

**A Species Action Plan for the
Gopher Frog
*Lithobates capito***

**Final Draft
November 1, 2013**



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EXECUTIVE SUMMARY

The gopher frog (*Lithobates capito*) is a relatively large frog that lives in close association with gopher tortoises (*Gopherus polyphemus*) in xeric (well-drained) upland habitats throughout Florida outside of the Everglades and extreme south Florida. Although recent surveys suggest that Florida populations in the peninsula are relatively secure, this species is declining in other parts of its range and in some parts of the state. This plan addresses known threats to the gopher frog and the need for further investigation of potential threats to the species, as well as gaps in our understanding of species life history and ecology.

Based on the biological review group findings, input from peer reviewers, and information received from the public, the Florida Fish and Wildlife Conservation Commission recommended the gopher frog not be listed as Threatened and that it be removed from the list of Species of Special Concern.

To ensure that the conservation status of the gopher frog is maintained or improved so that the species will not again need to be listed on the Florida Endangered and Threatened Species List, 5 objectives are proposed: 1) maintain and increase the amount of suitable habitat for gopher frogs in the state, 2) fill gaps in our understanding of the species, 3) determine and monitor the status of populations state wide, 4) provide any protections necessary to conserve the species, and 5) encourage public understanding and support for conservation actions. High-priority habitat conservation actions for this species are to evaluate if any additional lands should be protected, increase the amount of gopher frog upland and wetland habitat that is appropriately managed with fire, and to increase restoration efforts on degraded uplands and wetlands. High-priority research and monitoring actions for this species are to conduct research to fill gaps on gopher frog life history, to conduct studies to determine the impacts of translocation on gopher frogs, to determine the taxonomic status of gopher frogs in Florida, and to conduct a study of the gene flow and genetic variation among populations throughout the state. This plan also calls for surveys to determine the status of the gopher frogs in the Panhandle. In order to protect the gopher frog from over-collection and commercialization once it is delisted, this plan calls for a review of existing regulations to determine if additional protections are needed. Staff in FWC's Landowner Assistance Program and Gopher Tortoise Program should be consulted to identify incentives for private landowners to conserve important gopher frog habitat.

This plan details the actions necessary to improve the conservation status of the gopher frog. A summary of this plan will be included in the Imperiled Species Management Plan (ISMP), in satisfaction of the management plan requirements in Chapter 68A-27, Florida Administrative Code, Rules Relating to Endangered or Threatened Species. The ISMP will address comprehensive management needs for 60 of Florida's imperiled species and will include an implementation plan; rule recommendations; permitting standards and exempt activities; anticipated economic, ecological, and social impacts; projected costs of implementation and identification of funding sources; and a revision schedule. The imperiled species management planning process relies heavily on stakeholder input and partner support. This level of involvement and support is also critical to the successful implementation of the ISMP. Any significant changes to this plan will be made with the continued involvement of stakeholders.

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GLOSSARY OF TERMS AND ACRONYMS

BRG: Biological review group, a group of taxa experts convened to assess the biological status of taxa using criteria specified in Rule 68A-27.001, Florida Administrative Code, and following the protocols in the Guidelines for Application of the International Union for Conservation of Nature (IUCN) Red List Criteria at Regional Levels (Version 3.0) and Guidelines for Using the IUCN Red List Categories and Criteria (Version 8.1).

BSR: Biological status review report, the summary of the biological review group's findings. Includes a Florida Fish and Wildlife Conservation Commission (FWC) staff recommendation on whether or not the species status meets the listing criteria in Rule 68A-27.001, Florida Administrative Code. These criteria, based on IUCN criteria and IUCN guidelines, are used to help decide if a species should be added or removed from the Florida Endangered and Threatened Species List. In addition, FWC staff may provide within the report a biologically justified opinion that differs from the criteria-based finding.

Candidate Conservation Agreement: A voluntary agreement between the U.S. Fish and Wildlife Service and one or more parties to address the conservation needs of one or more candidate species, or species likely to become candidates in the near future, for federal listing under the Endangered Species Act.

CCAA: Candidate Conservation Agreement with Assurances. Proactive, voluntary agreements between the U.S. Fish and Wildlife Service and a private party that allows a property owner to voluntarily implement conservation measures on lands that benefit the species in the agreement, while providing regulatory assurances to the landowner should the species become federally listed under the Endangered Species Act.

Commensal: An organism living in a relationship in which one animal derives food, refuge, or other benefits from another animal without hurting or helping the other animal.

DEP: Florida Department of Environmental Protection

Extirpated: Locally extinct. Refers to a species no longer present in a specific part of its original range.

F.A.C.: Florida Administrative Code. The Department of State's Administrative Code, Register and Laws Section is the filing point for rules promulgated by state regulatory agencies. Agency rulemaking is governed by Chapter 120, Florida Statutes, Administrative Procedures Act. Rules are published in the Florida Administrative Code.

FFS: Florida Forest Service, formerly the Florida Division of Forestry.

FNAI: The Florida Natural Areas Inventory, a non-profit organization administered by Florida State University and dedicated to gathering, interpreting, and disseminating information critical to the conservation of Florida's biological diversity.

GLOSSARY OF TERMS AND ACRONYMS

Fragmentation: A process of environmental change, commonly caused by human-related land conversion, where once connected habitats become divided into smaller and more isolated fragments.

F.S.: Florida Statutes

FWC: The Florida Fish and Wildlife Conservation Commission, the state agency constitutionally mandated to protect and manage Florida's native fish and wildlife species.

FWLI: Florida Wildlife Legacy Initiative

FWRI: The Florida Fish and Wildlife Research Institute, the fish and wildlife research branch of the FWC.

GIS: Geographic Information System

GPS: Global Positioning System

Habitat: The area used for any part of the life cycle of a species (including foraging, breeding, and sheltering).

HCP: Habitat Conservation Plan

IFAS: University of Florida's Institute of Food and Agricultural Sciences

ISMP: Imperiled Species Management Plan

IUCN: International Union for Conservation of Nature, a professional global conservation network.

IUCN Red List (of Threatened Species): An objective, global approach for evaluating the conservation status of plant and animal species, the goals of which are to: Identify and document those species most in need of conservation attention if global extinction rates are to be reduced; and provide a global index of the state of change of biodiversity.

LAP: Landowner Assistance Program, a federal cost-share program administered in Florida by the Florida Fish and Wildlife Conservation Commission.

Metapopulation: A group of populations of a species that are connected through the exchange of individuals.

NGO: Non-governmental organization

Recipient site: A property where relocated animals are released.

GLOSSARY OF TERMS AND ACRONYMS

Take: As defined in 68A-1.004, F.A.C. (General Prohibitions). “Taking, attempting to take, pursuing, hunting, molesting, capturing, or killing any wildlife or freshwater fish, or their nests or eggs by any means whether or not such actions result in obtaining possession of such wildlife or freshwater fish or their nests or eggs.”

Translocation: The movement of an animal from where it is found to an entirely new area, for the purpose of establishing a new population.

USFWS: United States Fish and Wildlife Service, the federal agency mandated to protect and manage the nation’s native fish and wildlife resources.

WMD: Water Management District(s)

Xeric: Refers to upland habitats on dry, well-drained soils.

INTRODUCTION

This section provides a brief summary of information on selected aspects of the biology and life history of the gopher frog. For more detailed reviews and information on the biology and conservation of this species, please refer to the [Gopher Frog Biological Status Review Report](#) (Florida Fish and Wildlife Conservation Commission [FWC] 2011) or Jensen and Richter (2005).



Figure 1. Adult gopher frog showing lighter coloration, Hernando County, Florida. Photograph by Kevin Enge, FWC.

Biological Background

Taxonomy and Morphology

Formerly 2 subspecies of gopher frog were thought to occur in Florida, but currently all gopher frogs east of Mobile Bay, Alabama, are considered to be 1 species with no subspecies divisions (Jensen and Richter 2005). The Florida gopher frog (*Rana capito aesopus*) was believed to occur east of the Apalachicola River extending into the southern peninsula, and the dusky gopher frog (*Rana capito sevosa*) was believed to occur west of the Apalachicola River (Conant and Collins 1991). Young and Crother (2001) conducted a genetic study that showed no divisions among populations of *Rana capito* (Le Conte 1855) east of Mississippi. Based on this information, Young and Crother (2001) elevated the Mississippi population to species status under the name *Rana sevosa* (Goin and Netting 1940) and rejected all former subspecies of *Rana capito* as invalid. Frost et al. (2006) used genetic and morphological characteristics to put forward a revised taxonomy of amphibians that removed the gopher frog from the genus *Rana* and placed it in the genus *Lithobates*. The removal of the gopher frog and other frog species from the genus *Rana* is questioned by some taxonomic experts (Pauly et al. 2009). This document uses the name *Lithobates capito* as the scientific name for the gopher frog since it is the name used by the major professional North American herpetological societies in their official list of scientific and common names (Crother 2012). It should be noted that the results of a recent range-wide genetic analysis of the species suggest that gopher frog populations in the Florida peninsula have substantial genetic differences between populations in the Panhandle and in the rest of the range of the species. However, more studies are needed to determine the exact locations of genetic breaks and the degree of genetic separation (S. Richter, Eastern Kentucky University, unpublished data). This plan supports efforts to determine the taxonomic status of the peninsular populations (see [Action 10](#)).

The gopher frog is a relatively large frog, with adults measuring between 64 and 112 mm (2.5 and 4.4 in) from snout to vent (Cash et al. 2008). Gopher frogs range in color from light tan to gray or dark brown with irregular black or dark brown blotches on the back, sides, and legs ([Figures 1 and 2](#)). A raised ridge (dorsolateral fold) runs down each side from behind the eye to the hind leg. Males can be distinguished from females during the breeding season by the presence of dark thumb pads called nuptial pads. Gopher frog tadpoles are greenish gold with irregular, scattered dark spots over the body and tail ([Figure 3](#)). They are difficult to distinguish



Figure 2. Adult gopher frog from Okaloosa County, Florida, showing darker coloration. Photograph by Kelly Jones, Virginia Tech.

from southern leopard frog (*Lithobates sphenoccephalus*) tadpoles but typically have a translucent snout that is absent in leopard frogs. Gopher frog tadpoles also lack facial markings that are typically present on leopard frog tadpoles, a light “mustache” (lines extending from each corner of the mouth) and a light nose spot or vertical stripe. The presence of gopher frogs can be determined by dip-netting for tadpoles, listening for chorusing males during the breeding season, or finding them in gopher tortoise burrows by trapping, cameras, or observation. The breeding call of the male is a deep, snoring sound.

Life History and Habitat

Detailed information on gopher frog life history and habitat requirements has been summarized by Jensen and Richter (2005). Gopher frogs typically inhabit xeric (well-drained) upland habitats occupied by gopher tortoises and in close proximity (< 5 km [3.1 mi]) to suitable breeding wetlands. In Florida, gopher frogs have been found in



Figure 3. Gopher frog tadpole. Photograph by Kevin Enge, FWC.

a wide variety of upland habitats including sandhills, upland pine forests, scrub, xeric hammock, mesic and scrubby flatwoods, dry prairie, mixed hardwood-pine communities, pastures, and various other disturbed habitats that still harbor gopher tortoises (Enge 1997; K. Enge, Florida Fish and Wildlife Conservation Commission [FWC], unpublished data). Suitable breeding wetlands (Figure 6) include a variety of shallow, fishless, and temporary or semi-permanent wetland habitats that have an open canopy and emergent vegetation (Jensen and Richter 2005). Breeding has been observed in depression marshes, basin marshes, wet prairies, dome swamps, upland sandhill lakes, sinkhole ponds, ditches, and borrow pits (FWC 2011).

Gopher frogs spend the majority of the year in the uplands where they shelter in underground burrows. In Florida, gopher frogs primarily use gopher tortoise burrows, although they will use other refugia such as pocket gopher and small mammal burrows, crayfish burrows, stump holes, leaf litter, hollow logs, and clumps of grass (Wright 1932, Carr 1940, Blihovde 2006, Roznik



Figure 4. Gopher frog tadpole undergoing metamorphosis. Photograph by Kevin Enge, FWC.

2007, FWC 2011). Adult gopher frogs feed on invertebrates (primarily insects) and smaller frogs, and often hunt prey inside or near their burrows (Jensen and Richter 2005). During the breeding season, frogs migrate up to 5 km (3.1 mi) to breeding wetlands to mate and lay eggs (Humphries and Sisson 2012). Breeding generally occurs from September to April in northern Florida (Palis 1998, FWC 2011), but often takes place in the summer in central and south Florida (Godley 1992). However, breeding can occur during any time of the year with heavy rains (Jensen and Richter 2005). Studies suggest that gopher frogs reach sexual maturity between 1.5 and 2 years of age (Phillips 1995, Palis 1998, Jensen and Richter 2005). Males attract females for mating at breeding ponds by calling. Once paired with a male, females will deposit a single globular, fist-sized egg mass of 500 to 5,000 eggs attached to submerged or emergent vegetation in the wetland (Palis 1998, Jensen and Richter 2005; [Figure 5](#)). As the egg mass is laid, it is externally fertilized by the male. Eggs hatch within 4 to 5 days and continue development as larvae (tadpoles), which take 3 to 7 months to develop and metamorphose into froglets (Wright 1932, Phillips 1995, Palis 1998). Newly metamorphosed frogs leave the wetlands shortly after transforming and migrate into the uplands, where they shelter in burrows (Roznik and Johnson 2009a). Adults return to the uplands after breeding and may migrate to and from breeding ponds using the same routes (Franz 1986, Palis 1998).

Although the longevity of gopher frogs in the wild is unknown, individuals have lived as long as 7 years in captivity (Jensen and Richter 2005). Predators including eastern newts (*Notophthalmus viridescens*) and aquatic insects have been observed eating gopher frog eggs (Bailey 1989, Richter 2000, Jensen and Richter 2005). Predators of tadpoles include water snakes, predatory fish, and aquatic insects (Aresco and Reed 1998, Jensen and Richter 2005, Gregoire and Gunzburger 2008).



Figure 5. Gopher frog egg mass. Photograph by Aubrey Heupel.



Figure 6. Suitable breeding pond in Ocala National Forest. Photograph by Anna Farmer, FWC.



Figure 7. Sandhill upland habitat. Photograph by Anna Farmer, FWC.



Figure 8. Gopher tortoise burrow. Photograph by Anna Farmer, FWC.

Nearly 75% of froglets leaving a pond were killed by snakes or mammals (Roznik and Johnson 2009b). Adult gopher frogs are preyed upon by water snakes and possibly turtles in breeding ponds (Jensen and Richter 2005). Little information is available about predation on adults in the uplands, although it presumably occurs. Gopher frogs are vulnerable to fire and vehicle mortality when juveniles disperse from ponds and during breeding migrations (Roznik and Johnson 2009b, Humphries and Sisson 2012).

Distribution and Population Status

According to the best available information, the historical range of the gopher frog extends eastward from the Mobile River delta in Alabama across the southeastern Coastal Plain into North Carolina (Jensen and Richter 2005). Discoveries of individuals in central Alabama (1 individual) and the Cumberland Plateau in Tennessee (2 individuals) suggest a more extensive distribution, although these individuals may be genetically distinct from gopher frogs in the Coastal Plain (Mount 1975, Miller and Lamb 2004, Jensen and Richter 2005). In Florida, the gopher frog historically occurred throughout the state except for the Everglades and extreme south Florida (FWC 2011, Krysko et al. 2011; [Figure 9](#)).

The status of the gopher frog is currently being reviewed by the U.S. Fish and Wildlife Service (USFWS) to determine if the species requires federal protection under the Endangered Species Act. In Florida, recent surveys suggest that healthy populations of gopher frogs exist on public lands in peninsular Florida. Surveys from 2006 to 2013 of historical and potential breeding sites in the peninsula have documented breeding in 208 ponds, including many previously undocumented breeding ponds on 43 public lands (K. Enge, unpublished data). With the exception of the Munson Sandhills in Apalachicola National Forest, no recent systematic surveys have been conducted in the Panhandle. Outside of Florida, gopher frogs appear to be declining throughout their range based on the lack of breeding at historical breeding sites and the reduction of their habitat (Jensen and Richter 2005).

Conservation History

In 1976, the Florida Game and Fresh Water Fish Commission (predecessor to the FWC) listed what was then believed to be the eastern subspecies of the gopher frog (*Rana areolata aesopus*) as Threatened. The gopher frog was reclassified as a Species of Special Concern and protected at the species level in 1979, when Florida's imperiled species listing criteria were modified to

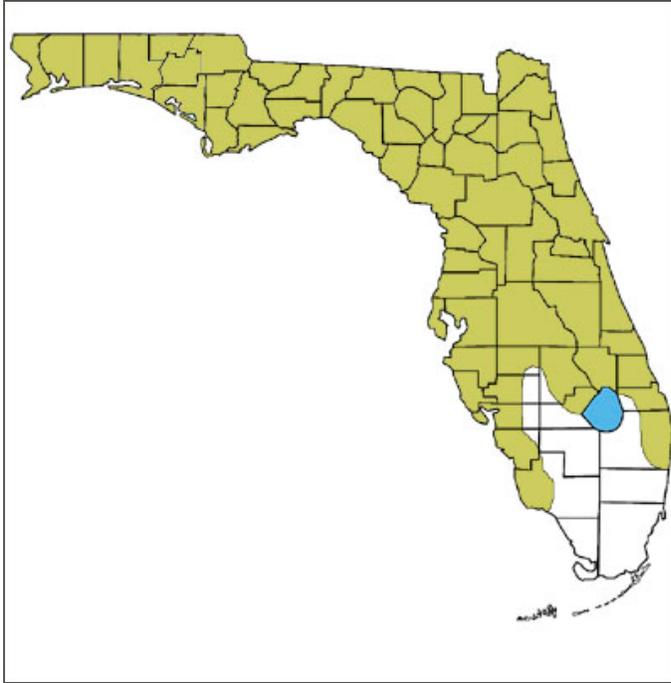


Figure 9. Historical range of the gopher frog in Florida based on historical records and the location of suitable habitat. Map credit: Monica MsGarrity, University of Florida.

include this category. These protections made it illegal to take, possess, transport, or sell this species, its eggs or young, or its parts in Florida without a permit issued by FWC. In 2010, the FWC convened a biological review group (BRG) of experts on the gopher frog to assess the biological status of the species using criteria specified in Rule 68A-27.001, Florida Administrative Code (F.A.C.). The gopher frog BRG concluded from the biological assessment that the gopher frog did not meet any listing criteria, and the gopher frog will be removed from the Species of Special Concern list. This plan recommends reevaluating existing rules and establishing any protections needed to prevent overharvest, over-collection, or commercialization of the gopher frog.

Efforts to protect the gopher tortoise in Florida have undoubtedly benefitted the gopher frog. The take of gopher tortoises has been regulated in Florida since 1972, when harvest of the species was first regulated. A Gopher Tortoise Management Plan was initially approved by the FWC in 2007, and revisions to the plan were approved in 2012. That plan lists conservation actions for both gopher tortoises and commensal species including the gopher frog (FWC 2012) (see [Appendix 1](#)). Currently, both gopher tortoises and their burrows are protected, and a state permitting system provides for the relocation of tortoises from development sites and for the mitigation of tortoise habitat lost to development. Until recently, FWC policy has allowed the gopher frog and other commensal species to be translocated with tortoises from development sites to recipient sites, but concerns about the potential for disease transmission and other possible negative impacts on recipient populations led to an interim policy in 2012 that limited translocation to on-site movements until the effects of translocation on commensal species could be studied ([Appendix 1](#)). The gopher tortoise is currently a candidate species for federal protection under the Endangered Species Act in the eastern portion of its range (it is federally listed as Threatened in the western part of its range). In 2008, a Candidate Conservation Agreement was enacted by many entities including the Department of Defense, U.S. Forest Service, USFWS, FWC, Georgia Department of Natural Resources, South Carolina Department of Natural Resources, Alabama Division of Wildlife and Freshwater Fisheries, tribal organizations, and several non-governmental organizations (NGOs) to coordinate and implement conservation activities for the gopher tortoise.

The gopher frog has also benefitted from state efforts to protect and restore xeric upland and wetland habitats. State land acquisition programs (e.g., Preservation 2000, Florida Forever) have greatly increased the acreage of conservation land over the past 2 decades. Currently, Florida has

over 3.8 million ha (9.3 million ac) of non-submerged public conservation lands, of which over 405,000 ha (1 million ac) are suitable for gopher frogs (B. Stys, FWC, personal communication; Florida Natural Areas Inventory [FNAI] 2012). Statewide, numerous public and private land managers are actively engaged in the restoration of natural habitats. According to a recent report on state lands management, state land managers completed restoration projects on over 18,200 ha (45,000 ac) between 2010 and 2012 (Land Management Uniform Accounting Council, 2012). In addition to work on public lands, several state and federal programs, including FWC's Landowner Assistance Program, the Florida Forest Service's (FFS) Forest Stewardship Program, the USFWS's Partners for Fish and Wildlife Program, and multiple U.S. Department of Agriculture Natural Resources Conservation Service programs assist private landowners with habitat restoration activities on their properties. Several organizations (the Florida Department of Environmental Protection, FFS, The Nature Conservancy, and The Longleaf Alliance) also currently operate fire strike teams in Florida. These teams provide additional trained personnel and equipment for assisting land managers with prescribed fire and other habitat restoration activities. Efforts such as the America's Longleaf Restoration Initiative to re-establish longleaf pine (*Pinus palustris*) forests and restore degraded longleaf pine habitats will also improve and increase the amount of habitat available for gopher frogs.

Threats and Recommended Listing Status

In 2010, the FWC directed staff to evaluate the status of all species listed as Endangered, Threatened, or Species of Special Concern that had not undergone a status review in the past decade. To address this charge, staff conducted a literature review and solicited information from the public on the status of the gopher frog. The FWC convened a biological review group of experts on the gopher frog to assess the biological status of the species using criteria specified in Rule 68A-27.001, F.A.C. This rule includes a requirement for BRGs to follow the Guidelines for Application of the International Union for Conservation of Nature (IUCN) Red List Criteria at Regional Levels (Version 3.0) and Guidelines for Using the IUCN Red List Categories and Criteria (Version 8.1). FWC staff developed a draft Biological Status Review Report (BSR) that included the BRG's findings and a preliminary listing recommendation from staff. The FWC distributed the draft for peer review. The gopher frog BRG concluded from the biological assessment that the species did not meet any listing criteria. The FWC received no information from the public during the information request period. Several peer reviewers did not agree with the findings of the BSR, but did not provide evidence that changed the review finding. Based on the literature review, the BRG findings, and peer-review input, FWC staff recommended the gopher frog not be listed as an imperiled species and that it be removed from the Species of Special Concern List.

Although the BRG did not find that the gopher frog met the criteria for listing, the [BSR](#) identified several threats to the species that will be addressed by this plan. Habitat loss and alteration of xeric upland habitats were identified as the most significant threats to the species in Florida and range-wide. Other threats identified include fire suppression and altered fire regimes in both upland and wetland habitats, wetland destruction and degradation, off-road vehicle use in pond basins, groundwater withdrawals, impacts to wetland and upland habitat from climate changes, fish introductions to breeding wetlands, and disease impacts on populations.

CONSERVATION GOALS AND OBJECTIVES

The BRG found that the gopher frog did not meet the criteria to warrant listing on the Florida Endangered and Threatened Species List.

Goal

The conservation status of the gopher frog is maintained or improved so that the species will not again need to be listed on the Florida Endangered and Threatened Species List.

Objectives

I. Maintain and increase the amount of suitable habitat for gopher frogs in the state.

Rationale

Habitat loss and alteration are the greatest threats to this species in Florida and throughout its range (Jensen and Richter 2005, FWC 2011). Florida's human population is projected to increase from 19 million currently to 36 million by 2060, resulting in the conversion of an additional 2.8 million ha (7 million ac) of land to urban uses, including 1 million ha (2.7 million ac) of natural habitat (Zwick and Carr 2006). These habitat conversions will negatively impact gopher frog populations, resulting in additional population declines unless efforts are made to offset these losses by providing additional suitable habitat through land acquisition, the restoration of degraded lands, and improving habitat management on natural lands.

II. Fill gaps in our understanding of the species.

Rationale

Some aspects of gopher frog ecology are not well understood. In addition, the potential impacts of threats such as climate changes, disease, and groundwater withdrawals on gopher frog populations are unknown. Further research is needed to better understand the basic life history requirements and conservation needs of this species.

III. Determine and monitor the status of the population statewide.

Rationale

Although recent surveys suggest that populations in peninsular Florida are stable, there have not been extensive surveys in the Panhandle, and the status of these populations is unknown. In addition, no systematic monitoring program has been established to track the status of this species over time. Regular monitoring is necessary to determine population trends and assess the need for additional management actions.

IV. Provide any protections necessary to conserve the species.

Rationale

While this species does not meet the criteria for listing, adult gopher frogs can be rare in some populations, making them potentially vulnerable to local extirpation if adults are removed. In order to ensure the persistence of regional populations and that this species will not again need to be listed, it is important to evaluate whether this species needs continued protection from collection, harvest, commercial exploitation, and other forms of direct take.

CONSERVATION GOALS AND OBJECTIVES

V. Encourage public understanding of the species and support for conservation actions.

Rationale

Due to its secretive nature, the gopher frog is not well known or understood by the public. Outreach is needed to make the public aware of the conservation needs, regulations, and identification of this species, as well as engender public support for conservation actions.

CONSERVATION ACTIONS

The following sections describe the conservation actions that will make the greatest contribution toward achieving the conservation objectives. Actions are grouped by category (e.g., Habitat Conservation and Management, Population Management). Action priority, urgency, potential funding sources, likely effectiveness, identified partners and leads for implementation are identified in the Conservation Action Table ([Table 1](#)).

Habitat Conservation and Management

Gopher frogs require both suitable upland and wetland habitats to complete their life cycle and are therefore threatened by loss and degradation in both habitats. In Florida and across its range, the gopher frog has experienced significant losses in both its upland and wetland habitats (Jensen and Richter 2005, FWC 2011). In Florida, gopher frogs are dependent on relatively open xeric upland habitats and are strongly tied to the presence of gopher tortoises (FWC 2011). Although gopher frogs can tolerate some degree of habitat fragmentation and can be found in pastures and other disturbed habitats (FWC 2011), they are not commonly found in areas converted to intensive agriculture, silviculture, or urban areas (Franz and Smith 1999, Wigley et al. 1999, Means and Means 2005; L. Smith, Jones Ecological Research Center, unpublished data). Gopher frogs also appear to avoid fire-suppressed uplands that have become overgrown with hardwoods (Roznik et al. 2009).

In addition to their upland habitat requirements, gopher frogs require the presence of suitable breeding wetlands in close proximity (< 5 km [3.81 mi]) to suitable uplands. Gopher frogs require shallow, fishless, and temporary or semi-permanent wetlands with a hydroperiod of at least 3 months, emergent vegetation, and an open canopy (Jensen and Richter 2005). In order to maintain their suitability, breeding wetlands must be burned regularly when wetlands are dry to prevent shrub encroachment and peat buildup that will decrease the hydroperiod and change the vegetative structure (Means 2008, FWC 2011).

Action 1 Evaluate if any additional lands should be protected for the long-term conservation of the species.

Florida's public conservation lands currently include over 405,000 ha (1 million ac) of suitable gopher frog habitat and probably protect enough habitat to ensure the long-term persistence of the species in Florida (Cox and Kautz 2000, FWC 2011). However, additional lands may need to be protected to create movement corridors between populations and to ensure the persistence of regional populations. Information on gopher frog populations from recent surveys in the peninsula, new surveys in the Panhandle, and information on the location of suitable habitat from geographic information system-based (GIS-based) potential habitat maps should be used to evaluate if any key areas for gopher frog conservation require additional protection. If specific lands are identified for conservation, coordination will be necessary with federal agencies, the state Acquisition and Restoration Council, NGOs, local governments, and FWC programs (Gopher Tortoise Management) to help prioritize land acquisition projects and promote other habitat protection measures (e.g., conservation easements, land use agreements) to protect these identified areas.

Action 2 Increase the amount of gopher frog upland and wetland habitat that is appropriately managed with fire on public and private lands.

Active fire management in xeric uplands and suitable breeding wetlands is necessary to provide the open-canopy conditions preferred by gopher frogs. We define appropriate fire management as that conducted at the right interval, season, and intensity to mimic natural processes. In general, appropriate fire management is defined for each natural community by FNAI's Guide to the Natural Communities of Florida, 2010 Edition. Potential strategies for implementing this action include the support and formation of prescribed fire strike teams to assist public and private land managers, coordination with other land managing agencies to provide any needed equipment and assistance for prescribed fire or restoration activities that return fire function, and provision of training and other forms of support for private landowners that wish to manage their lands with prescribed fire.

Action 3 Increase restoration efforts on degraded xeric upland habitats on public and private lands such that natural plant communities and functions are restored.

Active restoration of degraded xeric upland habitat on public and private lands will increase the amount of available habitat for gopher frogs in the state. Restoration efforts for this species should be focused on areas within 5 km of suitable breeding wetlands or other gopher frog populations, as these areas will have the greatest potential to be recolonized following restoration. Potential strategies for implementing this action include supporting the restoration of native vegetation on degraded lands, hardwood reduction in overgrown habitats using chemical and mechanical methods, and removal of non-native vegetation. Areas with low tortoise densities may also require the restoration of gopher tortoises, although the number of tortoise burrows necessary to support a viable population of gopher frogs is not known and should be investigated to better define gopher frog habitat requirements (see Action 5).

Action 4 Identify and restore potentially suitable breeding wetlands on public and private lands that have become degraded.

Many wetlands that would otherwise be suitable for gopher frog breeding have been impacted by human activities that have altered their hydrology or plant structure or have been polluted or become unsuitable due to the introduction of predaceous fish species. In some cases, these wetlands can be restored so that the available breeding habitat for gopher frogs can be increased. Restoration efforts for this species should be focused on wetlands that currently have or formerly had the [correct vegetation and hydrology to serve as breeding wetlands](#) and which are within 5 km (3.1 mi) of xeric upland habitats that are inhabited by gopher tortoises. Potential strategies for implementing this action include activities that restore hydrological function such as filling ditches, removing encroaching upland vegetation by using chainsaws or other low-impact mechanical methods, restoring native vegetation, removing non-native vegetation, removing predatory fish, eliminating recreational vehicle use of known and potential breeding wetlands, rehabilitating firelines and implementing other activities that restore fire to fire-suppressed wetlands.

Population Management

No population management actions are recommended at this time beyond habitat protection and habitat management for the species. However, important data gaps still exist in our

understanding of Florida’s gopher frog populations, species life history, and potential threats to the species. These data gaps will be addressed by the monitoring and research actions in the following section. Should these research and monitoring actions uncover threats to the species that require specific management actions, those actions will be included in future versions of this plan.

Monitoring and Research

Some aspects of gopher frog life history and ecology are unknown or poorly understood. In addition, the potential impacts of some threats to the species are unknown and require further investigation. The following monitoring and research actions are critical to understanding the requirements of the species and for implementing science-based species management. Results from research will help guide and refine conservation strategies for the species and future versions of this plan.

Action 5 Conduct research to fill data gaps on gopher frog life history.

Although some aspects of the life history and population demographics of the gopher frog are known, considerable gaps in our knowledge still exist. Information is lacking on basic parameters such as longevity, survivorship, reproductive success and recruitment rates, and the degree of connectivity between populations. The current knowledge of dispersal distances in this species is taken mostly from anecdotal evidence and deserves further study, as this is an important parameter used in habitat suitability models. Much has been hypothesized about the metapopulation dynamics (dynamics of multiple interacting populations) of this and other amphibian species; however, little is known about how gopher frog populations are structured, how they interact, population turnover rates, and the role of neighboring populations in preventing local extirpations. The relationship between gopher frogs and different habitat types and gopher tortoise densities is also poorly understood. Much of this information will be challenging to study given current techniques and the secretive nature of this animal, but gathering additional information on life history and population dynamics will lead to a better understanding of the species and enable the development of more refined conservation strategies.

Action 6 Conduct research to better understand the impacts of diseases on gopher frog populations.

Globally, disease is a major threat to amphibians and has been a source of extinctions and declines worldwide (Skerratt et al. 2007, Gray et al. 2009). The impact of disease on gopher frog populations is relatively poorly understood, although large die-offs of gopher frogs have been observed in Florida and in closely related species in other states (Rothermel et al. 2008, FWC 2011). Additional research is needed to understand the types of diseases carried by gopher frogs, their prevalence, and their impact on wild populations.

Action 7 Conduct studies to investigate the effects of anthropogenic water withdrawals on gopher frog populations.

Hydrologic impacts on rivers and lakes and extreme shifts in potentiometric levels (i.e., “groundwater contours”) have been documented in North Florida due to anthropogenic

groundwater withdrawals (Grubs and Crandall 2007). The impacts of these withdrawals on gopher frog breeding wetlands are unknown at this time but may significantly decrease the hydrology and suitability of breeding wetlands that have hydrologic connections to groundwater. Similar threats from water withdrawals may also occur in other parts of the state. Further research is needed to determine the extent to which groundwater withdrawals impact the hydrology of gopher frog breeding wetlands.

Action 8 Conduct studies to investigate the effects of predicted climate changes on gopher frog populations.

Changes in the timing and amount of precipitation, seasonal and maximum temperatures, and sea level are predicted for Florida (U.S. Global Change Research Program 2009). These changes have the potential to alter the hydrology and salinity of breeding wetlands and upland habitat conditions, as well as cause physiological stress, affect developmental rates, and alter behavior (Blaustein et al. 2010, FWC 2011). These changes could cause population declines or extirpations of individual gopher frog populations and significantly threaten the persistence of the gopher frog and other amphibian species in the state. A vulnerability assessment conducted for FWC by the Defenders of Wildlife ranked the gopher frog as “Highly Vulnerable” to climate change due to potential changes in the hydrology of breeding ponds, the possibility of more intense fires that would destroy habitat, and its dependence on the burrows of other species (Dubois et al. 2011). Studies should be conducted to determine if recent climate changes are associated with declines in gopher frog populations, decreases in the availability of suitable breeding wetlands (through altered hydrology or vegetation changes), or changes in reproductive success. These studies should be conducted in conjunction with a statewide monitoring program of the species on public lands (see [Action 13](#)). Although the predicted changes in temperature and precipitation have the potential to cause a mismatch between the availability of water and the timing of breeding for some amphibian species, it is unlikely that gopher frogs will be negatively affected by this in Florida because this species has been observed to breed in response to heavy rainfall events at any time of the year (K. Enge, personal communication).

Action 9 Conduct studies to evaluate the impacts of translocation on gopher frogs.

Until recently, FWC policy allowed for the gopher frog and other commensal species to be translocated along with gopher tortoises from development sites to recipient sites. In 2012, concerns about potential negative impacts of translocations on commensal populations led to a temporary halt to offsite translocations until the effects of translocations could be studied. In order to inform FWC policy, radio-telemetry studies are needed to determine the effects of translocation on the survival, movement, and behavior of gopher frogs. Studies are also needed to determine the reproductive success of translocated frogs and to determine the potential of translocations to spread disease in this species.

Action 10 Determine the taxonomic status of gopher frog populations in Florida.

The results of a recent range-wide genetic analysis of the species suggest that gopher frog populations in the Florida peninsula have substantial genetic differences from populations in the Panhandle and in the rest of the range of the species, but more studies are needed to determine

the exact locations of genetic breaks and the degree of genetic separation (S. Richter, Eastern Kentucky University, unpublished data). Additional studies are underway to better understand the differences between peninsular and Panhandle gopher frogs and to determine their taxonomic relationship. If needed, support (e.g., genetic samples, funding) should be provided for these studies. In addition to providing information on the taxonomic relationships among populations of this species, these studies and [Action 11](#) will provide information necessary for FWC staff to evaluate the genetic consequences of translocating gopher frogs from development sites to recipient sites. If taxonomic studies indicate the presence of multiple species or subspecies in Florida, the state listing status of the gopher frog should be reevaluated.

Action 11 Complete a statewide genetic study of the gopher frog to determine the level of gene flow and genetic variation among populations.

Little information exists regarding the effects of habitat fragmentation and loss on gene flow in this species and on the level of connectivity among populations in different regions of the state. Understanding gene flow among populations is necessary to determine whether populations will remain viable over time and whether additional management actions are needed in cases where populations have become isolated. Genetic diversity is important for the health of wild populations, ensures the ability of populations to adapt to a changing environment, and reduces the negative impacts of deleterious alleles (harmful versions of a gene). In amphibians, reduced genetic diversity has been linked to reductions in a number of fitness traits, including lower survival, decreased reproductive success and larval growth, increased physical abnormalities, and greater susceptibility to disease and pollutants (Allentoft and O'Brien 2010). A genetic study is needed to determine the degree of connectivity among existing populations and the genetic diversity of those populations.

Action 12 Conduct surveys to determine the status of gopher frogs in the Panhandle.

Although recent surveys for gopher frogs have provided information on the status of this species in the peninsula, no recent surveys have been conducted in the Panhandle except for in the Munson Sandhills of Apalachicola National Forest. This is an important data gap in our understanding of the status of gopher frog populations statewide. Previously documented and potential breeding ponds in the Florida Panhandle should be surveyed to determine the status of the species west of the Apalachicola River. If surveys for gopher frogs in the Panhandle indicate significant population declines in this species, the state listing status of the gopher frog should be reevaluated and the need for additional population management actions in the Panhandle should be evaluated.

Action 13 Initiate a monitoring program for gopher frogs on public lands.

Although recent surveys have provided information on the current status and distribution of the gopher frog in the peninsula, no current monitoring program systematically and regularly monitors the status of this species. A statewide monitoring program should be designed and implemented to monitor population trends in this species over time. This monitoring program will provide valuable information on how the species is responding to climate changes and other threats. Potential methods for monitoring this species include call surveys at breeding ponds,

automated recording devices to record calls at breeding ponds, dip-net surveys for tadpoles, surveys for egg masses, traps at burrows, or cameras to scope gopher tortoise burrows. This monitoring program should focus on public lands but should also include monitoring on private lands with suitable habitat where access is voluntarily granted by the landowner.

Rule and Permitting Intent

Protections

During the species' previous listing as a Species of Special Concern, it was protected under Rule 68A 27.005(2)(a), F.A.C., (Designation of Species of Special Concern; Prohibitions; Permits), which prohibits the take, possession, transportation, or sale of gopher frogs, their parts, or their eggs without a specific federal or state permit. Upon removal from the Species of Special Concern List, the gopher frog will no longer receive the protections specified under this rule. Adult gopher frogs can be rare in some populations and this species has experienced declines in some parts of the state due to habitat loss. Thus, over-collection, harvest, or commercialization of this species may put additional pressure on remaining populations. In order to prevent the extirpation of local populations from this threat, the need to protect the gopher frog, specifically, in Rule 68A-26.002, F.A.C. (Regulations Relating to the Taking of Amphibians), should be evaluated.

Action 14 Evaluate and establish any necessary protections from commercialization, collection, harvest, and other forms of take for the gopher frog.

Permitting Threshold

Provisions for permits to take the gopher frog will be as provided in Rule 68A-9.002, F.A.C. This rule authorizes the Executive Director of FWC to issue permits authorizing the taking or possession of wildlife for scientific, educational, exhibition, propagation, management, or other justifiable purposes.

Permitting Exemption for Wildlife Management Activities

Rule 68A-27.007(2)(c), F.A.C., provides that land management activities that benefit wildlife and do not conflict with species management plans are authorized and do not require a permit authorizing incidental take. Gopher frogs are dependent on various habitat management activities including prescribed fire, hardwood control through chemical and mechanical means, sand pine reduction and invasive plant removal, and activities that restore native vegetation. It is our intent that these habitat management activities continue to be authorized without a permit as long as they are not a part of land clearing for development activities and the collapse of gopher tortoise burrows is avoided.

Permitting Exemption for Wildfire Suppression Activities

Rule 68A-27.007(2)(e), F.A.C., provides that wildland fire suppression necessary to ensure public safety during emergency circumstances, including but not limited to, setting counterfires, removing fences and other obstacles, digging trenches, cutting firelines, or using water from public and private sources are authorized and do not require a permit authorizing incidental take despite any other provision of this section. It is our intent that these activities continue to be authorized without a permit because of their importance to human safety.

Scientific Collection Permits

The FWC may issue permits authorizing direct and intentional take of the gopher frog for scientific or conservation purposes that will benefit the survival potential of the species, including collection of scientific data needed for conservation or management of the species. In order to compile additional data regarding gopher frog abundance and distribution, a condition should be added to scientific collecting permits for other trapping efforts (e.g., drift-fence arrays, tortoise trapping, and small mammal surveys) within the gopher frog’s range requiring the notification of FWC when gopher frogs are captured. Existing reporting conditions should be clarified to require the permittee to report specific information including date, location (including global positioning system [GPS] coordinates if possible), and habitat type information to FWC. Digital photos of captured individuals should also be provided for verification of identification and to serve as vouchers for submission to the Florida Museum of Natural History. Permit conditions also could require that if incidental mortality occurs, all gopher frog specimens be provided for genetic studies. This would allow FWC’s Fish and Wildlife Research Institute staff to gather additional data on gopher frog populations. Permits for scientific collecting should be issued when they will help achieve the conservation goal, objective, and actions outlined in this plan.

Action 15 Revise scientific collection permit conditions to provide relevant data on gopher frog captures and mortality.

Law Enforcement

The FWC’s Division of Law Enforcement, in conjunction with federal, state, and local partners, is responsible for enforcing Florida’s wildlife and fisheries laws. FWC’s law enforcement officers are vital to the success of achieving the goals and objectives of this and other management plans because they both ensure the enforcement of conservation laws and educate the public on how to identify and report violations. Training should be provided to FWC law enforcement officers to ensure that they are able to accurately identify Florida’s protected amphibian species, are aware of all applicable rules and regulations pertaining to these species, and are able to explain to the public the ecological importance of Florida’s amphibians.

Action 16 Develop and implement a training program for FWC law enforcement officers on the identification of and rules and regulations pertaining to gopher frogs and other protected amphibian species.

Incentives and Influencing

As discussed in the previous section on habitat conservation and management, private lands can play an important role in achieving the goals and objectives for the gopher frog in Florida. Conservation-based incentives provide a way to engage more private landowners in conservation activities that benefit gopher frogs and other wildlife. These incentives typically consist of financial payments, regulatory assurance, or both that help further the goals and objectives of species’ conservation plans.

Action 17 Coordinate internally with FWC staff that provide technical assistance and outreach to private landowners to identify cost-share opportunities and other incentives for landowners who manage gopher frog habitat on private lands.

The FWC's Landowner Assistance Program provides technical and financial assistance to private landowners who conduct certain wildlife management practices on their lands. In addition to administering internal cost-share programs, this program administers or assists other agencies with the application of several landowner incentive programs that may be useful in achieving the goals and objectives outlined in this plan. Among these are the Forest Stewardship Program, Wildlife Habitat Incentives Program, Environmental Quality Incentives Program, and Partners for Fish and Wildlife Program.

Florida provides tax incentives including property tax exemptions for landowners that put a perpetual conservation easement on their land (Florida Constitution, Article XII, § 2827). This allows landowners interested in maintaining their current conservation practices into the future to receive a break from property taxes for excluding additional development on their property. These tax reduction incentives encourage greater conservation of gopher frog habitat. Written land management plans developed through FWC's Landowner Assistance Program can provide documentation to support applications for these tax incentives.

Mitigation-based incentive programs provide private landowners with economic incentives to maintain or restore lands for a specific conservation purpose. Both the state's wetland mitigation program and FWC's gopher tortoise recipient site program have the potential to benefit gopher frogs. Florida's wetland mitigation program was established in 1993 (s. 373.4135, Florida Statutes [F.S.]) and is administered by the Florida Department of Environmental Protection (DEP) and the water management districts (WMDs). This program allows for both public entities and private landowners to set up mitigation banks in which credits are received for the acres of wetlands restored, created, enhanced, or protected. These wetland credits can then be sold to other entities as a part of the mitigation process when a wetland is impacted by urban development, road-construction, or other activities. FWC's gopher tortoise recipient program provides financial incentives for private landowners to conserve and restore gopher tortoise habitat. Private landowners that have their properties certified as a gopher tortoise recipient site can receive financial compensation when tortoises are transferred from a donor site (generally a site that is being developed). Both programs have the potential to conserve and restore gopher frog habitat and should be evaluated to determine if additional criteria or guidelines can be incorporated to focus conservation efforts on high priority gopher frog habitats.

Action 18 Coordinate internally with FWC's Gopher Tortoise Management Program to identify opportunities for conserving important gopher frog habitat.

Action 19 Coordinate with DEP and WMD staff and evaluate wetland mitigation banks as means to protect gopher frog breeding wetlands.

Because the USFWS is reviewing the evidence for listing the gopher frog as Threatened under the Endangered Species Act, Habitat Conservation Plans (HCPs) and Candidate Conservation Agreements with Assurances (CCAA) may provide incentives for private landowners to conduct activities that benefit gopher frogs on private lands. HCPs are planning documents developed during the application process for an incidental take permit for a federally listed species. These plans outline the effects of anticipated future impact and proposed actions to be undertaken to minimize and mitigate such impacts. HCPs can apply to both listed and non-listed species, including those that are candidates or have been proposed for listing. CCAs are proactive,

voluntary agreements between the USFWS and a private party that allows a property owner to voluntarily implement conservation measures on lands that benefit the species in the agreement, while providing regulatory assurances to the landowner should the species become federally listed under the Endangered Species Act.

Action 20 Coordinate with FWC and USFWS staff and evaluate HCPs and CCAAs as means to provide a conservation benefit for gopher frogs and provide incentives to private landowners.

Action 21 Implement as appropriate HCPs and CCAAs to benefit the conservation of gopher frogs with interested landowners.

Education and Outreach

Education is critical to public awareness of the gopher frog protection status and habitat needs. Well-informed citizens can take actions to support gopher frog conservation efforts and management objectives. Both formal and informal settings can serve as opportunities to inform the public.

The gopher frog is an elusive species that spends most of its time underground in burrows. This species is seldom seen and not well understood by the public. Education and outreach are needed in order to inform the public about this species and engage them in efforts to conserve it. A biological species profile, including photos and distribution maps, is available on FWC's imperiled species webpage. Additional outreach materials should be prepared to educate the public about this species including periodic press releases on actions taken to conserve the species, postings on social media sites, and other materials that can be distributed to the public.

Action 22 Create and distribute outreach materials to provide information on the identification, distribution, biology, and threats to this species for the general public.

Coordination with Other Entities

Gopher frogs inhabit lands that are managed by multiple public agencies, non-profit organizations, and private entities. Coordination and partnership with both public and private land managers will be necessary to implement the [habitat conservation](#) measures and [monitoring and research](#) activities described in the previous sections of this plan. In addition, Florida has numerous academic institutions and researchers capable of conducting the research and monitoring activities described in this plan.

Table 1. Gopher Frog (*Lithobates capito*) Conservation Action Table

NOTE: An explanation of acronyms used is below the table.

Objective(s) Addressed	Team Assigned Priority Level	Action Item Number	Action Items	Conservation Action Category	Ongoing, Expanded or New Effort?	Authority	Man Power	Estimated Cost To Implement	Funding Source(s)	Lead for Implementation: FWC Program(s) and/or Section(s)	External partners	Likely Effectiveness	Feasibility	Urgent?
1	1	1	Evaluate if any additional lands should be protected for the long-term conservation of the species. (Informed by Action 12)	Habitat Conservation & Mgmt	NEW	YES	YES	\$0-25k	Existing budget	FWRI, HSC (SCP, Land Acquisition and Planning)	TBD	Medium/Low. The effectiveness of this action will depend the willingness of landowners to partner in this effort and the funding/incentives available for the long-term protection of identified lands. Funds for state land protection have been scarce in recent years.	Highly feasible. FWC has the resources in place to complete this action.	NO; Immediate survival is not under threat, however this action should be done as soon as possible to further prevent the development of lands that are of key importance to the persistence of regional populations.
1	1	2	Increase the amount of gopher frog upland and wetland habitat on public and private lands that is appropriately managed with fire.	Habitat Conservation & Mgmt	EXPANDED	NO	YES	\$100k+	Unknown	HSC (WHM, LAP, Legacy, Gopher Tortoise Program)	DEP, FFS, The Nature Conservancy, The Longleaf Alliance, USFWS, USDA (NRCS & USFS), DOD, private landowners	High. Increasing the amount of wetland and uplands that are appropriately burned will increase the amount of habitat and breeding areas available to the species.	Feasible. FWC and other partners have programs in place to complete this action, but substantial funding will be needed.	NO; Immediate survival is not under threat, however the long-term survival of this species is dependent on this action.
1	2	3	Increase restoration efforts on degraded xeric upland habitats on public and private lands such that natural plant communities and functions are restored.	Habitat Conservation & Mgmt	EXPANDED	NO	YES	\$100k+	Unknown	HSC (WHM, LAP, Legacy, Gopher Tortoise Program)	DEP, FFS, The Nature Conservancy, The Longleaf Alliance, USFWS, USDA (NRCS & USFS), DOD, private landowners	High. Restoring uplands will increase the amount of habitat available to the species.	Feasible. FWC and other partners have programs in place to complete this action, but substantial funding will be needed.	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.
1	2	4	Identify and restore potentially suitable breeding wetlands on public and private lands that have become degraded.	Habitat Conservation & Mgmt	EXPANDED	NO	YES	\$100k+	Unknown	HSC (WHM, AHRE, LAP, Legacy)	DEP, FFS, The Nature Conservancy, USFWS, USDA (NRCS & USFS), DOD, private landowners	High. Restoring wetlands will increase the amount of breeding areas available to the species.	Feasible. FWC and other partners have programs in place to complete this action, but substantial funding will be needed.	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.
2	2	5	Conduct research to fill data gaps on gopher frog life history.	Monitoring & Research	NEW	YES	YES	TBD	Grants, existing budget, unknown	FWRI, HSC (SCP)	Florida universities	Medium/High. Gathering additional information on life history and population dynamics will lead to a better understanding of the species and enable the development of more refined conservation strategies.	Feasible. FWC has existing relationships and programs in place to complete this action, but substantial funding will be required.	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.
2	3	6	Conduct research to better understand the impacts of diseases on gopher frog populations.	Monitoring & Research	EXPANDED	YES	YES	TBD	Grants, existing budget, unknown	FWRI, HSC (SCP)	Florida universities	Unknown. If negative impacts from disease are detected, they may be difficult to mitigate.	Feasible, but difficult due to the lack of information currently known about amphibian diseases and the rarity in which amphibian die-offs are encountered.	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.
2	3	7	Conduct studies to investigate the effects of anthropogenic water withdrawals on gopher frog populations.	Monitoring & Research	NEW	YES	YES	TBD	Grants, unknown	FWRI, HSC (SCP)	Florida universities, water management districts, various public and private landowners	Unknown. If negative impacts from water withdrawals are detected, they may be difficult to mitigate.	Feasible. FWC has existing relationships and programs in place to complete this action, but adequate funding will be required.	Yes; these withdrawals may significantly affect breeding wetlands by decreasing the hydrology and suitability of breeding wetlands that have hydrologic connections to groundwater.
2	3	8	Conduct studies to investigate the effects of predicted climate changes on gopher frog populations.	Monitoring & Research	NEW	YES	YES	TBD	Grants, existing budget, unknown	FWRI, HSC (SCP)	Florida universities, USGS (ARMI)	Unknown. If negative impacts from climate change are detected, they may be difficult to mitigate.	Feasible. FWC has existing relationships and programs in place to complete this action, but adequate funding will be required.	YES; climate changes could potentially cause the extirpation of individual gopher frog populations or significantly threaten the persistence of the gopher frog and other amphibian species in the state.
2	2	9	Conduct studies to evaluate the impacts of translocation on gopher frogs.	Monitoring & Research	EXPANDED	YES	YES	\$25-50k	Grants, existing budget, unknown	FWRI, HSC (Gopher Tortoise Program)	FWRI is currently conducting a pilot study of the effects of translocation on gopher frog movement and survival.	Medium. This study will determine if gopher frog individuals and populations are negatively affected by translocations and help FWC staff to determine if translocation is an appropriate policy for gopher frogs found on development sites.	Feasible. FWC has existing relationships and programs in place to complete this action, but adequate funding will be required.	NO; Immediate survival is not under threat, however this action will increase our understanding of the species.

Table 1. Gopher Frog (*Lithobates capito*) Conservation Action Table

Objective(s) Addressed	Team Assigned Priority Level	Action Item Number	Action Items	Conservation Action Category	Ongoing, Expanded or New Effort?	Authority	Man Power	Estimated Cost To Implement	Funding Source(s)	Lead for Implementation: FWC Program(s) and/or Section(s)	External partners	Likely Effectiveness	Feasibility	Urgent?
2	1	10	Determine the taxonomic status of gopher frog populations in Florida.	Monitoring & Research	ONGOING	YES	YES	TBD	Grants, existing budget, unknown	FWRI, HSC (SCP)	Dr. Stephen Richter (Eastern Kentucky University) has a study in progress, researchers at other universities	High. Taxonomic studies are needed to determine the status of this species in Florida.	Feasible. FWC has existing relationships and programs in place to complete this action, but additional funding may be required.	Yes; if the taxonomy changes and multiple species/evolutionary significant units are identified in Florida, some may be more imperiled than others.
2	2	11	Complete a statewide genetic study of the gopher frog to determine the level of gene flow and genetic variation between populations.	Monitoring & Research	ONGOING	YES	YES	\$25-50k	Grants, existing budget	FWRI, HSC (SCP)	Study in progress. FWRI is partnering with Dr. Stephen Richter of Eastern Kentucky University and Dr. Stacey Lance of the Savannah River Ecology Lab.	High. Understanding gene flow among populations is necessary to determine whether populations will remain viable over time and whether additional management actions are needed.	Feasible. FWC has existing relationships and programs in place to complete this action, but adequate funding will be required.	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.
3	1	12	Conduct surveys to determine the status of gopher frogs in the panhandle.	Monitoring & Research	ONGOING	YES	YES	\$0-25k	Grants, existing budget	FWRI, HSC (SCP)	FWRI will begin surveys in the Panhandle in December 2013. Partners include various public and private landowners in the Panhandle.	High. Surveys will enable FWC staff to determine the status of the species in the panhandle and evaluate whether additional management actions are needed.	Feasible. FWC has existing relationships and programs in place to complete this action, but additional funding may be required.	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.
3	3	13	Initiate a monitoring program for gopher frogs on public lands.	Monitoring & Research	EXPANDED	YES	YES	TBD	Grants, existing budget, unknown	FWRI, HSC (SCP)	Public and private landowners	High. This monitoring program will provide information on how the species is responding to climate changes and other threats.	Feasible. FWC has existing relationships and programs in place to complete this action, but adequate funding will be required.	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.
4	1	14	Evaluate and establish any necessary protections from commercialization, collection, harvest and other forms of take for the gopher frog.	Protections & Permitting	EXPANDED	YES	YES	\$0-25k	NA	HSC (SCP), LE	NA	Medium/High. This action will prevent the local extirpation of populations due to over collecting as long as new rules are enforced.	Feasible. FWC can easily modify existing rules to complete this action, but proper training will need to be provided to law enforcement officers (See Action 16).	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.
4	4	15	Revise scientific collection permit conditions to provide relevant data on gopher frog captures and mortality.	Protections & Permitting	EXPANDED	YES	YES	\$0-25k	NA	HSC (SCP), FWRI	NA	Low/Medium. Effectiveness depends on the willingness of permittees to comply. Compliance will need to be enforced by permitting staff.	Feasible. FWC can modify the permit process to complete this action.	NO; this action will not directly affect the survival of the species but will increase our understanding of the species.
4,5	1	16	Develop and implement a training program for FWC law enforcement officers on the identification of and rules/regulations pertaining to gopher frogs and other protected amphibian species.	Law Enforcement	EXPANDED	YES	YES	\$0-25k	Existing budget	HSC (SCP), LE	NA	Medium/High. Since Florida has a number of frogs that are similar to this species, effectiveness depends on the quality of instruction and training materials provided to law enforcement officers.	Feasible. Knowledgeable staff can provide training to FWC law enforcement officers.	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.
1	1	17	Coordinate internally with FWC staff that provide technical assistance and outreach to private landowners to identify cost share opportunities and other incentives for landowners who manage gopher frog habitat on private lands.	Incentives & Influencing	EXPANDED	YES	YES	\$0-25k	Existing budget	HSC (LAP, SCP)	NA	Medium/High. The effectiveness of this action will depend the willingness of landowners to partner in this effort and the funding/incentives available.	Feasible. FWC has existing relationships and programs in place to complete this action.	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.
1	2	18	Coordinate internally with FWC's gopher tortoise management program to identify opportunities to conserve important gopher frog habitat.	Incentives & Influencing	EXPANDED	YES	YES	\$0-25k	Existing budget	HSC (SCP, Gopher Tortoise Program)	NA	Low/Medium. Coordination may not increase effectiveness since recipient sites are determined by landowner participation.	Feasible. FWC has existing relationships and programs in place to complete this action.	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.
1	3	19	Coordinate with DEP and WMD staff and evaluate wetland mitigation banks as means to protect gopher frog breeding wetlands.	Incentives & Influencing	EXPANDED	NO	YES	\$0-25k	Existing budget	HSC (OCPS, SCP)	DEP, WMD	Unknown	Feasible. An existing external program administers the state wetland mitigation bank program, and existing FWC staff can coordinate with them.	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.
1	4	20	Coordinate with FWC and USFWS staff and evaluate Habitat Conservation Plans (HCPs) and Candidate Conservation Agreements with Assurances (CCAA) as means to provide a conservation benefit for gopher frogs and provide incentives to private landowners.	Coordination with Other Entities, Incentives & Influencing	EXPANDED	NO	YES	\$0-25k	Existing budget	HSC (SCP)	USFWS, private landowners	Low/Medium. Effectiveness will depend on the willingness of private landowners to participate.	Feasible. FWC has existing relationships and programs in place to complete this action.	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.

Table 1. Gopher Frog (*Lithobates capito*) Conservation Action Table

Objective(s) Addressed	Team Assigned Priority Level	Action Item Number	Action Items	Conservation Action Category	Ongoing, Expanded or New Effort?	Authority	Man Power	Estimated Cost To Implement	Funding Source(s)	Lead for Implementation: FWC Program(s) and/or Section(s)	External partners	Likely Effectiveness	Feasibility	Urgent?
1	4	21	Implement as appropriate Habitat Conservation Plans (HCPs) and Candidate Conservation Agreements with Assurances to benefit the conservation of gopher frogs with interested landowners.	Coordination with Other Entities, Incentives & Influencing	EXPANDED	NO	YES	\$0-25k	Existing budget	HSC (SCP)	USFWS, private landowners	Low/Medium. Effectiveness will depend on the willingness of private landowners to participate.	Feasible. FWC has existing relationships and programs in place to complete this action.	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.
5	5	22	Create and distribute outreach materials to provide information on the identification, distribution, biology, and threats to this species for the general public.	Education & Outreach	EXPANDED	YES	YES	\$0-25k	Existing budget, unknown	HSC (SCP, CPS, CR)	IFAS	Low. The gopher frog is a small, uncharismatic species that is unlikely to garner significant public support.	Highly feasible. FWC already has programs in place to conduct this action. Additional funding may be required to create printed outreach materials.	NO; Immediate survival is not under threat, however this action will be beneficial to the long-term survival of this species.

Acronyms used in this table:

- AHRE: Aquatic Habitat Restoration and Enhancement, Conservation Planning Services, a section of the Florida Fish and Wildlife Conservation Commission's Division of Habitat and Species Conservation
- ARM: Amphibian Research and Monitoring Initiative, a program within the U.S. Geological Survey
- CPS: Conservation Planning Services, a section of the Florida Fish and Wildlife Conservation Commission's Division of Habitat and Species Conservation
- DEP: Florida Department of Environmental Protection
- DOD: Department of Defense
- FFS: Florida Forest Service
- FWC: Florida Fish and Wildlife Conservation Commission
- FWR: Fish and Wildlife Research Institute, the research branch of the Florida Fish and Wildlife Conservation Commission
- HCP: Habitat Conservation Plan
- HSC: Habitat and Species Conservation, a Division of the Florida Fish and Wildlife Conservation Commission
- IFAS: Institute of Food and Agricultural Sciences, a program administered by the University of Florida
- NA: Not applicable
- NRCS: National Resource Conservation Service
- OCPS: Office of Conservation Planning Services, a section of the Florida Fish and Wildlife Conservation Commission's Division of Habitat and Species Conservation
- SCP: Species Conservation Planning, a section of the Florida Fish and Wildlife Conservation Commission's Division of Habitat and Species Conservation
- TBD: To be determined
- USDA: United States Department of Agriculture
- USFS: United States Forest Service
- USFWS: United States Fish and Wildlife Service
- USGS: United States Geological Survey
- WHM: Wildlife and Habitat Management, a section of the Florida Fish and Wildlife Conservation Commission's Division of Habitat and Species Conservation
- WMD: Water Management District(s)

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APPENDICES

Appendix 1. Relevant information about the gopher frog that is included in Chapter 5 of the FWC Gopher Tortoise Management Plan 2012 (Gopher Tortoise Commensal Species).

Commensal Ecology

The presence of gopher frogs is closely linked to the presence of gopher tortoises, and this species relies extensively on gopher tortoise burrows for shelter and, to some degree, food (Godley 1992). These frogs will occasionally use mammal and crayfish burrows and other natural refugia (Carr 1940, Blihovde 2006, Roznik and Johnson 2009). The survival of newly metamorphosed gopher frogs is dependent on their ability to locate and use gopher tortoise burrows and other underground refugia (Roznik and Johnson 2009).

Considerations for Limited Relocation of Gopher Frogs

Limited relocation may be authorized by FWC in concert with permitted gopher tortoise relocation activities and specified on the gopher tortoise relocation permit. This is because gopher frogs are most commonly encountered during tortoise capture, either in bucket traps or during burrow excavation. They can also be trapped by placing a funnel trap in the mouth of the burrow or by using drift fences in combination with buckets or funnel traps to intercept their seasonal migrations to breeding ponds. Frogs may be secured in plastic containers (1 frog per container) with a wet paper towel soaked with non-chlorinated water (bottled water, filtered water, or well water). Containers with frogs should be of a length that is at least double the body length, with a width that is equal to the body length, and a height that will permit the animal to sit naturally with head clearance. Containers with frogs should have air holes in the lid and/or sides of the container that are sufficient for ventilation. In general, containers with frogs can be kept under the same conditions as gopher tortoises for transport, but frog containers must be cleaned and new wet paper towels replaced daily to prevent desiccation of the animals. Agents who undertake tortoise relocations in central and southern Florida should be aware of three nonnative amphibians (Cuban treefrog, greenhouse treefrog, and cane, giant, or marine toad) that may be confused with gopher frogs. These nonnative species should not be relocated but must be either euthanized or placed with a properly permitted individual or organization. Gopher frogs should be relocated to an area where active gopher tortoise burrows are within 2 km (1.2 mi) of fish-free, isolated wetlands that are not separated by any significant barriers to frog movement (*e.g.*, no major roads or rivers). The relocation site should be as close to the capture site as possible, and major river drainages should not be crossed. Frogs should be released directly into the mouth of the burrow at the recipient site, but avoid releasing more than 1 frog into a burrow.

Conservation and Research Actions

Determine the effects of relocation on the survivorship and behavior for both relocated individuals and resident gopher frogs in recipient populations.

Little is known about the effects of relocation on this species. Additional studies are needed to determine:

- Movements and behavior of relocated gopher frogs and individuals in recipient populations.

- Survivorship of relocated gopher frogs and any impacts of relocated individuals on survivorship in the recipient population.
- Success of relocated adults at finding wetland breeding sites and success of breeding of relocated individuals at recipient sites.
- Relationships between habitat variables and gopher tortoise density on survivorship of relocated frogs.

Develop effective relocation strategies for the gopher frog.

No relocation guidance has been developed for the gopher frog. Research is necessary to determine if relocation is appropriate for this species. If experimental relocations indicate that relocation is a viable option for this species, research should be conducted to determine the most effective relocation method for gopher frogs.

Assess disease transmission risk factors and disease mitigation strategies for gopher frog relocations.

Disease transmission within gopher frog populations is poorly understood. Factors associated with disease transmission should be studied and, if possible, effective strategies for decreasing disease transmission should be developed before relocating this species.

Interim FWC Policy on the Relocation of Priority Commensals

The FWC has permitted the humane relocation of gopher tortoises since the mid-1980s. Along with the gopher tortoise, a “suite of species,” or commensals, was also permitted for relocation. Specifically, state-listed species were authorized for relocation with the gopher tortoises when captured incidentally during authorized gopher tortoise capture methods. These state-listed species included the Florida mouse, gopher frog, and pine snake; and prior to 2009, also included the eastern indigo snake. Although the relocation of these animals has occurred, no follow-up monitoring was required. Therefore, little to nothing is known about the survival of these relocated animals and their impact on resident individuals or populations. Furthermore, little is known how commensal species respond to relocation, in particular the Florida mouse, gopher frog, and pine snake, and little research has been conducted on the best methods for relocating these species. Concerns exist about the potential impacts to resident populations, genetic boundaries, and minimizing the potential spread of disease, because these factors are poorly understood. For these reasons, interim guidelines for limited relocation are provided until the individual species management plans are developed and approved by FWC’s Commission*. Once the species plans are approved, this interim guidance will be re-evaluated to ensure that all aspects of commensal conservation are considered, and changes to this policy will be amended in the future as needed. The FWC will work with stakeholders from the Gopher Tortoise Technical Assistance Group (GTTAG) and species experts from the scientific/academic communities to develop guidance that is best for species conservation while ensuring its practicability for the regulated community.

**Note that individual Species Management Plans have been replaced by individual Species Action Plans, which are a component of a single, comprehensive Imperiled Species Management Plan. See [Executive Summary](#) for more detailed explanation.*

Until more permanent guidance is developed and approved by FWC's Commission, the priority commensals that do not require a separate permit from FWC or the USFWS will be authorized for limited relocation under FWC-issued gopher tortoise relocation permits. The FWC gopher tortoise permits do not authorize release of any animal onto properties not specified in the issued permit. One type of gopher tortoise relocation permit (for temporary exclusion) does allow gopher tortoises to be temporarily relocated to adjacent sites only with written permission from the landowner. This written permission must be included with the permit application in order to obtain FWC authorizations needed for relocation on adjacent habitat. Species that will be authorized include the Florida mouse, gopher frog, and pine snake. No other species will be authorized for limited relocation under gopher tortoise permits, and a separate permit may be needed in order to perform relocation (see specific species information above under "Regulation"). Upon approval of the Gopher Tortoise Management Plan at the scheduled 5 September 2012 FWC Commission meeting, this *Interim FWC Policy on the Relocation of Priority Commensals* will supersede the guidelines for commensals provided in Appendix 9, *Handling of Commensal Species during Relocations* of the Gopher Tortoise Permitting Guidelines (April 2008, revised November 2011).

Limited Relocation Guidance

Limited relocation helps remove captured commensals from harms' way while minimizing the threats to individuals and populations (e.g., by lessening potential impacts of competition with resident populations, crossing genetic boundaries, and possible spread of disease). Different permit options are available for the relocation of gopher tortoises depending on the type and extent of impact to the gopher tortoise and habitat on which it depends. Gopher tortoise relocation permits are described in the Gopher Tortoise Permitting Guidelines (April 2008, as amended) available at the [FWC's gopher tortoise webpage](#). The following interim guidance only applies to listed and non-listed commensals that are incidentally captured during permitted gopher tortoise relocation activities. Trapping or capturing these species associated with any other activity requires a separate permit from FWC's Protected Species Permitting section.

To accommodate various project types and permit scenarios, FWC has developed interim guidance (see *Table* on following page) for limited relocation of commensals based on post-development site characteristics and species identity. Additional species-specific considerations for relocations are included above in the sections for priority commensal species. Species-specific guidelines for permitting relocations and research are forthcoming and will be developed as management plans are finalized for listed commensal species. For the interim, the following guidance is provided so that animals encountered during gopher tortoise trapping and relocation efforts are appropriately handled and released.

Table. Interim guidance for limited relocation of commensals based on post-development site characteristics and species identity.

Post-development site characteristics	<i>If a gopher tortoise burrow will be impacted from development activities and some habitat will remain on-site</i>	<i>If a gopher tortoise burrow will be impacted from development activities and adjacent habitat is available</i>	<i>If a gopher tortoise burrow will be impacted/destroyed from development activities and no habitat will remain</i>
Gopher frog	Any incidentally captured gopher frog should be released on-site or allowed to escape unharmed if some habitat will remain post-development activities.	Any incidentally captured gopher frog should be released on-site or allowed to escape unharmed if some habitat will remain post-development activities, within 2 km (1.2 mi) of capture site.	Any incidentally captured gopher frog should be allowed to escape unharmed or donated to a facility for educational or research purposes (permit required for receiving facility).

Appendix 1, Literature Cited

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