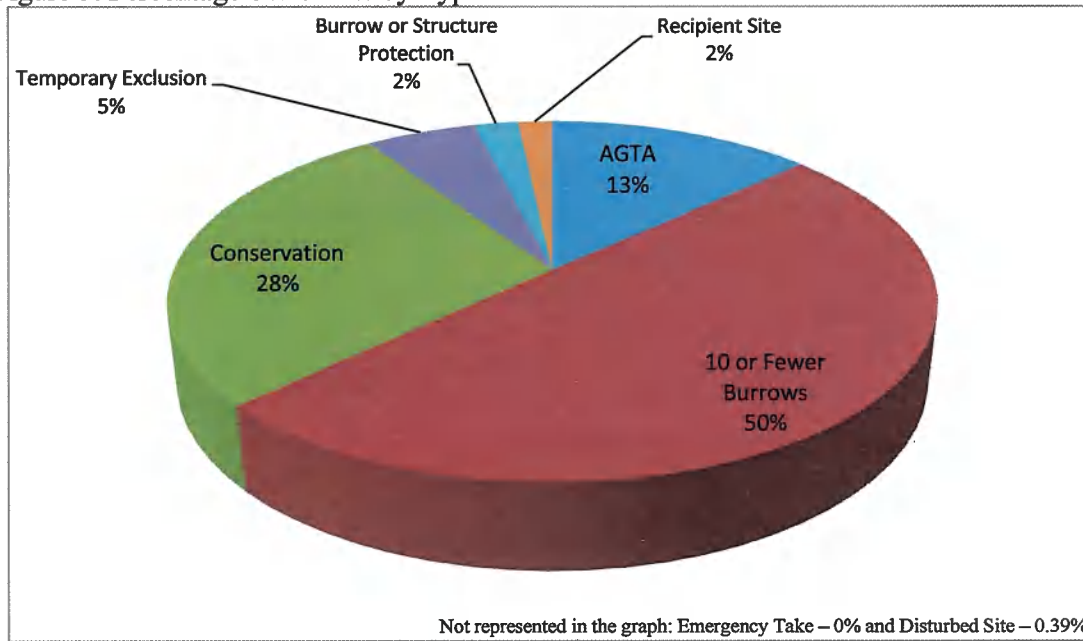
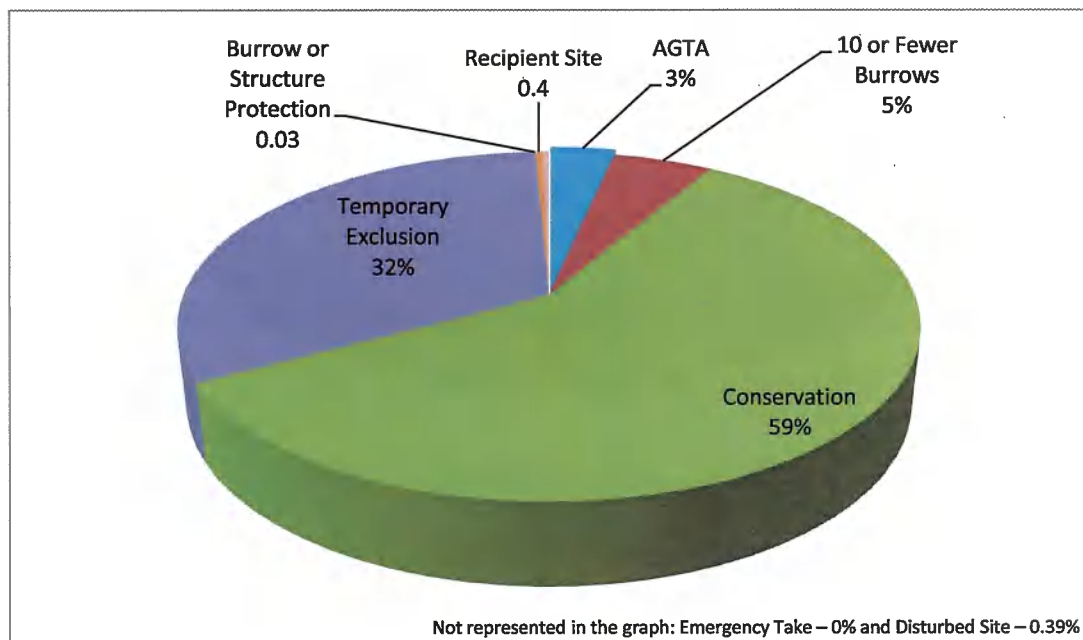


Figure 6. Percentage of Mitigation Contributions by Permit Type



Mitigation Contributions by Economic Sector (All Permit Types) 2011

The largest costs sustained for mitigation contributions were sustained by private firms at \$570,279.02. Local government sustained costs of \$314,310.18 followed by state government at \$72,470.52 and single family home owners at \$34,552.04. Federal government costs were \$8,271.06 (Table 8, for a total of \$999,882.82).

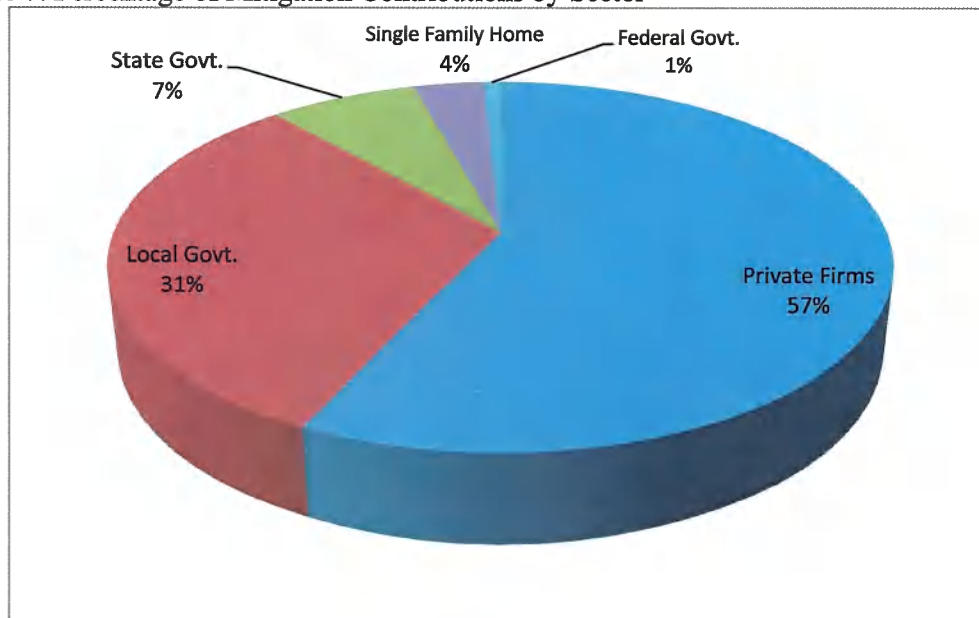
Table 8. Mitigation Contributions by Sector (All Permit Types)

Sector	Costs
Private Firms	\$570,279.02
Local Govt.	\$314,310.18
State Govt.	\$72,470.52
Single Family Home	\$34,552.04
Federal Govt.	\$8,271.06

Percentage of Mitigation Contributions by Sector

Private firms represented the largest percentage of mitigation contributions at 57 % followed by local government at 31%. State government represented 7% of total mitigation contributions followed by single family home owners at 4% and the federal government at 1% of total mitigation contributions for the regulated community (Figure 7).

Figure 7. Percentage of Mitigation Contributions by Sector



Cost of Mitigation Contributions to the Regulated Community by Sector and Permit Type

Private firms represent 57 percent of the mitigation contributions and the largest expenditure is for the Conservation permit at \$345,331.02 followed by the Temporary

Exclusion permit at \$170,986.40. Total mitigation contributions for private firms in 2011 were \$570,279.02. Local government represented 31 percent of all mitigation contributions by the regulated community. The largest expenditures for local government was \$149,813.60 for Temporary Exclusion permits and \$149,758.98 for Conservation permits and total costs for this sector was \$314, 310.18. State government represented approximately 7 percent of the total mitigation contributions. The Conservation permit was by far the largest expenditure for state government at \$66,520.44 followed by the 10 or Fewer Burrows permit at \$2,401.28 total mitigation contributions for this sector were \$72,470.52. This was followed by single family home owners who represented 4 percent of total mitigation contributions. The largest mitigation contribution for single family home owners was for the 10 or Fewer burrows at \$17,817.60 followed by the Conservation permit at \$16,659.44. Total mitigation contributions for single family home owners were \$34,552.04. The Federal government represented 1 percent of total mitigation contributions for permitting and their costs came in only one category of permit, the Conservation permit at \$8,271.06 (Tables 8 and 9).

Table 9. Mitigation Contributions to the Regulated Community by Permit Type (Cost CII.1)

Permit Type	Private Firms	Single Family Homeowner	Local Govt.	State Govt.	Federal Govt.
Authorized Gopher Tortoise Agent	\$27,999.00	\$0.00	\$2,998	\$2,998	\$0.00
10 or Fewer Burrows	\$20,787.20	\$17,817.60	\$10,188.80	\$2,401.28	\$0.00
Conservation	\$345,331.42	\$16,659.44	\$149,758.98	\$66,520.44	\$8,271.06
Temporary Exclusion	\$170,986.40	\$0.00	\$149,813.60	\$0.00	\$0.00
Burrow or Structure Protection	\$75.00	\$75.00	\$50.00	\$50.00	\$0.00
Recipient Site	\$2,000.00	\$0.00	\$1,500	\$500.00	\$0.00
Emergency Take	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Disturbed Site	\$3,100	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$570,279.02	\$34,552.04	\$314,310.18	\$72,470.52	\$8,271.06

Table 10. Total Mitigation Contributions to the Regulated Community by Permit Type (All Sectors) (Cost CII.1)

Permit Type	Total Permitting Cost to the Regulated Community
Authorized Gopher Tortoise Agent	\$33,996.60
10 or Fewer Burrows	\$51,194.88
Conservation	\$586,541.34

Temporary Exclusion	\$320,800.00
Burrow or Structure Protection	\$250.00
Recipient Site	\$4,000
Emergency Take	\$0.00
Disturbed Site	\$3,100.00
Grand Total *	\$999,882.82

*Note: The actual revenue received by FWC for 2011 was \$999,950.00. The \$999,882.82 in Table 10 above is due to rounding error of 0.0068.

Economic Impact

The following economic analysis was performed with version 3.0 of IMPLAN (Impact Analysis for PLANning), a software program designed to analyze economic impacts. IMPLAN's structure is based on the conventional input/output (I/O) approach to determining economic impacts. Input output models provide rigorous mathematical expression of the economic relationships among sectors of the economy (groupings of businesses and government based on their economic function), and between businesses and consumers. An input/output model represents the flows of economic activity between sectors within a region, capturing each sector's purchases from other sectors of the economy in order to produce a dollar's worth of goods and services.

One advantage of the input/output models is the broad economy wide perspective they take. In economic terminology, they provide a "general equilibrium" framework instead of a "single-market" analysis, or "partial equilibrium" perspective. The general equilibrium approach examines not only the markets in which the primary transactions of interest take place, but also tracks the economic effect through all related markets and sectors of the economy. So, the input/output model captures not only the direct impact of permitting costs (expenditures) but also the secondary, or indirect and induced effects as the impact moves (ripples) through the economy as a whole.

The following is an analysis of the economic impacts resulting from all direct costs related to the GTMP. All data files for this analysis are specific to Florida. The analysis will look at the economic impact of two distinct transfers of funds: private funds to FWC to cover mitigation contributions (see summary in Tables 9 and 10 above), and government funds to private sector vendors to cover mitigation actions. Table 11 is an estimate of total third-party costs by permit type and section regulated community.

Table 11. Private Third-Party Costs by Permit Type and Sector

Permit Type	Local Government	State Government	Federal Government
Authorized Gopher Tortoise Agent	\$4,763	\$4,763	\$0
10 or Fewer Burrows	\$89,050	\$20,987	\$0
Conservation	\$853,809	\$379,248	\$47,155
Temporary Exclusion	\$437,415	\$0	\$0
Burrow or Structure Protection	\$824	\$824	\$0
Recipient site	\$31,500	\$10,500	\$0
Emergency Take	\$0	\$0	\$0

Disturbed Site	\$0	\$0	\$0
Total	\$1,417,362	\$416,322	\$47,155

The Economic Impact of Transfers from the Private Sector to FWC – Mitigation Contributions

Permitting costs for private firms in 2011 were \$570,279. Employment, labor income and value added represent a loss to the industry sectors identified in this economic analysis. Table 12 provides an identification and description of the sectors used in the economic analysis and Table 13 provides the distribution of loss for private firms in 2011; and Table 14 identifies the top five industries affected. The economic effect of funds transferred from government agencies to FWC are not considered because the ripple effect of money within the government sector is the same regardless of level (local, state or federal).

Table 12. Sectors and Description

Business Sector	Description
34	Construction of new non-residential buildings
35	Construction of new non-residential manufacturing structures
37	Construction of new residential permanent site structures

Table 13. Description of Loss – Private Firms (2011) within Florida

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	-4.4	-\$210,582	-\$243,724	-\$570,279
Indirect Affect	-1.3	-\$66,726	-\$100,466	-\$173,457
Induced Effect	-1.9	-\$82,376	-\$148,609	-\$243,003
Total Effect	-7.6	-\$359,685	-\$492,798	-\$986,739

Table 13 above describes the loss of transferring permitting costs in 2011 of \$570,279 from the private sector to state government. The economic model reports an annual direct loss to the affected industries of 4.4 jobs. The indirect loss is associated with the affected industries purchasing goods and services among themselves and the model reports a loss of 1.3 jobs. The induced effects are a result of a decrease in household spending and result in an additional 1.9 job losses. The total annual affect is the sum of the direct, indirect and induced losses. Labor income (all forms of employment income, including employee compensation which includes wages and benefits) is reduced by \$359,685. The value added economic effect is a combination of labor income, other property income and indirect business taxes which result in an annual loss to the private sector of \$492,798. The annual loss of economic output (total value of all goods and services) is estimated at \$986,739. This is the economic affect statewide of the costs of permitting in 2011 (statewide model) as opposed to regional or local impacts.

Table 14. Top 5 Industries Affected (2011)

Business Sector	Description	Employment	Labor Income	Value Added	Output
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34	Construction of new non-residential buildings	-2.7	-\$128,685	-\$144,853	-\$320,279
35	Construction of new non-residential manufacturing structures	-0.9	-\$43,271	-\$48,356	-\$100,000
37	Construction of new residential permanent structures	-0.8	-\$38,627	-\$50,514	-\$150,000
369	Architectural Engineering Firms	-0.3	-\$16,429	-\$17,348	-\$31,210
413	Food Services	-0.2	-\$5,705	-\$8,031	-\$14,855

The following tables identify the economic effects of permitting costs paid by private firms in 2011 to state government (FWC).

Table 15. Economic Analysis of Private Firms 2011 Monetary Permitting Contributions to State Government - Geographic Area: State of Florida - Sector: 3437 – Employment and Payroll (state and local government non-education)

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	+6.9	+\$481,760	+\$547,286	+\$570,279
Indirect Effect	\$0	\$0	\$0	\$0
Induced Effect	+3.4	+\$142,393	+\$256,581	+\$419,883
Total Effect	+10.3	+\$624,153	+\$803,867	+\$990,162

In Table 15 above, the model demonstrates the economic effects of private firms monetary permitting contributions to *state government* of \$570,279. These are costs paid by the private sector for permitting costs in 2011. The direct effect shows an additional 6.9 jobs will be added to state government and a total increase of 10.3 jobs. Of these 10.3 jobs, 3.4 jobs are in the private sector. Labor income is estimated at \$624,153 and the total output from the monetary permitting contributions estimated at \$990,162.

Table 16. Top Five Industries Affected (2011)

Sector	Description	Employment	Labor Income	Value Added	Output
3437	State and Local Govt. Employment and Payroll	+6.9	+\$481,760	+\$547,286	+\$570,279
413	Food Services	+0.3	+\$8,389	+\$11,808	+\$21,843
394	Offices of Physicians and Dentists	+0.2	+\$14,705	+\$15,681	+\$26,535
397	Private Hospitals	+0.2	+\$11,191	+\$11,946	+\$24,946
360	Real Estate	+0.2	+\$2,378	+\$17,796	+\$24,562

	Establishments			
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Table 17. Comparison of Private Sector Annual Losses and Gains to State Government and Private Sector (based on 2011)

	Employment	Employment	Labor Income	Labor Income	Value Added	Value Added	Output	Output
Impact Type	Losses to Private Sector	Gains to State Govt. and Private Sector	Losses to Private Sector	Gains to State Govt. and Private Sector	Losses to Private Sector	Gains to State Govt. and Private Sector	Losses to Private Sector	Gains to State Govt. and Private Sector
Direct Effect	-4.4	+6.9	- \$210,582	+\$481,760	- \$243,724	+\$547,286	- \$570,279	+\$570,279
Indirect Effect	-1.3	0	-\$66,726	\$0	\$100,466	\$0	\$173,457	\$0
Induced Effect	-1.9	+3.4	-\$82,376	+\$142,393	- \$148,609	+\$256,581	- \$243,003	+\$419,883
Total Effect	-7.6	+10.3	- \$359,685	+\$624,153	- \$492,798	+\$803,867	- \$986,739	+\$990,162

Table 17 above is a direct comparison of the economic effects of transferring permitting contributions of \$570,279 from the private sector to the state of Florida during 2011. Simply put, the loss to the private sector is a gain to the state government sector. On net, the impacts have a nearly equal and opposite reaction in the economy. If one assumes a relatively small change in the cost of permitting during the next five years, then one can assess the overall economic impact of the GTMP. Overall, it is estimated the plan will result in an annual loss of 7.6 jobs (all from the private sector), yet at the same time create 10.3 jobs per year, 6.9 jobs to state government (non-education) and 3.4 jobs to the private sector. The net annual effect of the monetary permitting contributions of private firms is 2.7 new jobs; 4.2 fewer private jobs and 6.9 more state employees. Likewise, labor income from the permitting monetary contribution of the private firms to *state government* is estimated at \$624,153 per year and represents a loss to the private sector of \$359,685 per year. Output (total value of all goods and services) represents an annual loss to the private sector of \$986,739. The monetary contribution of permitting costs by private firms produces \$990,162 of annual output to the *state government* sector. The economic impact of the permitting system costs is minute, yet positive producing \$3,423 in positive economic impact for Florida annually.

Many of the categories above in Table 17 represent very close relationships (employment, output) while there are some differences in other categories (labor income and value added). It is therefore important to understand that these are two very different economies. One of the best ways to explain these differences is with the concept of leakage. Leakages are any payments made to imports or value added sectors which do not in turn re-spend dollars within a region. For example, if a product was not made here (Florida) the leakage out of the economy can be considerable. Yet, the economic impact from the private sector losses to the state government sector is very small.

The Economic Impact of Transfers from the Non-FWC Public Sector to Private Third-Party Vendors – Mitigation Actions

Costs required by non-FWC public agencies to hire private third-party vendors for mitigation actions in 2011 were estimated to be \$1,880,839 (see Table 11 above). Employment, labor income and value added represent a loss to the industry sectors identified in this economic analysis. Table 18 provides the distribution of loss for public non-FWC agencies in 2011 and Table 18 identifies the top five industries affected. The economic effect of funds transferred from the private regulated community to private third-party vendors are not considered because the ripple effect of money within these private sectors will generate essentially no net change.

Table 18 below reflects a transfer (or loss) to state government of \$1,880,839. These funds are what state, local and federal government pays to the private sector for services (tortoise surveys, capture of tortoises) and other mitigating actions in 2011. The transfer of funds to the private sector represents a direct loss to government of 22.8 jobs and 11.1 jobs lost to the private sector. The total output loss (value of all goods and services) is estimated at \$3,265,656 and these estimates represent annual losses.

Table 18. Loss to Non-FWC Government Sectors From Transfers to Private Third-Party Vendors

Impact Type	Employment	Labor income	Value Added	Output
Direct	-22.8	-\$1,588,893	-\$1,805,005	-\$1,880,839
Indirect	\$0.0	\$0.0	\$0.0	\$0.0
Induced	-11.1	-\$469,628	-\$846,231	-\$1,384,816
Total	-33.9	-\$2,058,521	-\$2,651,237	-\$3,265,656

Table 19. Top Five Industries Affected from Transfer From Non-FWC Public Agencies (2011)

Business Sector	Description	Employment	Labor Income	Value Added	Output
3437	Government employment and payroll	-22.8	-\$1,588,893	-\$1,805,005	-\$1,880,839
413	Food Services	-1.1	-\$27,668	-\$38,945	-\$72,040
394	Offices of Physicians and Dentists	-0.7	-\$48,498	-\$51,716	-\$87,516
397	Private Hospitals	-0.6	-\$36,909	-\$39,398	-\$82,275
360	Real Estate	-0.5	-\$7,843	-\$58,691	-\$81,008

Table 20. Gain to Third-Party Vendors From Transfers from Non-FWC Government Sectors

Impact Type	Employment	Labor Income	Value Added	Output
Direct	17.9	\$1,139,719	\$1,188,439	\$1,880,839
Indirect	5.3	\$245,022	\$367,963	\$607,109
Induced	9.7	\$410,915	\$741,126	\$1,212,072
Total	32.9	\$1,795,657	\$2,297,529	\$3,700,020

Table 21. Top Five Industries Affected From Transfer to Private Third-Party Vendors (2011)

Business Sector	Description	Employment	Labor Income	Value Added	Output
375	Environmental and Technical Consulting Services	18.0	\$1,145,375	\$1,194,337	\$1,890,173
413	Food Services	1.3	\$32,615	\$45,908	\$84,920
382	Employment Services		\$29,382	\$35,023	\$43,361
360	Real Estate	1.0	\$11,517	\$86,185	\$118,956
394	Offices of Physicians and Dentists	0.6	\$38,383	\$40,531	\$76,118

Table 20 represents *government* money (\$1,880,839) paid to third party vendors, private sector entities for services associated with mitigating actions associated with the proposed revisions to the Gopher Tortoise Management Plan. This transfer of funds from government to third party vendors creates 17.9 direct jobs and results in 32.9 positions to the private sector on an annual basis. The output (total value of all goods and services) related to the transfer of funds from government to the private sector for mitigation efforts is estimated at \$3,700,020.

Table 21 represents an analysis of cost by permit type associated with the transfer of funds from government to third party vendors (private sector) for 2011.

Permitting Revenue/Cost Projected for Five Years

Applications for permits are likely to increase over the next five years and will probably reflect the state's economic rate of growth. This is centered on the assumption that gopher tortoise permitting is most often initiated by projects tied to economic growth and development. During their March 2012 meeting of the Open Market Committee, the U.S. Federal Reserve Board projected national gross domestic product (GDP) to grow at an inflation adjusted rate of between 3% and 4% over the next three years. This is slightly more than the 20 year moving average of 2.9%. Furthermore, they project that Florida will grow at a slightly lower rate than the national average. Using these figures as best estimates and that the rate of growth will continue for two additional years, a figure of 2.9% is used to project the growth of total permitting revenues/costs for the next five years (Table 22 below).

Table 22. Projected annual permit revenues/costs for 2012 – 2016. Based on 2011 figures of \$999,882 and 2.9% annual growth rate. (Figures are nominal)

Year	Projected Permit Revenue/Cost
2013	\$1,058,722.41
2014	\$1,089,425.36
2015	\$1,121,018.70
2016	\$1,153,528.24
2017	\$1,186,980.55

Chapter 120.54(3) (b) Compliance

The following are answers to the general question of related to Florida Statute, Chapter 120.54(3)(b), **“Are the proposed revisions to the gopher tortoise management plan...**

“ ... likely to have direct or indirect adverse economic impact on economic growth, private sector job creation or employment, or private sector investment in excess of \$1 million in the aggregate within 5 years after implementation?”

The proposed revisions to the Gopher Tortoise Management Plan present a suite of conservation strategies and actions that serve to achieve the measurable objectives of the plan. Costs to the regulated community are directly tied to the health of the economy as there is a linear relationship between total costs and development. As the economy improves from the “Great Recession” development is expected to improve and total costs to the regulated community will be consistent with the increase in development. However, individual sector costs to the regulated community are not expected to increase over the course of the 2nd five-year Action Cycle (2013-2017). Therefore, the proposed revisions to the Gopher Tortoise Management Plan are not likely to pose direct or indirect adverse economic impact on economic growth, private sector job creation or private sector investment in excess of \$1 million in the aggregate within 5 years of implementation. Local, state and Federal government transfers to third-party private vendors create a positive gain in employment estimated at 32.9 jobs and \$3,700,020 in economic output.

“... likely to have an adverse impact on business competitiveness, including the ability of persons in the state to compete with Persons doing business in other states or domestic markets, productivity, or innovation in excess of \$1 million in the aggregate within five years after implementation?”

The proposed revisions to the Gopher Tortoise Management Plan permits anyone who completes the FWC approved training course to compete as an Authorized Gopher Tortoise Agent doing business in the State of Florida. Additionally, the gopher tortoise has been protected in Florida for over 30 years, initially as a Species of Special Concern, and since 2007 as a Threatened species. Any activity involving the take has required the prior issuance of an appropriate permit or authorization from FWC.

The proposed revisions to the Gopher Tortoise Management Plan is not likely to have an adverse impact on business competitiveness, including the ability of persons in the state to compete with persons doing business in other states or domestic markets, productivity, or innovation in excess of \$1 million in the aggregate within 5 years of implementation.

“... likely to increase regulatory costs, including transactional costs, in excess of \$1 million in the aggregate within five years after implementation?”

Regulatory and transactional costs for permitting are not expected to increase over the course of the second 5-year action cycle of the plan (2013-2017) as the costs for permits remain static. However, total costs to the regulated community are directly tied to the health of the Florida economy. As Florida begins to emerge from the recessionary effects of the *economic downturn* total costs will increase over time as more permits are issued and more development takes place. Additionally, additions to private sector job growth will also

increase as the government sector transfers more revenue to private third-party vendors for mitigation action. Estimates of total costs to the regulated community for the second 5-year action cycle of the plan (2013-2017) are provided below.

Year	Projected Permit Revenue Costs
2013	\$1,058,722.41
2014	\$1,089,425.36
2015	\$1,121,018.70
2016	\$1,153,528.24
2017	\$1,186,980.55

“Provide a good faith estimate of the number of individuals and entities likely to be required to comply with the proposed revised Gopher Tortoise Management Plan together with a general description of the types of individuals likely to be affected by the plan.”

The proposed revisions to the Gopher Tortoise Management Plan will affect landowners, commercial, residential (private home owners) construction companies and other land development entities; local, state, and federal government agencies, utilities, small businesses, the general public and all other entities who qualify for a permit.

“Provide a good faith estimate of the cost to the agency, and to any other state and local government entities, of implementing and enforcing the proposed revisions to the Gopher Tortoise Management Plan and any anticipated effect on state or local revenues.”

The proposed revisions to the Gopher Tortoise Management Plan include no increase to staffing or in compensation, so the revisions will produce no increases in costs due to staff, salary or benefits. Beyond staff salaries and rather small capital expenditures, there is an additional estimated direct payment to vendors of \$1,836,600 through the second 5-year cycle of the action plan (2013-2017). Costs to the Florida Fish and Wildlife Conservation Commission and other government agencies include the following:

FWC Direct Costs – Human Resources and Capital	\$ 3,844,842
FWC Opportunity Costs	\$ 2,026,007
Other Agency Opportunity Costs	<u>\$ 3,075,000</u>
Total	\$ 8,945,849

Total Costs

In 2011 the total costs to *local government* was \$1,731,672, to *state government* \$488,792, and Federal Government \$55,426. Enforcement of the proposed revisions to the Gopher Tortoise Management Plan will be the responsibility of the Division of Law Enforcement, Florida Fish and Wildlife Conservation Commission and are incurred as an opportunity cost. No additional state agency enforcement responsibilities are anticipated through the life cycle of the second 5-year action cycle of the plan. Revenue to the FWC should increase during the life cycle of the second 5-year cycle of the action plan as the

economy begins to recover from the recession. There are no anticipated effects on local revenues.

“Provide 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 revisions of the gopher tortoise management plan. As used in this section “transactional costs” are direct costs that are readily ascertainable based on standard business practices , and include filing fees, the cost of obtaining a license, the cost of equipment required to be installed or used or procedures required to be employed, additional operating costs incurred, the cost of monitoring and reporting and any other costs.”

Transactional costs as defined here are direct costs readily ascertainable based on standard business practices. Transactional costs (direct costs) for the regulated community for 2011 include the following: Please see the section on regulatory costs for projections through 2017.

Private Firms -	\$ 3,309,157
Local Government -	\$ 1,731,672
State Government -	\$ 488,792
Single Family Home Owner	\$ 286,493
Federal Government -	\$ 55,426

“Provide an analysis of the impact on small businesses as defined by s. 288.703, and an analysis of the impact on small counties and small cities as defined in s.120.52.”

Section 288.703, F.S. defines small business as “an independently owned and operated business concern that employs less than 200 or fewer permanent full-time employees and that, together with its affiliates, has a net worth of not more than \$5 million or any firm based in this state which has a Small Business Administration 8(a) certification. As applicable to sole proprietorships, the \$5million net worth requirement shall include both personal and business investments.” In s.120.52, F.S., “Small City” is defined as “any municipality that has an unincarcerated population of 10,000 or less according to the most recent decennial census. ‘Small County’ is defined as “any county that has an unincarcerated population of 75,000 or less according to the most recent decennial census.”

Regarding the identification of small businesses affected by the plan, these statutory definitions are most difficult to satisfy. Regulated business is under no obligation to provide estimates of net worth to the agency. Privately operated services, such as Dun and Bradstreet do provide ratings of various businesses (including small businesses) but that information is proprietary; and provides estimates of risk (which are based on net worth, credit appraisal and other considerations), not income statements or balance sheets. These services rate specific companies, not broad categories such as small businesses. The Small Business Administration (SBA) data on firms with 8(a) certification is easily available and indicates 590 firms. The SBA website defines the 8(a) certification as “providing eligible firms with greater access to the resources they need to grow and develop their businesses. Elsewhere, the SBA describes their certification program as having been created to “help small

disadvantaged businesses to compete for federal contract opportunities.” So the SBA website is clearly not, nor intended to be an estimate of the number of small businesses in Florida. The statutory definitions also make no distinction between individually owned firms with few employees, and those with up to 20 employees, which may have higher profits and greater market share. The effects of regulation on the two firms may be quite different.

The following counties qualify as small counties by definition in Section 120.52, F.S.: Baker, Bradford, Calhoun, Columbia, De Soto, Dixie, Franklin, Gilchrist, Glades, Gulf, Hamilton, Hardee, Hendry, Holmes, Jackson, Lafayette, Levy, Liberty, Madison, Nassau, Okeechobee, Putnam, Sumter, Suwannee, Taylor, Union, Wakulla, Walton and Washington.

Recommended Future Research

Typically a Schedule of Estimated Regulatory Cost is limited in scope to the cost of regulation and not required to consider any potential economic benefits. However, agencies presumably impose regulations for some perceived benefit and, while the source of these benefits might be difficult to quantify, they are often related to human health and/or welfare either directly or indirectly. In the case of the GTMP, the desired outcome is to improve the condition of gopher tortoises and their associated habitat. The presumption is that it is important to humans to protect this species and the associated commensals, otherwise why would people go to the trouble to develop and enforce a far-reaching plan such as the GTMP?

Referring back to Table 2, the basic framework to estimate the benefits of the GTMP is clearly identified. There are potentially both market and non-market benefits to humans resulting from the GTMP, the question is, are they measureable? The short answer is yes, however they may be difficult to identify and quantify. While this task may be difficult, it should none-the-less be considered because regulations should ultimately be evaluated on their net benefit to society and methods that only evaluate their cost are insufficient for informed decisions.

Marketable Project Benefits

There are probably few, if any marketable goods and services that are promoted by the GTMP. However, it might still be a reasonable exercise to consider their possibly. For example, does the GTMP result in an improvement in the habitat that allows for increased harvesting of a plant or animal that has commercial value?

Non-marketable Project Benefits

It is more likely that the GTMP provides benefits lacking established markets (see below). Yet, the lack of established markets does not mean these benefits lack economic value. An entire field of economics is devoted to quantifying and measuring non-market values for a wide range of goods and services. It is important to understand that the lack of established markets should never deter policy makers from recognizing and measuring the importance of these goods and services anymore than they would ignore the importance of marketable goods and services.

For methodological reasons, non-market benefits are further divided into values derived from humans using the affected resource and those derived from humans not directly using the resource, also known as passive use values. In the case of wildlife, people are more familiar with assigning value to species they directly use. This could include the value of increased deer numbers to hunters, more fish available to anglers or more bald eagles for bird watchers to view. Since the gopher tortoise is not directly used and even viewing is a rare event, there is likely little use value to consider.

The most likely value for the gopher tortoise is in the area of passive or non-use. It's already been established that by constructing burrows, gopher tortoises provide a unique service to dozens of commensals. In some systems these burrows might be critical to not only to the gopher tortoise itself, but perhaps dozens of other species as well. A better understanding of these ecological services and their importance to ecosystem health is an important first step to valuing the impact of the GTMP. There are well established and widely published economic valuation methods that permit an evaluation of these services if they can be clearly identified. Using the economic methodology of contingent market valuation and conjoint analysis, researchers have successfully assigned economic value to ecological services such as vegetative buffers and water clarity and the importance of edge effect and increase of bird life. Similar studies with the importance of gopher tortoise burrows should be possible.

In addition to ecological services, some species of wildlife are popular on their own merit and have considerable value to many people. It is well known that the West Indian Manatee is widely popular among not only Floridians, but even people who have never seen them. Furthermore this "existence" value has been documented by several studies. In the case of the GTMP, there is evidence that the gopher tortoise may also enjoy a limited amount of "celebrity" status and, while individual people may place a relatively small value on an animal's well being, if this value is widespread it may collectively represent a large sum.

Suggested areas of GTMP benefits in terms of non-marketable goods/services can include:

- Ecological Services (ES) from Increased Gopher Tortoise Actions
 - Catalogue ES resulting from gopher tortoise
 - Develop contingent market survey for ecosystems with and w/o ES
 - Estimate market for identified ES
- Gopher Tortoise Abundance
 - Use value –gopher tortoise viewing?
 - Existence value – knowing gopher tortoises exist and/or thrive

The process of conducting studies to estimate the potential of GTMP benefits will likely involve resource economists working with biologists to better understand the ecological services likely affected by the plan. This process may be difficult and time consuming so it should be planned well in advance of the next SERC revision. With an ever growing desire to evaluate regulations for their overall benefit and cost, it is recommended that the GTMP consider this more balanced assessment in future revisions.

Summary and Conclusions

This document sets forth the economic analysis of the proposed revision to the Gopher Tortoise Management Plan. The Florida Fish and Wildlife Conservation Commission published its first Gopher Tortoise Management Plan in 2007 and the gopher tortoise was reclassified from a Species of Special Concern to Threatened. The economic analysis contained herein covers the second 5-year action cycle of the plan (2013-2017).

All economic analysis contained in this review are limited to documenting the incremental changes in cost and do not address the larger welfare picture. In this case only the actual direct and appropriate indirect costs are estimated and reported following the format established by the Statement of Estimated Regulatory Cost as prescribed by Section 120.54(3)(b), Florida Statutes (F.S.).

The total estimated costs and revenues for the five year GTMP are summarized in Table 23 below. The five year total for direct costs and opportunity costs are estimated at \$35 million and \$5.1 million respectively, for a combined total cost of \$40.1 million to FWC and the regulated community. Looking at the net of mitigation contributions and private third-party vendor revenues, there is a transfer of \$7.4 million over the five year period from the public sector to the private sector. This will result in a net increase of 1.7 new private sector jobs annually and a shift of 15.9 public sector jobs to the private sector per year for a total of 8.5 new private sector jobs in five years (see Table 24). On the revenue side, FWC will see \$5.6 million in total revenue (\$3.2 million from the private sector and \$2.4 million from government agencies). In terms of economic growth, the GTMP will result in a net annual growth of \$437,784 or \$2.8 million in five years.

In conclusion, to truly evaluate the economic efficiency of the GTMP, one would need to include the projected public benefits and compare them to project costs. At this point, there are no efforts to collect these data. However, it is recommended that in future evaluations, an effort to collect this information be attempted.

Table 23. Summary of Five Year Project Costs, Revenues and Impacts

	Year 2013	Year 2014	Year 2015	Year 2016	Year 2017	Total
Costs						
Total Direct Costs CI.1						
To Regulated Community	\$5,988,971	\$6,108,750	\$6,230,925	\$6,355,544	\$6,482,655	\$31,166,845
To FWC	\$738,818	\$753,595	\$768,666	\$784,040	\$799,721	\$3,844,840
Opportunity Costs CI.2						
New Initiative						\$189,407
Agency Grant Match						\$1,836,600

Other Agency						\$3,075,000
Total Opportunity Costs						\$5,101,007
Total Costs						\$40,112,692
Economic Impact CII.1						
Transfers to Private	\$1,991,509	\$2,049,263	\$2,108,692	\$2,169,844	\$2,232,769	\$10,552,078
Transfers to Public	\$603,835	\$621,346	\$639,365	\$657,907	\$676,986	\$3,199,438
Net Private-Public	\$1,387,675	\$1,427,917	\$1,469,327	\$1,511,937	\$1,555,783	\$7,352,640
Economic Growth	\$463,544	\$476,986	\$490,819	\$505,053	\$519,699	\$2,456,101
Revenue						
Economic Impact CII.1						
Private Revenue to FWC	\$603,835	\$621,346	\$639,365	\$657,907	\$676,986	\$3,199,438
Public Revenue to FWC	\$454,881	\$468,073	\$481,647	\$495,615	\$509,988	\$2,410,203
Total of all Revenue						\$5,609,642

Table 24. Jobs Created and Lost per Year by the GTMP

Action	Public Jobs	Private Jobs	Net Jobs
Mitigation Contributions	6.9	-4.2	2.7
Third-party Vendor Payments	-22.8	21.8	-1
Total	-15.9	17.6	1.7

ENDNOTES: Internet URLs Hyperlinked in this Document

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- ¹ <https://www.flrules.org/gateway/ChapterHome.asp?Chapter=68A-27>
 - ² <http://www.myfwc.com/wildlifehabitats/imperiled/listing-action-petitions/>
 - ³ <http://www.myfwc.com/wildlifehabitats/managed/gopher-tortoise/>
 - ⁴ MyFWC.com/GopherTortoise
 - ⁵ <http://www.fws.gov/endangered/what-we-do/hcp-overview.html>
 - ⁶ <http://www.fnai.org/clip.cfm>
 - ⁷ myfwc.com/WILDLIFEHABITATS/Legacy_index.htm
 - ⁸ <http://fwcg.myfwc.com/>
 - ⁹ http://www.fnai.org/pdf/nc/FNAI_NatComGuide_2010.pdf
 - ¹⁰ <http://www.fnai.org/reference-natural-communities.cfm>
 - ¹¹ <http://fga.freac.fsu.edu/georgie/obvmV5/>
 - ¹² http://www.fnai.org/Reference_NC_Sampling_Design.pdf
 - ¹³ http://www.fnai.org/FNAI_RNC_Measures_Definitions.pdf
 - ¹⁴ <http://myfwc.com/conservation/special-initiatives/fwli/archive/taking-action/scrub/>
 - ¹⁵ <http://www.floridaforestservice.com/index.html>
 - ¹⁶ <http://fireinflorida.ifas.ufl.edu/index.html>
 - ¹⁷ <http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/florida/contact/index.htm>
 - ¹⁸ <http://www.fws.gov/fire/pftc/>
 - ¹⁹ http://www.floridaforestservice.com/wildfire/rx_councils.html
 - ²⁰ <http://www.southernfireexchange.org/index.html>
 - ²¹ <http://www.frames.gov/portal/server.pt/community/southern/245>
 - ²² <http://www.fws.gov/southeast/candidateconservation/examples.html>
 - ²³ <http://www.fws.gov/southeast/candidateconservation/>
 - ²⁴ <http://www.fws.gov/endangered/what-we-do/hcp-overview.html>
 - ²⁵ <http://www.fws.gov/endangered/landowners/conservation-banking.html>
 - ²⁶ <http://www.fws.gov/endangered/>
 - ²⁷ <http://www.flsenate.gov/Laws/Constitution#A12S28>
 - ²⁸ <http://sfrc.ufl.edu/>
 - ²⁹ <https://www.flrules.org/gateway/ChapterHome.asp?Chapter=68A-27>
 - ³⁰ <http://www.myfwc.com/wildlifehabitats/imperiled/biological-status/>
 - ³¹ <http://myfwc.com/license/wildlife/protected-wildlife/#sc>
 - ³² <http://myfwc.com/license/wildlife/protected-wildlife/>
 - ³³ <http://myfwc.com/license/wildlife/protected-wildlife/#sc>
 - ³⁴ <http://www.fws.gov/northflorida>
 - ³⁵ <http://www.fws.gov/northflorida>
 - ³⁶ <http://www.fws.gov/northflorida>
 - ³⁷ <http://www.fws.gov/northflorida/IndigoSnakes/indigo-snakes.htm>
 - ³⁸ <http://myfwc.com/license/captive-wildlife/>
 - ³⁹ <http://www.myfwc.com/wildlifehabitats/nonnatives/>
 - ⁴⁰ <http://www.myfwc.com/wildlifehabitats/managed/gopher-tortoise/>
 - ⁴¹ <http://www.myfwc.com/license/wildlife/protected-wildlife/>
 - ⁴² share.myfwc.com/GT2/default.aspx

