Florida's Imperiled Species Management Plan

2016-2026

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Florida's Imperiled Species Management Plan

A comprehensive, integrated approach for the conservation of state-listed species

November, 2016

Amendments incorporated December, 2018

Florida Fish and Wildlife Conservation Commission

Financial support for this plan's development was provided by the Florida Fish and Wildlife Conservation Commission and the U.S. Fish and Wildlife Service's State and Tribal Wildlife Grants Program

Acknowledgements

Florida's Imperiled Species Management Plan is the culmination of significant effort of many individuals within and outside of the Florida Fish and Wildlife Conservation Commission. The ongoing, in-depth involvement of stakeholders and partners was key to this plan's publication. In addition, the plan's authors would like to thank leaders within FWC, who have continually supported the plan's conception and development; staff from many agency divisions, who provided valuable expertise and input; and the numerous partners that devoted time to reviewing and improving drafts.

Many worked diligently, together and with the authors, to answer the challenge of conceptualizing this plan. These include Andrea Alden, David Arnold, Mark Barrett, Robin Boughton, Brian Branciforte, Mike Brooks, Curtis Brown, Deborah Burr, Ryan Butryn, Scott Calleson, Caly Coffey, Terry Doonan, Thomas Eason, Jim Estes, Ann Forstchen, Kipp Frohlich, Roland Garcia, Greg Gibson, Judy Gillan, Bob Glazer, Jennifer Goff, Caroline Gorga, Bonita Gorham, Jessica Graham, Whitney Gray, Andrew Grayson, Brad Gruver, Dave Hankla, Diane Hirth, Ted Hoehn, Cavell Kyser, Jerrie Lindsey, Gil McRae, Maria Merrell, Ron Mezich, Kyle Miller, Emily Norton, Tim O'Meara, Tom Ostertag, George Otto, Kate Haley Parsons, Chris Paxton, Joe Prenger, Kelly Rezac, Fred Robinette, Jim Rodgers, Scott Sanders, Steve Shea, Ben Shepherd, Elizabeth Slack, Brian Smith, Kent Smith, Lawson Snyder, Beth Stys, Dan Sullivan, Mary Truglio, Bill Turner, Shannon Whaley, Amber Whittle, Angela Williams, Shannon Wright, and Michael Yaun. Dr. Michael Thomas, of Environmental Economics, Inc., developed the impacts assessment.

Primary authors of Florida's Imperiled Species Management Plan are Laura Barrett, Claire Sunquist Blunden, Brie Ochoa, and Melissa Tucker.

Recommended citation:
Florida Fish and Wildlife Conservation Commission. 2016. Florida's Imperiled Species Management Plan. Tallahassee, Florida.

Cover photograph by David Moynahan, Florida Fish and Wildlife Conservation Commission.

Foreword

The Florida Fish and Wildlife Conservation Commission (FWC) has a long history of actively conserving a broad diversity of fish and wildlife resources including nongame and imperiled species. We know Florida's citizens and visitors value these wildlife resources and particularly appreciate conservation efforts to maintain species that are imperiled and need more attention and support. To honor the public trust in this regard, FWC has dedicated increasingly significant work and funding to support the conservation of nongame and imperiled species and the natural communities they inhabit. These efforts, along with strong support from partners and stakeholders, comprise a sense of community ownership of nongame wildlife and imperiled species that will help ensure their long-term survival and welfare.

Florida law confirms the importance of protecting and conserving imperiled wildlife species. In 2010, FWC approved revised rules directing how the agency evaluates, lists, and protects these species, including the development of management plans for species listed as Threatened by the state, and for species being removed from the state imperiled species list. Since that time, FWC staff has provided qualified expertise necessary to complete Florida's Imperiled Species Management Plan (ISMP), representing FWC's first comprehensive approach to the management of multiple state-listed species.

The resulting ISMP has benefitted greatly through wide-ranging partner engagement that has further galvanized broad community ownership and support for long-term wildlife conservation efforts. Stakeholders have been actively involved since the ISMP's initiation, and their feedback has been continually sought and incorporated throughout the plan's development. The ISMP was developed with the continual application of science-based decision-making. When integrated with the insightful input of stakeholders, this approach has resulted in a more comprehensive, highly inclusive, and scientifically robust approach to planning for conservation and recovery of multiple state-listed species.

The ISMP identifies concentrated, species-specific conservation actions as well as broad, integrated strategies. It directs FWC's work for state-listed species, which includes leading implementation of the conservation actions identified, as well as implementing Species Conservation Measures and Permitting Guidelines: measures designed to facilitate conservation through voluntary actions and permitting. The ISMP will be implemented with intentional focus on areas managed for conservation and simultaneous cooperation with private landowners to ensure the greatest level of conservation is achieved as cost effectively as possible. While successful implementation of the ISMP will be achieved primarily through nonregulatory means, some elements of the plan, such as protecting species from unauthorized take, or mechanisms to authorize allowable incidental take, require some regulatory framework and associated rules.

Our state-listed species exist in the very locations and habitats where many of us enjoy fishing, hunting, boating, wildlife viewing, and other outdoor recreational activities. These places are so valuable to Floridians and our visitors, and a big part of that value is knowing we share them with diverse, healthy, and interesting wildlife communities. This plan is designed to ensure the long-term stability of these special communities and, in doing so, continue bringing value and enrichment to the quality of life we enjoy in Florida.

Nick Wiley
Executive Director
Florida Fish and Wildlife Conservation Commission

Executive Summary

Florida's Imperiled Species Management Plan (ISMP) is the result of a progressive approach to Endangered and Threatened species management in Florida. For the first time, conservation goals, and actions necessary to achieve them, are published for Florida's state-listed species (see the Species Action Plans [SAPs]). Additionally, a strategic, comprehensive plan to improve conditions for imperiled species is presented here in framework for implementation over the next 10 years. This plan, along with the supporting Species Action Plans, addresses the needs of 57 species.

This plan focuses primarily on improving the conservation status of Florida's imperiled wildlife through reducing the risk of extinction, maintaining sufficient habitat, and improving public and partner support of conservation efforts. To achieve this, ISMP objectives focus on two key areas: filling data gaps necessary to improve conservation and management, and maximizing conservation through directed communication, outreach, and management. While these objectives may emphasize public conservation areas for implementation, the importance of private lands in supporting conservation for imperiled species cannot be undervalued. Therefore, great attention will be placed on working cooperatively with private landowners to sustain and further conserve imperiled species.

Of the 57 species currently included in the ISMP, 37 are listed as state Threatened, five are listed as Species of Special Concern by the state, and 15 have been removed from Florida's Endangered and Threatened Species List (see Table 1). Addressing the needs of Florida's imperiled wildlife is a broad challenge, which FWC has elevated as one of six agency strategic initiatives from the Agency's 2014–2019 Strategic Plan. Three other strategic initiatives (Conservation Through Innovation, Expanding Participation in Conservation, and Conflict Wildlife) also directly support ISMP objectives, and the focus on these initiatives will complement successful implementation of the ISMP.

The ISMP was initiated following Commission-approved regulatory changes to Chapter 68A-27, F.A.C., Rules Relating to Florida's Endangered or Threatened Species, requiring its development. Thus, the regulatory component to this plan includes fulfillment of that requirement through changes to the Florida Administrative Code rules. Rule amendments include listing-status changes, possession limits, clean-up of cross-referenced rules, and clarification or simplification of language where needed (Table 5 outlines proposed rule changes).

In addition to providing adequate species protections, the regulatory component of the ISMP also aims to improve clarity, efficiencies, and permitting options. Species Conservation Measures and Permitting Guidelines will be prepared for all 57 species and will provide essential information, including habitat requirements and related protections as they apply. These Guidelines will outline when a permit is required, what activities are allowed without a permit, and other important information such as buffer zones or seasonal restrictions. They will also include (when applicable) minimization options to avoid impact to a species and preempt the need for a permit.

Florida's Imperiled Species Management Plan is organized into six chapters.

The **Introduction** provides background on the history of imperiled species management in Florida and describes the initial development and timeline for Florida's Imperiled Species Management Plan.

Law and Policy describes the regulatory authority in place for protecting Florida's Endangered and Threatened species and explains changes in permitting, rules, and policies.

The **Species Action Plan Summaries** contain synopses of the major threats, conservation goals, and key actions detailed in the complete Species Action Plans. The complete SAPs outline recommended conservation actions and how they may be implemented. They also serve as a valuable resource to land managers, researchers, local governments, and other partners as they detail the steps necessary to achieve individual species conservation goals, including improving status to the point that some species may be delisted. The SAPs are foundational to the ISMP, serving as one of the plan's key building blocks. Their implementation is critical to meeting species-specific conservation objectives.

The **integrated conservation strategies** identify common elements across species. These management strategies address the needs of, and are intended to benefit, multiple species and habitats concurrently. The integrated conservation strategies were developed with careful evaluation of potential conflicts, emerging issues, resource limitations, and landscape-scale considerations. Integrated actions serve as the steps to implement the integrated conservation strategies. Like the SAPs, the integrated conservation strategies are fundamental to the ISMP, and are designed to lead us towards achieving the ISMP goal.

Implementation outlines our approach for prioritizing and managing resources to maximize the effectiveness of the ISMP and to make meaningful conservation progress. Conserving or improving the status of imperiled species to effectively reduce the risk of extinction requires broad public and partner support. Florida Fish and Wildlife Conservation Commission will actively engage across our agency, with partners and the public, to improve imperiled species management at both regional and statewide levels. This chapter also outlines proposed ISMP progress monitoring and a review and revision schedule.

The **Impacts Assessment** addresses the ecological, sociological, and economic impacts associated with implementing or not implementing the ISMP. This section identifies potentially affected parties and potential costs or benefits to those parties. Florida Fish and Wildlife Conservation Commission counts on, and will include, substantial input from stakeholders for the impacts assessment.

2018 Amendment Summary

This amendment reflects rule revisions that changed the listing status of seven species and clarify take and possession for mammals not included on the Florida Endangered and Threatened Species List. These changes were approved by the Commission in September, 2018 and became effective following advertisement and review. The process leading to species status changes included Biological Status Reviews, Species Action Plan revisions, development of Species Conservation Measures and Permitting Guidelines, advertised notices of proposed rule changes, and Commission approval. Amendments to this plan were made on several pages to reflect these changes. The following information provides background and summarizes revisions to the plan.

Revisions to Florida's Imperiled Species Management Plan

While species listing-status changes may impact many portions of the plan, including references to the number and status of species included, revisions in this amendment are limited to the pages on which the most significant updates were needed. A more comprehensive revision of the plan will be conducted according to the revision schedule outlined in the Introduction. The changes made in this amendment include:

- **Introduction, Page 4**
  Updates to Table 1: addition of two newly identified species of alligator snapping turtles, and 2018 status changes for seven species (see below). In-text references to the number or status of species addressed in the plan are overridden by Table 1, which has been fully updated.
- **Law and Policy, page 31**
  Strike-through of Table 5: Because rule changes in this table are now effective, they are no longer relevant in the context presented, thus the table has been stricken, but retained for reference.
- **Species Action Plan Summaries, pages 41 through 98**
  Revision of Species Action Plan Summaries: updates for the species listed below to reflect name changes, changes in listing status and current protections, revised conservation goals, and updated range maps.

Changes to species status and protections in 2018

Species Common Name	Scientific Name	F.A.C. Rule Change	Change in 2018 Amendment
Eastern chipmunk	*Tamias striatus*	68A-29.002	Added new rule clarifying take
Florida mouse	*Podomys floridanus*	68A-29.002	Added new rule clarifying take
Homosassa shrew	*Sorex longirostris eionis*	68A-27.003 68A-29.002	SSC → Removed from the List Added new rule clarifying take
Southern fox squirrel	*Sciurus niger niger*	68A-27.003 68A-29.002	SSC → Removed from the List Added new rule clarifying take
Osprey (Monroe County)	*Pandion haliaetus*	68A-27.003	SSC → Removed from the List
Alligator snapping turtle	*Macrochelys temminckii*	68A-27.003	SSC → Removed from the List
Apalachicola alligator snapping turtle	*Macrochelys apalachicolae*	68A-27.003	SSC → Removed from the List
Suwannee alligator snapping turtle	*Macrochelys suwanniensis*	68A-27.003	SSC → State Threatened
Harlequin darter	*Etheostoma histrio*	68A-27.003	SSC → Removed from the List

SSC = Species of Special Concern

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Glossary

Best management practices: Methods, measures, or practices (often voluntary) that are developed, selected, or approved by various agencies to provide guidance to landowners and others to protect, enhance, and preserve natural resources, including wildlife habitat. Examples include the Florida Department of Agriculture and Consumer Services Florida Forestry Wildlife Best Management Practices and the Florida Agricultural Wildlife Best Management Practices.

Breeding: Animals are present and engaged in behavior such as courtship, nest scraping, territorial defense, egg-laying, and/or caring for dependent young.

Citizen science: Scientific research conducted, in whole or in part, by amateur or nonprofessional scientists.

Cryptic species: Those species that may not be easily observed, tracked, or surveyed due to camouflage or behavior rather than rarity.

Endemic: Native to, and restricted to, a defined geographic area.

Environmental Resource Permit program: A state of Florida program that regulates activities involving the alteration of surface water flows. Permit applications in this program may be processed by either the Florida Department of Environmental Protection or one of the state's water management districts.

Essential behavioral patterns: Behaviors associated with breeding, feeding, or sheltering.

Federal candidate species: Plants and animals for which the U.S. Fish and Wildlife Service has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act, but for which development of a proposed listing regulation is precluded by other higher priority listing activities.

Federally listed species: Those species protected under the federal Endangered Species Act, including federally Endangered species and federally Threatened species.

Florida's Endangered and Threatened Species List: Florida's list of wildlife designated as federally Endangered or Threatened, state Threatened, or state Species of Special Concern in accordance with Rules 68A-27.003, and 68A-27.005, F.A.C.

Florida's Wildlife Legacy Initiative: A program designed to combine effective statewide planning with regional partnership development to implement wildlife conservation actions at the local level.

Harass: As defined by Rule 68A-27.001(4), F.A.C., in the definition of *take* for state-Threatened species, means an intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns that include, but are not limited to, breeding, feeding or sheltering.

Harm: As defined by Rule 68A-27.001(4), F.A.C., in the definition of *take* for state-Threatened species, means an act that actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Imperiled species: A species that is listed on Florida's Endangered and Threatened Species List in accordance with Rules 68A-27.003 and 68A-27.005, F.A.C., or protected by designation under the federal Endangered Species Act.

Incidental take: Any taking otherwise prohibited, if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity (as defined in Rule 68A-27.001(5), F.A.C.).

Integrated Conservation Strategy: Conservation strategies designed to meet the needs of multiple species and their habitats, with supporting actions intended to improve the conservation status of Florida's imperiled species.

Intentional take: As defined in Rule 68A-27.007(2) (a), F.A.C., intentional take is the result of activities purposely carried out to cause the take; for example, collection of animals for scientific research.

Lower Keys: The area from Big Pine Key to Key West.

Marginal benefits: Amount people are willing to pay or give in order to obtain additional goods or services.

Marginal costs: Those costs associated with producing additional units of goods or services.

Man-made structures: Structures created by people, which may or may not be intended for use by wildlife. Structures include (but are not limited to) buildings, bridges, utility poles, signs, equipment, heavy machinery, pipes, loading docks, and bat and bird houses.

Minimization measures: Actions intended to address the evaluation factors considered during the incidental take permitting process described in Rule 68A-27.007(2)(b), F.A.C., for state-Threatened species, and to ultimately reduce take of the species.

Mitigation: One of the measures intended to address the evaluation factors considered during the incidental take permitting process described in Rule 68A-27.007(2)(b), F.A.C., for state-Threatened species, and to ultimately counterbalance take of the species.

Range-limited species: Those species that occur in only one or two counties, or in narrow strips of habitat in up to five counties.

Regional staff (FWC): Agency staff of the five regional offices: Northwest (850-265-3676); North Central (386-758-0525); Northeast (352-732-1225); Southwest (863-648-3200); and South (561-625-5122).

Single-use nest: A nest that is used by a species once for nesting activities and is rarely, if ever, reused in subsequent nesting attempts by the same species. State-Threatened species that rarely reuse nests are Wakulla seaside sparrow, Scott's seaside sparrow, Worthington's marsh wren, Marian's marsh wren, reddish egret, little blue heron, roseate spoonbill, tricolored heron, white-crowned pigeon, American oystercatcher, snowy plover, black skimmer, least tern, and Florida sandhill crane.

Species Conservation Measures and Permitting Guidelines (Guidelines): Guidelines that contain species-specific information on the habitat and range of species, provide technical assistance on conservation practices and avoiding take, and identify the permitting options available when take will occur. Details in Guidelines vary based on the listing status of the species.

Species evaluation request: An evaluation of a species for listing on or removal from Florida's Endangered and Threatened Species List as described in Rule 68A-27.0012, F.A.C.

Species Focal Area: Areas containing features (such as unique population units or habitat types) important to the long-term conservation of a species, as identified in Species Conservation Measures and Permitting Guidelines.

Species of Greatest Conservation Need: In Florida this includes animals that are at risk or are declining as identified in Chapter 3 of Florida's State Wildlife Action Plan. It includes federally listed and state-listed species as well as many other species whose populations are of concern.

Species of Special Concern: A temporary category of protection for species determined to be data deficient during the Biological Status Review, and afforded the protection described in Rule 68A-27.005, F.A.C., which declares that "no person shall take, possess, transport, or sell any species of special concern included in this subsection or parts thereof or their nests or eggs except as authorized by permit from the executive director, permits being issued upon reasonable conclusion that the permitted activity will not be detrimental to the survival potential of the species. For purposes of this section, the definition of the word take in Rule 68A-1.004, F.A.C., applies."

State-listed species: Those species listed on Florida's Endangered and Threatened Species List as state-designated Threatened or state Species of Special Concern.

State Threatened: Synonymous with **state-designated Threatened** and **Threatened**. A state designation for any species, subspecies, or isolated population of fish or wildlife (including invertebrates) that is native to Florida and meets the criteria described in Rule 68A-27.0001(3), F.A.C., and is afforded the protections described in Chapter 68A-27.00, F.A.C.

Take: 1) For state-Threatened species (Rule 68A-27-.001(4), F.A.C.): to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. 2) For Species of Special Concern (Rule 68A-1.004(79), F.A.C.): 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.

Wildlife/Habitat Management Plan: General site information as well as the methods, measures, practices, or actions to be implemented to address state-Threatened species and Species of Special Concern observed or reasonably likely to occur on a project site that is the subject of activities permitted in accordance with both Chapter 373, Part IV and Chapter 378, Part II, Florida Statutes.

List of Acronyms

AHCR	Aquatic Habitat Conservation and Restoration
AHRE	Aquatic Habitat Restoration and Enhancement
BCA	Benefit/cost analysis
BMP	Best management practice
BRG	Biological Review Group
BSR	Biological Status Review
CCAA	Candidate Conservation Agreement with Assurances
CCB	Cooperative Conservation Blueprint
CCCL	Coastal Construction Control Line
CRP	Conceptual Reclamation Plan
CSA	Coordinated Status Assessments
DEP	Florida Department of Environmental Protection
DRI	Development of Regional Impact
ERP	Environmental Resource Permit
ESA	Endangered Species Act
ETDM	Efficient Transportation Decision Making
F.A.C.	Florida Administrative Code
FDACS	Florida Department of Agriculture and Consumer Services
FNAI	Florida Natural Areas Inventory
F.S.	Florida Statutes
FWC	Florida Fish and Wildlife Conservation Commission
FWLI	Florida's Wildlife Legacy Initiative
FWRI	Fish and Wildlife Research Institute (division of FWC)
GIS	Geographic information system
HCP	Habitat Conservation Plan
HSC	Habitat and Species Conservation (division of FWC)
ICS	Integrated Conservation Strategies
IFAS	Institute of Food and Agricultural Sciences
INRMP	Integrated Natural Resource Management Plan
ISMP	Florida's Imperiled Species Management Plan

IUCN	International Union for Conservation of Nature
LAP	Landowner Assistance Program
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resource Conservation Services
REDI	Rural Economic Development Initiative
SAP	Species Action Plan
SERC	Statement of Estimated Regulatory Costs
SFA	Species Focal Area
SGCN	Species of Greatest Conservation Need
SSC	Species of Special Concern
SWERP	Statewide Environmental Resource Permit
SWG	State Wildlife Grants program
TNSM	Threatened and Nongame Species Management
UMAM	Uniform Mitigation Assessment Method
USFWS	U.S. Fish and Wildlife Service
Water-CAT	Florida Water Resource Monitoring Catalog
WCPR	Wildlife Conservation, Prioritization, and Recovery program
WHMP	Wildlife/Habitat Management Plan
WMA	Wildlife Management Area
WMD	Water Management District

Introduction

The first of its kind for state-listed species, Florida's Imperiled Species Management Plan (ISMP) is a 10-year plan created to address the conservation needs of multiple species through a comprehensive approach. The approach is two-fold: use integrated strategies to benefit multiple species and simultaneously address individual species' needs. This comprehensive approach is a strategic course to imperiled species conservation and management, and it increases the opportunity to use available resources to benefit a greater number of species and effectively improve conditions for Florida's wildlife statewide. The strategies presented are intended to minimize threats and reverse negative impacts, and to address the complexity of improving habitat conditions for multiple species.

Goal and objectives

Development of Florida's Imperiled Species Management Plan was a cross-agency effort, with significant input from partners and stakeholders. The result is a blueprint for statewide management of imperiled species, the purpose of which is to improve management and conservation by reducing the risk of extinction, maintaining biodiversity, and improving public and partner support for conservation efforts. Conveying identified threats and known species' needs, as well as promoting opportunities for the public and partners to improve conditions for wildlife, are critical components of this plan. Through implementation of the ISMP, Florida Fish and Wildlife Conservation Commission (FWC) intends to improve the conservation status of Florida's imperiled wildlife through strategic management, research, and outreach. Progress will be measured and evaluated and appropriate course corrections made, with the knowledge that adjustments for emerging information and issues will be necessary.

The goal and objectives of this plan largely focus on two key areas: filling data gaps to improve conservation and management, and maximizing conservation through directed communication, outreach, and management. Considerable gaps in knowledge exist for many imperiled species (some have been listed in Florida for more than 30 years and only limited research and monitoring have been conducted for certain species). To effectively improve the status of these species, our understanding of species-specific attributes and requirements must improve. Directed communication, outreach, and management—for FWC staff, our partners, and the public—are important for increasing support and achieving the results necessary for imperiled species conservation. Targeting outreach to specific audiences will improve its effectiveness (Haubold 2012), and FWC will continue to expand efforts to do this (e.g., providing Guidelines and best management practices to landowners and land managers). This plan emphasizes FWC's commitment to work cooperatively with private landowners, as well as managers of public conservation lands, to improve conservation for species included in this plan.

This plan is the result of a progressive approach to wildlife conservation in Florida. Through public engagement and close partnerships with stakeholders, other government agencies, and nongovernmental organizations, a streamlined, comprehensive, and prioritized process has been carefully designed to facilitate successful conservation of Florida's wildlife. Through implementation, coordination and collaboration with the many partners that support ISMP's development, will continue to be a critical component of successfully achieving the plan's goal.

Priorities for the ISMP are reflected in six objectives, which together support achievement of the ISMP goal.

Florida's Imperiled Species Management Plan goal

With broad public and partner support, conserve or improve the status of imperiled species to effectively reduce the risk of extinction.

Objective 1

By 2017, conduct necessary research and reevaluate the five species designated as Species of Special Concern.

Objective 2

By 2020, complete 15 percent of data gap actions identified in Species Action Plans and by 2025, 30 percent.

Objective 3

By 2025, implement a monitoring plan for all species included in Florida's Imperiled Species Management Plan with an existing survey protocol.

Objective 4

By 2016, complete a regional assessment for the FWC Northwest region and by 2020 for each of the other FWC regions.

Objective 5

By 2017, focus at least 10 percent of agency resources on supporting implementation of Florida's Imperiled Species Management Plan and Species Action Plans.

Objective 6

By 2018, develop a system to account for protections and conservation gains for species included in Florida's Imperiled Species Management Plan throughout the range of FWC engagement with partners and stakeholders.

Species included in this plan

Imperiled species are those that Florida is in danger of losing—that is, species that face threats to long-term survival. The species included in this plan are those listed on Florida's Endangered and Threatened Species List as state-designated Threatened or Species of Special Concern (SSC)—in other words, state-listed species—and those species that were found to no longer warrant listing and were removed from Florida's Endangered and Threatened Species List.

Florida's Imperiled Species Management Plan is designed to address the needs of 57 species (see Table 1):

- 37 state-designated Threatened species,
- Five Species of Special Concern, and
- 15 delisted species (i.e., species removed from Florida's Endangered and Threatened Species List).

Species removed from Florida's Endangered and Threatened Species List in 2016 are included in this plan, and conservation actions are identified for each to prevent them from again becoming listed, as required by Chapter 68A-27, Florida Administrative Code (F.A.C.). The Species of Special Concern listing status is expected to be phased out by the end of 2017, once updated Biological Status Reviews (BSRs) for the five Species of Special Concern are completed. Following the updated BSRs for SSCs, a recommendation will be made to either re-

move the species from the list or retain it as Threatened. This will allow for a single state-listing status (Threatened), in accordance with the intent of the 2010 rule changes in Chapter 68A-27, F.A.C.

In 2010, changes to the rules relating to Endangered and Threatened Species initiated BSRs for all state-listed species, and required management plan development for those without a draft or final management plan. As seen in Figure 1, species included in the ISMP do not include those that appear on Florida's Endangered and Threatened Species List as federally Endangered or federally Threatened.

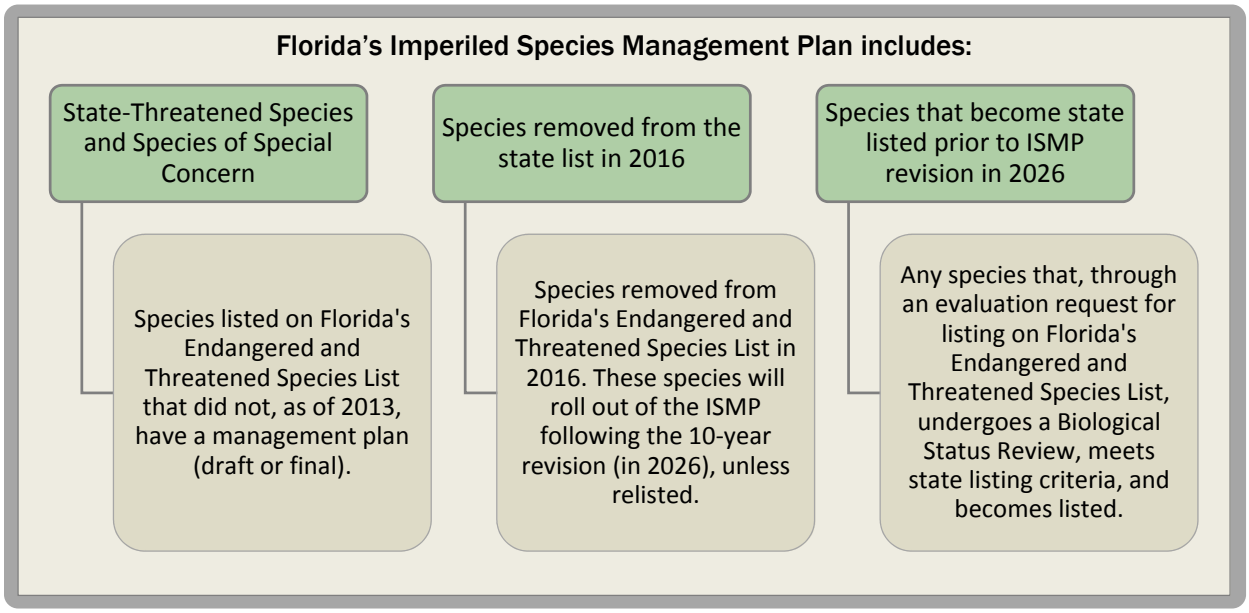


Figure 1. Species included in Florida's Imperiled Species Management Plan (ISMP) for 2016-2026.

Any species listed in the future will be incorporated into Florida's Imperiled Species Management Plan. Species may be considered for addition to, or removal from, Florida's Endangered and Threatened Species List through submission of a species evaluation request or by emergency listing request as described in Rule 68A-27.0012, F.A.C. For a species evaluation request to be complete, the species must undergo a biological vulnerability screening (an evaluation process using specific criteria to determine a species' biological score), followed by a BSR. Emergency listing determinations made effective on a temporary basis by Executive Order must be approved or terminated by the Commission. If it is determined that the species meets criteria to be added to or removed from Florida's Endangered and Threatened Species List, a Species Action Plan (SAP) will be developed (or revised, if one already exists) within one year. Upon approval by the Commission, the species will be added to or removed from the list in accordance with Rule 68A-27.0012, F.A.C., and the ISMP will be amended accordingly.

This table was updated in 2018 to reflect status changes for several species. Refer to the Amendment Summary for additional details.

Table 1. Species included in Florida's Imperiled Species Management Plan, as of the 2018 amendment.

Species are color coded by taxa:	Mammals	Birds	Reptiles	Amphibians	Fish	Invertebrates	Total
Threatened (T)	4	16	8	2	6	2	38
Delisted since 2016 (DL)	4	5	6	2	3	1	21

59 species (as of 2018)

2018 Status	Taxa	Common Name	Scientific Name	Status Change
Threatened		Big Cypress fox squirrel	*Sciurus niger avicennia*	Remaining T
		Everglades mink	*Neovison vison evergladensis*	Remaining T
		Sanibel Island rice rat	*Oryzomys palustris sanibeli*	SSC → T
		Sherman's short-tailed shrew	*Blarina shermani*	SSC → T
		American oystercatcher	*Haematopus palliatus*	SSC → T
		Black skimmer	*Rynchops niger*	SSC → T
		Florida burrowing owl	*Athene cunicularia floridana*	SSC → T
		Florida sandhill crane	*Antigone canadensis pratensis*	Remaining T
		Least tern	*Sternula antillarum*	Remaining T
		Little blue heron	*Egretta caerulea*	SSC → T
		Marian's marsh wren	*Cistothorus palustris marianae*	SSC → T
		Reddish egret	*Egretta rufescens*	SSC → T
		Roseate spoonbill	*Platalea ajaja*	SSC → T
		Scott's seaside sparrow	*Ammodramus maritimus peninsulae*	SSC → T
		Snowy plover	*Charadrius nivosus*	Remaining T
		Southeastern American kestrel	*Falco sparverius paulus*	Remaining T
		Tricolored heron	*Egretta tricolor*	SSC → T
		Wakulla seaside sparrow	*Ammodramus maritimus juncicola*	SSC → T
		White-crowned pigeon	*Patagioenas leucocephala*	Remaining T
		Worthington's marsh wren	*Cistothorus palustris griseus*	SSC → T
		Suwannee alligator snapping turtle	*Macrochelys suwanniensis*	SSC → T
		Barbour's map turtle	*Graptemys barbouri*	SSC → T
		Florida brown snake (Lower Keys)	*Storeria victa*	Remaining T
		Florida Keys mole skink	*Plestiodon egregius egregius*	SSC → T
		Florida pine snake	*Pituophis melanoleucus mugitus*	SSC → T
		Key ringneck snake	*Diadophis punctatus acricus*	Remaining T
		Rim rock crowned snake	*Tantilla oolitica*	Remaining T
		Short-tailed snake	*Lampropeltis extenuata*	Remaining T
		Florida bog frog	*Lithobates okaloosae*	SSC → T
		Georgia blind salamander	*Eurycea wallacei*	SSC → T
		Blackmouth shiner	*Notropis melanostomus*	Remaining T
		Bluenose shiner	*Pteronotropis welaka*	SSC → T
		Crystal darter	*Crystallaria asprella*	Remaining T
		Key silverside	*Menidia conchorum*	Remaining T
		Saltmarsh topminnow	*Fundulus jenkinsi*	SSC → T
		Southern tessellated darter	*Etheostoma olmstedi maculaticeps*	SSC → T
		Black Creek crayfish	*Procambarus pictus*	SSC → T
		Santa Fe cave crayfish	*Procambarus erythrops*	SSC → T
Delisted		Eastern chipmunk	*Tamias striatus*	SSC → DL
		Florida mouse	*Podomys floridanus*	SSC → DL
		Homosassa shrew	*Sorex longirostris eionis*	SSC → DL
		Southern fox squirrel	*Sciurus niger niger*	SSC → DL
		Brown pelican	*Pelecanus occidentalis*	SSC → DL
		Limpkin	*Aramus guarauna*	SSC → DL
		Osprey (Monroe County)	*Pandion haliaetus*	SSC → DL
		Snowy egret	*Egretta thula*	SSC → DL
		White ibis	*Eudocimus albus*	SSC → DL
		Alligator snapping turtle	*Macrochelys temminckii*	SSC → DL
		Apalachicola alligator snapping turtle	*Macrochelys apalachicolae*	SSC → DL
		Peninsula ribbon snake (Lower Keys)	*Thamnophis sauritus sackenii*	T → DL
		Red rat snake (Lower Keys)	*Pantherophis guttatus*	SSC → DL
		Striped mud turtle (Lower Keys)	*Kinosternon baurii*	T → DL
		Suwannee cooter	*Pseudemys concinna suwanniensis*	SSC → DL
		Gopher frog	*Lithobates capito*	SSC → DL
		Pine Barrens treefrog	*Hyla andersonii*	SSC → DL
		Harlequin darter	*Etheostoma histrio*	SSC → DL
		Lake Eustis pupfish	*Cyprinodon variegatus hubbsi*	SSC → DL
		Mangrove rivulus	*Kryptolebias marmoratus*	SSC → DL
		Florida tree snail	*Liguus fasciatus*	SSC → DL

Imperiled species management system

Background

From 1972 to 1999, Florida's process for adding or removing species from Florida's Endangered and Threatened Species List did not include fixed criteria or a standardized species evaluation process. In 1999, with the assistance of stakeholders, FWC adopted a listing process that includes quantitative criteria based on the International Union for Conservation of Nature (IUCN). In 2003, FWC responded to stakeholder concerns about the management of imperiled species by broadening group representation to find a solution. Following enhancements to the listing process, FWC continued to work with a broader pool of partners and stakeholders to further refine the evaluation and management of imperiled species, and to address public concerns.

Current system

In 2010, FWC officially adopted the imperiled species management system through changes to Chapter 68A-27, F.A.C. The listing process, a critical part of imperiled species management (Haubold 2012), is only one of many components of Florida's approach to imperiled species management; this is an important distinction and was key to achieving stakeholder support. The system includes measurable criteria used to determine a species' eligibility for listing on Florida's Endangered and Threatened Species List, requires Biological Status Reviews for species being considered for addition to or removal from the list, and specifies management plan development for all species being added to or removed from the list (see sidebar). Conservation actions necessary to address threats to a particular species or suite of species, including protective provisions such as permitting standards or possession limits, are components of a management plan. Species not already listed and believed to be at high risk of extinction may be evaluated during the allocated annual time frame, or immediately if an emergency listing request is submitted, with the intent to minimize threats and impacts and to improve the status of imperiled species and reduce the potential need for future federal listing.

Components of FWC's imperiled species management system

- Measurable listing criteria
- Biological Status Reviews
- Management plan development (through Species Action Plans and Florida's Imperiled Species Management Plan)

Desired future condition

Thinking beyond just the listing process to consider the dynamics of an effective, comprehensive management system led FWC, in partnership with stakeholders, to define the desired future condition of the imperiled species management system as,

> *A Florida where no native species goes extinct due to human action or inaction; species declines are halted or reversed; species conservation is coordinated among partners; biodiversity is maintained; adequate funding is available for species conservation; and the importance of species conservation is fully supported by the public.*

Realizing the desired future condition for the imperiled species management system relies heavily on the effective development and implementation of the ISMP. This will not be achieved by FWC or other state or federal agencies alone; success depends on partnerships with stakeholders and the citizens of Florida. With many

endemic species and a mosaic of unique natural communities, wildlife management in Florida has been influenced by numerous stakeholders, agencies, programs, and plans. Other agency and partner planning efforts and the resulting resources continue to influence conservation planning. They have provided a foundation and established a standard to which the ISMP was developed, and they will continue to be integral to Florida's wildlife management.

Nine factors of an effective imperiled species management system (Haubold 2012)

- Resources
- Partnerships
- Communication and outreach
- Policy, regulation, enforcement
- Science and technology
- Designation of at-risk species
- Conservation activities
- Species and habitat
- Public support

Nine major factors (see sidebar) are identified as key to an effective imperiled species management system (Haubold 2012), none of which should be considered independently. For example, without resources or public support, conservation activities could not occur. If a species' status is not accurately determined through the listing process, which typically requires good science, the species might not receive the directed conservation it needs. Conversely, if listed when not at risk, it might take resources away from other species needing directed management (Haubold 2012).

Plan development

Development of Florida's Imperiled Species Management Plan began in 2010, following Commission approval of changes to the Threatened and Endangered Species Rule, and has involved hundreds of agency staff members, partners, and stakeholders. The resulting plan is a comprehensive approach to wildlife management. The public, partners, and stakeholders have been actively engaged in developing an integrated and comprehensive plan. Development of the ISMP has included Biological Status Reviews; development of Species Action Plans; and evaluation of shared needs, emerging issues, and available protective measures; followed finally by the development of integrated conservation strategies (ICSs) (Figure 2). The strategies and actions presented in this plan are designed to benefit multiple species. They are not, however, intended to replace species-specific needs identified in Species Action Plans, species management plans, or Species Conservation Measures and Permitting Guidelines; rather, these documents serve as components of the ISMP's holistic approach.

The balance of using integrated strategies and simultaneously addressing the needs of individual species is a strategic course to achieving the ISMP conservation goal: With broad public and partner support, conserve or improve the status of imperiled species to effectively reduce of the risk of extinction.

Biological Status Reviews

Immediately following adoption of the 2010 changes to Chapter 68A-27, F.A.C., Biological Review Groups (BRGs) appointed by FWC evaluated those species already on Florida's Endangered and Threatened Species List. The groups conducted Biological Status Reviews for all species on the list that had not received a review in the past decade—61 in total. In accordance with the newly adopted evaluation criteria (under Rule 68A-27.0012(2)(b), F.A.C.), the BRGs looked at population size and trends, distribution and range, threats to the species, population viability models, and aspects of the life history that may influence the rangewide and Florida-specific status, according to the Guidelines for Using the IUCN Red List Categories and Criteria (IUCN 2001) and Guidelines for Application of IUCN Red List Criteria at Regional Levels (IUCN 2003). The BRGs also considered information submitted by the public and the best available scientific and commercial biological data for

the species to determine if its status met listing criteria. Over 200 external experts and staff were involved in development and peer review of the approved BSRs.

Following the Biological Status Reviews, FWC staff ultimately recommended that 40 species be listed as Threatened on Florida's Endangered and Threatened Species List. Based on FWC listing criteria, evidence indicated that 16 species were not facing a high risk of extinction, and staff recommended removing them from the list. These species have published Species Action Plans and will continue to receive management and protection adequate to prevent them being relisted on Florida's Endangered and Threatened Species List. Staff recommended that five species, for which key information is unknown, remain Species of Special Concern, with the intent to pursue additional information sufficient to determine whether they meet listing criteria (see Table 1 for specific listing status changes).

The FWC Commissioners agreed with the recommendations and directed staff to proceed with developing management plans for species that did not already have a draft or final management plan. Of the 61 state-listed species that had not undergone a Biological Status Review in a decade, one (the Florida black bear [*Ursus americanus floridanus*]) had a draft management plan, and three (Atlantic sturgeon [*Acipenser oxyrinchus oxyrinchus*], pillar coral [*Dendrogyra cylindrus*], and Florida bonneted bat [*Eumops floridanus*]) became federally listed and are not included in the ISMP. This leaves a total of 57 species included in the ISMP.

Species Action Plans

Species Action Plans outline the management actions necessary to minimize the impacts of known threats, improve habitat conditions, and streamline efforts to conserve and recover the species. The FWC staff, partners, and numerous stakeholders were involved in developing Species Action Plans to address the needs of the species evaluated during the BSRs. Following public review, Species Action Plans were published in November 2013 and finalized with Commission approval as components of the ISMP. Goals for the Species Action Plans were determined based on the recommended listing status and consideration of the listing criteria triggered for each species (Table 2). For Threatened species, goals were developed with intent to improve species status so it can be removed from listing and not again need to be listed. However, for those Threatened species with a limited range, goals were developed to improve the species status so it is secure within its historical range. For the few remaining Species of Special Concern, goals include gathering information necessary to determine the species status. For species being removed from the list (delisted), goals were developed with intent to maintain or improve the species status so the species will not need to be relisted in the future. In support of the selected conservation goal, each Species Action Plan includes specific management objectives and priori-tized conservation actions. Species-specific actions, categorized among habitat conservation and management, population management, research and monitoring, rule and permitting intent, law enforcement, incentives and influencing, education and outreach, and coordination with other entities, are included along with identi-fied partners and organizations that are key to implementation. Conservation actions are primarily nonregula-tory, and directly support the ISMP through their emphasis on filling knowledge gaps and maximizing conser-vation though directed communication, outreach, and management.

Table 2. Species conservation goals identified in the Species Action Plans.

Species Listing Status	Species Action Plan Conservation Goals
Threatened	Goals for Threatened species were created with the intent to improve the conservation status of the species to a point that the species can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed. For Threatened species that have a very limited range, occur in fewer than 10 locations, and/or have a population totaling less than 1,000 mature individuals, goals were created with the intent to improve the conservation status of the species to the point that the species is secure within its historical range.
Species of Special Concern	Goals are designed to determine the conservation status for the species.
Delisted	Goals for species being removed from the list were created with the intent that the conservation status of the species is maintained or improved so that the species will not need to be relisted on Florida's Endangered and Threatened Species List.

Species Action Plans will be revised within seven years, and may be updated sooner, as progress toward objectives or additional information necessitates. Staff will develop a rolling schedule to avoid revising all SAPs within the same year. If any additional species are determined to meet state-listing criteria, a SAP will be prepared within one year of Commission approval of the recommended listing status.

Critical to the ISMP, SAPs assess current conditions and prioritize the actions and resources needed to improve species' conservation status. Implementation of the SAPs is ongoing, with many actions already in progress, and it is through the species-specific actions that integrated conservation strategies emerged. While SAPs provide the detailed steps necessary to improve the conservation status for individual species, the ISMP outlines the implementation strategies to ensure that benefits are maximized, resources are applied in the most effective manner, and wildlife populations are managed holistically.

Integrated conservation strategies

While SAPs identify threats and outline conservation needs for individual species or groups of species, ICSs take a more comprehensive approach by focusing on higher-level strategies and the integrated actions that benefit multiple species and their habitats. Integrated conservation strategies facilitate implementation of the SAPs while also considering emerging issues and potential conflicts, thereby focusing implementation on areas and issues that will yield the highest level of conservation for the greatest number of species. While the 14 ICSs describe integration of species needs; habitat needs; and staff time, effort, and resources, they are not intended to meet the complete needs of all species. Species-specific needs outside of the ICSs are not discounted and will be addressed simultaneously with ICS implementation.

Accomplishing the ICSs and their integrated actions requires communication and coordination across agency and partner boundaries, as well as with stakeholders. Effective progress depends on implementation at a regional and landscape scale, and consideration of the needs of other species not included in this plan. Complementary programs and coordination of applied resources will achieve the most conservation for the greatest number of species.

Law and policy

The Law and Policy chapter was carefully developed with intense consideration of the nonregulatory components of the plan. The 2010 rule changes to Chapter 68A-27, F.A.C., included revision of the *take* definition. *Take,* as defined in Rule 68A-27.001(4), F.A.C., extends protection to state-Threatened species with the addition of take resulting from harm (which may include significant habitat modification or degradation that results in actual injury or death by impairing essential behavioral patterns including breeding, feeding, or sheltering) and harassment (an intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent that normal behavioral patterns are disrupted). For Species of Special Concern and delisted species, *take* in Rule 68A-1.004(79), F.A.C., applies to and protects these species, and their nests or eggs from pursuing, hunting, molesting, capturing, or killing, unless otherwise allowed in an alternate rule chapter (see *take* in Glossary).

Take, as defined in F.A.C. rules, is fundamental to the development and implementation of permitting guidance and future species protections. Species Conservation Measures and Permitting Guidelines (Guidelines) will include both nonregulatory and regulatory guidance, as appropriate, and will be an additional resource to the SAPs in providing species-specific conservation details. Depending on listing status, the Guidelines will be tailored to provide information relevant to the species, such as habitats that support essential behavioral patterns for each species, and related protections as they apply. Not all species will have the same level of detail in the Guidelines, even among those with a shared listing status. The Current Protections section will first identify rules for take of state-Threatened species or Species of Special Concern. Any additional protections for state-Threatened species or Species of Special Concern or protections for delisted species will also be summarized with reference to the applicable rule, statute, or federal regulation. Additional protections may include possession limits, feeding prohibitions, or federal requirements for migratory birds. Through collaboration among staff, partners, and stakeholders, Species Conservation Measures and Permitting Guidelines will be developed, and when completed will be presented to the Commission for approval. The Guidelines will be revised as warranted, following public review, and Commission approval.

Our level of knowledge and understanding of life history and ecology varies widely among the species. Because of the cryptic nature of some species, simply finding them presents a challenge; therefore, attempting to interpret when actions or activities may result in take for cryptic species is not always possible and could lead to inefficient and unreasonable results. This plan openly acknowledges that the management approaches, even among state-Threatened species, will adapt based on our level of knowledge and understanding of the essential behavioral patterns for each individual species.

Implementation

Partners and stakeholders have provided significant input into the development of Florida's Imperiled Species Management Plan. The ISMP—along with the associated Species Action Plans, laws, policies, and Species Conservation Measures and Permitting Guidelines—forms the road map to guide us toward improving conditions for Florida's imperiled species. While FWC will take the lead in coordinating and supporting the ISMP's implementation, the agency will still rely very heavily on other state and federal agencies, our key partners, and engaged stakeholders to provide the necessary input and resources for successful implementation. With so much unknown about many state-listed species, a significant focus for this plan's first 10 years is to fill knowledge gaps necessary to improve management and conservation for these species.

In addition to filling knowledge gaps, identifying more systematic, coordinated approaches to imperiled species management and conservation are priorities for achieving our goal. Each of the above objectives will be mon-

itored, and progress will be reported annually. Because the ISMP outlines implementation of integrated strategies simultaneous with completing actions that address individual species needs, annual progress reporting will also include a species update to document achievements on prioritized species actions in the SAPs.

A formal review of ISMP progress will occur five years after plan approval. This review will include an assessment of the six measurable objectives, summarize progress on SAPs and ICSs, and include input from key partners and stakeholders. Assessing progress midway through the plan's 10-year revision time-frame will allow for thoughtful evaluation on any changing priorities, consideration of emerging issues, sharing of lessons learned, and formal engagement with stakeholders.

The ISMP is a guiding part of an overall imperiled species management approach to support Florida's wildlife diversity. Achieving the goal of the ISMP will take many years, in part due to the magnitude of the challenges facing state-listed species, and in part due to the biology and conservation needs of some species. Because of the complexity of implementing the ISMP, this plan provides the direction and sideboards for implementation, while allowing for flexibility in how to proceed. Assessing the potential impacts of implementing or not implementing the ISMP informs FWC as to better fulfill its mission of managing fish and wildlife resources for their long-term well-being and the benefit of people.

The ISMP also includes an assessment of ecological, social, and economic impacts in the Impacts Assessment chapter, prepared with stakeholder input. The impacts assessment looks at potential costs and benefits of implementing, or not implementing, the plan. Proposed rule changes that may have economic impacts are individually addressed in Table 17.

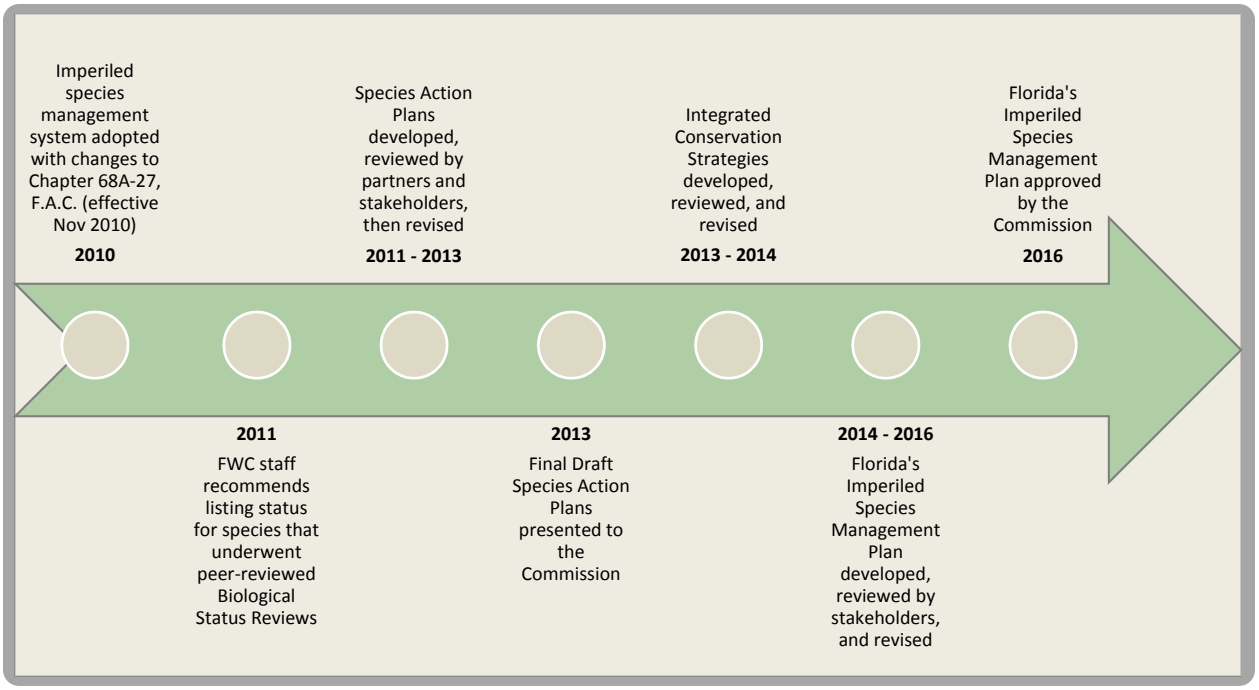


Figure 2. Imperiled Species Management Plan development timeline.

Contributions to imperiled species management

Florida, home to many endemic species and unique natural communities, is among the most biologically diverse states in the U.S. (NatureServe 2002). Wildlife management in Florida has been influenced by numerous

stakeholders, agencies, programs, and plans. In addition to their contributions to improving wildlife diversity in Florida, the programs and resources outlined below are among those that have most influenced development of the ISMP and will be instrumental in the ISMP's successful implementation.

FWC Agency Strategic Plan

The Agency Strategic Plan is a comprehensive road map to accomplishing FWC's mission of managing fish and wildlife resources for their long-term well-being and the benefit of people. The Agency Strategic Plan outlines strategic initiatives: areas where significant gains are needed in the short-term. Strategic initiatives identify programs and conservation challenges to which FWC is committed to making meaningful progress in the next five to 10 years. Completing the ISMP and beginning implementation of prioritized species actions and integrated conservation strategies is one of the six strategic initiatives in the 2014–2019 Agency Strategic Plan.

Florida's Wildlife Legacy Initiative

The federal State and Tribal Wildlife Grants Program, created by the U.S. Congress in 2000, encourages efforts to protect and conserve wildlife before they become imperiled. Florida's State Wildlife Grants Program (SWG) is supported by the federal State and Tribal Wildlife Grants Program, which provides annually appropriated funding to every state and territory. As a requirement of participating in this program, Florida developed a State Wildlife Action Plan, which identifies listed and nonlisted species deemed to be at risk or declining. In the State Wildlife Action Plan, these at-risk species are referred to as Species of Greatest Conservation Need (SGCN). The SWG is a matching grants program that provides financial support for projects that address conservation needs identified in Florida's State Wildlife Action Plan.

To meet the intent of the State and Tribal Wildlife Grants Program, and to further the goals of Florida's State Wildlife Action Plan, FWC created Florida's Wildlife Legacy Initiative (FWLI). A nonregulatory program, FWLI is designed to combine effective statewide planning with regional partnership development to implement conservation actions at the local level. Partners are essential in identifying and implementing priority FWLI goals that support Florida's State Wildlife Action Plan. The FWLI goals direct the use of SWG funding and other FWC resources.

Through FWLI, FWC has worked with more than 100 partners to secure $33 million in funding and matching contributions to undertake approximately 200 projects that include habitat restoration, research, surveying and monitoring to fill species data gaps, and other conservation projects on both public and private lands (FWC 2012). Information gathered has helped guide management of Species of Greatest Conservation Need. Other supported activities include prescribed-fire teams, coral monitoring and recovery, springs working groups, water-quality improvement, and seagrass restoration and monitoring. Projects that address the actions and threats identified in Florida's State Wildlife Action Plan complement implementation of the ISMP. Together, both plans will address threats to Florida's imperiled and at-risk wildlife.

Promoting Wildlife Diversity

Maintaining wildlife diversity is the core focus of Florida's State Wildlife Action Plan. The Wildlife Conservation, Prioritization, and Recovery (WCPR) program within FWC assists FWC land managers in prioritizing species' needs. Section 259.105(2)(a)11, F.S., requires that other land-management agencies consult FWC about management activities related to imperiled species, and FWC then provides technical assistance and other support that non-FWC land managers need to improve wildlife conservation on Florida's public lands. Staff from FWC comments on a variety of development and land-conversion projects during the planning phase, and through

this process, species needs are considered, with options to minimize or prevent impacts and improve landscape-level planning for conservation and diversity. Other landscape-level programs that address wildlife diversity include the federal Landscape Conservation Cooperative and the FWC-led Cooperative Conservation Blueprint (CCB). These programs have influenced ISMP development by their requests for more-refined information regarding imperiled species. In order to provide species-specific habitat management recommendations or relay the higher-level needs for multiple imperiled species, the information had to be compiled and evaluated. The Species Action Plans, integrated conservation strategies, Species Conservation Measures and Permitting Guidelines—all components of Florida's Imperiled Species Management Plan—provide the refined information that FWC will use to offer consultation and technical assistance regarding imperiled species conservation and management in Florida. Through development and implementation of the ISMP, FWC has increased and, will continue to increase, as appropriate, the resources necessary to provide more consultation, technical assistance, and commenting related to state-listed species.

State-federal coordination

Once species are federally designated under the Endangered Species Act (ESA), the appropriate federal agency (National Oceanic and Atmospheric Administration Fisheries [NOAA Fisheries] or U.S. Fish and Wildlife Service [USFWS]) assumes the lead role for conservation of those species. The transition to federal listing under the ESA does not entirely end the role that state agencies may have in research or management for a particular species. The USFWS Interagency Policy Regarding the Role of State Agencies in ESA Activities summarizes the authority under which state and federal agencies work together to protect federally listed species. The FWC is highly engaged with USFWS and NOAA Fisheries in conservation and management activities for many federally listed species, including, for example, the Florida grasshopper sparrow (*Ammodramus savannarum floridanus*), Atlantic sturgeon, Gulf sturgeon (*Acipenser oxyrinchus desotoi*), multiple beach mice (*Peromyscus* spp.), and Eastern indigo snake (*Drymarchon couperi*).

The three species that became federally listed between the 2010 BSRs and the 2016 publication of the ISMP (Atlantic sturgeon, pillar coral, and Florida bonneted bat) are not included in the ISMP; however, the information in their Species Action Plans is highly valuable in developing federal recovery plans and identifies priority actions that FWC staff can support as the species transition from state to federal oversight. While federal agencies (NOAA Fisheries or USFWS) will ultimately assume the lead role for conservation of those three species, FWC will continue to work closely with our federal partners, as is done for other federally listed species. Many landscape- and habitat-level activities benefit both state-listed and federally listed species; thus, any recommendations for state-listed species or their habitats must also support the protection of federally listed species and their habitats.

The USFWS, NOAA Fisheries, and FWC are also working closely in response to the recent multidistrict litigation petition to list more than 300 species under the federal ESA. Many of these petitioned species are on Florida's Endangered and Threatened Species List, and development and implementation of the SAPs and the ISMP may help prevent the need for listing at the federal level. For some species, such as Barbour's map turtle, alligator snapping turtle, and Florida pine snake, federally funded projects are underway to fill data gaps necessary to fully implement Species Action Plans and provide input to status reviews at the federal level.

In addition to the federal agency coordination for petitioned species, FWC actively participates in recovery planning set forth in Section 4 of the federal ESA. Ongoing recovery team and/or recovery planning involvement by FWC staff includes the Miami blue butterfly (*Cyclargus thomasi bethunebakeri*), Florida scrub jay (*Aphelocoma coerulescens*), Florida manatee (*Trichechus manatus latirostris*), and Florida panther (*Puma concolor coryi*), among others.

Section 6 of the federal ESA outlines cooperative work with the states. Florida's Section 6 Agreement, revised in 2012, is an excellent example of furthering joint management efforts. In addition to standard Section 6 language that allows states to survey and monitor federally listed species and provides some funding for management of these species, the agreement between Florida and USFWS has the flexibility for Florida to issue permits for federally listed species, if conditions are agreed on by both the state and federal agencies. Florida's Section 6 Agreement is intended to highlight the truly cooperative nature between FWC and the three USFWS field offices located in Florida, an approach that began in 2003 with development of the Manatee Forums. The Manatee Forums began with a goal of increasing cooperation between FWC, USFWS, and stakeholder groups.

In addition to the Section 6 Agreement, Florida plays an active role in other federal conservation programs, including habitat conservation plans (HCPs) and safe harbor agreements, both of which assist nonfederal landowners who encounter federally listed species on their properties. Staff from FWC provides the technical assistance necessary for Florida landowners and municipalities to enroll in these programs. Over the last decade, FWC has assisted in the development of HCPs and land acquisitions, including easements, for the recovery of federally listed species. Candidate Conservation Agreements with Assurances (CCAAs) allow landowners with federal candidate species on their property to receive credit for beneficial management practices, with the assurance that if the candidate species is listed in the future, the landowner will not have additional regulatory burdens associated with their ongoing activities. The development of CCAAs also incorporates state-listed species where appropriate, and benefits these species, improving conservation for a suite of species.

Benefits of the comprehensive and integrative approach

While the ISMP is adaptive and will be revised to reflect changing priorities, new information, and progress toward conservation goals, the shift to a more comprehensive approach to imperiled fish and wildlife conservation in Florida has already yielded the positive outcomes shown below.

- Thorough and systematic compilation of available information on Florida's imperiled species allows FWC to be more efficient and effective in consultations with landowners and land managers, as well as in internal prioritization and implementation of research and management activities.
- The ability to provide supporting information to the USFWS and NOAA Fisheries for petitioned species has also improved. Not only are species threats and conservation needs identified, but additional research is being conducted for several petitioned species to gather much-needed additional data. Providing this information and demonstrating FWC's ability to bring conservation and necessary protections to these species may help to preclude the need for federal protection.
- Greatly improved collaboration among agency staff has allowed for thoughtful evaluation of necessary protections and how to best achieve them in a real world application. Because the species are quite different, the ISMP openly acknowledges as policy that they will not all be treated the same. Input is expected and needed from partners and stakeholders on those necessary protections and how best to achieve them.
- With the desire to be more proactive and work more closely with landowners, land managers, developers, and local governments in planning for land-use changes, developments, projects, and/or future land use, FWC has already increased resources to provide consultation, technical assistance, and commenting. As necessary, FWC will adjust resources to support any increase in permitting for state-listed species.
- Partners and stakeholders have been heavily engaged in planning and will be needed for successful implementation as well.

Law and Policy

Florida Fish and Wildlife Conservation Commission is the body created by the Florida Constitution to manage, protect, and conserve the state's fish and wildlife species. It is the agency's mission to manage fish and wildlife for their long-term well-being and the benefit of people, and this mission includes imperiled species. The mission is balanced, and protection of imperiled species does not preclude recreation, development, or consumptive use of wildlife. Laws and policies create the framework within which FWC implements its mission. Laws include statutes passed by the Florida Legislature (Chapter 379, Florida Statutes [F.S.]) and rules approved by the seven-member Fish and Wildlife Conservation Commission. Imperiled species rules are primarily organized into Chapter 68A-27, F.A.C., with supporting statutes in Chapter 379, F.S. Policies are formally approved definitive statements of a principle or course of action to guide agency decision-making, or the manner of proceeding regarding the agency's management, protection, and conservation of fish and wildlife resources for their long-term well-being and the benefit of people.

Developing Florida's Imperiled Species Management Plan required review of existing laws and policies to determine if additions and changes would be necessary to implement the plan. Changes include rule deletions, additions, and modifications, as well as new policies, and Species Conservation Measures and Permitting Guidelines (now in development; see Objective 6). This chapter presents law and policy changes needed for, or associated with, achieving the goal of the ISMP: to conserve or improve the status of imperiled species to effectively reduce the risk of extinction. The regulations, including permitting requirements, associated with state-listed species are not intended to provide a mechanism for recovery of these species, but they should prevent declines so that other conservation actions outlined in the Species Action Plans and integrated conservation strategies can then achieve the conservation goals for each species.

Laws

The law and policy framework for imperiled species management, protection, and conservation is based on the concept of *take*. Laws relating to imperiled species regulate if take may lawfully occur, when and how it may do so, and the consequences of it occurring illegally. Federal laws, such as the Endangered Species Act, the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, and the Marine Mammal Protection Act provide regulatory oversight for take of federally listed species, all migratory birds, marine mammals, and eagles. For state-listed species, Chapter 68A-27, F.A.C., defines take and the conditions in which it can occur. Other rules (such as 68A-16.003, F.A.C., for birds; 68A-25.002, F.A.C., for reptiles; and 68A-26.002, F.A.C., for amphibians) address take and provide possession limits for wildlife, including some state-Threatened species and those species removed from Chapter 68A-27, F.A.C., following determination that the species no longer meets state listing criteria. These state and federal laws work together to protect species throughout Florida and reduce the risk of extinction. Chapter 68A-27, F.A.C, identifies species covered under the federal Endangered Species Act as federally listed, and state involvement in conservation and management of federally listed species is addressed by Section 6 of the Endangered Species Act. However, the ISMP does not address take of federally listed species since this is the primary responsibility of USFWS and NOAA Fisheries.

The three species (pillar coral, Florida bonneted bat, and Atlantic sturgeon) that were state-listed at the time of the rule change in 2010 became federally listed after the BSR and the development of the SAPs, so early drafts of the ISMP included these species. Although they are no longer included in the ISMP and no Species Conservation Measures and Permitting Guidelines will be developed for them, FWC remains involved in the management and conservation of these species.

Understanding and limiting take

The definition of *take* (Rule 68A-27-.001(4), F.A.C.) for state-Threatened species is to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. The term *harm* in this definition means an act that actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation that actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. The level of habitat modification or degradation significant enough to result in take varies based on each species' essential behaviors, and on the species' use of specific habitat features for these behaviors. The term *harass* means an intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns, which include, but are not limited to, breeding, feeding, or sheltering. The definition of harass does not include habitat modification or degradation.

A different definition of *take* applies to species not listed as state Threatened. Species of Special Concern are those that BRGs identified as data deficient to the extent that their listing status could not be determined. This is a temporary category of imperilment because these five species will be reevaluated by the end of 2017 and either listed as Threatened or removed from the state list. For these species, the definition of *take* (Rule 68A-1.004(79), F.A.C.) is "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." Harm and harass are not components of this definition of *take*, so activities that disrupt essential behavioral patterns are not considered as take for Species of Special Concern.

Take for state-Threatened species is further categorized into two types: intentional and incidental. *Intentional take* results from activities purposely carried out to cause the take; for example, collection of animals for scientific research. *Incidental take* occurs incidental to, and is not the purpose of, some otherwise lawful activity; for example, when land is cleared during construction and the nest or young of a state-Threatened species is unknowingly destroyed.

Take is important because it can affect a species' status and its ability to recover from imperilment. Take can reduce the numbers of individuals of a species, or the specific habitat features that support essential behavioral patterns, to a point where viable populations are no longer possible.

Imperiled species laws and policies establish the framework to control take so that state-Threatened species may persist without increasing the likelihood of extinction or extirpation. Other conservation actions, such as land or population management, can then focus on achieving the goal of species recovery, if possible, to a point where the protections of listing are no longer needed. Fundamental to this framework is that take of state-listed species is prohibited by law unless FWC issues a permit or other type of authorization allowing take to occur. Authorizations for take without additional permitting are provided in rule, for some activities. Examples of these include 1) land management activities that benefit wildlife and that are not inconsistent with Management Plans for species as defined in Rule 68A-27, F.A.C., are authorized and do not require a permit for incidental take; 2) take of state-listed species on airport properties, as addressed in Rule 68A-9.012, F.A.C., which also outlines when no additional take permitting is needed, and 3) wildlife-specific best management practices (as outlined in the forestry and agricultural programs administered by the Florida Department of Agriculture and Consumer Services [FDACS]).

Within this framework, FWC uses both nonregulatory and regulatory approaches to address conservation of imperiled species. Nonregulatory approaches include using influence and incentives, as detailed in the Integrated Conservation Strategies chapter, such as coordinating with local governments in the development of comprehensive plans. Regulatory approaches include other agencies' regulatory processes as well as FWC's

permitting processes. Technical assistance is provided throughout all stages of project development before formal entry into other agencies' or FWC's permitting processes, including pre-application meetings, and can generally be provided during any of these approaches.

Species Conservation Measures and Permitting Guidelines

Species Conservation Measures and Permitting Guidelines (Guidelines) are being developed in support of the ISMP and SAPs. For state-listed species, these Guidelines will provide a comprehensive overview of the suite of approaches FWC uses to manage take. For delisted species, Guidelines will outline the voluntary conservation measures available to continue to conserve the species, and any relevant protections. The Guidelines are intended to be a single source for the policy and protocols associated with FWC's imperiled species technical assistance and permitting programs, and FWC's interaction with applicants and other regulatory agencies as it pertains to wildlife. For each state-Threatened species, the Guidelines will identify species range and habitat features that support essential behaviors of feeding, breeding, and sheltering. They will also provide guidance on when an impairment of the essential behaviors would be significant and meet the definition of take through killing or injuring wildlife or disrupting normal behavioral patterns such that it constitutes harassment. Details within the Guidelines vary based on the species' status (Threatened, Species of Special Concern, or delisted) and our knowledge of the species' needs.

The Guidelines are organized into the following sections, and the scope of each is addressed in detail later in this chapter:

- Biological background,
- Distribution and survey methodology,
- Recommended conservation practices,
- Measures to avoid take,
- Coordination with other state and federal agency processes, and
- FWC permitting.

Guidelines include species-specific requirements and recommendations, including identification of the habitat features that support essential behavioral patterns such as feeding, breeding, and sheltering. *Requirements* are actions or protocols that must be followed to avoid the need for permitting, or as part of a permitting process by FWC or other permitting agencies. They also include actions that must be undertaken to avoid violating FWC's or other agencies' permit conditions and rules. The terms *shall* or *must* in the Guidelines denote requirements. *Recommendations* include preferred protocols or techniques that applicants or permittees should follow, but that are not required (i.e., other viable methods are allowed). The terms *should* and *may* in the Guidelines denote recommendations. Guidance for delisted species use recommendations over requirements, with a focus on technical assistance to prevent relisting in the future, although some species may have possession limits that apply to the taxa at large.

The Species Conservation Measures and Permitting Guidelines will provide options based on project size, time frame, and type of impact and will accommodate most project-based permitting needs. However, these Guidelines may not address permitting needs of all larger, landscape-scale projects that affect state-listed species. These landscape-level projects offer unique opportunities to balance conservation and land use, and permitting needs can be considered on a case-by-case basis. In some instances, these large properties may already have land conservation measures in place through other programs that may address some state-listed species protections. Landowners with real estate holdings of significant regional impact and with the potential for take of state-listed species may contact FWC to discuss options for agreements tailored to the specific needs of those holdings. Consideration of such agreements by FWC will include the landowner's commitment to meet

the requirements outlined in Rules 68A-27.005 and 27.007, F.A.C., for take of state-listed species. These types of agreements can be approved by the FWC Executive Director.

These Guidelines do not address all technical details or aspects of the permit application process. They do not address permitting for federally listed species since federal permitting is completed separately from FWC permitting; for state-listed species that overlap in range and habitat use with federally listed species, coordination with the USFWS is highlighted, and benefits to both the state and federally listed species may occur through the use of the conservation practices. Although Guidelines are not intended to need annual revisions, when changes are proposed by staff or stakeholders they will be reviewed as needed by an FWC standing team and provided to the public and partners for comment prior to any proposal for changes. The Guidelines will be revised as warranted, following public review, and Commission approval.

Biological background

Each set of Guidelines provides species-specific information that outlines the context for recommended conservation practices and permitting. Although the biological background provides important information, the details of this section are informational only, and are not recommendations or requirements. For state-Threatened species, this includes a description of the essential behavioral patterns of feeding, breeding, and sheltering, and a description of when impairment of those behaviors would be significant enough to meet the definition of *take*. This section also describes specific threats to a species that the Guidelines can address. For species with limited information on life history and ecology, the background clearly describes areas of uncertainty.

Distribution and survey methodology

Range maps are provided for each species and match those found in the SAP summaries. The areas identified on the maps are intended for informational purposes only, and represent the geographic area that encompasses the principle observations of individuals of a species, including areas of intervening unoccupied habitat. In addition to range maps, county list of counties where the species has been observed is also included.

Surveys can provide site-specific information about species presence. Survey results can inform decisions on potential avoidance and minimization measures, if they are needed and practicable. Survey methodology for each species is provided if available. If surveys for state-listed species are conducted in accordance with the methodology outlined in the Guidelines, and species are not detected, no FWC permitting is needed.

Recommended conservation practices

Conservation practices are general measures that will benefit the species. Recommendations vary by species and provide details related to management for specific habitat features or to minimize known threats. For example, habitat features may include specific forage species or suggested tree densities; threat minimization may include reduced use of pesticides or recommendations for signs to decrease road mortality. These practices are not required; however, using these recommendations will increase the suitability of a site for the species. Implementing recommended conservation practices does not require a permit authorizing incidental take. Information contained in the conservation practices also may be useful to consider during project development or when identifying potential avoidance or minimization measures, if take is expected to occur.

Measures to avoid take

When take of state-listed species present at a site is avoided, no incidental take permitting is necessary for those species. This section of the Guidelines describes three categories of avoiding take: activities that are not expected to cause take, avoidance measures that will eliminate the need for FWC take permitting, and other authorizations for take such as wildlife-specific best management practices (as outlined in the forestry and agricultural programs administered by the Florida Department of Agriculture and Consumer Services).

Activities that are not expected to cause take include a limited set of specific activities that do not meet the definition of take for SSC or Threatened species. Examples include FWC approved aversive conditioning methods (see the policy for Aversive Conditioning of State-Listed Species) and take of inactive bird nests as described in the Nest Removal for Inactive Single-Use Nests of State-Threatened Birds policy. Avoidance measures that will eliminate the need for FWC take permitting may include buffer distances or season restrictions, which when followed would eliminate the likelihood of take and the need for any further FWC permitting. Although these avoidance measures are provided, on some sites they may not be practicable due to small lot sizes or project design.

Agriculture, as defined in Section 570.02, F.S., conducted in accordance with Chapter 5I-8, F.A.C., and the wildlife best management practices (BMPs) adopted in Rules 5I-8.001 and 5M-18.001, F.A.C., by the Department of Agriculture and Consumer Service pursuant to Section 570.94, F.S., is authorized and does not require a permit authorizing incidental take despite any other provision of Rule 68A-27.007, F.A.C., or Rule 68A-27.005, F.A.C. Participation confirmed through a signed Notice of Intent for the FDACS Florida Forestry Wildlife BMPs and Florida Agricultural Wildlife BMPs and implementation of these BMPs provides a presumption of compliance with regard to incidental take of state-listed species. The Forestry Technical Advisory Group, in accordance with Section 570.94, F.S., meets every two years to discuss enrollment in, continued implementation of, and potential development of new BMPs. Staff from FWC will work with FDACS to create a Technical Advisory Group that will discuss enrollment in, continued implementation of, and potential development of new Agricultural BMPs. Guidelines will identify the practices found within these programs as they apply to a specific species. As identified in SAPs, FWC staff will work with FDACS to continue to evaluate implementation and effectiveness of wildlife BMPs and other measures that also avoid take.

Coordination with other state and federal agencies

As the state review agency, FWC is responsible for providing assistance to local, state, and federal entities regarding Florida's fish and wildlife resources that fall under its authority. As part of FWC's responsibility, staff provides science-based technical assistance to public and private landowners, local governments, nongovernmental organizations, federal agencies, and other state agencies. Technical assistance may include potential locations of wildlife, habitat types these species use, and details on the specific habitat features that support essential behavioral patterns, survey methodologies, recreational opportunities, land-management considerations, and conservation opportunities. Early interaction with FWC staff can help prevent the need for wildlife-related permits later in the planning and development process. Participation by FWC in management-related reviews such as sector plans and large-scale comprehensive plan amendments allows the agency to provide counties and planning councils with information that may assist them with landscape-level planning. Existing planning tools such as the Critical Lands and Waters Identification Project and the Cooperative Conservation Blueprint can be used early in landscape-level planning processes to maximize conservation and development opportunities.

Review of specific land- and water-use projects often begins with FWC staff providing prospective applicants and partners with information on potential impacts to fish and wildlife prior to entering any regulatory process. If take of state-listed species is not anticipated, technical assistance may include recommendations for site development that will be wildlife friendly and maintain habitat connections across the landscape. When recommendations of this type are included in technical assistance communications, there is no regulatory requirement to follow them. Other forms of information often consist of species or habitat features that support essential behavioral patterns likely to occur within the area; survey methods to further assess state-listed species onsite; methods for avoiding or minimizing impacts to these species including potential take from habitat modification or degradation where it kills or injures wildlife by significantly impairing essential behavioral patterns;

permitting alternatives when take is unavoidable; and options for achieving conservation or scientific benefit for state-Threatened species. The information provided to the applicant constitutes technical assistance recommendations with no regulatory requirement to follow them. Early discussion can lead to project designs that avoid all take, preventing the need to enter any permitting process for state-listed species. In some instances, avoiding all take is not a practical alternative; in these cases, staff can provide information necessary for initiating FWC's permitting process. This information includes species- or habitat-specific methods for assessing potential impacts, methods for avoiding or minimizing impacts, and options to achieve a conservation benefit as identified in the incidental take permitting process. Permitting information provided to applicants during the technical assistance phase does not replace the need for review of applications by FWC permitting staff for completeness and consistency with rule requirements.

Information provided to applicants can expedite and ensure success through the permitting process. Information includes

- Species- or habitat-specific methods for assessing potential impacts,
- Methods for avoiding or minimizing impacts, and
- Options to achieve a conservation or scientific benefit as identified in the incidental take permitting process.

For activities governed by both Chapter 373 Part IV, F.S., (Environmental Resource Permit [ERP]) and Chapter 378 Part II, F.S., (Conceptual Reclamation Plan [CRP]), the applicant may request FWC review of the Florida Department of Environmental Protection (DEP) application, if it includes a Wildlife/Habitat Management Plan (WHMP), and it is submitted concurrently to DEP and FWC. A WHMP shall address all state-listed species observed or reasonably likely to occur on a project site. The application and WHMP will be reviewed by FWC staff to determine whether or not it complies with the requirements under Chapter 68A-27, F.A.C. and the standards herein.

We recognize that ERP/CRP landscape-level projects offer unique opportunities to provide regionally significant benefits, connectivity, and protections for multiple state-listed species and their habitats. The WHMP may include and FWC shall consider, if included, applicant-controlled lands, and non-applicant controlled lands adjacent to and in the regional vicinity of a proposed ERP/CRP project site that, taken together, achieve landscape-level species or habitat benefits or landscape-level linkages promoting fish and wildlife movement between and among habitat capable of supporting essential behavioral patterns. If a WHMP achieves this scientific or conservation benefit for state-listed species and shows the activity will not have a negative impact on the survival potential of those state-listed species, it is presumed to comply with the requirements under Chapter 68A-27, F.A.C., and the standards herein.

Staff from FWC shall issue a determination that the WHMP is sufficient to comply with the requirements of Chapter 68A-27, F.A.C., or provide a written response stating how the WHMP does not comply with the requirements of 68A-27, F.A.C. No additional FWC authorizations for those species addressed in the WHMP are required, despite any other provisions of Chapter 68A-27, F.A.C., if the activities are conducted in accordance with the final ERP/CRP approvals and the final FWC approved WHMP. Implementation of the final ERP/CRP and approved WHMP provides a presumption of compliance with Chapter 68A-27, F.A.C., as outlined above, for species included in the WHMP.

The FWC authorization shall be in effect for the duration of the ERP/CRP, during which time FWC may verify continued implementation of the WHMP and any ERP/CRP provisions applicable to state-listed species. A copy of the annual reports submitted to the FDEP permitting agency shall be provided to FWC. If subsequent significant modifications or changes, as defined in the WHMP, are made to the WHMP, FWC shall be notified to

review the amended WHMP. The scope of FWC's review shall be limited to the scope of the applicant's proposed change(s) to the WHMP. If state-listed species not included in the WHMP are encountered on the project site, FWC shall be consulted, and if not already provided for in the WHMP, additional measures may be required. In the event that a species' listing status is changed by FWC, a revision to the WHMP may be necessary to remove or update references to species-specific measures. The amended WHMP, if approved by FWC, shall be subject to the same presumption of compliance set forth above. These provisions shall not apply to activities constituting intentional take subject to Rule 68A-27.007(2)(a), F.A.C.

Review of land and water conversion projects

As a reviewing and commenting agency in other state agency regulatory programs, FWC can address take of imperiled species. Once an applicant enters into a regulatory process, FWC staff works with the applicant, as well as with the respective regulatory agency, to identify and address fish and wildlife impacts as required by the particular regulatory process. Depending on the regulatory process, conditions may be included in the other state agency permit that require measures be taken to avoid, minimize, or mitigate impacts to fish and wildlife resources. Unlike technical assistance provided in the planning stages, these conditions can become regulatory requirements of executing the permit from another state agency.

Although the other regulatory processes address general impacts to wildlife, FWC can utilize information provided through these processes to evaluate if those general impacts are also causes of take under the rule-defined context of take of SSC and state-Threatened species. Wildlife conservation is addressed by FWC through numerous state regulatory processes by identifying impacts to fish, wildlife, and habitat resources and providing implementation strategies to offset those impacts (see Table 3). Each of these processes provides FWC unique opportunities to work with other agencies and applicants to identify and implement actions that comply with Rules 68A-27.005, F.A.C., and 68A-27.007, F.A.C., for impacts that also constitute take of state-listed species. Such opportunities may include incorporating protective measures or conditions into permits, modifying site-design plans to avoid take and designate conservation areas, monitoring and managing take during development and operation, and designating regionally important habitat areas for conservation.

As part of reviewing any project where take of a state-listed species is likely, FWC staff will look at the requirements for permitting take in Chapter 68A-27, F.A.C., and the measures for avoidance, minimization, and mitigation that are incorporated into projects as part of the permitting and regulatory processes of other local, state, and federal agencies. If permits issued by other agencies adequately provide similar information needed for issuing a SSC or state-Threatened species take permit, FWC will evaluate these applications to determine if they meet the requirements of Chapter 68A-27, F.A.C., with a minimal application process. This may be accomplished through the following options: 1) issuing a concurrent take permit from FWC, 2) a memorandum of understanding with the cooperating agency that would allow that agency to issue a take permit under FWC-staff approved conditions, or 3) a programmatic permit issued to another agency. These permits would be enforceable, transparent, and issued based on the understanding that implementation of project commitments will satisfy the requirements of Rule 68A-27.005, F.A.C., or Rule 68A-27.007, F.A.C. If these conditions are not met, then a separate incidental take permit would be recommended.

One example of this process is the ERP program implemented by DEP and the five water management districts (WMDs) under Chapter 373 Part IV, F.S. (two Florida counties, Broward and Hillsborough, also have the authority to issue ERPs pursuant to Section 373.441, F.S.). The ERP program applies to any activity that may alter surface-water flows, including dredging and filling in wetlands, and activities in uplands that may create stormwater runoff. The majority of land conversion or development projects in the state must go through some portion of the ERP program. Staff from FWC reviews applications submitted to DEP and the WMDs under the ERP program for new permits, modifications, and conceptual permits with the potential to affect wetlands.

Several ERP types are reviewed by FWC staff, including, but not limited to, dredging and filling in wetlands, mining, stormwater management, navigational dredging, seaports, and electrical and natural gas transmission. Staff reviews these permits to assess potential impacts to fish and wildlife resources, including wetland-dependent state-listed species and the habitat features that are supporting essential behavioral patterns, as authorized under Chapter 379, F.S., and Chapter 68A-27, F.A.C. Laws and policies relating to FWC's state-listed species are the framework and guidance for such reviews. Through the commenting process, DEP and the WMDs can incorporate FWC conditions into permits they issue and if the conditions are similar, or equal, to requirements of an FWC incidental take permit, it may streamline a secondary permitting process. Additionally, ERP permits typically require the applicant to provide minimization and mitigation for wetland or other impacts, which may include minimization or mitigation in adjacent uplands. Wetland mitigation offered under the ERP will be reviewed by FWC to see if it complies with the requirements of Rule 68A-27.007, F.A.C., for permitting for take of state-Threatened wetland-dependent species. If the factors for issuing an incidental take permit are addressed through the ERP program, FWC may not require any additional measures or permitting. If other regulatory agency permitting processes do not allow for minimization conditions, or do not achieve the conservation or scientific benefit necessary for permitting take of state-Threatened species, then FWC staff will continue to work with the applicant to complete the FWC permitting process.

Table 3. State regulatory programs that may impact or consider imperiled species or their habitats.

Program	Statute	Rule/Agreement	Comments
Developments of Regional Impact (DRI)	380.06(12)(c) F.S.	73C-40.024(2), F.A.C.	Allows regional planning council to request input from other agencies.
		73C-40.041, F.A.C.	Listed Plant and Wildlife Resources Uniform Rule allows FWC to place conditions into development orders related to fish and wildlife resources, conservation areas, and habitat management.
DRI – Substantial Deviations	380.06(19)(b)11., F.S.		Requires review if an area set aside for listed species via the DRI process is to be affected by the deviation.
Master DRIs	380.06(21), F.S.	73C-40.028(1), F.A.C.	Requires the same procedures as for a DRI to be followed.
County Comprehensive Plan Amendments	163.3184(1)(c)9., F.S.		Allows FWC to review county comprehensive plans and plan amendments only.
Sector Plans	163.3245(3)(c), F.S.		Includes FWC as a review agency.
Rural Lands Stewardships	163.3248(4), F.S.		Allows property owners to consult with FWC as well as other agencies.
	163.3248(9) and (9)(a), F.S.		Allows landowners to enter into agreements with FWC.
Statewide Environmental Resource Permit (SWERP)	373.414(1)(a)2. and 373.414(1)(a)4., F.S.	Sections 5.5.2.2, 10.2.2, and 10.2.7 of the Applicant's Handbook (which is incorporated by reference into rule by Ch. 62-330.010(4)(a), F.A.C.)	The Applicant's Handbook requires that DEP/WMDs send FWC copies of individual permit applications. Section 10.2.7 addresses secondary impacts to wetland-dependent listed species.
			The public interest test in statute requires consideration of "whether the activity will adversely affect the conservation of fish and wildlife, including endangered or threatened species, or their habitats" and "whether the activity will adversely affect the fishing or recreational values or marine productivity in the vicinity of the activity…."
		62-330.417(3)1, F.A.C.	Requires a letter of consistency concurrence from FWC to get a general permit for a boat ramp.
Wetland Mitigation	373.414(2)(a) and (b), F.S.		Statute addresses protection of listed species in isolated wetlands.
Mitigation Banks	373.4136, F.S.[1]	62-342, F.A.C.	373.4136(4)(f), F.S., considers "[t]he extent to which the mitigation bank provides habitat for fish and wildlife, especially habitat for species listed as threatened, endangered, or of special concern, or provides habitats that are unique for that mitigation service area."
Uniform Mitigation Assessment Method (UMAM)	373.414(18), F.S.	62-345.300(2), F.A.C.	Requires consideration of use of the area by fish and wildlife.
		62-345.300(3)(a), F.A.C.	Includes a requirement to assess the area and identify what fish and wildlife functions are supported by the community/habitat.
		62-345.400(8), F.A.C.	Requires consideration of the anticipated wildlife utilization and type of use (feeding, breeding, nesting, resting, or denning), and applicable listing classifications (Threatened, Endangered, or Species of Special Concern as defined by Rules 68A-27.003, 68A-27.004, and 68A-27.005, F.A.C.).
Joint Coastal Program	161.055(2)(b), F.S.	62B-49.001, F.A.C.	Indirect inclusion through Environmental Resource Permitting requirements in the program.
Coastal Construction Control Line (CCCL)	161.163, F.S.	62B-33.005, F.A.C.	Language in statute and rules references the state's responsibility to consider impacts to nesting sea turtles. FWC has responsibilities related to sea turtles under 379.2431, F.S. Rule 62B-33.005 establishes beaches and dunes as integral part of coastal system, providing habitat for wildlife.
		62B-41.0055, F.A.C.	
		62B-55, F.A.C.	
Miami-Dade County Lake Belt Plan and mitigation	373.4149(5), F.S.		Allows FWC Executive Director, among others, to enter into agreements with landowners to implement the program.
	373.41492(6)(b), F.S.		Includes FWC on an interagency committee to oversee mitigation expenditures.
Harris Chain of Lakes Restoration Council and program	373.467(1)(b), F.S.		Includes FWC in the Harris Chain of Lakes Restoration Council and allows FWC to review proposals, restoration techniques, and data associated with restoration efforts of the program.
	373.468 F.S.		
Surface Water Improvement and Management (SWIM) plans and programs	373.453(3), F.S.		Identifies FWC as a review agency.
Wekiva River Basin Commission	369.324(1)(f)6., F.S.		Includes FWC as an ad hoc nonvoting member of the Wekiva River Basin Commission.
Ecosystem Management Agreements	403.0752, F.S.		Enables FWC to establish voluntary ecosystem management agreements with regulated entities and other governmental agencies.
Electrical Power Plant and Transmission Line Siting Act	403.507(2)(a)4., F.S.		Relates to power plants and identifies FWC as a review agency and a potential party to the hearing.
	403.508(3)(a)4., F.S.		
	403.526 (2)(a)4., F.S.		Relates to transmission lines and identifies FWC as a review agency and a potential party to the hearing.
	403.527(2)(a)5., F.S.		
Natural Gas Transmission Pipeline Siting	403.941(2)(a)4. F.S.		Relates to power plants and identifies FWC as a review agency and a potential party to the hearing. Also includes FWC in review of alternative corridors.
	403.9411(4)(a)5., F.S.		
	403.9412(1)(d), F.S.		

[1] 373.403(18), F.S., defines "ecological value" as "the value of functions performed by uplands, wetlands, and other surface waters to the abundance, diversity, and habitats of fish, wildlife, and listed species. These functions include, but are not limited to, providing cover and refuge; breeding, nesting, denning, and nursery areas; corridors for wildlife movement; food chain support; and natural water storage, natural flow attenuation, and water quality improvement, which enhances fish, wildlife, and listed species utilization."

Program	Statute	Rule/Agreement	Comments
Mandatory Phosphate Mine Reclamation	378.205(2), F.S.		Statute allows DEP to seek comments from other agencies on reclamation applications.
		62C-16.0041(1)(e), F.A.C.	Requires the applicant for a conceptual reclamation plan or plan change to describe the locations of listed species.
		62C-16.0051(11), F.A.C.	Requires operators to incorporate measures to "offset fish and wildlife values lost as a result of mining operations and…identify special programs to restore, enhance, or reclaim particular habitats, especially for endangered and threatened species…." Also allows them to "designate specific locations within the mine as 'Wildlife Areas' and include a plan for reclamation and management for sites so designated. Slopes, revegetation, and erosion control requirements may be modified by the department in such areas on a case-by-case basis where such changes will benefit the overall plan for the propagation of wildlife."
Limestone Reclamation	378.503(4), F.S.	62C-36.008(4), F.A.C.	Reclamation performance standards must include provisions for safety to wildlife.
Heavy Mineral Mining Reclamation	378.601(4)(b), F.S.		Requires that reclamation is "conducted in a manner which has minimal long-term adverse impacts on surface and groundwater resources, wildlife…."
		62C-37.008(10), F.A.C	Requires operators to "identify what measures have been incorporated into the conceptual plan to offset fish and wildlife values lost as a result of mining activities and shall identify special programs to restore, enhance, or reclaim particular habitats, especially for endangered and threatened species… ."
Fullers Earth Mining Reclamation	378.703(3), (8), and (9), F.S.		All refer to the need to protect wildlife or offset impacts to habitat.
		62C-38.008(7)(b). F.A.C.	Requires the operator to "identify what measures have been incorporated into the conceptual plan to offset fish and wildlife values lost as a result of mining activities and shall identify special programs to restore, enhance, or reclaim particular habitats, especially for endangered and threatened species…."
Wastewater Discharge into Wetlands		62-611.300(3), F.A.C.	Rule states that "[t]he discharge of reclaimed water to treatment or receiving wetlands shall… [n]ot cause adverse effects on endangered or threatened species" (one of three General Qualitative Design Criteria).
Everglades Improvement and Management	373.4592, F.S.		Statute describes the unique ecosystem of the Everglades and the solutions needed to address negative effects of hydroperiods, invasive species, and phosphorous levels. Prevents phosphorous criteria from causing an imbalance in the natural population of flora and fauna.
Florida Coastal Management Program	380.205(2), F.S. 380.23, F.S.	Program guide for the Florida Coastal Management Program	379, F.S., is incorporated into the Florida Coastal Management Program. The Florida Coastal Management Program Guide describes the program in detail and describes FWC's connection to the program as well as wildlife related issues addressed by the program and consistency determination.[2]
Oil and Gas Drilling in the Big Cypress Watershed		62C-30.005(1), F.A.C.	Requires that the project (including roads) not "cause permanent impact on…the wildlife of the area, with special emphasis on rare and endangered species" in the Big Cypress Watershed.
		62C-30.005(2)(a)8., F.A.C.	Requires that "roads shall be constructed to avoid serious damage or enduring scars to land and wildlife, and to avoid obstructing the natural movement of water and wildlife" in the Big Cypress Watershed.
		62C-30.005(2)(a)11., F.A.C.	Prohibits access corridors and drilling pads from being "constructed in or through those zones which are documented and/or confirmed by the Florida Game and Fresh Water Fish Commission as areas of high level Florida panther activity unless reasonable and prudent alternatives are not available. Known red-cockaded woodpecker colonies, rookeries, alligator holes, research sites, pine uplands, and threatened or endangered species habitats shall be avoided where possible." And, requires that drilling sites "be located to minimize negative impacts on the vegetation and wildlife, including rare and endangered species…."
Efficient Transportation Decision Making (ETDM)		ETDM website	Describes efficient transportation decision-making, the environmental screening tool, and FWC's role as a review agency in the Agency Operating Agreement
Aquaculture lease applications	253.75, F.S.	18-21.021(1)(l)3., F.A.C.	Identifies FWC as a review agency.
Ten-year site plans for electricity utilities	186.801(2)(e), F.S.		Requires each utility to submit to the Public Service Commission a report that includes "the views of appropriate local, state, and federal agencies…."
Rural Economic Development Initiative (REDI)	288.0656(6)(a)10., F.S.		Identifies FWC as having a REDI representative.
Campus Master Plans	1013.30(6), F.S.		Identifies FWC as a review agency.

[2] Federal Consistency in Florida

The Florida Coastal Management Program (FCMP) was approved by NOAA in 1981 and is codified at Chapter 380, Part II, F.S. The State of Florida's coastal zone includes the area encompassed by the state's 67 counties and its territorial seas. The FCMP consists of a network of 24 Florida Statutes administered by eight state agencies and five water management districts. This framework allows the state to make integrated, balanced decisions that ensure the wise use and protection of the state's water, property, cultural, historic, and biological resources; protect public health; minimize the state's vulnerability to coastal hazards; ensure orderly, managed growth; protect the state's transportation system; and sustain a vital economy. Federal consistency reviews are integrated into other review processes conducted by the state depending on the type of federal action being proposed. The Florida State Clearinghouse, administered by the DEP Office of Intergovernmental Programs, is the primary contact for receipt of consistency evaluations from federal agencies. The Florida State Clearinghouse coordinates the state's review of proposed federal activities, requests for federal funds, and applications for federal permits other than permits issued under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Consistency reviews of federal permits issued under those Acts are conducted in conjunction with wetland resource and environmental resource permits issued by the Department of Environmental Protection or the water management districts. The Offshore Projects Unit, also in the Office of Intergovernmental Programs, coordinates consistency reviews of federal activities proposed in offshore waters. Regardless of the process used, the review of federal activities is coordinated with the appropriate FCMP member agencies. Each agency is given an opportunity to provide comments on the merits of the proposed action, address concerns, make recommendations, and state whether the project is consistent with its statutory authorities in the FCMP. Regional planning councils and local governments also may participate in the federal consistency review process by advising the Department of Economic Opportunity (DEO) on the local and regional impact of proposed federal actions. Comments provided by regional planning councils and local governments are considered by the DEO in determining whether the proposed federal activity is consistent with specific sections of Chapter 163, Part II, F.S., that are included in the FCMP. If a state agency determines that a proposed federal activity is inconsistent, the agency must explain the reason for the objection, identify the statutes the activity conflicts with and identify any alternatives that would make the project consistent. As the designated lead coastal agency for the state, DEP communicates the agencies' comments and the state's final consistency decision to federal agencies and applicants for all actions other than permits issued under Clean Water Act Section 404 and Section 10 of the Rivers and Harbors Act. The state's consistency decisions on those permits are made through the approval or denial of the wetland resource or environmental resource permits issued under Chapter 373, Part IV, F.S. The public can review projects submitted for the state's review at http://appprod.dep.state.fl.us/clearinghouse/. Comments on those projects can be sent to the Florida State Clearinghouse using the contact information on that page.

FWC permitting

Permits authorizing either intentional or incidental take can, under certain conditions, be issued by FWC for state-listed Threatened species, as described in Rule 68A-27.007, F.A.C. The Species of Special Concern permitting standard is found in Rule 68A-27.005, F.A.C., and does not include a distinction between incidental and intentional take. All permitting guidance for SSC is included in a single section of the document not divided into intentional and incidental take. Separate standards for incidental and intentional take are not identified in rule for SSC, so all permits are issued when the activity will not be detrimental to the survival potential of the species. Although some take of SSC may be incidental to otherwise legal activities, take permitting for non-Threatened species is limited to the individual animal or their nests and eggs, and mitigation is not included in the permitting process. In some cases, species removed from Florida's Endangered and Threatened Species List (and thus removed from Chapter 68A-27, F.A.C.) will be regulated by possession limits in other chapters of the Florida Administrative Code: 68A-25, 68A-26, and 68A-6. For take or possession beyond what is allowed in the rules of those chapters, permits are issued using the standards in Rule 68A-9.002, F.A.C. The justifiable purposes outlined in Rule 68A-9.002, F.A.C., are scientific, educational, exhibition, propagation, management, or other justifiable purposes.

Other take permitting exemptions are provided in Rule 68A-27.007, F.A.C. Land-management activities that benefit wildlife and are not inconsistent with management plans, agriculture using best management practices, and fire suppression are all exempt from any permitting requirements (Rules 68A-27.007(c), (d), and (e), F.A.C.). Specifically, any agricultural or silvicultural activities covered by a Notice of Intent to implement FDACS Florida Forestry Wildlife BMPs or Florida Agricultural Wildlife BMPs do not require a permit. Relocation of commensals consistent with Gopher Tortoise Permitting Guidelines (Rule 68A-27.003, F.A.C.) and FWC Policy on the Relocation of Priority Commensals requires no additional incidental take permit.

Intentional take permitting

Intentional take is not incidental to otherwise lawful activities. It is often associated with trapping, collecting, or handling a species for research or conservation. For state-Threatened species, intentional take permits, commonly called scientific collecting permits, may only be considered for scientific or conservation purposes (defined as activities that further the conservation or survival of the species taken), including collection of scientific data needed for conservation or management. Such permits can only be issued if the activities will benefit the survival potential of the species. For state-designated SSC, permits are issued upon the reasonable conclusion that the permitted activity will not be detrimental to the survival potential of the species. Permitting guidelines for each species identify the circumstances under which intentional take is allowed and provide guidance on meeting the conditions for issuance of an intentional take permit.

Scientific collecting and conservation

Scientific collecting and conservation permits allow for the handling of animals, including capture and holding. Capturing and handling always pose some risks to an animal, but knowledge gained can outweigh potential risks. To minimize impacts and assure that scientific collecting permits are only issued for activities beneficial to a species, permits are issued for state-Threatened species using the guidance found in Rule 68A-27.007 (2)(a), F.A.C.:

1. Whether the purpose for which the permit required is adequate to justify removing specimens of the species from the wild;
2. The probable direct and indirect effect which issuing the permit would have on the wild population of the species sought to be taken;
3. Whether the permit would conflict with any program intended to enhance survival of the species

sought to be taken;

4. Whether the purpose of the permit would likely reduce the threat of extinction for the species sought to be taken;
5. The opinions or views of scientists or other persons or organizations having expertise concerning the species sought to be taken; and
6. Whether expertise, facilities, or other resources available to the applicant are adequate to successfully accomplish the objective stated in the application.

Risks to property or human safety

Intentional take may sometimes be necessary if a species, or specific features of the species' habitat that support essential behavioral patterns, poses a risk to human safety or property. For some species, aversive conditioning measures have been developed to modify the behavior of individual animals. When aversive conditioning is not successful and concerns still exist for human safety or property, applications for intentional take permits will be considered on a case-by-case basis (see the policy for aversive conditioning). This option is limited to certain species that are a safety risk to people or property, and the Species Conservation Measures and Permitting Guidelines provide specifics on what aversive conditioning activities are allowed without a permit. Examples of intentional take to protect property or human safety may include harassment to prevent wildlife from attacking people (e.g., squirting aggressive sandhill cranes with water).

Incidental take permitting

Incidental take permits may be issued for state-Threatened species by FWC when take cannot be avoided during otherwise lawful activities, if there will be a scientific or conservation benefit and it is shown that the permitted activity will not have a negative impact on the survival potential of the species. Conservation benefit, scientific benefit, and negative impact are evaluated by considering factors listed in Rule 68A-27.007(2)(b), F.A.C. These conditions are usually accomplished through a combination of avoiding take when practicable, minimizing the take that will occur, and mitigating for permitted take. Because FWC incidental take permits are only issued for state-Threatened species, the permitting guidelines for Species of Special Concern do not include incidental take permitting information, only intentional take permitting information.

Scientific and conservation benefit

In order to consistently implement F.A.C. rule when issuing incidental take permits, the following definitions form the policy guidance on what constitutes a scientific or conservation benefit.

Conservation Benefit - Applications for incidental take of state-Threatened species will be considered on a case-by-case basis. Through consideration of the seven evaluation factors listed in Rule 68A-27.007, F.A.C, it must be clear that any proposed take is counterbalanced, and there is an additional benefit for the loss of species or habitat components supporting the essential behavioral patterns of breeding, feeding, or sheltering. The level of counterbalance plus additional conservation is determined by review of the proposed activity through the seven evaluation factors. The level is specific to how the application addresses the seven evaluation factors and to the species concerned.

Scientific Benefit - Any study that would provide significant advancement in knowledge or management of the species, as identified in the Species Action Plan or other management or recovery documents, may be used to meet the condition of scientific benefit. Because scientific benefit can be used in lieu of conservation benefit, the value to the species must be measured against species needs and conservation actions, as determined by FWC. Scientific benefit may vary based on species and our current knowledge of species needs and habitats.

Evaluation factors

In addition to the requirement for a scientific or conservation benefit for any incidental take permit issued, the permitted activity must also have no negative impact on the survival potential of the species. Seven evaluation factors (listed in Rule 68A-27.007(2)(b), F.A.C.) must be considered when issuing an incidental take permit for a state-Threatened species:

1. The objectives of a federal recovery plan or a state management plan for the species sought to be taken;
2. The foreseeable long-range impact over time if take of the species is authorized;
3. The impacts to other fish and wildlife species if take is authorized;
4. The extent of injury, harm, or loss to the species;
5. Whether the incidental take could reasonably be avoided, minimized, or mitigated by the permit applicant;
6. Human safety; and
7. Other factors relevant to the conservation and management of the species.

Minimization measures

Species Conservation Measures and Permitting Guidelines provide options for minimizing take of state-Threatened species. Although only evaluation factor 5 includes the term *minimized*, the Guidelines include a suite of minimization measures that assist in addressing all the evaluation factors. Minimization can lessen the impact of activities, but not to the level that harm is eliminated; however, these measures are important to address the rule requirement of having no negative impact on the survival potential of the species, as shown by the applicant and assessed through the evaluation factors. Projects that cannot avoid all take, including harm, may require additional conservation to meet the threshold of providing a conservation or scientific benefit. Focusing on avoidance in the pre-FWC permitting process, or on minimization measures during project design, may reduce what is needed to achieve a conservation or scientific benefit. Minimization measures are included in all Species Conservation Measures and Permitting Guidelines written for state-Threatened species, and may include the categories outlined in Table 4.

In addition to the species-specific minimization measures, multispecies options are being developed to provide recommendations and requirements for activities that will impact multiple state-listed species in an area. These options are intended to minimize potential conflicts in implementing Species Conservation Measures and Permitting Guidelines, which focus on a single species, and offer streamlined minimization measures and mitigation options. Not all habitats or locations in the state are expected to have multispecies guideline options because these options are driven by overlapping range and habitat features that support essential behavioral patterns of state-Threatened species.

Table 4. Minimization measures and the evaluation factors that FWC must consider when issuing a permit. Consideration of these factors when evaluating permit applications is in accordance with Florida Administrative Code rule.

Minimization Measure	Description	Example Measure from Guidelines	*Evaluation Factors Considered When Issuing a Permit*						
			1	2	3	4	5	6	7
			Objectives of management/ recovery plans	Long-range impacts over time	Impacts to other fish and wildlife species	Extent of injury, harm, or loss	Level of avoidance, minimization, or mitigation	Human safety	Other factors
Seasonal or Temporal Restrictions	Altering the timing of activities can minimize impacts during critical life periods of some species.	Conduct activities before or after breeding season.	X	X	X	X	X		
Buffer Zones	Creating buffer zones around habitat features essential to certain behaviors can help minimize impacts of activities.	Provide a buffer of 300 feet for roosting waterbirds.	X	X	X	X	X		
Design Modification	Alter some aspect of project design to avoid habitats that support essential behavioral patterns.	Group developed areas into a smaller footprint and maintain conservation areas on site.	X	X	X	X	X	X	X
Method Modification	Alter building, clearing, or other methods of project development.	Directional clearing techniques may allow slow-moving animals to move from an area and minimize impacts.			X	X	X		X
Surveys	Surveys are not recommended for all species; however, in some cases, surveys will allow applicants to target minimization where it provides the greatest benefit.	Identify trees with nests to flag for avoidance when clearing a site.	X	X	X	X	X		
Cryptic Species	Cryptic species are those that may not be easily observed, even when using correct survey methodology in occupied habitat. For this reason, surveys are not recommended; but, general habitat measures may minimize impacts to cryptic species.	Use open-bottom culverts set below grade where practicable to allow species to move across roads.		X	X	X	X		X
Multi-Species Habitat Measures	Multiple state-listed species occur in some habitats and locations, and streamlined minimization measures can be used instead of single species measures that may be in conflict.	In sandhills, leave snags and stumps where possible (benefits Florida pine snake, short-tailed snake, Florida mouse, and gopher frog).	X	X	X	X	X		X

Options for achieving a conservation or scientific benefit

Mitigation is the primary option available to meet the rule requirements for a scientific or conservation benefit when take cannot be avoided completely. Mitigation is specifically mentioned in evaluation factor 5, but the benefits of mitigation can also address factors 2, 3, and 4 (see Table 4). Mitigation is often necessary in meeting the rule requirement of having no negative impact on the survival potential of the species, as assessed through the evaluation factors. The Species Conservation Measures and Permitting Guidelines provide species- or habitat-specific information on mitigation options, and how, if necessary, those options can be combined to achieve conservation benefit. Although the Guidelines provide examples of available mitigation options, any applicant for an incidental take permit may offer other options to be considered on a case-by-case basis.

Habitat

Mitigation options for take of state-Threatened species include replacing habitat that supports essential behavioral patterns to achieve a conservation benefit. Our approach is to consider the value of the habitat relative to the essential behavioral patterns of the species. Equal or greater value could, therefore, be quantified by acreage, condition, location, long-term commitment to management, or specific habitat features that support essential behavioral patterns. In some cases the functional value of habitats for a specific species may be greater than an acre-to-acre comparison. For example, habitat that supports essential behavioral patterns for a species and serves as an important corridor is rare, or is available within a very limited range, and may provide a greater value to the species than larger, lower quality habitat. One possible method for assessing habitat value for state-Threatened species may be a process similar to the Uniform Mitigation Assessment Method used for wetlands, where the upland habitat features that support essential behavioral patterns are identified and scored for both the sites impacted and the sites proposed for mitigation. A tool for this purpose does not exist, but staff will consider developing and field-testing such a tool; guidance for use of such a tool would be incorporated into species-specific Guidelines as appropriate.

Species Conservation Measures and Permitting Guidelines identify habitat features that play a critical role in the essential behavioral patterns of a species. Some conservation areas have features (such as unique population units or habitat features) that are important for the long-term conservation of a species, and these are identified as Species Focal Areas (SFAs) for specific species (note that not all species have SFAs). To maintain the value of these areas for state-Threatened species, our approach is to encourage development outside of areas adjacent to or connecting SFAs through nonregulatory approaches, while focusing mitigation options in these important areas to provide the greatest benefit to state-listed species. In most cases, these areas for mitigation are also closely linked to existing conservation lands.

Options for habitat mitigation include, but are not limited to, the following.

- Creation, enhancement, restoration, and management of habitat can provide mitigation to achieve a conservation benefit. The value of management, restoration, or enhancement on existing easements or conserved land may be lower than the value of acquisition or easements that add to the available conservation land. In some cases, however, sites critical for supporting essential behavioral patterns of specific species may be identified, and restoration or management of these sites can constitute a conservation benefit.
- Acquisition, fee simple or through long-term easements, is acceptable and encouraged under some conditions. The value of habitat for supporting essential behavioral patterns must be determined, which may require surveys or species occupancy information. Desired habitat characteristics may be species specific, and could depend on quantity, occupancy, location, or long-term management assurance. Easements can align with SAP actions. As information is obtained through research and monitoring, Guidelines may need to be revised to use the best available science for focusing acquisition or easement location and necessary habitat features to achieve landscape-level conservation benefits.

Funding

Monetary contribution is another option for mitigation, with funds collected tied to providing a benefit for the state-Threatened species being impacted. Species Conservation Measures and Permitting Guidelines summarize the conservation actions in Species Action Plans, and funds can be used to support these actions. Examples include, but are not limited to, research and monitoring, developing information on management techniques, developing incentive programs, and outreach. Funding may also support habitat options when used for management, restoration of habitats, or acquisition of land or easements. Monetary contributions that support conservation actions or integrated conservation strategies provide a conservation benefit. Monetary contributions to mitigation funds are not a requirement for mitigation, but in some cases may serve as an option for certain types of projects where habitat-related mitigation is not feasible.

The mitigation contribution is specific to species or suites of species within a habitat. Developing appropriate mitigation values requires coordination and input from partners and affected stakeholders, and will be linked to funding conservation actions, not based on an impact-per-individual animal. Mitigation-related monetary contributions are not intended to replace existing local, state, or federal funds used for state-listed species, but should add to existing funding sources for conservation actions. Mitigation contributions will be used to implement conservation actions and are not intended to build staff or expand agency infrastructure. Monetary contribution could also be applied to preapproved non-FWC conservation funds, such as land trusts that manage easements.

Information

Information options are not a stand-alone form of mitigation and do not rise to the level of scientific benefit; but, in combination with other options, information can be part of the mitigation package to achieve a conservation benefit. Information as mitigation may come in many forms and, in most cases, information needs are very species specific. This component of conservation benefit must, therefore, occur in combination with other options.

Species Conservation Measures and Permitting Guidelines provide guidance on what information is needed, based on data gaps identified in the Species Action Plans and Biological Status Reviews. Examples of information options include presence/absence data from surveys, access to sites for surveys, participation in genetic studies, and information on management techniques. Providing data may, in some cases, help to achieve a conservation benefit, particularly when a species has significant gaps in occupancy data, and in combination with other options, access to data can provide a conservation benefit by improving knowledge about the species and its management.

Scientific benefit

The scientific benefit option must provide significant advancement in knowledge or management of the species, as identified in the Species Action Plan or other management or recovery documents. Since scientific benefit can be used in lieu of conservation benefit, the value to the species must be measured against species needs and conservation actions, as determined by FWC. Scientific benefit may vary based on species and our current knowledge of species needs and habitats. Status assessments or monitoring on an individual property would not necessarily fall into this category. Because little information is available for cryptic species (see the policy for Permitting Standards for Incidental Take of Cryptic Species), smaller studies may be able to provide a significant advancement in the knowledge for the species. Currently funded studies or programs will not be counted as scientific benefit, but contributions that add value to studies or programs (e.g., time, money, staff) may qualify.

Species Conservation Measures and Permitting Guidelines identify high-priority research needs based on information contained in the Species Action Plans. Development of projects that address these needs should be

discussed with FWC staff to determine if they would meet the definition of scientific benefit and serve as mitigation.

Rules and statutes

As previously noted, laws include Florida Administrative Code rules approved by the seven-member Fish and Wildlife Conservation Commission and statutes passed by the Florida Legislature in support of FWC. See Table 5 for proposed rule changes that support implementation of Florida's Imperiled Species Management Plan. Rules affecting the protection, management, and conservation of wildlife are in the Florida Forever Act (Section 259.105, F.S.) and the following chapters of the Florida Administrative Code.

- Chapter 68A-1, F.A.C., General: Ownership, Short Title, Severability and Definitions
- Chapter 68A-4, F.A.C., General Prohibitions and Requirements
- Chapter 68A-9, F.A.C., Miscellaneous Permits (Permits to Take Wildlife or Freshwater Fish for Justifiable Purposes)
- Chapter 68A-12, F.A.C., Rules Relating to Game (Possession or Sale of Birds or Mammals; Taxidermy Operations and Mounting Requirements)
- Chapter 68A-16, F.A.C., Rules Relating to Birds
- Chapter 68A-23, F.A.C., Rules Relating to Freshwater Fish
- Chapter 68A-25, F.A.C., Rules Relating to Reptiles
- Chapter 68A-26, F.A.C., Rules Relating to Amphibians
- Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species
- Chapter 68B-8, F.A.C., Marine Special Activity License Program
- Chapter 68F-20, F.A.C., Aquatic Plant Control Permits

This table was stricken in 2018 as these changes are already effective. Refer to the Amendment Summary for additional details.

Table 5. Proposed Florida Administrative Code rule changes in support of ISMP implementation.

Rule Title/ Division/ Chapter/ Section	Rule/ Subsection/ Paragraph/ Sub-paragraph	Summary of change	Reason for change
68A-9.002 Permits to Take Wildlife or Freshwater Fish for Justifiable Purposes	(1)	Add language for 'other federal authorizations'.	Change clarifies that federal authorizations other than permits also are acceptable as indication of federal authorization to take and/or possess migratory birds or their nests.
68A-12.004 Possession or Sale of Birds or Mammals; Taxidermy Operations and Mounting Requirements	(11)(b)1.	Change Rule 68A-13.002 to Rule 68A-16.001 in the sub-paragraph.	Corrects reference to the rule adopting the Migratory Bird Treaty Act.
	(11)(d)2.	Delete Rule 68A-27.004 from subparagraph.	Corrects reference to a rule that no longer exists.
68A-16.003	New section	Add section that no State permit is needed to take inactive nests, or parts thereof, of birds not listed in 68A-27.	Provide consistency between listed and non-listed species rules, state rule, and consistency with Federal implementation of the Migratory Bird Treaty Act.
68A-25.002 General Provisions for Taking Possession and Sale of Reptiles	New subsection	Add a subsection or add language to an existing subsection to prohibit the take and possession of Peninsula ribbon snakes and red rat snakes in the Lower Keys.	The Lower Keys population of Peninsula ribbon snake and the Lower Keys population of the red rat snake did not meet the criteria for listing as state Threatened; but these species need specific protection from overexploitation to be maintained as a part of the wildlife diversity in the Lower Keys.
	(6)(a)2.d.	Add the Lower Keys population of the striped mud turtle to the list of turtles that may not be taken from the wild.	The Lower Keys population of the striped mud turtle did not meet the criteria for listing as a state-Threatened species, but needs protection from intentional take to prevent meeting listing criteria in the future.
68A-26.002 Regulations Relating to the Taking of Amphibians	(1) or new subsection	Add language that excludes Pine Barrens treefrogs and gopher frogs from the rule allowing take of frogs.	The Pine Barrens treefrog and the gopher frog did not meet the criteria for listing as state-Threatened species and have been removed from Florida's Endangered and Threatened Species List, but still need protection from intentional take to prevent meeting listing criteria in the future.
68A-27.0012 Procedures for Listing and Removing Species from Florida's Endangered and Threatened Species List	(4)	Remove the subsection.	The moratorium referred to in the subsection has ended, and no longer needs to be referred to in rule.
68A-27.003 Designation of Endangered and Threatened Species; Prohibitions	Title	Rule title should be "Florida Endangered and Threatened Species List; Prohibitions."	Title should have been changed in 2010, but apparently was not. Change may be made by technical revision (no Commission approval needed).
	(2)(a)	Add language "or when such conduct is authorized in a management plan as defined in this chapter and approved by the Commission, or as authorized in Commission-approved guidelines" to exempting conduct authorized by management plan from the prohibition on take, possession, or sale of a Threatened species.	Some activities or conduct that may cause some minor amount of take may be specifically authorized in the management plan if they are known to benefit species or do not cause significant impacts to a species. These activities or conduct would be in violation of the rule prohibiting take of state-Threatened species if language is not added to the rule authorizing such activities or conduct. Similar exemptions are described in 68A-27.007(2)7.
	(2)(new paragraph)	Add the Florida bog frog and the Georgia blind salamander to the list. Requires adding a new paragraph for amphibians to subsection.	The Florida bog frog and the Georgia blind salamander met the criteria for listing as a state-Threatened species.

STRIKE

This table was stricken in 2018 as these changes are already effective. Refer to the Amendment Summary for additional details.

Rule Title/ Division/ Chapter/ Section	Rule/ Subsection/ Paragraph/ Sub-paragraph	Summary of change	Reason for change
(continued) 68A-27.003 Designation of Endangered and Threatened Species; Prohibitions	(2)(new paragraph)	Add the Black Creek crayfish and the Santa Fe cave crayfish to the list. Requires adding a new paragraph for crustaceans to the subsection.	The Black Creek crayfish and the Santa Fe cave crayfish met the criteria for listing as a state-Threatened species .
	(2)(c)	Add the bluenose shiner, saltmarsh topminnow, and southern tessellated darter to the list of state-Threatened species.	The bluenose shiner, saltmarsh topminnow, and southern tessellated darter met the criteria for listing as state-Threatened species, were removed from the Species of Special Concern list and are now listed as state Threatened.
	(2)(d)	Add the Barbour's map turtle, Florida Keys mole skink, and Florida pine snake to the list of state-Threatened species.	The Barbour's map turtle, Florida Keys mole skink, and Florida pine snake met the criteria for listing as state-Threatened species, were removed from the Species of Special Concern list and are now listed as state Threatened.
	(continued) (2)(d)	Remove the Lower Keys populations of the Peninsula ribbon snake and striped mud turtle from the list of state-Threatened species.	The Lower Keys populations of the Peninsula ribbon snake and the striped mud turtle did not meet the criteria for listing as state Threatened and have been removed from Florida's Endangered and Threatened Species List.
	(2)(e)	Add the American oystercatcher, black skimmer, Florida burrowing owl, little blue heron, Marian's marsh wren, reddish egret, roseate spoonbill, Scott's seaside sparrow, tricolored heron, Wakulla seaside sparrow, and Worthington's marsh wren to the list of state-Threatened species.	The American oystercatcher, black skimmer, Florida burrowing owl, little blue heron, Marian's marsh wren, reddish egret, roseate spoonbill, Scott's seaside sparrow, tricolored heron, Wakulla seaside sparrow, and Worthington's marsh wren met the criteria for listing as state Threatened, were removed from the Species of Special Concern list and are now listed as state Threatened.
	(2)(f)	Add the Sanibel Island rice rat and Sherman's short-tailed shrew to the list of state-Threatened species.	The Sanibel Island rice rat and the Sherman's short-tailed shrew met the criteria for listing as state-Threatened species and are now listed as state Threatened.
		Remove the Florida mastiff bat from the list of state-Threatened species.	The Florida bonneted bat (formerly the Florida mastiff bat) became listed as Federally Endangered by the U.S. Fish and Wildlife Service in 2013. It thus became listed as Federally Endangered on Florida's List of Endangered and Threatened Species.
	(2)(g)	Remove the pillar coral from the list of state-Threatened species.	The pillar coral was listed as federally Threatened by the National Marine Fisheries Service. It thus became listed as federally Threatened on Florida's List of Endangered and Threatened Species.
68A-27.005 Designation of Species of Special Concern; Prohibitions; Permits	(1)	Remove the subsection.	The referenced moratorium has expired, and the subsection stating what will be done during this moratorium is no longer relevant.
	(2)(b)	Remove the bluenose shiner, saltmarsh topminnow, southern tessellated darter, Lake Eustis pupfish, and mangrove rivulus from the Species of Special Concern list.	The bluenose shiner, saltmarsh topminnow, and southern tessellated darter met the criteria for listing as state Threatened and are now listed under 68A-27.003. The Lake Eustis pupfish and the mangrove rivulus did not meet the criteria for listing as state Threatened and have been removed from Florida's Endangered and Threatened Species List.
	(2)(c)	Remove the Florida bog frog and the Georgia blind salamander from the Species of Special Concern list.	The Florida bog frog and the Georgia blind salamander met the criteria for listing as state-Threatened species and are now listed under 68A-27.003.
		Remove the Pine Barrens treefrog and the gopher frog the Species of Special Concern list.	The Pine Barrens treefrog and the gopher frog did not meet the criteria for listing as state-Threatened species and have been removed from Florida's Endangered and Threatened Species List.

STRIKE

This table was stricken in 2018 as these changes are already effective. Refer to the Amendment Summary for additional details.

Rule Title/ Division/ Chapter/ Section	Rule/ Subsection/ Paragraph/ Sub-paragraph	Summary of change	Reason for change
(continued) 68A-27.005 Designation of Species of Special Concern; Prohibitions; Permits	(2)(d)	Remove the Barbour's map turtle, Florida Keys mole skink, and Florida pine snake from the Species of Special Concern list.	The Barbour's map turtle, Florida Keys mole skink, and Florida pine snake met the criteria for listing as state-Threatened species and are now listed under 68A-27.003.
		Remove the Lower Keys population of the red rat snake, and the Suwannee cooter from the Species of Special Concern list.	The Lower Keys population of the red rat snake, and the Suwannee cooter did not meet the criteria for listing as state-Threatened species and have been removed from Florida's Endangered and Threatened Species List.
	(2)(e)	Remove the American oystercatcher, black skimmer, Florida burrowing owl, little blue heron, Marian's marsh wren, reddish egret, roseate spoonbill, Scott's seaside sparrow, tricolored heron, Wakulla seaside sparrow, and Worthington's marsh wren from the Species of Special Concern list.	The American oystercatcher, black skimmer, Florida burrowing owl, little blue heron, Marian's marsh wren, reddish egret, roseate spoonbill, Scott's seaside sparrow, tricolored heron, Wakulla seaside sparrow, and Worthington's marsh wren met the criteria for listing as state-Threatened species and are now listed under 68A-27.003.
		Remove the snowy egret, white ibis, brown pelican, and limpkin from the Species of Special Concern list.	The snowy egret, white ibis, brown pelican, and limpkin did not meet the criteria for listing as state-Threatened species and have been removed from Florida's Endangered and Threatened Species List.
	(2)(f)	Remove the Sanibel Island rice rat, Sherman's short-tailed shrew, and Florida mouse from the Species of Special Concern list.	The Sanibel Island rice rat and the Sherman's short-tailed shrew met the criteria for listing as state-Threatened species and are now listed under 68A-27.003. The Florida mouse did not meet the criteria for listing as a state-Threatened species and has been removed from Florida's Endangered and Threatened Species List.
	(2)(g)	Remove the Florida tree snail from the Species of Special Concern list.	The Florida tree snail did not meet the criteria for listing as state-Threatened species and has been removed from Florida's Endangered and Threatened Species List.
	(2)(h)	Remove the Black Creek crayfish and the Santa Fe Cave crayfish from the Species of Special Concern list.	The Black Creek crayfish and the Santa Fe Cave crayfish met the criteria for listing as state-Threatened species and are now listed under 68A-27.003
68A-27.007 Permits and Authorizations for the Take of Florida Endangered and Threatened Species.	(2)(a)	Add language to allow intentional take for human safety.	Human safety is a consideration for allowing incidental take; adding human safety language to intentional take guidance will provide consistency and allow authorization of permits without needing to achieve a conservation or scientific benefit.
	(2)(b)	Remove the language that specifies a different permit issuance standard for the blackmouth shiner, striped mud turtle, Florida mastiff bat, and pillar coral.	These species were listed as state Endangered in 2010 when the imperiled species rules were revised. The standard used for state-Endangered species at that time was incorporated into the revised rules for these species to ensure no perceived loss of protection while the management plan was developed. The Florida bonneted bat (formerly the Florida mastiff bat) and the pillar coral are now federally listed and moved to the federally designated Endangered and Threatened section of Florida's Endangered and Threatened Species List. The striped mud turtle did not meet the criteria for listing as a state-Threatened species and has been removed from Florida's Endangered and Threatened Species List. The blackmouth shiner remains as a state-Threatened species with the protections provided for such species.
	(2)(f)	Add "Intentional" in front of "take" at the beginning of the sentence.	Clarifies that intentional take permit requirements for listed marine species are included in Chapter 68B-8, not in Chapter 68A-27.

STRIKE

Policies

A policy is a formally approved definitive statement of a principle or course of action to guide agency decision-making or the manners of proceeding regarding its management of fish and wildlife resources for their long-term well-being and the benefit of people. Of the many FWC policies, only a few specifically impact the management of imperiled species. Included here are several new policies that support the ISMP's implementation. These policies are available on FWC's Management Plans webpage, and will be added to the FWC Conservation Issues and Policies webpage as it is updated. Through ISMP implementation, new policies and revisions to existing ones are anticipated.

Permitting standards for incidental take of cryptic species

Issue

The 57 species included in the ISMP are diverse, both biologically and in terms of the threats each faces, and the level of knowledge and understanding varies widely from species to species. In particular, little is known about the life history and ecology of cryptic species, which are those that may be difficult to detect due to behavior, habitat, or physical features, even when using standard survey techniques in occupied habitat. Studies of snakes (Durso et al. 2011) and pond turtles (Olivier et al. 2010) point out the difficulties of using standard survey methods without also incorporating estimates of detection probability, and indicate that these methods often fall short when answering management-related questions on spatial and temporal dynamics of cryptic species. Small, benthic fish (Willis 2001), for example, are difficult to detect with standard visual-count survey methods, which underestimate both diversity and density. Even large terrestrial vertebrates such as tigers (Carbone et al. 2001) and the red fox (Vine et al. 2009) have proven difficult to detect and monitor due to rarity and behavior. Cryptic species, particularly rare cryptic species, are so difficult to detect that managers need to carefully consider when surveying efforts are no longer the best use of limited resources (Chades et al. 2008). Likewise, laws and policies that address regulation of cryptic species need to be carefully considered to best achieve conservation goals. Chapter 68A-27, F.A.C., identifies prohibitions for both Species of Special Concern and state-Threatened species, and defines take for state-Threatened species. However, interpretation of when incidental take occurs, particularly harm and harass for state-Threatened species, is difficult without a clear understanding of the essential behavioral patterns of the species or the habitat features that may support these behaviors, and monitoring methods that allow for reliable detection. Lack of knowledge about a species also leads to different considerations for when scientific benefit is achieved due to the documented difficulties in detecting cryptic species. Therefore, assessing conservation or scientific benefit identically for all species is not possible.

Policy guidelines

Permitting for cryptic species will focus on cooperation and acquiring information instead of a regulatory burden, with the understanding that as information is gained, permitting may need to be adjusted. For cryptic species, information on distribution and habitat use may constitute a scientific benefit. For the purposes of this policy, cryptic species include Sherman's short tailed shrew, Everglade's mink, Florida Keys mole skink, Florida brown snake (Lower Keys population), Key ringneck snake, Florida pine snake, short-tailed snake, rim rock crowned snake, and Georgia blind salamander. The Homosassa shrew, classified as SSC, is also cryptic; however, the definition of take for SSC does not include harm and harass, and thus the species is not included here.

Nest removal for inactive single-use nests of state-Threatened birds

Issue

Rule 68A-27.003(2)(a), F.A.C., prohibits the take, possession, or sale of a state-designated Threatened species' nest, regardless of whether or not the nest is active or if it is important to the species when inactive. However, some bird species use a nest only once and rarely, if ever, reuse it in subsequent nesting attempts; we refer to these species here as *single-use nesters*. As such, there is no biological benefit to preventing take of nest structures in these specific cases. In the case of single-use nesters, once young have left and are no longer dependent on the nest, it will be abandoned and not used for subsequent nesting. Thus, the nest is no longer supporting essential behavioral patterns of breeding and sheltering for the species. As such, our policy is that there is no need to protect inactive single-use bird nests. This policy applies only to destruction of the nest itself and does not authorize possession of the nest or impacts to the nest substrate or the surrounding habitat. Although many taxa may make nest structures, this policy is limited to nests of state-Threatened birds. This policy does not apply to the nests of the southeastern American kestrel or Florida burrowing owl, since these species do not fit the definition of single-use nesters (i.e., inactive nests may be reused by these species). This policy is consistent with Rule 68A-27-16.003, F.A.C., and the USFWS 2003 Memo for interpretation of inactive nest removal under the Migratory Bird Treaty Act.

Policy guidelines

The following definitions apply to species addressed by this policy.

Nest — A nest is a structure or place that is recognizable as being created by or used by a bird for the purpose of brooding and caring for eggs and young. Nests may consist of, but are not limited to, cavities (e.g., woodpeckers, kestrels); burrows (burrowing owls); structures composed of sticks (e.g., cardinals, wading birds), mud (e.g., swallows), or fine plant materials (e.g., marsh wrens, seaside sparrow); nest scrapes (e.g., beach-nesting birds); and nest platforms (e.g., ospreys) and nest boxes (e.g., kestrels, titmice, chickadees) once occupied by birds. In some cases, nests may simply consist of eggs and very little or no structure at all other than the ground itself (e.g., common nighthawks, sandhill cranes).

Active nest — A nest is considered active when supporting essential behavioral patterns, which occur from the point of nest building until young of the season become capable of sustained flight or permanently leave the nest. Nest building includes a breeding pair exhibiting courtship, carrying nest material, and/or engaging in construction or repair of a nest.

Inactive nest — A nest is considered inactive when it does not contain viable eggs and does not contain young that are incapable of permanently leaving the nest. An inactive nest may contain egg-shell fragments or dead chicks, but only if adult birds have stopped attending to the nest, eggs, or young is the nest considered inactive.

Nesting (breeding) season — The period of time during which a particular species usually, but not always, nests (builds or repairs nests and broods young).

Single-use nest — A nest that is used by a species once for nesting activities and is rarely, if ever, reused in subsequent nesting attempts by the same species. State-Threatened species that rarely reuse nests are Wakulla seaside sparrow, Scott's seaside sparrow, Worthington's marsh wren, Marian's marsh wren, reddish egret, little blue heron, roseate spoonbill, tricolored heron, white-crowned pigeon, American oystercatcher, snowy plover, black skimmer, least tern, and Florida sandhill crane.

Actions that do not require take permits

Some birds do not depend on the same nest to support essential behavioral patterns after the young permanently leave the nest or after the nest fails from natural processes. Such nests are defined as *single-use nests*.

No permit is required to destroy an inactive single-use nest as long as the proposed level of habitat modification or degradation (including impacts to vegetation used for nesting or to nesting substrates such as beaches) prompting the removal is not deemed significant enough to result in take of the species as defined in Rule 68A-27.003, F.A.C. Note that possession of the removed nest is prohibited without a permit under Rules 68A-27.003(2)(a) and 68A-16.001, F.A.C., and the Federal Migratory Bird Treaty Act.

Protections and Prohibitions

Nests used or built by state-Threatened birds must be protected from destruction or disturbance that constitutes take including harm or harassment while they are active. Protection may entail maintaining a safe, species-specific buffer distance from equipment, traffic, pets, and other disturbances. Destruction of active nests at any time of year is prohibited without permits from FWC and USFWS, regardless of whether or not it is during the typical nesting season. Note that this policy only applies to removal of nests and does not authorize modification or degradation to surrounding habitat, including substrates used for nesting (e.g., nest trees, beaches), that may result in take according to Chapter 68A-27, F.A.C. Possession of removed nests is prohibited without a permit under Rules 68A-27.003(2)(a) and 68A-16.001, F.A.C., and the Federal Migratory Bird Treaty Act.

State-listed species and man-made structures

Issue

Listed species have been documented using man-made structures for essential behavioral patterns (feeding, breeding, and sheltering). Clear policy is needed to protect state-listed species when proposed activities may alter or remove such structures.

Policy guidelines

Actions that do not require take permits

Removal or modification of man-made structures that are clearly not occupied by state-listed species do not require FWC permits; however, the removal or modification of structures recently or previously occupied must be conducted in a manner consistent with this policy. For the purposes of this policy, man-made structures include structures created by people, which may or may not be intended for use by wildlife. Structures include (but are not limited to) buildings, bridges, utility poles, signs, equipment, heavy machinery, pipes, loading docks, and bat and bird houses.

For actions proposed where state-listed species have recently been using a man-made structure for essential behaviors, removal or modification of the structure is authorized without a permit, provided that

- an approved Wildlife/Habitat Management Plan is in place for the area in which the activity will occur, or
- at least 14 days prior notification is provided to the FWC's Species Conservation Planning Biologist in the region where the activity will occur; no eggs or dependent young are present, or the nesting cycle (or rearing of young) has been completed; and the activity is conducted in such a way so as to avoid direct physical injury of individual animals.

Persons complying with these conditions are legally covered should incidental take of state-listed species using the structure occur as a result of its removal or modification. Persons not complying with these conditions, such as those that do not contact FWC and provide 14 days' notice or do not conduct the activity in a way that avoids direct physical injury, are not authorized to cause incidental take.

This policy does not replace requirements relating to bats occupying man-made structures; persons must also comply with Rule 68A-9.010, F.A.C. Persons complying with that rule and this policy are legally covered should

incidental take of nonlisted bats occur as a result of removal or modification of the structure. The Florida bonneted bat, a federally Endangered species, is not covered by Rule 68A-9.010, F.A.C., and a federal permit may be needed whenever it is encountered in man-made structures slated for removal or modification. This policy does not apply to the bald eagle (*Haliaeetus leucocephalus*), which is protected by the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and Rule 68A-16.002, F.A.C. Removal of any bald eagle nest requires a permit from both the USFWS and FWC. Additionally, FWC's Osprey Nest Removal Guidelines will be updated to reflect consistency with this policy.

Actions that require incidental take permits

When listed species occupy man-made structures for nesting or breeding, the goal is to avoid and minimize disturbance that constitutes take including harm or harassment. Therefore, this policy does not authorize removal or modification of man-made structures when listed species are actively engaged in nesting or breeding. An incidental take permit during this time will be issued without any mitigation when the activity must occur to ensure human health and/or safety. Such incidental take permits will include appropriate conditions for minimizing the take and avoiding direct, physical injury of the animals. In exceptional cases where it is not possible to leave nests in place, movement of nests, eggs, or young by persons with appropriate training and experience in the safe handling of the species or similar species would be required. For example, a permit issued for air conditioner repairs on a roof with nesting least terns could include protective measures such as posted working areas and specific working times and duration.

Mitigation

Removal or alteration of any man-made structures that have served as listed species habitat for nesting or breeding that results in an incidental take will not be required to provide a conservation or scientific benefit when conducted consistent with this policy. In cases where the man-made structure was required as part of a mitigation plan for permits issued for impacts to state-listed species (e.g., nesting structures), the original permitting agency should be contacted to discuss replacement mitigation sites.

Aversive conditioning of state-listed species

Take of state-Threatened species is prohibited in Rule 68A-27.003(2)(a), F.A.C., and defined in Rule 68A-27.001(4), F.A.C, as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in such conduct. The term *harass* is further defined as an intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns, which include but are not limited to, breeding, feeding, or sheltering. Take of a Species of Special Concern is prohibited under Rule 68A-27.005(2)(a), F.A.C., and states that no person shall take, possess, transport, or sell any Species of Special Concern or parts thereof or their nests or eggs except as authorized by permit from the Executive Director (permits issued upon reasonable conclusion that the permitted activity will not be detrimental to the survival potential of the species).

Take, as it applies to Species of Special Concern, is defined in Rule 68A-1.004, F.A.C., as 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.

Issue

Human health and safety are core considerations of FWC's mission. Conflicts between people and wildlife in Florida have been increasing in recent years, and FWC and partners strive to resolve these conflicts in an effective and efficient way. For example, when fed by people or when defending a breeding territory, Florida sandhill

cranes have been known to attack cars, damage windows and screens, or even attempt to attack humans. Big Cypress and Sherman's fox squirrels can lose their fear of people if given food and may then run at or become aggressive toward people and potentially bite them. These species and their actions have the potential to impact human safety, pets, and property.

This policy applies to species listed as state-Threatened or Species of Special Concern and is currently only applicable to the Florida sandhill crane, Big Cypress fox squirrel, and Sherman's fox squirrel.

Policy guidelines

Staff from FWC has outlined appropriate aversive conditioning techniques for state-listed species in the Species Conservation Measures and Permitting Guidelines. When aversive conditioning techniques are used as described, no permit is required and citizens would be covered in the case of unintentionally taking an animal when conducting these activities. For the purpose of this policy, aversive conditioning is defined as behavior modification using an adverse stimulus in response to the inappropriate or undesirable behavior of individual animals. Aversive conditioning includes species-, situation- and location-specific nonlethal actions to reduce or eliminate nuisance behavior exhibited by individual animals. Available aversive conditioning options allow the public to respond quickly when necessary to prevent conflicts from becoming more severe and to protect human health, safety, and property. By providing appropriate methods for aversive conditioning to reduce risks to human health, safety, and property, FWC intends to minimize conflicts with these species, prevent harmful deterrent methods, and thus enhance their survival potential by increasing public support for their conservation.

The decision to apply aversive conditioning is made on a case-by-case basis; however, before utilizing the recommended aversive conditioning techniques, all other appropriate or practicable steps, as outlined in the Species Conservation Measures and Permitting Guidelines, should be taken to resolve the conflict.

Regional FWC staff can provide technical assistance on these measures, including guidance to

- remove attractants contributing to the behavior, including feeding wildlife;
- temporarily cover shiny surfaces or remove shiny objects; and
- temporarily protect windows, screens, or water lines with approved exclusion fencing.

Aversive conditioning techniques may include approved persistent methods that do not result in physical harm or contact, capture, or handling of state-listed species. Approved methods are detailed in the Species Conservation Measures and Permitting Guidelines. These methods would need to be determined on a species basis and may change based on environmental conditions and details of each case. Support for implementing these methods will be provided by regional staff as necessary. After-action reports are requested to allow FWC to collect information on species involved, and where and how often these methods are being used.

If aversive conditioning does not resolve the human health or safety issue, the issuance of an intentional take permit will be considered on a case-by-case basis.

Species Action Plan Summaries

Species Action Plans outline the management actions necessary to minimize the impact of known threats, improve habitat conditions, and streamline efforts to conserve the species; they also identify species-specific conservation goals. Research needs, key partners, and recommended improvements to species protections are also included in each SAP. Foundational to Florida's Imperiled Species Management Plan, Species Action Plans document a thorough assessment of current conditions and prioritize the actions necessary to improve species' conservation status. These plans are the building blocks of the comprehensive approach outlined in the ISMP, and it is through the species-specific actions that the integrated conservation strategies emerged. Implementation of the SAPs is ongoing, and many actions are already in progress. While the Species Action Plans provide the detailed steps necessary to improve the conservation status for individual species, the ISMP outlines the implementation strategies to ensure benefits are maximized, resources are applied in the most effective manner, and wildlife populations are managed in holistic perspective.

The following summaries of the Species Action Plans are designed to provide readers with basic information on where species are known to occur, known threats to the species, and the conservation strategies intended to improve the status of each species. These summaries identify the current listing status for each species, including for those that have been removed from Florida's Endangered and Threatened Species List (recently delisted species will be identified as Species of Greatest Conservation Need in Florida's State Wildlife Action Plan). The complete Species Action Plans are available at the Imperiled Species section of MyFWC.com.

Threats listed in the summaries that follow are those highlighted in the Species Action Plans themselves. These threats are largely understood as the causes behind the species-specific conditions that triggered listing criteria during the Biological Status Reviews. That is, the threats outlined here may not be directly outlined in the Biological Status Review reports, but are believed to be directly or indirectly contributing to the vulnerability factors identified in the reports. For details about listing status recommendations, see the complete Biological Status Reviews.

The summaries are organized by taxa, using the following color-coding system.

Mammals
Birds
Reptiles
Amphibians
Fish
Invertebrates

Big Cypress Fox Squirrel

Sciurus niger avicennia

Photograph by Michael Landwehr.

The Big Cypress fox squirrel is one of four subspecies of fox squirrel in Florida. Fox squirrels are large tree squirrels whose coloration is usually a mix of buff (tan), gray, and black, with patterns that are highly variable among individual squirrels.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

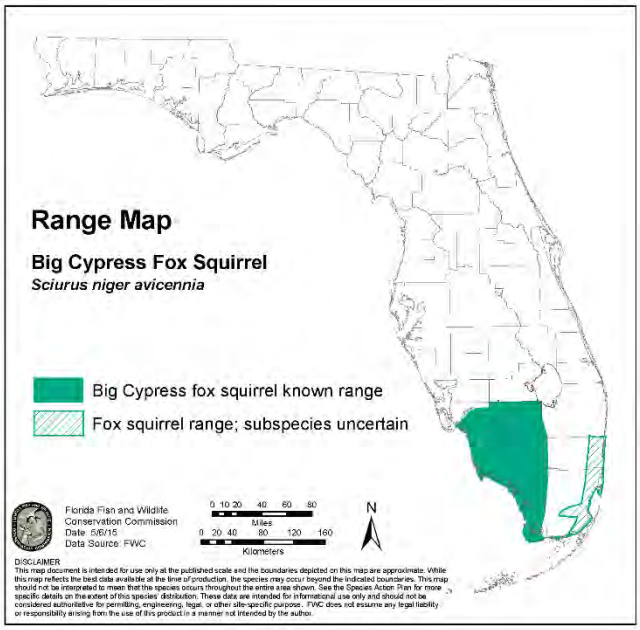
The conservation status of the Big Cypress fox squirrel is improved to the point that the species is secure within its historical range.

Identified Threats

- Habitat loss and degradation due to land-use conversion, especially on the western periphery of the species' range. Rapid urbanization has also contributed to fragmented populations. While this species is somewhat adaptable, the loss of large trees suitable for nesting may exclude it from otherwise inhabitable urban areas.
- Insufficient management of potentially suitable habitat, primarily due to inadequate fire regimes.
- Significant loss of bromeliads (e.g., *Tillandsia fasciculata*), which Big Cypress fox squirrels use for nesting substrate, due to effects of the nonnative Mexican bromeliad weevil *(Metamasius callizona)*.
- Disease, including mange and squirrel poxvirus.
- Road mortality, especially in urban areas.

Conservation Approach

- Clarify the genetic relationship among fox squirrels to better understand species distribution and improve protections.
- Determine habitat types used and preferred by Big Cypress fox squirrels.
- Identify specific habitat features that help to increase the abundance of Big Cypress fox squirrels in preferred habitats.
- Increase survival and productivity rate by developing incentives to encourage landowners and land managers to maintain or enhance the quality of preferred habitats.



Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Eastern Chipmunk

Tamias striatus

Photograph by Dr. Laura Wagner, Clemson University.

The eastern chipmunk is commonly associated with hardwood forests comprised of oak and hickory trees, but is also found in residential areas. Northern Florida represents the southern edge of the species range.

Status

Removed from Florida's Endangered and Threatened Species List in 2016.

Conservation Goal

The conservation status of the eastern chipmunk is maintained or improved so that the species will not again need to be listed on Florida's Endangered and Threatened Species List. This goal reflects current information, and will be incorporated into the revised Species Action Plan.

Identified Threats

- Habitat loss due to the clearing of deciduous forests

Conservation Approach

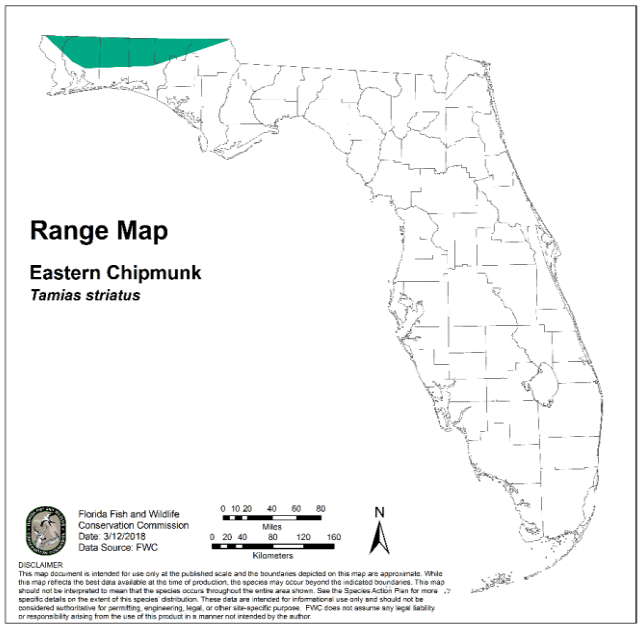
- Ensure the statewide population of the eastern chipmunk is stable or increasing.
- Develop a more complete understanding of the specific habitat requirements of the eastern chipmunk in Florida and incorporate this information into habitat management guidelines for public conservation lands.
- Determine the significant factors affecting chipmunk population persistence in Florida.

Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife.
- Regulations Relating to the Taking of Mammals, 68A-29.002, clarifies take and possession limits for non-listed mammals.

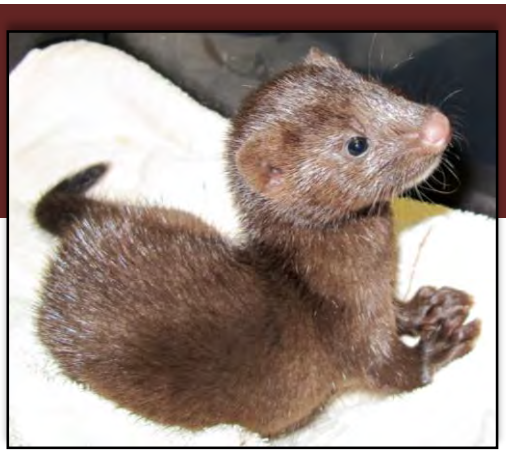
Resources

- Species Action Plan
- Biological Status Review Report
- Species Conservation Measures and Permitting Guidelines



Everglades Mink

Neovison vison evergladensis



Photograph by David Shindle, Conservancy of Southwest Florida.

The mink is a medium-sized mammal in the weasel family. The Everglades mink, found only in Florida, is a subspecies of American mink (*N. vison*).

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

Conservation status of the Everglades mink is improved to the point that it is secure within its historical range.

Identified Threats

- Habitat loss due to agriculture and urbanization
- Habitat alteration, including changes to the natural water-levels in the Everglades, changes in water quality, alteration of seasonal water-levels related to climate change, and saltwater intrusion associated with sea-level rise
- Disease, including canine distemper virus
- High sensitivity to environmental pollutants, such as mercury
- Proliferation of nonnative predators, particularly the Burmese python (*Python molurus bivittatus*)

Conservation Approach

- Fill critical gaps in existing information on the species' phylogenic subspecies designation, extent of occurrence, area of occupancy, and population size and trend.
- Increase understanding of the species' habitat requirements, specific population-limiting factors (such as disease and pollutants), and effective survey techniques.
- Protect the population through appropriately designed rules and permitting requirements.
- Educate the public, stakeholders, and land managers about conservation needs and results of research on the Everglades mink.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Florida Mouse

Podomys floridanus

Photograph © Fiona Sunquist.

The Florida mouse constructs underground burrows, often within the burrow of another species, primarily the gopher tortoise *(Gopherus polyphemus)*. This mouse is restricted to dry, fire-maintained upland habitats with deep, sandy soils.

Status

Removed from Florida's Endangered and Threatened Species List in 2016**.**

Conservation Goal

The conservation status of the Florida mouse remains the same or has improved so that it does not warrant listing on Florida's Endangered and Threatened Species List.

Identified Threats

- Loss, degradation, and increasing fragmentation of scrub and sandhill communities due to development and agricultural use or insufficient management (fire suppression or inadequate fire application).
- Decline of gopher tortoises, on which the Florida mouse is considered moderately dependent.
- Unintended consequences of relocation, a practice currently allowed in limited circumstances under FWC's Gopher Tortoise Permitting Guidelines.

Conservation Approach

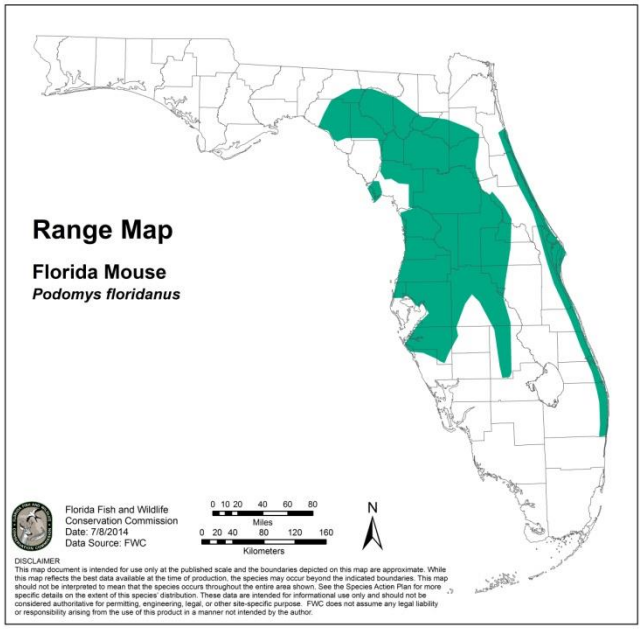
- Maintain a stable or increasing statewide population while addressing local threats.
- Identify the characteristics of high-quality habitat (such as specific vegetation composition and diversity) to inform management practices, including the use of prescribed fire.
- Determine the genetic structure and connectivity throughout the species' range.

Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife.
- Regulations Relating to the Taking of Mammals, 68A-29.002, clarifies take and possession limits for non-listed mammals.

Resources

- Species Action Plan
- Biological Status Review Report



Homosassa Shrew

Sorex longirostris eionis

Photograph by Justin C. Davis.

Shrews are secretive animals adapted for living and foraging under leaf and pine-straw litter and in mole tunnels. The Homosassa shrew has a long tail and tapered snout, with adults averaging 3.78 inches in length. It is darker and more chestnut in color than closely related species. Eyes are greatly reduced but external ears are present.

Status

Removed from Florida's Endangered and Threatened Species List in 2018.

Conservation Goal

Determine the conservation status of the Homosassa shrew in Florida.

Identified Threats

- Habitat loss and degradation due to land-use conversion, especially that which results in excessive soil compaction and/or removal of coarse woody debris and the uppermost soil layer.
- Threats associated with increasing urbanization, such as predation by free-ranging cats (*Felis catus*), drowning in swimming pools, and mortality associated with lawn maintenance.

Conservation Approach

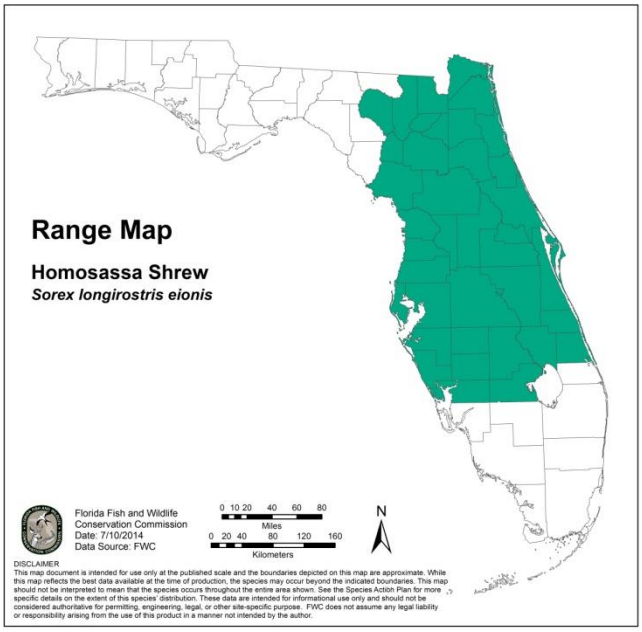
- Maintain known preferred habitat types to minimize impacts to the species.
- Provide land managers with information on microhabitat requirements that benefit the shrew and guidance on assessing shrew abundance and density at their location.
- Utilize existing programs and coordinate with conservation partners to maximize efforts.

Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife.
- Regulations Relating to the Taking of Mammals, 68A-29.002, clarifies take and possession limits for non-listed mammals.

Resources

- Species Action Plan
- Biological Status Review Report
- Species Conservation Measures and Permitting Guidelines



Sanibel Island Rice Rat

Oryzomys palustris sanibeli

Photograph by Jerry Lee Gingerich

The Sanibel Island rice rat is a medium-sized rat with a long, sparsely haired tail. Its distribution is limited to Sanibel Island, where it is only known to occur in freshwater marshes. Further study is needed to understand whether it also occurs in coastal marsh and mangrove habitats, as do other rice rats.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

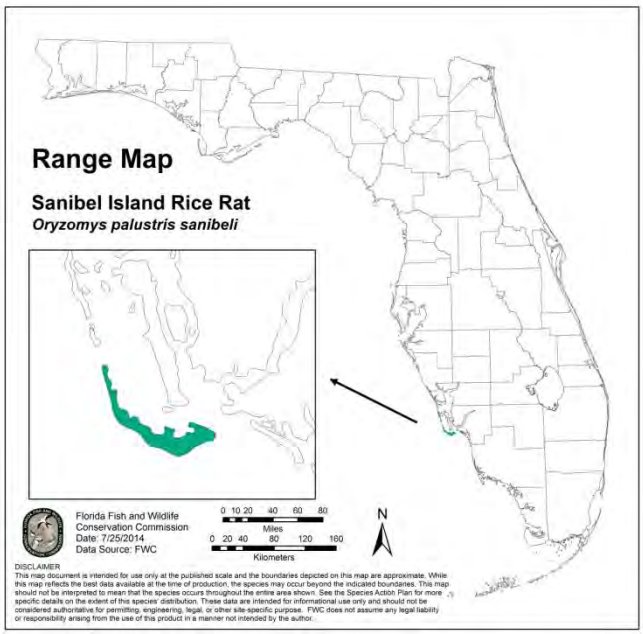
The conservation status of the Sanibel Island rice rat is improved to the point that the species is secure within its historical range.

Identified Threats

- Habitat loss, degradation, and fragmentation
- Difficulty in applying management tools, such as prescribed fire, near urbanized areas of Sanibel Island
- Predation by free-ranging cats (*Felis catus*)
- Resource competition with black rats (*Rattus rattus*)
- Impacts associated with sea-level rise and climate change, including increased salinity of freshwater marshes

Conservation Approach

- Manage habitat to improve conditions on 25 percent of potentially suitable sites.
- Identify methods to increase connectivity, improving mobility between fragmented habitat.
- Implement a monitoring program to reliably verify presence or absence at all potentially suitable sites across the species' historic range.
- Use monitoring results to evaluate trends in population size and responses to management activities.
- Further examine the genetics of rice rat populations on Sanibel Island, Pine Island, and the mainland.



Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Southern Fox Squirrel

Sciurus niger

Photograph by David Jones.

Previously understood to be two subspecies, recent genetic research determined that individuals thought to be Sherman's fox squirrels are not significantly distinct from Southern fox squirrels.

Status

Removed from Florida's Endangered and Threatened Species List in 2018.

Conservation Goal

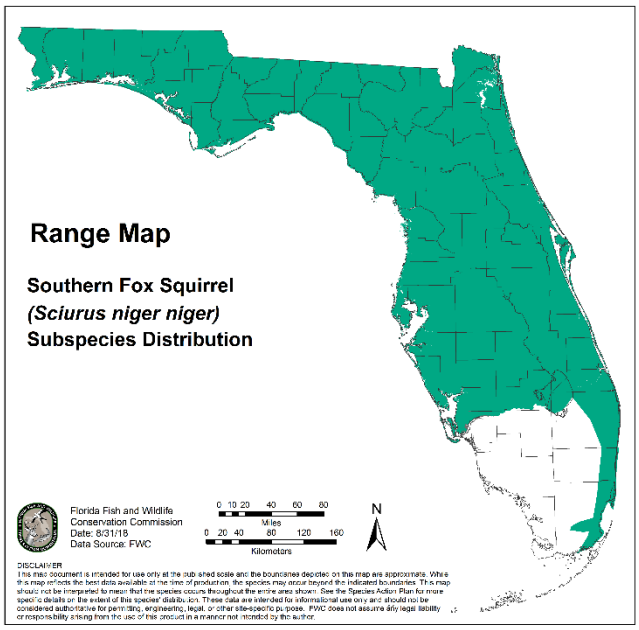
The conservation status of the Southern fox squirrel is maintained or improved so that the species will not again need to be listed on Florida's Endangered and Threatened Species List.

Identified Threats

- Loss of longleaf pine *(Pinus palustris)* forests, mixed pine-hardwood forests, pineland, sandhill, and scrub due to development, agriculture, clear-cutting, and conversion to pasture and other uses.
- Habitat degradation due to logging, fire suppression, and insufficient retention of mature oaks during habitat restoration efforts.
- Fragmentation of habitat and potential isolation of local populations.
- Road mortality, especially in urban areas.
- Disease, including fibromatosis and squirrel poxvirus.

Conservation Approach

- Maintain habitat through science-based management and engagement with public and private entities.
- Further clarify the taxonomy for fox squirrel subspecies occurring in the Southeastern United States.
- Increase survival and productivity rates for Southern fox squirrels through improving habitat management efforts on public and private conservation lands and creating or maintaining corridors to connect isolated populations.



Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife.
- Regulations Relating to the Taking of Mammals, 68A-29.002, clarifies take and possession limits for non-listed mammals.

Resources

- Species Action Plan
- Biological Status Review Report
- Species Conservation Measures and Permitting Guidelines

Sherman's Short-Tailed Shrew

Blarina shermani

Photograph by Justin C. Davis, FWC.

The Sherman's short-tailed shrew is a slate gray, robust shrew, with short legs and a tapered snout. Adults average 4.3 inches in length. The tail is short, hairy, and slightly flattened. The eyes and ears are very small. This species has not been confirmed in many years, and is considered highly vulnerable to extinction.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

The conservation status of the Sherman's short-tailed shrew is improved to the point that the species is secure within its historical range.

Identified Threats

The following threats are largely exacerbated by the Homosassa shrew's very restricted range.

- Habitat loss and degradation due to land-use conversion, especially that which results in excessive soil compaction or removal of coarse woody debris in the uppermost soil layer.
- Threats associated with increasing urbanization, such as predation by free-ranging domestic cats (*Felis catus*), drowning in swimming pools, and mortality associated with lawn maintenance.

Conservation Approach

- Confirm the existence of the species within its suspected range through survey efforts in suitable habitat.
- Identify and refine survey methodology to reliably confirm presence.
- When presence is confirmed, determine population size and trend, and confirm the taxonomic status of the species through genetic sequencing.
- Identify preferred habitat associations while using knowledge of closely related shrew species to improve habitat conditions.
- Quantify threats and determine management actions that will sustain or increase the population.

Current Protections

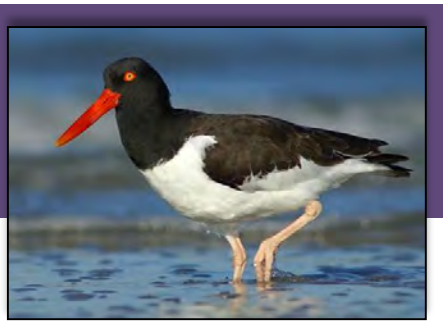
- No person shall take (including harm or harass), possess, or sell any Threatened species, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

American Oystercatcher

Haematopus palliatus



Photograph by Jack Rogers.

The American oystercatcher makes its nest directly in sand, shell, or small gravel in coastal areas. This species creates a scrape in the substrate in which to lay its camouflaged eggs. As its name implies, the species feeds primarily on marine bivalves.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

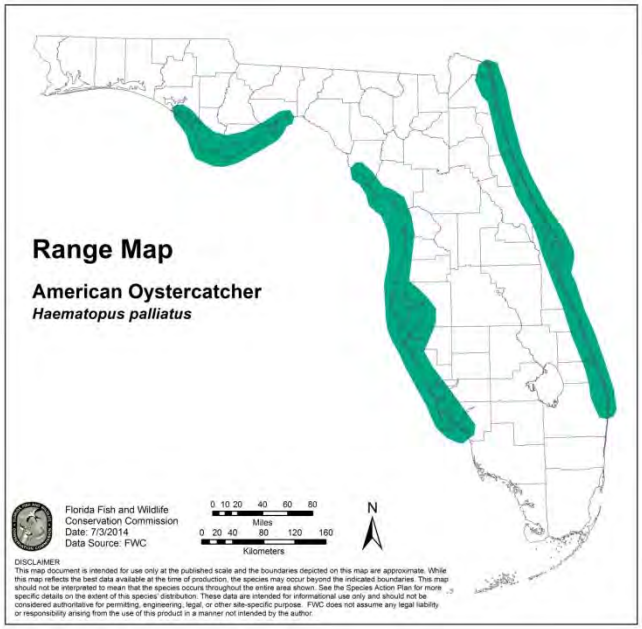
Improve the conservation status of the American oystercatcher to a point that it can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Habitat loss and degradation, largely due to coastal development and incompatible recreational use.
- Disturbance during breeding, causing nest failure and resulting in loss of eggs and/or chicks.
- Changes to water quality that impact bivalves (e.g., pollution, turbidity, depth, and temperature).
- Predation is a significant threat magnified by human disturbance.

Conservation Approach

- Increase the population of the American oystercatcher by protecting breeding sites.
- Protect, restore, enhance, and create habitat sufficient to accommodate population growth.
- Continue monitoring through the Florida Shorebird Alliance, and refine methods as necessary.
- Fill information gaps, including determining productivity rates necessary to sustain population growth.
- Minimize loss of birds and nests at rooftop breeding sites.
- Educate those who recreate, reside, and work on beaches and in coastal areas about the species' conservation needs.
- Improve protections and implement a permitting structure to support management actions.



Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Black Skimmer

Rynchops niger

Photograph by Jack Rogers.

Black skimmers, like other beach-nesting birds, nest in shallow scrapes in sand, shell, or gravel along the coast and occasionally on flat, gravel-covered rooftops.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

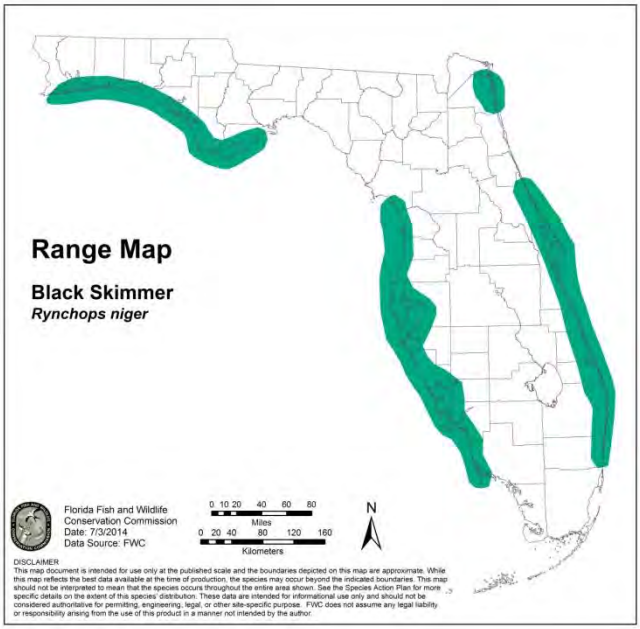
Improve the conservation status of the black skimmer to a point that it can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Habitat loss and degradation, largely due to coastal development and incompatible recreational use.
- Disturbance during breeding, causing nest failure and resulting in loss of eggs and/or chicks.
- Direct loss of eggs and chicks due to pedestrian and vehicular traffic on beaches.
- Mortality and injury associated with rooftop nesting colonies.
- Predation is a significant threat that is magnified by human disturbance, as waiting predators benefit when adult birds are flushed from a nest.

Conservation Approach

- Increase the population by protecting breeding and staging sites through appropriate management.
- Protect, restore, enhance, and create habitat sufficient to accommodate population growth.
- Continue monitoring through the Florida Shorebird Alliance, refining methods as necessary.
- Fill information gaps, including productivity rate necessary for population stability.
- Educate those who recreate, reside, and work in coastal areas about species' conservation needs.
- Minimize loss of birds and nests at rooftop breeding sites.
- Improve protections and implement a permitting structure to support management actions.



Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Brown Pelican

Pelecanus occidentalis

Photograph by FWC.

Brown pelicans plunge dive for fish in salt, brackish, and fresh water. In Florida, brown pelicans nest primarily in mangroves, though a few ground colonies have been documented.

Status

Removed from Florida's Endangered and Threatened Species List in 2016**.**

Conservation Goal

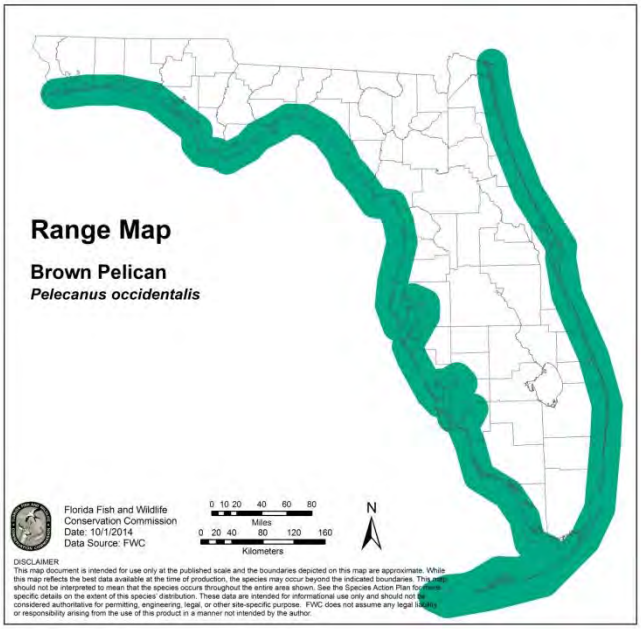
The conservation status of the brown pelican is maintained or improved so that the species will not again need to be listed on Florida's Endangered and Threatened Species List.

Identified Threats

- Monofilament and hook entanglement, and accidental ingestion of fishing hardware
- Disturbances that cause breeding birds to flush, exposing eggs/young to predators and elements
- Loss of suitable breeding habitat due to development
- Habitat degradation from nonnative vegetation, hydrologic alteration, climate change, and nutrient enrichment in waters
- Increased presence of predators that cause nest failure
- Overwash during the breeding season threatens ground colonies
- Water quality changes that reduce prey base or impact water clarity

Conservation Approach

- Through targeted outreach, minimize monofilament and hook entanglement and protect brown pelicans from injury and mortality related to intentional feeding.
- Through management and restoration, ensure that quality habitats for breeding and foraging are sufficient to maintain or increase the current population.
- Provide adequate protection at breeding locations and increase the amount of protected breeding habitat available.



Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife, and specifically prohibits the intentional feeding of pelicans where determined to be detrimental to a local population.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Florida Burrowing Owl

Athene cunicularia floridana

Photograph by FWC.

The Florida burrowing owl is geographically distinct from burrowing owls occurring in the western U.S. Burrowing owls require well-drained upland habitats, and are typically found at treeless sites with sparse or low-growing vegetation. Because of this, they may be found at airports, golf courses, in some neighborhoods, and at sites cleared for development.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

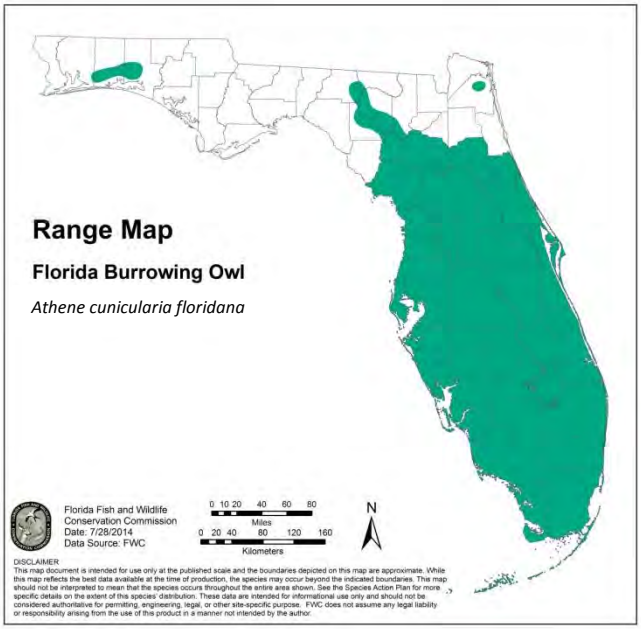
Conservation status of the Florida burrowing owl is improved to a point that the species can be removed from Florida's Endangered and Threatened Species list and will not again need to be listed.

Identified Threats

- Loss of native habitat and the resulting dependence on altered habitat.
- Lack of protected habitat, even for rural burrowing owls.
- Lure of potentially hazardous habitat, such as predevelopment activities (vegetation clearing) resulting in sites that mimic native habitat of the burrowing owl.
- Urban area threats, including vehicle collision, predation or injury by domestic animals, and burrow destruction by mowers or other equipment.

Conservation Approach

- Protect and manage habitat to support current population and to accommodate population growth.
- Minimize impacts of development and land-use conversion through Species Conservation Measures and Permitting Guidelines, outreach, and technical assistance.
- Ensure adequate protection of burrows through education, enforcement, and management.
- Determine if one or more populations exist, and monitor population(s) to assess size and trend.



Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Florida Sandhill Crane

Antigone canadensis pratensis

Photograph by FWC.

The Florida sandhill crane is one of two subspecies that inhabits Florida. Indistinguishable by appearance, they are not known to interbreed. The greater sandhill crane (*A. c. tabida*) spends only the winter months here while the Florida sandhill crane lives in Florida year-round.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

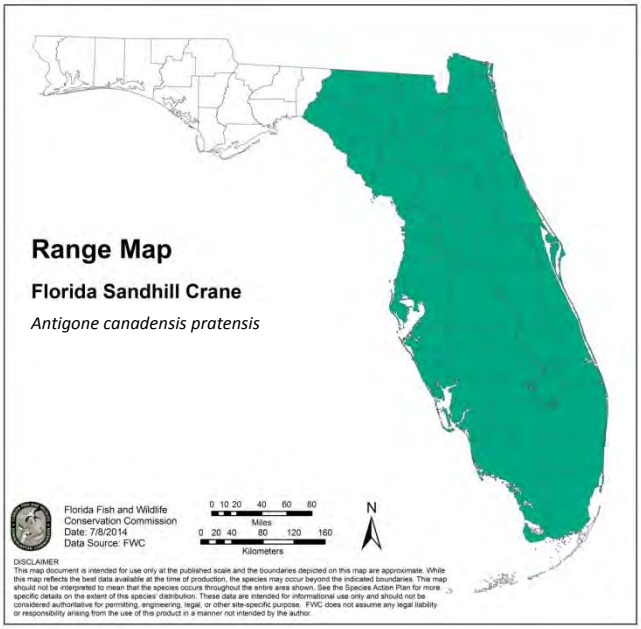
Improve the conservation status of the Florida sandhill crane to a point that it can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Habitat loss and degradation due to development and lack of appropriate management. The prairies, improved pastures, and freshwater marshes on which the species depends are especially vulnerable to overgrowth, development, and alteration.
- Predation and road mortality are exacerbated by habitat fragmentation as cranes travel farther between breeding and foraging areas; proximity of wetlands to upland areas is key to crane survival.
- Altered hydrology, drought, flooding, storms, and groundwater withdrawal can threaten productivity and survival.
- Lack of genetic diversity may be a threat, as the population estimate is less than 5,000 cranes.

Conservation Approach

- Increase the amount of suitable habitat through restoring hydrology and managing open habitats.
- Reduce mortality and ensure that quality habitat is sufficient to facilitate population growth.
- Ensure that species needs are considered in conservation and incentive programs.
- Fill information gaps and improve management through research and monitoring.
- Educate targeted audiences to minimize threats to crane survival and promote practices compatible with wildlife.



Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Least Tern

Sternula antillarum

Photograph by Jack Rogers.

The least tern is the smallest tern of North America, measuring about nine inches in length. Like other beach-nesting birds, nests in shallow scrapes in sand, shell, or gravel on the coast or near bodies of fresh water. Least terns also utilize flat, gravel rooftops for nesting.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

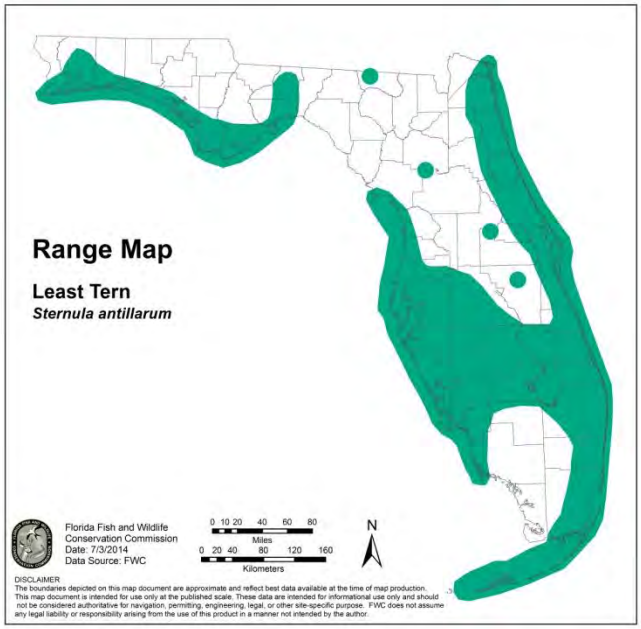
Improve the conservation status of the least tern to a point that it can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Habitat loss and degradation, largely due to coastal development and incompatible recreational use.
- Disturbance during breeding, causing nest failure and resulting in loss of eggs and/or chicks.
- Direct loss of eggs and chicks due to pedestrian and vehicular traffic on beaches.
- Mortality and injury associated with rooftop nesting colonies.
- Predation is a significant threat that is magnified by human disturbance.

Conservation Approach

- Increase the population by protecting breeding sites through appropriate management.
- Protect, restore, enhance, and create habitat sufficient to accommodate population growth.
- Continue monitoring through the Florida Shorebird Alliance, refining methods as necessary.
- Fill information gaps necessary to improve protections and management.
- Through targeted outreach, expand awareness about the species' conservation needs.
- Minimize loss of birds and nests at rooftop breeding sites.
- Improve protections and implement a permitting structure to support management actions.



Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Limpkin

Aramus guarauna

Photograph by FWC.

The limpkin inhabits and forages in vegetated banks and the shallows of rivers and streams, along lake edges, and in swamps, marshes, and other wetlands throughout peninsular Florida.

Status

Removed from Florida's Endangered and Threatened Species List in 2016.

Conservation Goal

The conservation status of the limpkin remains the same or is improved so that the limpkin does not warrant relisting on Florida's Endangered and Threatened Species List.

Identified Threats

- Loss of foraging and nesting areas. Alteration of wetlands, the species' primary breeding and foraging habitat, due to development, diversion of natural water-flow, altered levels of water fluctuation, lower water-tables, and nutrient enrichment in waters.
- Magnified vulnerability to changes in water quality due to dependence on aquatic freshwater prey. Pollutants, turbidity, and presence of aquatic invasive species may alter the abundance and composition of available prey.
- Predation of mature individuals by alligators *(Alligator mississippiensis)* and Burmese pythons *(Python molurus bivittatus)* and nest predation by snakes and small mammals.
- Vulnerability to specific parasites from consuming snails harboring nematodes, for example.

Conservation Approach

- Maintain or increase the limpkin population through habitat management and protection.
- Restore and manage habitat appropriately to increase the amount of suitable habitat.
- Implement monitoring statewide.
- Through partnerships, ensure that the needs of limpkins are considered during large-scale wetland restoration (such as projects in the Everglades).

Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife.
- The federal Migratory Bird Treaty Act, under which it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Little Blue Heron

Egretta caerulea

Photograph by Jack Rogers.

Little blue herons are stealthy hunters, preying on small fishes, aquatic crustaceans, amphibians, snakes, and insects. Though their diets are diverse, they do require shallow wetlands for foraging.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

Improve the conservation status of the little blue heron to a point that it can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Habitat degradation, including diversion of natural water-flow, altered levels of water fluctuation, lower water-tables, and nutrient enrichment in waters.
- Loss of suitable foraging and breeding areas due to human disturbance, especially during key phases of reproduction (e.g., continued disturbance near nesting colonies).
- Increased presence of predators that cause nest failure.
- Magnified vulnerability to pesticides, heavy metals, and other environmental contaminants.

Conservation Approach

- Reverse the little blue heron's population decline by protecting breeding sites.
- Ensure that quality habitat is sufficiently available to support migratory populations and to sustain and grow Florida's resident population.
- Partner effectively to ensure that species needs are considered during large-scale wetland restoration (such as projects occurring in and planned for the Everglades).
- Provide adequate protection to important nesting colonies through enforcement and education.
- Identify and prioritize top nesting colonies in Florida to effectively target research and conservation efforts.

Current Protections

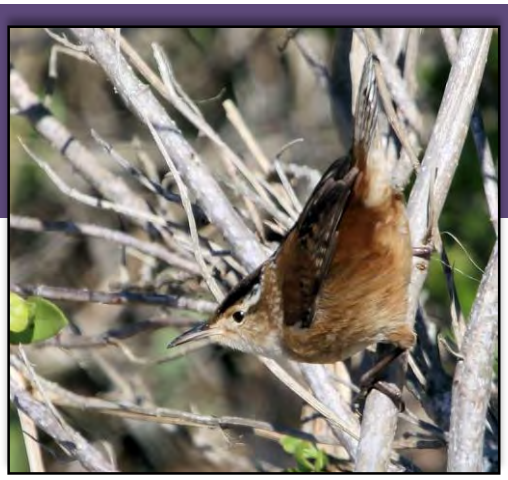
- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Marian's Marsh Wren

Cistothorus palustris marianae



Photograph by Larry Gridley.

Marian's marsh wren is a small, nonmigratory songbird. It is restricted to saltmarsh habitat, a coastal ecotone that forms a transitional zone between marine and terrestrial communities. This unique habitat is considered to be among the most productive natural communities in the world.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

Improve the conservation status of the Marian's marsh wren so that it is secure within its historical range.

Identified Threats

- Historic and continued loss of intact salt marshes and related fragmentation from dredging and filling, impoundments, and other hydrological changes that alter vegetation composition.
- Changes resulting from sea-level rise and climate change.
- Single events, such as hurricanes and oil and chemical spills.
- All known threats are exacerbated by this species' limited and narrow range.

Conservation Approach

- Maintain protections for saltmarsh habitat.
- Collect information necessary to determine management strategies that will stabilize the Marian's marsh wren population within its historical range.
- Identify threats and population-limiting factors, including vulnerability to disturbance.
- Identify management actions that will improve habitat quality and result in conditions necessary for successful recolonization.
- Through education and outreach, improve awareness of species dependent on salt marsh.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Osprey of Monroe County

Pandion haliaetus

Photograph by Tom Wilmers.

Ospreys breeding in coastal southern Florida (Monroe and surrounding counties) are considered nonmigratory residents. However, genetic distinction between ospreys in south Florida and ospreys elsewhere in the state is not significant.

Status

Removed from Florida's Endangered and Threatened Species List in 2018.

Conservation Goal

The conservation status of non-migratory ospreys in Monroe County is maintained or improved.

Identified Threats

- Vulnerability to water-quality changes that result in prey base declines. For example, prey may be limited in portions of Florida Bay due to hypersalinity from lowered freshwater inflow.
- Loss of suitable breeding habitat.
- Human disturbance, especially during key phases of reproduction.
- Entanglement in monofilament and injury resulting from accidental ingestion of fishing hooks.

Conservation Approach

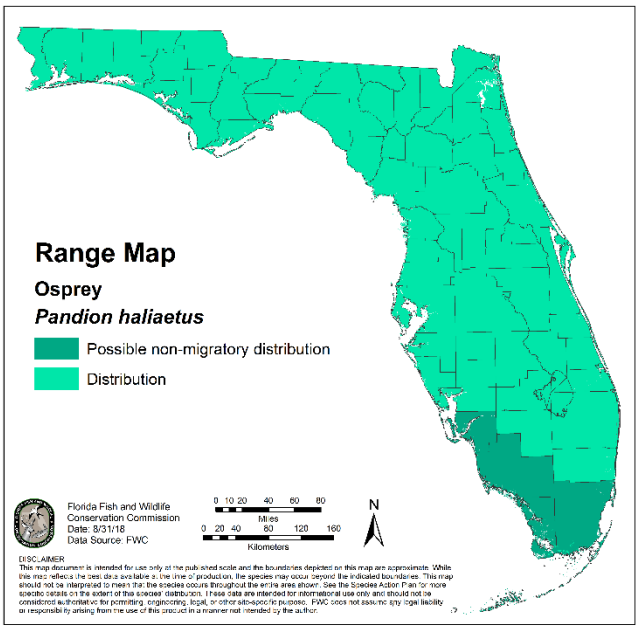
- Improve the quality and increase the amount of nesting and foraging habitat in Monroe County.
- Ensure long-term habitat quality and availability through participation in Everglades restoration.
- Maintain or increase the number of resident ospreys in Monroe County and surrounding areas.
- Prevent monofilament entanglement and disturbance by boat operators through targeted outreach.

Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report
- Species Conservation Measures and Permitting Guidelines



Reddish Egret

Egretta rufescens

Photograph by Jack Rogers.

The reddish egret nests exclusively on vegetated islands along the coast with nearby wetlands for foraging. Saltwater mud flats, sandbars, and coastal lagoons with water less than six inches deep are typical foraging grounds.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

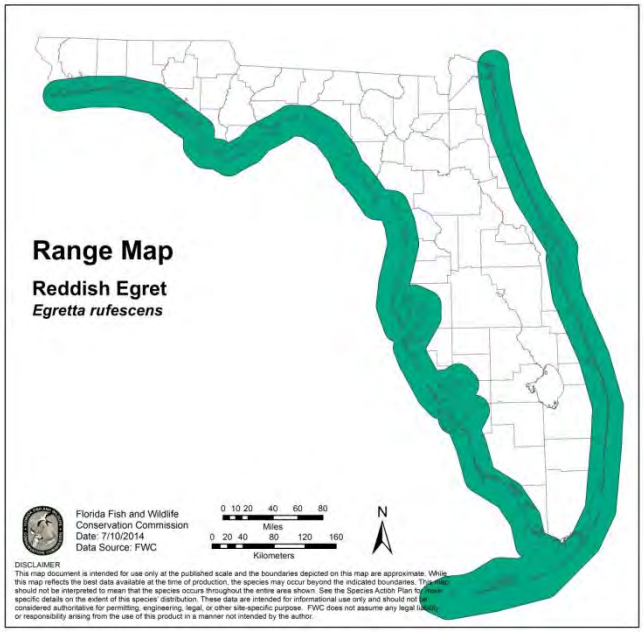
Improve the conservation status of the reddish egret to a point that it can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- A habitat specialist, this species is restricted to coastal wetlands, making it especially vulnerable to coastal habitat alteration from development, use, sea-level rise, and water management.
- Diversion of natural water flow, altered levels of water fluctuation, lower water-tables, and nutrient enrichment in waters when these conditions impact prey abundance and diversity.
- Human disturbance, especially during foraging and key phases of reproduction.
- Increased presence of predators that cause nest failure.
- Magnified vulnerability to pesticides, heavy metals, and other environmental contaminants.

Conservation Approach

- Increase the population of reddish egrets by protecting breeding sites.
- Ensure quality habitat is sufficient to increase the number of locations in which the species occurs.
- Partner with appropriate organizations to ensure that species needs are considered during large-scale wetland restoration (such as projects occurring in and planned for the Everglades).
- Protect important nesting colonies through partnership with law enforcement and education.
- Identify and prioritize top nesting colonies within Florida to better target research and conservation efforts.



Current Protections

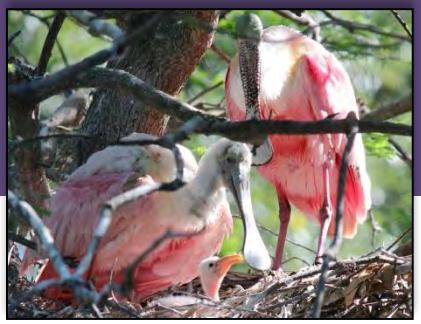
- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Roseate Spoonbill

Platalea ajaja



Photograph by FWC.

The roseate spoonbill uses its flat, spoon-shaped bill to probe shallow fresh or salt waters for small fish and other aquatic animals. Spoonbills nest primarily on coastal islands, though they occur inland outside of the breeding season.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

Improve the conservation status of the roseate spoonbill to a point that it can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Hydrologic alterations; this species relies on prey concentration resulting from gradual dry-down.
- Habitat degradation, including diversion of natural water-flow, altered levels of water fluctuation, lower water-tables, nutrient enrichment in waters, as well as changes associated with sea-level rise.
- Loss of suitable habitat due to human disturbance (e.g., continued disturbance of nesting colonies).
- Increased presence of predators that cause nest failure.
- Magnified vulnerability to pesticides, heavy metals, and other environmental contaminants.

Conservation Approach

- Increase the population of roseate spoonbills by protecting breeding sites.
- Ensure that quality habitat is sufficiently available to support migratory populations and to increase the number of locations where the roseate spoonbill occurs.
- Partner effectively to ensure that species needs are considered during large-scale wetland restoration (such as projects occurring in and planned for the Everglades).
- Adequately protect nesting colonies through partnership with law enforcement and education.
- Identify and prioritize top nesting colonies in Florida to better target research and management.

Current Protections

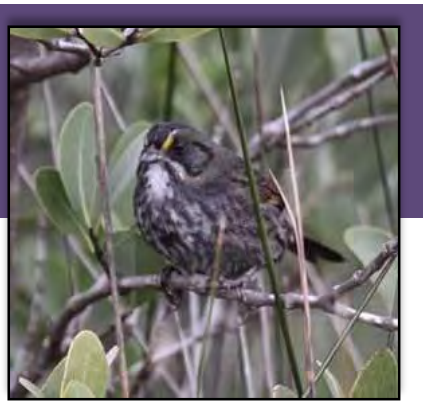
- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Scott's Seaside Sparrow

Ammodramus maritimus peninsulae



Photograph by John Mangold.

Scott's seaside sparrow is a small, nonmigratory songbird. It is restricted to saltmarsh habitat, a coastal ecotone that forms a transitional zone between marine and terrestrial communities. This unique habitat is considered to be among the most productive natural communities in the world.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

Improve the conservation status of the Scott's seaside sparrow so that it is secure within its historical range.

Identified Threats

- Historic and continued loss of intact salt marshes and related fragmentation from dredging and filling, impoundments, and other hydrological changes that alter vegetation composition.
- Changes resulting from sea-level rise and climate change.
- Single events, such as hurricanes and oil and chemical spills.
- All known threats are exacerbated by this species' limited and narrow range.

Conservation Approach

- Maintain protections for saltmarsh habitat.
- Collect information necessary to determine management strategies that will stabilize the Scott's seaside sparrow population within its historical range.
- Identify threats and population-limiting factors, including vulnerability to disturbance.
- Identify management actions that will improve habitat quality and result in conditions necessary for successful recolonization.
- Through education and outreach, improve awareness of species dependent on salt marsh.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Snowy Egret

Egretta thula

Photograph by Alex Kropp.

The snowy egret favors vegetated areas overhanging shallow water for nesting. Nesting colonies are often located on small islands surrounded by either fresh water or salt water.

Status

Removed from Florida's Endangered and Threatened Species List in 2016**.**

Conservation Goal

The conservation status of the snowy egret is to be maintained or improved such that the species does not need to be listed in the future.

Identified Threats

- Habitat degradation, including diversion of natural water flow, altered levels of water fluctuation, lower water tables, and nutrient enrichment in waters
- Loss of suitable foraging and breeding areas due to human disturbance, especially during key phases of reproduction (e.g., continued disturbance near nesting colonies)
- Increased presence of predators that cause nest failure
- Magnified vulnerability to pesticides, heavy metals, and other environmental contaminants

Conservation Approach

- Maintain a viable population throughout Florida by ensuring quality habitat is sufficiently available.
- Partner with appropriate organizations to ensure that the needs of snowy egrets are considered during large-scale wetland restoration (e.g., projects in the Everglades).
- Provide adequate protection to maintain important nesting colonies through partnership with law enforcement and education.
- Identify and prioritize the top nesting colonies within Florida to effectively target research and conservation efforts.

Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Snowy Plover

Charadrius nivosus

Photograph by Maxis Gamez.

The snowy plover makes its nest directly on the sand, shell, or small gravel of coastal areas. Though still attended to by adults, snowy plover chicks leave the nest within hours of hatching, and broods may travel more than one mile in a single day.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

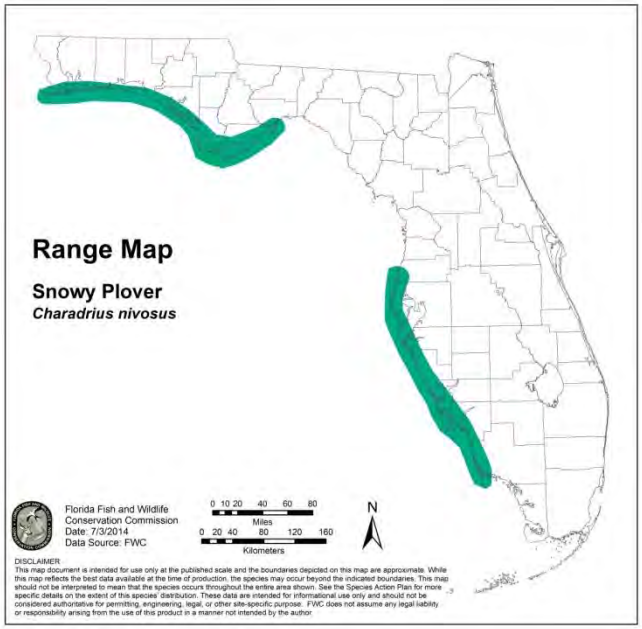
Improve the conservation status of the snowy plover to a point that it can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Habitat loss and degradation, largely due to coastal development and incompatible recreational use.
- Incompatible beach management practices, such as raking, that alter foraging habitat.
- Disturbance during breeding, causing nest failure and resulting in loss of eggs or chicks.
- Direct loss of eggs and chicks from pedestrian and vehicular traffic.
- Predation is a significant threat that is magnified by human disturbance.

Conservation Approach

- Increase the population of snowy plovers by protecting breeding and brood-rearing sites.
- Protect, restore, enhance, and create habitat sufficient to accommodate population growth.
- Continue monitoring through the Florida Shorebird Alliance, and refine methods as necessary.
- Fill information gaps, including determining productivity rates necessary for population growth.
- Educate those who recreate, reside, and work in coastal areas about the conservation needs of snowy plovers.
- Improve protections and implement a permitting structure to support management actions.



Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C, Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Southeastern American Kestrel

Falco sparverius paulus

Photograph by Alex Lamoreaux.

Kestrels are the smallest falcons in North America, measuring eight to 12 inches in length. The southeastern American kestrel is one of 17 subspecies of American kestrel in the western hemisphere; among these, it is the only subspecies that is a nonmigratory resident of Florida.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

The conservation status of the southeastern American kestrel is maintained or improved so that the species can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Loss of foraging and nesting habitat, largely due to loss of upland communities, and habitat degradation resulting from fire suppression
- Fragmentation of remaining habitat, which likely magnifies the impact of habitat loss
- Disease and lowered productivity resulting from chemical contaminants used in manufacturing

Conservation Approach

- Develop and implement habitat management guidelines that detail information on preferred habitat characteristics and promote management strategies to achieve them.
- Develop conservation measures for agricultural and silvicultural practices to minimize impacts.
- Expand use and management of nest boxes through partnership development.
- Improve understanding of distribution through expanded monitoring efforts.
- Fill information gaps on population status, demographics, and productivity in specific habitat types.
- Improve protections through developing enforcement policies and creating permitting guidelines.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Tricolored Heron

Egretta tricolor

Photograph by Jack Rogers.

The tricolored heron nearly always selects densely vegetated sites overhanging water for nesting, such as mangrove islands and willow thickets. Tricolored herons forage in a variety of wetlands including tidal marshes, swamps, and pond edges.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

Improve the conservation status of the tricolored heron to a point that it can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Habitat degradation, including diversion of natural water-flow, altered levels of water fluctuation, lower water-tables, and nutrient enrichment in waters.
- Loss of suitable foraging and breeding areas due to human disturbance, especially during key phases of reproduction (e.g., continued disturbance near nesting colonies).
- Increased presence of predators that cause nest failure.
- Magnified vulnerability to pesticides, heavy metals, and other environmental contaminants.

Conservation Approach

- Reverse the tricolored heron's population decline by protecting breeding sites.
- Ensure that quality habitat is sufficiently available to support migrants and grow Florida's population.
- Through partnerships, ensure species needs are considered during large-scale wetland restoration (e.g., projects in the Everglades).
- Protect important nesting colonies through partnership with law enforcement and education.
- Identify and prioritize the top nesting colonies within Florida to effectively target research and conservation efforts.

Current Protections

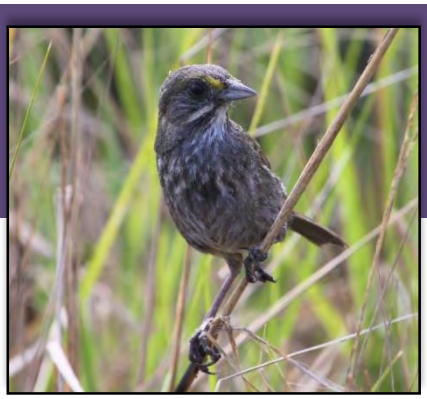
- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Wakulla Seaside Sparrow

Ammodramus maritimus juncicola



Photograph by Larry Gridley.

The Wakulla seaside sparrow is a small, nonmigratory songbird. It is restricted to saltmarsh habitat, a coastal ecotone that forms a transitional zone between marine and terrestrial communities. This unique habitat is considered to be among the most productive natural communities in the world.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

Improve the conservation status of the Wakulla seaside sparrow so that it is secure within its historical range.

Identified Threats

- Historic and continued loss of intact salt marshes and related fragmentation from dredging and filling, impoundments, and other hydrological changes that alter vegetation composition.
- Changes resulting from sea-level rise and climate change.
- Single events, such as hurricanes and oil and chemical spills.
- All known threats are exacerbated by this species' limited and narrow range.

Conservation Approach

- Maintain protections for saltmarsh habitat.
- Collect information necessary to determine management strategies that will stabilize the Wakulla seaside sparrow population within its historical range.
- Identify threats and population-limiting factors, including vulnerability to disturbance.
- Identify management actions that will improve habitat quality and result in conditions necessary for successful recolonization.
- Through education and outreach, improve awareness of species dependent on salt marsh.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

White-Crowned Pigeon

Patagioenas leucocephala

Photograph by Robert Epstein.

The white-crowned pigeon is similar in size and shape to the common rock dove (*Columba livia*), but has a longer neck and tail and a distinctive white cap on its head. This species depends upon an abundant supply of fruit, typically found in tropical hardwood hammocks within the species' range.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

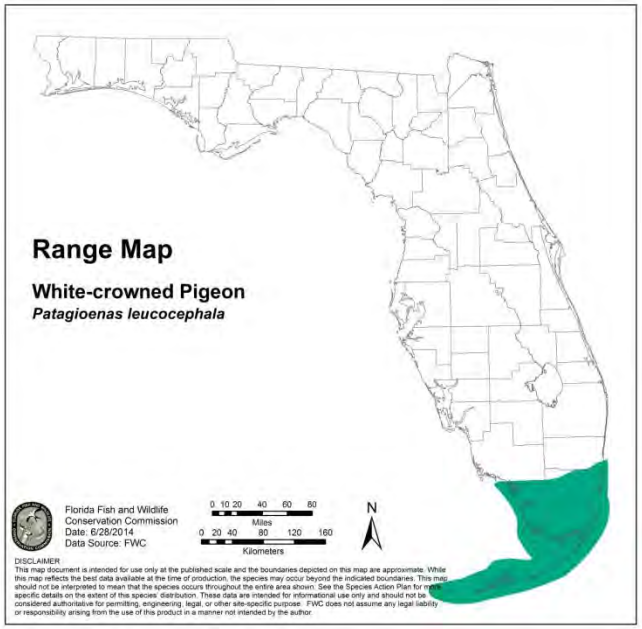
Conservation status of the white-crowned pigeon is improved to the point that the species is secure within its historical Florida range.

Identified Threats

- Intense loss, degradation, and fragmentation of south Florida's tropical hardwood hammock habitat.
- Projected habitat alteration associated with climate change and sea-level rise.
- Hunting in the species' wintering range (outside of the U.S.) is a continuing threat.
- Human disturbance to nesting colonies.
- Single event threats, such as hurricanes, are exacerbated because of the white-crowned pigeon's narrow and limited range.
- Nest predation by raccoons *(Procyon lotor)* and other predators is also a threat.

Conservation Approach

- Identify current breeding and foraging areas to guide management and conservation efforts.
- Fill knowledge gaps concerning reproductive success and mortality.
- Improve understanding of the white-crowned pigeon's life history and habitat requirements, and apply this information to targeted outreach efforts.
- Improve protections and effectiveness of permitting programs and rules.



Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

White Ibis

Eudocimus albus

Photograph by Alex Kropp.

The white ibis preys on aquatic crustaceans in both fresh water and salt water and on insects. This species typically nests in dense, single-species colonies, sometimes with thousands of birds.

Status

Removed from Florida's Endangered and Threatened Species List in 2016.

Conservation Goal

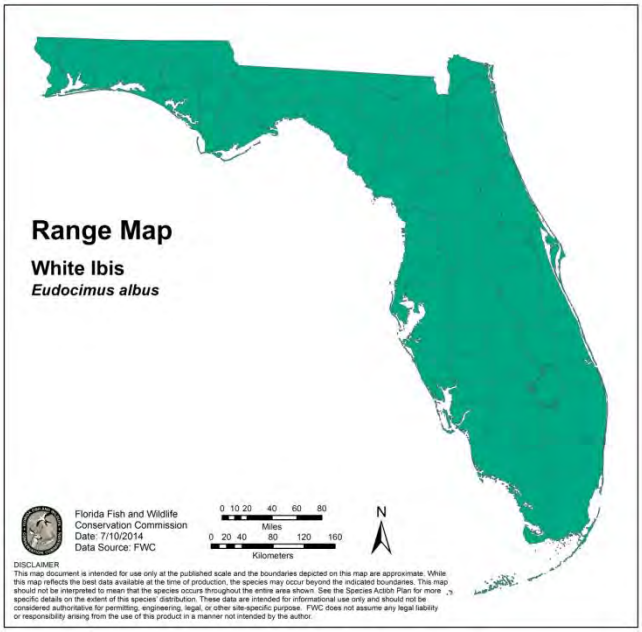
The conservation status of the white ibis is to be maintained or improved such that the species does not need to be listed in the future.

Identified Threats

- Habitat degradation, including diversion of natural water-flow, altered levels of water fluctuation, lower water-tables, and nutrient enrichment in waters
- Loss of suitable foraging and breeding areas due to human disturbance, especially during key phases of reproduction (e.g., continued disturbance near nesting colonies)
- Increased presence of predators that cause nest failure
- Magnified vulnerability to pesticides, heavy metals, and other environmental contaminants

Conservation Approach

- Maintain a viable population of white ibis throughout Florida by ensuring that quality habitat is sufficiently available.
- Partner with appropriate organizations to ensure that the needs of the white ibis are considered during large-scale wetland restoration (such as projects occurring in and planned for the Everglades).
- Provide adequate protection to maintain important nesting colonies through partnership with law enforcement and education.
- Identify and prioritize the top nesting colonies within Florida to effectively target research and conservation efforts.



Current Protections

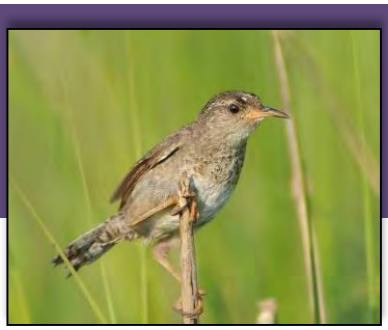
- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C, prohibits the take, transport, sale, and possession of wildlife.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including their feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Worthington's Marsh Wren

Cistothorus palustris griseus



Photograph © Ed Schneider.

The Worthington's marsh wren is a small, nonmigratory songbird. It is restricted to saltmarsh habitat, a coastal ecotone that forms a transitional zone between marine and terrestrial communities. This unique habitat is considered to be among the most productive natural communities in the world.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

Improve the conservation status of the Worthington's marsh wren so that it is secure within its historical range.

Identified Threats

- Historic and continued loss of intact salt marshes and related fragmentation from dredging and filling, impoundments, and other hydrological changes that alter vegetation composition.
- Changes resulting from sea-level rise and climate change.
- Single events, such as hurricanes and oil and chemical spills.
- All known threats are exacerbated by this species' limited and narrow range.

Conservation Approach

- Maintain protections for saltmarsh habitat.
- Collect information necessary to determine management strategies that will stabilize the Worthington's marsh wren population within its historical range.
- Identify threats and population-limiting factors, including vulnerability to disturbance.
- Identify management actions that will improve habitat quality and result in conditions necessary for successful recolonization.
- Through education and outreach, improve awareness of species dependent on salt marsh.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- Under the federal Migratory Bird Treaty Act, it is unlawful to pursue, hunt, take, capture, kill, or sell migratory birds, including feathers, eggs, and nests.

Resources

- Species Action Plan
- Biological Status Review Report

Alligator Snapping Turtle

Macrochelys temminckii

Photograph by Bradley M. O'Hanlon, FWC.

Previously understood to be one species, recent findings indicate that three species of alligator snapping turtle occur in Florida. *Macrochelys temminckii* is the most wide-ranging of the three species, occurring in Gulf coast drainages from the Yellow River in Florida to eastern Texas.

Status

Removed from Florida's Endangered and Threatened Species List in 2018.

Conservation Goal

Maintain or improve the conservation status of *M. temminckii* so that it does not warrant listing again on Florida's Endangered and Threatened Species List.

Identified Threats

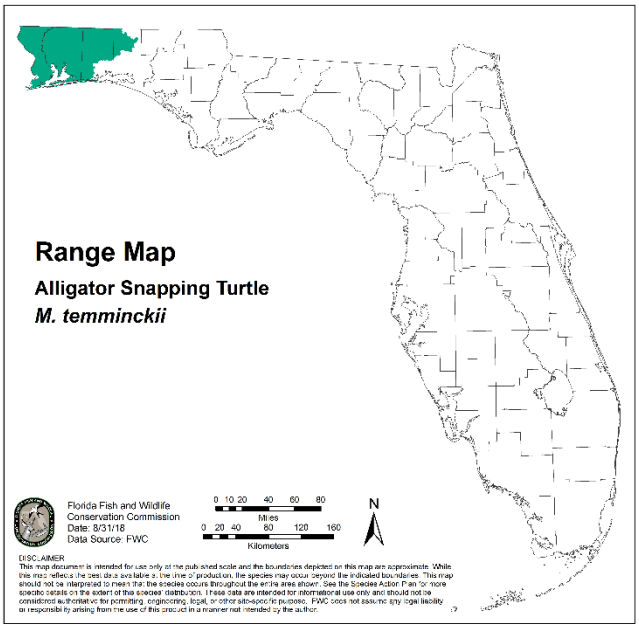
- Riverine habitat degradation due to channel dredging, snag removal, siltation, and pollution
- Incidental take from fishing gear, including trotlines and bush hooks
- Nest predation

Conservation Approach

- Maintain populations, in part by minimizing human impact from fishing, boating, and other activities.
- Prevent unauthorized take and possession, and provide protections adequate for conservation.
- Maintain extent of occurrence by improving water quality and quantity, habitat characteristics of occupied rivers, and nearby nesting habitats.
- Identify and conserve private lands bordering occupied waterways.
- Educate the public, law enforcement, and land managers about the species.

Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits take, transport, sale, and possession of wildlife.
- General Provisions for Taking, Possession and Sale of Reptiles, Rule 68A-25.002, F.A.C., prohibits the take, transport, and possession of alligator snapping turtles, along with other freshwater turtles.



Resources

- Species Action Plan
- Biological Status Review Report
- Species Conservation Measures and Permitting Guidelines

Apalachicola Alligator Snapping Turtle

Macrochelys apalachicolae

Photograph by Bradley M. O'Hanlon, FWC.

Previously understood to be one species, recent findings indicate that three species of alligator snapping turtle occur in Florida. *Macrochelys apalachicolae* has an extremely restricted range, occurring in drainages bound by the Ochlocknee and Choctawhatchee rivers.

Status

Removed from Florida's Endangered and Threatened Species List in 2018.

Conservation Goal

Maintain or improve the conservation status of *M. apalachicolae* so that it does not warrant listing again on Florida's Endangered and Threatened Species List.

Identified Threats

- Riverine habitat degradation due to channel dredging, snag removal, siltation, and pollution
- Incidental take from fishing gear, including trotlines and bush hooks
- Nest predation

Conservation Approach

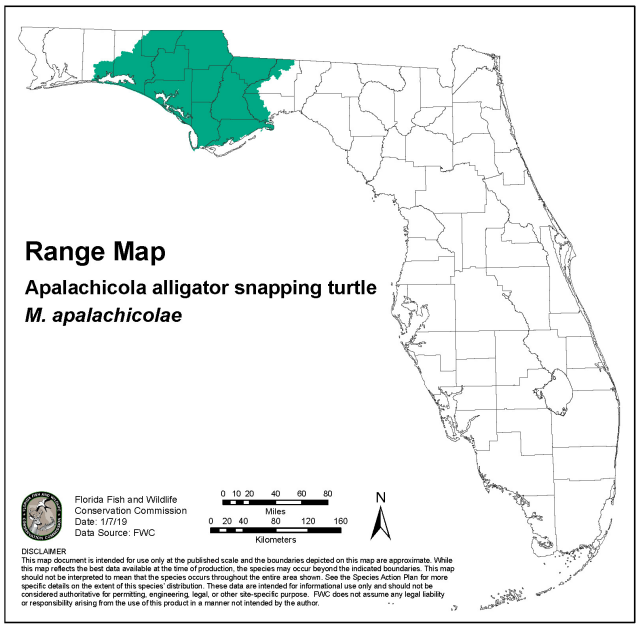
- Maintain populations, in part by minimizing human impact from fishing, boating, and other activities.
- Prevent unauthorized take and possession, and provide protections adequate for conservation.
- Maintain extent of occurrence by improving water quality and quantity, habitat characteristics of occupied rivers, and nearby nesting habitats.
- Identify and conserve private lands bordering occupied waterways.
- Educate the public, law enforcement, and land managers about the species.

Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits take, transport, sale, and possession of wildlife.
- General Provisions for Taking, Possession and Sale of Reptiles, Rule 68A-25.002, F.A.C., prohibits the take, transport, and possession of alligator snapping turtles, along with other freshwater turtles.

Resources

- Species Action Plan
- Biological Status Review Report
- Species Conservation Measures and Permitting Guidelines



Suwannee Alligator Snapping Turtle

Macrochelys suwanniensis

Photograph by Kevin Enge, FWC.

Previously understood to be one species, recent findings indicate that three species of alligator snapping turtle occur in Florida. *Macrochelys suwanneinsis* has an extremely limited range, occurring only in the Suwannee River drainage.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

Improve or maintain the conservation status of *M. suwanniensis* to a point that the species is secure within its historical range.

Identified Threats

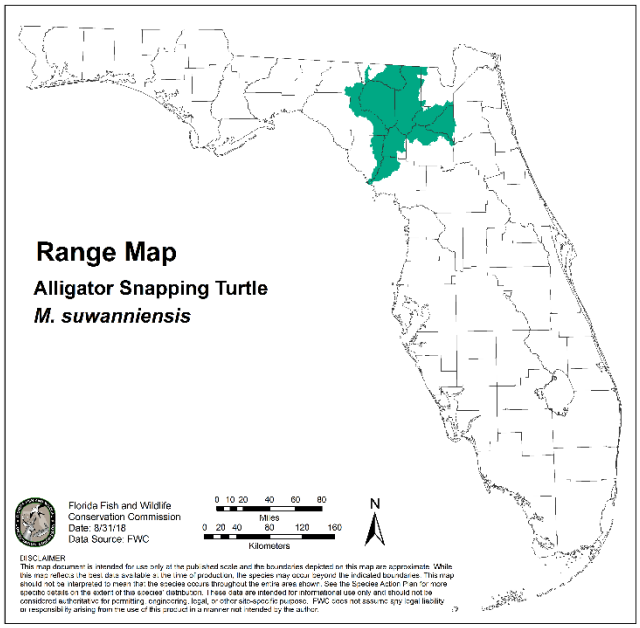
- Riverine habitat degradation due to channel dredging, snag removal, siltation, and pollution
- Incidental take from fishing gear, including trotlines and bush hooks
- Nest predation

Conservation Approach

- Maintain populations, in part by minimizing human impact from fishing, boating, and other activities.
- Prevent unauthorized take and possession, and provide protections adequate for conservation.
- Maintain extent of occurrence by improving water quality and quantity, habitat characteristics of occupied rivers, and nearby nesting habitats.
- Identify and conserve private lands bordering occupied waterways.
- Educate the public, law enforcement, and land managers about the species.

Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits take, transport, sale, and possession of wildlife.
- General Provisions for Taking, Possession and Sale of Reptiles, Rule 68A-25.002, F.A.C., prohibits the take, transport, and possession of alligator snapping turtles, along with other freshwater turtles.



Resources

- Species Action Plan
- Biological Status Review Report
- Species Conservation Measures and Permitting Guidelines

Barbour's Map Turtle

Graptemys barbouri

Photograph © John B. Jensen.

Barbour's map turtles have a yellowish blotch behind each eye, usually connecting to a third blotch on the top of the head. Females reach 13 inches in length, while males of the species reach only five inches.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

The conservation status of the Barbour's map turtle is improved to the point that the species is secure within its historical range.

Identified Threats

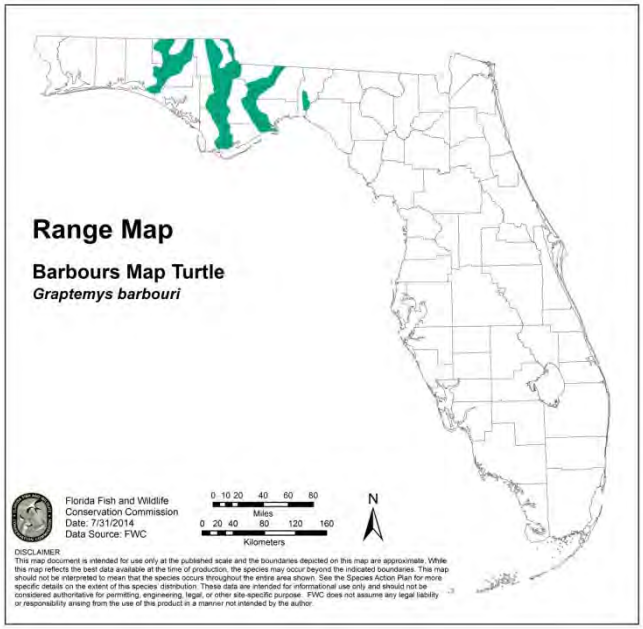
- Direct loss through take for food, take by pet collectors, wanton killing, and impacts with motorized watercraft
- Riverine habitat degradation due to channel dredging, snag removal, siltation, and pollution
- Predation of turtles and eggs by raccoons *(Procyon lotor)*, fish crows *(Corvis ossifrangus)*, and feral hogs *(Sus scrofa)*

Conservation Approach

- Provide protections necessary to conserve the species, including prevention of unauthorized take and possession.
- Maintain the extent of occurrence through improving water quality and quantity, and habitat characteristics of occupied rivers and nearby nesting habitats.
- Identify and conserve private lands bordering occupied waterways.
- Educate the public and law enforcement about the Barbour's map turtle, and promote consideration of the species' needs by land managers.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.
- General Provisions for Taking, Possession, and Sale of Reptiles, Rule 68A-25.002, F.A.C., prohibits the take, transport, and possession of the Barbour's map turtle, along with other species of freshwater turtles.



Resources

- Species Action Plan
- Biological Status Review Report

Florida Brown Snake of the Lower Keys

Storeria victa

Photograph by Kevin Enge, FWC.

The Florida brown snake has a maximum length of 12 inches and ranges from brown to olive in color.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

The conservation status of the Lower Keys population of the Florida brown snake is improved to the point that it is secure within the Lower Keys.

Identified Threats

- Habitat loss resulting from the clearing of hammock habitats and areas around wetlands in the Lower Keys.
- Roads, which fragment habitat, may contribute to reduced genetic diversity, and are a source of direct mortality.
- Climate change, sea-level rise, and storm surges present exceptional challenges to the Florida brown snake and its prey due to projected increases in salinity at freshwater sources in the Keys.
- Predation by raccoons *(Procyon lotor)*, free-ranging cats *(Felis catus)*, and nonnative species such as cane toads (*Rhinella marina*) and Cuban treefrogs (*Osteopilus septentrionalis*).

Conservation Approach

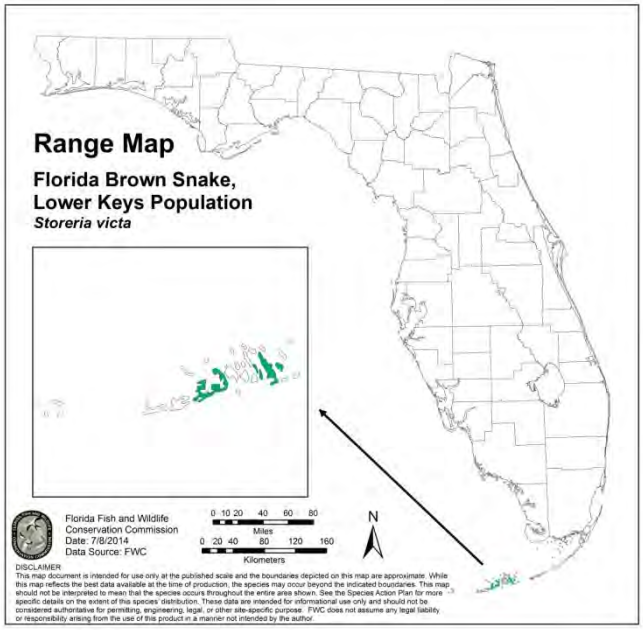
- Restore, protect, manage, and acquire as much suitable habitat as possible to support maintaining the species' area of occupancy and extent of occurrence.
- Continue efforts to remove nonnative species from Florida brown snake habitat.
- Maintain area of occupancy and extent of occurrence, and increase the population to support stability.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C, Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report



Florida Keys Mole Skink

Plestiodon egregius egregius

Photograph by Dick Bartlett.

The Florida Keys mole skink is one of five subspecies of mole skinks in Florida. It is small and slender, with smooth, shiny scales. The Florida Keys mole skink is known to occur on some islands in the Florida Keys, and on the Dry Tortugas.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

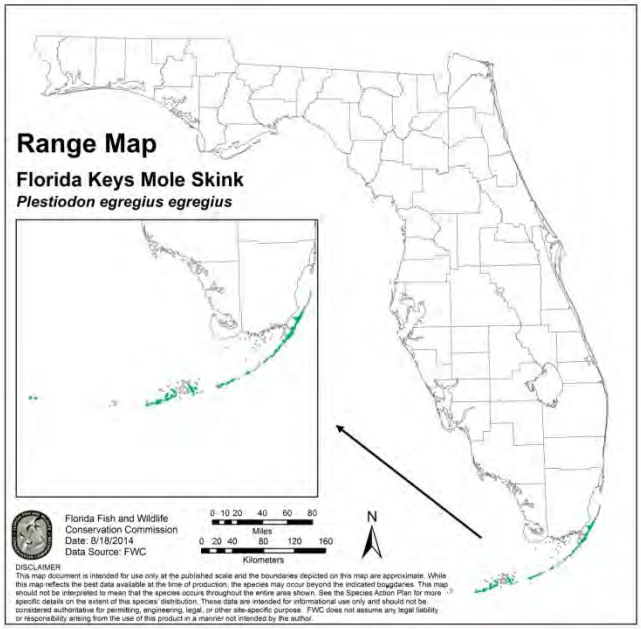
The conservation status of the Florida Keys mole skink is improved to the point that the species is secure within its historical range.

Identified Threats

- Habitat loss through shoreline development and clearing of pine rockland and tropical hardwood hammock habitats.
- Roads, which fragment habitat, are a source of mortality and also reduce genetic diversity.
- Climate change and sea-level rise present exceptional challenges to the Florida Keys mole skink due to the species' inhabitance of the transitional zone just above sea level and because their range is restricted to islands within the Florida Keys.
- Nonnative species, such as the red imported fire ant (*Solenopsis invicta*), along with free-ranging and domestic cats *(Felis catus)* are known predators of skink species.

Conservation Approach

- Research habitat preferences of the Florida Keys mole skink to inform habitat management in support of improving potential habitat throughout the species' range.
- Restore, protect, manage, and acquire as much suitable habitat as possible to support maintaining the species' area of occupancy and extent of occurrence.
- Continue efforts to remove nonnative species from the species' habitat.
- Direct outreach to local conservationists and interested members of the public to improve monitoring and encourage awareness of this species.



Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C, Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Florida Pine Snake

Pituophis melanoleucus mugitus

Photograph by Kevin Enge.

The Florida pine snake is a large (48-66 inches), nonvenomous snake with dark brown to reddish blotches on a gray to sandy-colored background. Its head and snout are adapted for burrowing, and this species spends most of its time underground. Its impressive defensive displays include hissing, raising its head and inflating its upper body, and shaking its tail.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

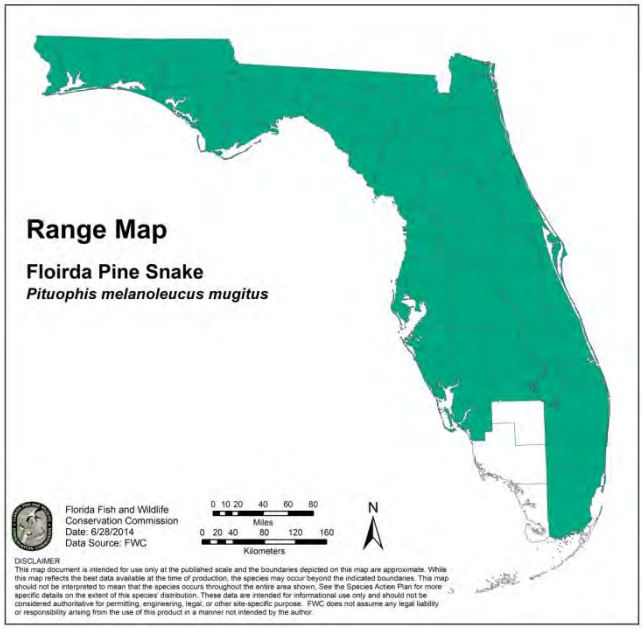
The conservation status of the Florida pine snake is improved to a point that the species can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Habitat loss, fragmentation, and degradation from the loss of dry uplands and fire suppression.
- Roads, which fragment habitat, may contribute to reduced genetic diversity and mortality.
- Due to its dependency on underground refuges, the decline of burrowing species such as the gopher tortoise *(Gopherus polyphemus)* and pocket gopher *(Geomys pinetus)* present a threat to habitat.
- Operations that result in stump removal, soil compaction, and root removal may be threats.
- Predation by domestic pets and other nonnative species, and intentional killing by humans.

Conservation Approach

- Increase the amount of suitable habitat through restoration, appropriate fire management, conservation easements, and support (incentive based and other) and technical assistance to public and private land managers.
- Fill knowledge gaps in species life history, threats, and potential conservation strategies.
- Determine and monitor the status of Florida pine snake populations.
- Encourage public understanding of and support for conservation actions through education and outreach about the natural history, identification, and ecological importance of Florida pine snakes and other snakes.



Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Key Ringneck Snake

Diadophis punctatus acricus

Photograph by Kevin Enge, FWC.

The Key ringneck snake averages 10 inches in length and prefers rockland habitat with freshwater sources nearby. The snakes depend on a moist microhabitat to balance their bodies' evaporative water loss.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

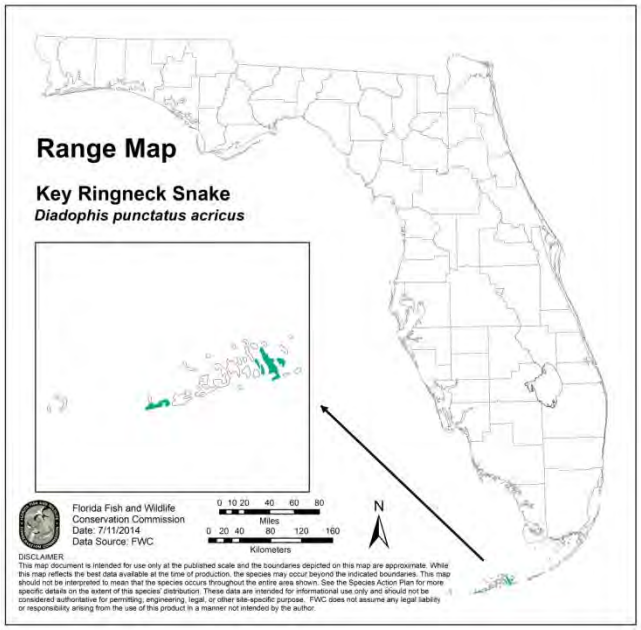
The conservation status of the Key ringneck snake is improved to the point that the species is secure within its historical range.

Identified Threats

- Habitat loss resulting from the clearing of pine rockland and tropical hardwood hammock habitats.
- Roads, which fragment habitat, may contribute to reduced genetic diversity, and are a source of mortality.
- Climate change, sea-level rise, and storm surges present exceptional challenges to the Key ringneck snake due to the species' dependence on freshwater holes, and projections are that salinity levels at these locations will increase.
- Nonnative species, such as the red imported fire ant (*Solenopsis invicta*), along with free-ranging and domestic cats *(Felis catus)*, are known predators of snakes.

Conservation Approach

- Research taxonomy, population status, and habitat preferences of the Key ringneck snake to inform management in support of improving habitat and implementing appropriate protections.
- Restore, protect, manage, and acquire as much suitable habitat as possible to support maintaining the species' area of occupancy and extent of occurrence.
- Continue efforts to remove nonnative species from Key ringneck snake habitat.
- Direct outreach to local conservationists and interested members of the public to improve monitoring and encourage awareness of this species.



Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C, Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Peninsula Ribbon Snake of the Lower Keys

Thamnophis sauritus sackenii

Photograph by Phillip A. Frank.

This species occurs along freshwater habitat, where it forages and shelters in grassy and shrubby vegetation. In the Lower Keys, it may also be found in mangroves and *Spartina* marshes. Specimens from the Keys have a yellow, orange, or tan middorsal stripe, bordered on each side by a black stripe.

Status

Removed from Florida's Endangered and Threatened Species List in 2016**.**

Conservation Goal

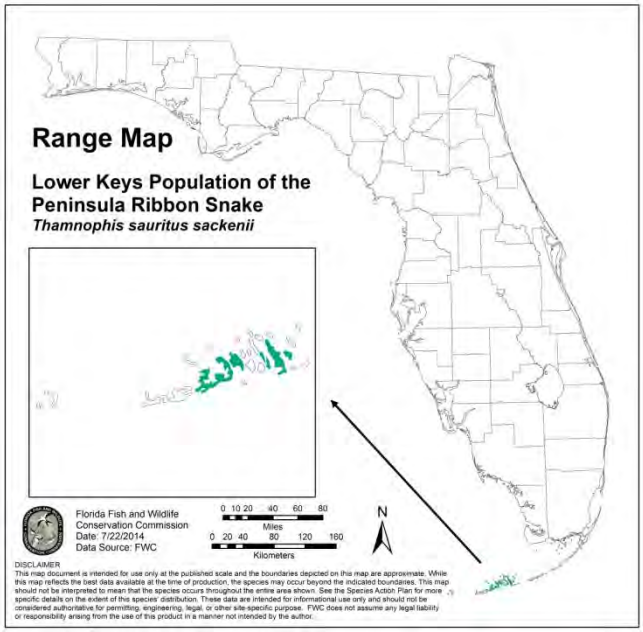
The conservation status of the peninsula ribbon snake, Lower Keys population, is maintained or improved so the species will not again need to be listed on Florida's Endangered and Threatened Species List.

Identified Threats

- Habitat loss due to clearing of hammocks and other habitat near freshwater sources.
- Intentional killing by people.
- Vehicle mortality may be a significant threat to this population, especially where roads are dense.
- Climate change and associated sea-level rise are exceptional challenges to all vulnerable species in the Florida Keys, as opportunities for inland migration are limited and saltwater intrusion may impact already rare freshwater wetlands.

Conservation Approach

- Maintain the area of occupancy and extent of occurrence through restoration, management, and acquisition of suitable habitat.
- Maintain or improve the extent and quality of habitat in the Lower Keys.
- Maintain a population with more than 10,000 individuals, with more than 1,000 individuals at least one location.
- Continue efforts to remove nonnative species from available habitat.



Current Protections

- General Provisions for Taking, Possession and Sale of Reptiles, Rule 68A-25.002, F.A.C, prohibits the take, transport, and possession of peninsula ribbon snakes in the Lower Keys.
- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife.

Resources

- Species Action Plan
- Biological Status Review Report

Red Rat Snake of the Lower Keys

Pantherophis guttatus

Photograph by Randy Grau, FWC.

The red rat snake population of the Lower Keys is not taxonomically distinct from red rat snakes in other parts of Florida, though it is unique in appearance.

Status

Removed from Florida's Endangered and Threatened Species List in 2016.

Conservation Goal

The conservation status of the Lower Keys population of the red rat snake remains the same or is improved so that that it does not warrant listing on Florida's Endangered and Threatened Species List.

Identified Threats

- Though adaptable, red rat snakes have likely been eliminated from some areas due to clearing of pine rockland and hardwood hammocks.
- This species may be targeted for harvest by the pet trade, due to its unique appearance.
- Snakes are intentionally killed by people and are predated by feral and free-roaming cats *(Felis catus)*, opossums *(Didelphis virginiana)*, and a number of other species.
- Vehicle mortality may be a significant threat to this population, especially on Big Pine Key, which has a dense network of roads.
- Climate change and associated sea-level rise are exceptional challenges to all vulnerable species in the Florida Keys, as opportunities for inland migration are limited and saltwater intrusion may impact already rare freshwater wetlands.

Conservation Approach

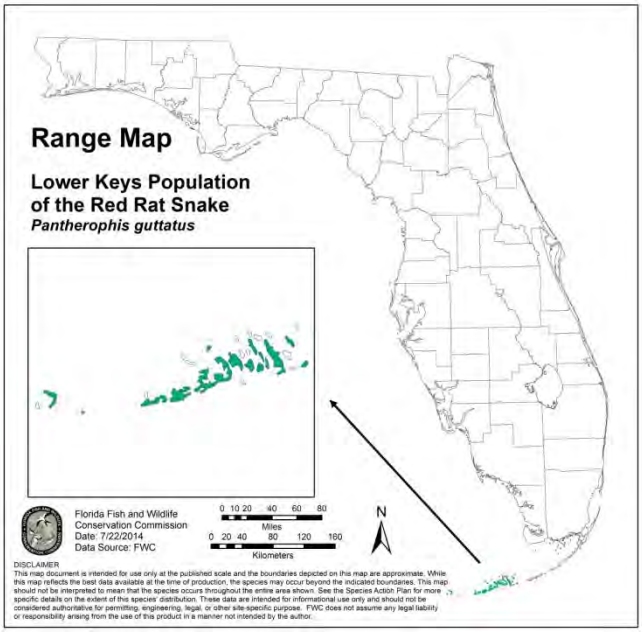
- Protect, restore, and manage as much suitable habitat as possible to maintain the red rat snake population in the Lower Keys.
- Continue efforts to eradicate nonnative species from the Lower Keys.
- Protect this population against harvest to deter collection for the pet trade.

Current Protections

- General Provisions for Taking, Possession and Sale of Reptiles, Rule 68A-25.002, F.A.C, prohibits the take, transport, and possession of the red rat snake in the Lower Keys.
- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife.

Resources

- Species Action Plan
- Biological Status Review Report



Rim Rock Crowned Snake

Tantilla oolitica

Photograph by Dustin C. Smith.

The rim rock crowned snake is tan to beige in color with a pinkish to cream belly. A pale blotch behind the eye is often present. The snake is endemic to south Florida, and specimens from the Keys may have a pale neckband not present in snakes from the mainland.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

The conservation status of the rim rock crowned snake is improved to the point that the species is secure within its historical range.

Identified Threats

- Habitat destruction and degradation resulting from the clearing of hammock and rockland habitats in south Florida.
- Roads, which fragment habitat, may contribute to reduced genetic diversity and direct mortality.
- Climate change, sea-level rise, and storm surges present exceptional challenges to the rim rock crowned snake and its prey due to projected increases in salinity at freshwater sources in the snake's limited range.
- Predation by nonnative species such as red imported fire ants *(Solenopsis invicta)*, cane toads *(Rhinella marina)*, Cuban treefrogs *(Osteopilus septentrionalis)*, and exotic lizards.

Conservation Approach

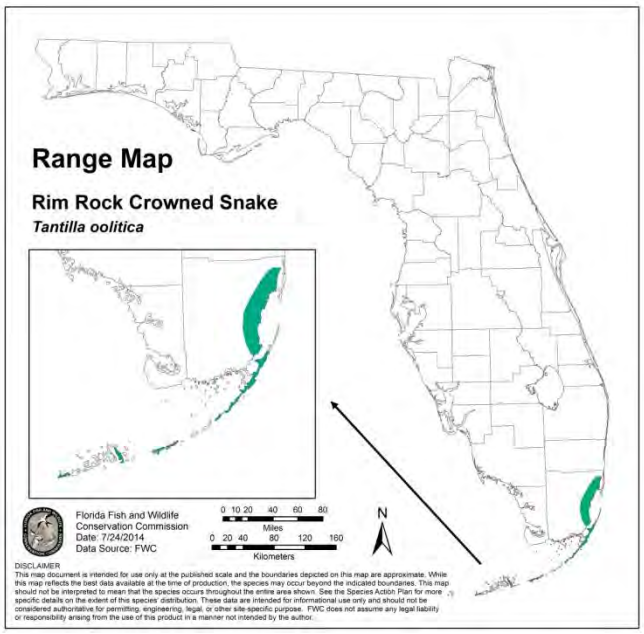
- Restore, protect, manage, and acquire as much suitable habitat as possible to support maintaining the species' area of occupancy and extent of occurrence.
- Continue efforts to remove nonnative species from rim rock crowned snake habitat.
- Research the species' life history to promote improved conservation and ultimately increase the population.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report



Short-Tailed Snake

Lampropeltis extenuata

Photograph by Kevin Enge, FWC.

The short-tailed snake is a slender snake with an average length of 12 to 20 inches. This snake has a gray or silver back with dark brown or black blotches alternating with yellow or red areas. A key feature is that the head is not distinct from its cylindrical body. The short-tailed snake is a burrowing species that spends most of its time burrowed in the sand.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

The conservation status of the short-tailed snake is improved to a point that the species can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Habitat loss, fragmentation, and degradation of xeric (dry) upland habitats.
- Road mortality and habitat fragmentation by roads.
- Predation by nonnative species, such as red imported fire ants *(Solenopsis invicta)* and pets. The short-tailed snake's primary prey, crowned snakes (*Tantilla relicta*), are also vulnerable to this threat.
- Intentional killing by humans.

Conservation Approach

- Increase or maintain the amount of suitable habitat through restoration, easements and other land-use agreements, partnerships, and technical assistance to public and private land managers.
- Fill data gaps for natural history, habitat requirements, and potential threats.
- Develop an effective method to determine and track the status of populations statewide.
- Encourage public understanding of and support for conservation actions through education and outreach about species identification, distribution, biology, threats, and ecological importance of this and other snake species.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Striped Mud Turtle of the Lower Keys

Kinosternon baurii

Photograph by Richard D. Bartlett.

A small (4.5 inches) freshwater turtle, this species inhabits shallow wetlands. Pale yellow stripes are visible on either side of the head, extending back towards the neck. In other parts of the species' range, three stripes extend down the length of its shell; these stripes are inconspicuous or lacking in specimens from the Lower Keys.

Status

Removed from Florida's Endangered and Threatened Species List in 2016.

Conservation Goal

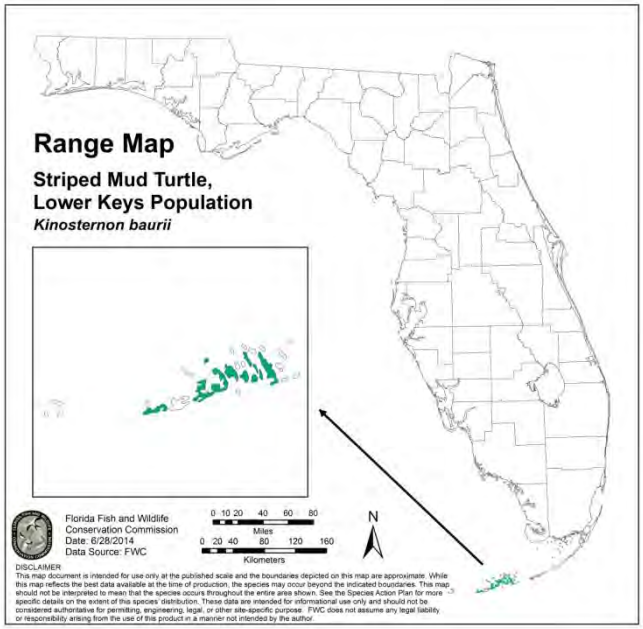
Conservation status of the striped mud turtle (Lower Keys population) is improved to the point that the species is secure within its historical range.

Identified Threats

- Loss and degradation of small, ephemeral, fresh or slightly brackish bodies of water the species inhabits. These areas are naturally rare and impacted by lower water tables due to human water use.
- Saltwater intrusion of wetlands caused by climate change, water-table reduction, and diversion.
- Climate change and sea-level rise are exceptional challenges to this population as opportunities for inland migration are limited, and increasing salinity of freshwater areas may impact habitat.
- Predation and nest destruction by species such as raccoons *(Procyon lotor)*, opossums *(Didelphis virginiana)*, introduced lizards, and red imported fire ants *(Solenopsis invicta)*.

Conservation Approach

- Maintain the population through habitat restoration and management, including improving freshwater quality and quantity.
- Maintain the population by identifying suitable habitat and working with landowners and managers to protect identified sites.
- Continue efforts to eradicate nonnative species from the Lower Keys.
- Protect this population against harvest and deter collection for the pet trade.



Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife.
- General Provisions for Taking, Possession and Sale of Reptiles, Rule 68A-25.002, F.A.C, prohibits the take, transport, and possession of striped mud turtles, along with other species of freshwater turtles.

Resources

- Species Action Plan
- Biological Status Review Report

Suwannee Cooter

Pseudemys concinna suwanniensis

Photograph © Ghislaine C. Guyot.

The Suwannee cooter grows to a maximum length of 17 inches, and inhabits rivers, large streams, and associated permanent freshwater habitats. With adequate protection, this species can achieve very high local densities and biomasses that play an important role in ecosystem stability and structure.

Status

Removed from Florida's Endangered and Threatened Species List in 2016.

Conservation Goal

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

Identified Threats

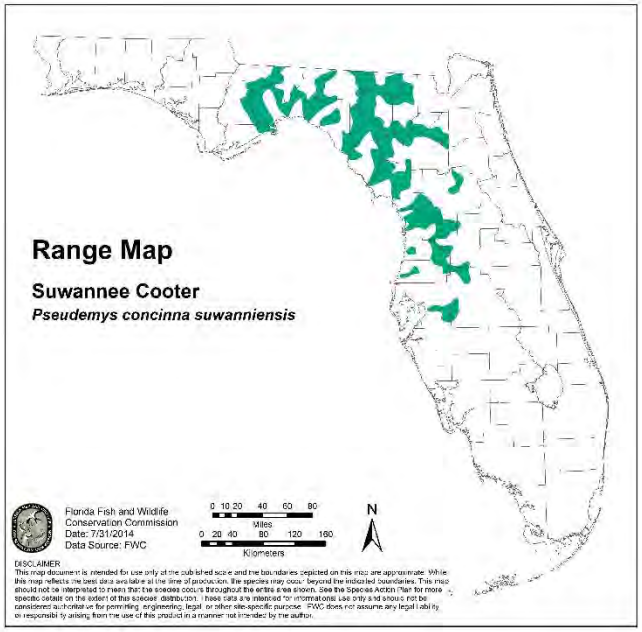
- Intentional take for food and by pet collectors
- Riverine habitat degradation and alteration due to pollution, impoundments, channel dredging, snag removal, and siltation
- Impacts with motorized boats
- Predation of turtles and eggs, chiefly by raccoons *(Procyon lotor)*, fish crows *(Corvus ossifragus)*, and feral hogs *(Sus scrofa)*

Conservation Approach

- Maintain and increase water quantity and quality of occupied rivers and nearby nesting habitat.
- Identify and protect private lands bordering inhabited waterways.
- Minimize take from fishing, boating, and other activities.
- Continue to provide adequate protections against collection for the pet trade and take for food.
- Promote education and outreach to stakeholder groups, including law enforcement, boaters, and anglers.

Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife.
- General Provisions for Taking, Possession, and Sale of Reptiles, Rule 68A-25.002, F.A.C., prohibits the take, transport, and possession of the Suwannee cooter, along with other species of freshwater turtles.



Resources

- Species Action Plan
- Biological Status Review Report

Florida Bog Frog

Lithobates okaloosae

Photograph by Kevin Enge, FWC.

The Florida bog frog is the smallest true frog in North America, only 1.5 to two inches in length. Adults inhabit shallow, acidic seeps and boggy overflows of slow-flowing streams that support a diversity of herbs, forbs, grasses, mosses, and lichens.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

The conservation status of the Florida bog frog is improved to the point that the species is secure within its historical range.

Identified Threats

- Habitat loss and degradation resulting from altered hydrology, fire exclusion, nonnative vegetation, and reduction of overall plant diversity
- Resource competition and potential genetic swamping with the closely related bronze frog *(Lithobates clamitans clamitans)*
- Parasites and pathogens, including ranaviruses, which have been documented in widespread die-offs of other amphibian species in the southeastern U.S.
- Saltwater intrusion and increasing periods of drought (that reduce seepage into the Florida bog frog's habitat) associated with climate change and sea-level rise

Conservation Approach

- Maintain and improve existing habitat through removal of nonnative vegetation and use of prescribed fire to improve hydrology and minimize vegetation succession.
- Monitor sites where this species has been documented to better understand effect of management actions.
- Provide protections necessary to conserve the species, including prevention of unauthorized take.
- Promote education, outreach, and collaboration among stakeholder groups.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Georgia Blind Salamander

Eurycea wallacei

Photograph by Nathanael Herrera, Florida State University.

The Georgia blind salamander, an aquatic-cave species, lives permanently in underground water systems within subterranean springs and flows of aquatic caves and aquifers. Adults are generally one to two inches in length.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

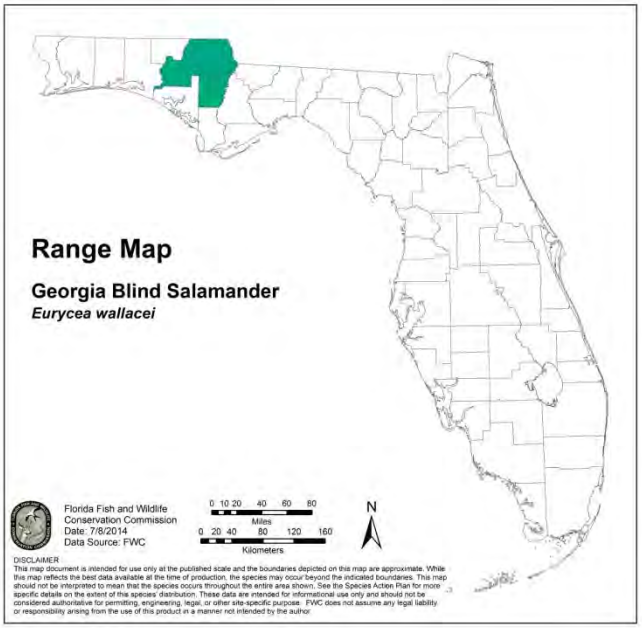
The conservation status of the Georgia blind salamander is improved to the point that the species is secure within its historical range in Florida.

Identified Threats

- Increased water pollution and other factors affecting water quality in the species' underground, aquatic habitat (such as fertilizers, pesticides, runoff, agricultural waste, septic tank effluent, and siltation)
- Changes in the water table due to groundwater withdrawal for agricultural and human use and decreases in precipitation caused by climate change or periodic drought
- Increased salinity associated with climate change and sea-level rise

Conservation Approach

- Determine specific habitat conditions (including water depth, temperature, dissolved oxygen content, turbidity, nutrient levels, and substrate composition) under which this species typically occurs to better evaluate its vulnerability to habitat degradation and how best to maintain or improve habitat quality.
- Maintain and enhance suitable habitat at a watershed level. Improving water quality and quantity, minimizing pollution, and restoring healthy watersheds will likely benefit this species.
- Promote education and outreach to inform law enforcement and the public, specifically cave recreationists.



Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species or parts of their nests or eggs, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Gopher Frog

Lithobates capito

Photograph by Kevin Enge, FWC.

The gopher frog is a relatively large frog, up to 4.5 inches in length. These frogs spend the majority of the year in uplands, where they inhabit underground burrows, often those created by gopher tortoises (*Gopherus polyphemus*).

Status

Removed from Florida's Endangered and Threatened Species List in 2016.

Conservation Goal

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

Identified Threats

- Habitat loss, fragmentation, and degradation of both xeric (dry) uplands and wetlands
- Fire suppression and altered fire regimes in uplands and wetlands
- Off-road vehicle use in pond basins
- May be affected by impacts to wetland and upland habitat from climate changes
- May be affected by impacts on breeding wetlands from groundwater withdrawals
- Fish introductions to breeding wetlands
- Disease

Conservation Approach

- Maintain and increase the amount of suitable habitat through increasing wetland and upland restoration efforts, managing for natural fire regimes in uplands and wetlands, and determining if public conservation lands provide adequate habitat for the long-term protection of this species.
- Fill information gaps for life history, threats, and potential conservation strategies.
- Initiate a population monitoring program for the species.
- Provide adequate protections to prevent overcollecting and commercialization.
- Encourage public understanding of and support for conservation of this species.

Current Protections

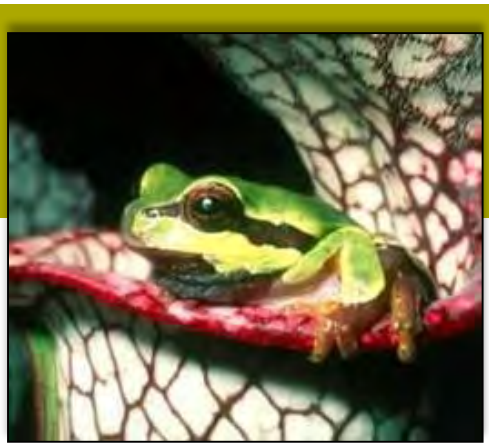
- Regulations Relating to the Taking of Amphibians, Rule 68A-26.02, F.A.C., excludes the gopher frog from allowable take of frogs.
- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife.

Resources

- Species Action Plan
- Biological Status Review Report

Pine Barrens Treefrog

Hyla andersonii



Photograph by Kevin Enge.

The Pine Barrens treefrog, approximately 1.5 inches in length, is primarily confined to acidic shrub and herb seepage bogs supporting herbaceous and woody plant species.

Status

Removed from Florida's Endangered and Threatened Species List in 2016.

Conservation Goal

The conservation status of the Pine Barrens treefrog remains the same or is improved so that it does not warrant listing on Florida's Endangered and Threatened Species List.

Identified Threats

- Loss and degradation of habitat through fire exclusion, destruction, or altered hydrology
- High desirability to pet collectors, potentially leading to unsustainable levels of take

Conservation Approach

- Maintain and increase habitat quality through use of prescribed fire, removal of nonnative vegetation, restoring hydrology, and offering technical assistance and incentives where appropriate.
- Monitor sites through seasonal call surveys and collaboration with partners, focusing on locations where this species has been documented.
- Provide protections necessary to conserve the species, including prevention of overcollection and commercialization.
- Promote education and outreach among stakeholder groups, including the public, local governments, and law enforcement.

Current Protections

- Regulations Relating to the Taking of Amphibians, Rule 68A-26.02, F.A.C., excludes the Pine Barrens treefrog from allowable take of frogs.
- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife.

Resources

- Species Action Plan
- Biological Status Review Report

Blackmouth Shiner

Notropis melanostomus

Photograph by D.G. Bass.

The blackmouth shiner is among the smallest minnows, with a maximum length of only 1.5 inches. It is recognizable by its sharply upturned mouth, large eyes, and dark midline. Known from only a few locations, this freshwater fish inhabits quiet backwaters and oxbow lakes with no measurable flow.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

Conservation status of the blackmouth shiner is improved to a point that the species can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Habitat loss and degradation resulting from changes in water quality and quantity, river impoundments, channel dredging, development, and point-source and nonpoint-source pollution.
- Susceptibility to single events (such as chemical spills) is exacerbated because of the species' very limited range.

Conservation Approach

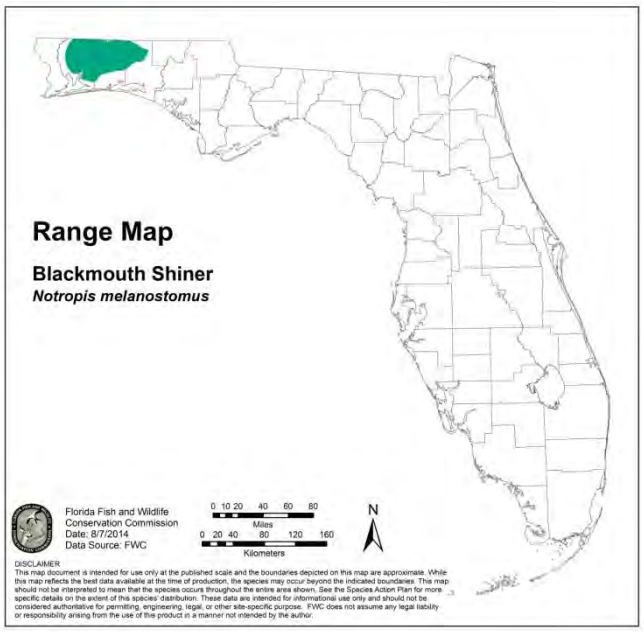
- Maintain or increase the population through maintaining or improving existing water quality and quantity, and habitat characteristics within priority subwatersheds.
- Maintain riparian habitat through adequate buffers.
- Increase understanding of species biology and habitat requirements through rangewide surveys, development of standardized monitoring protocol, and genetic testing.
- Coordinate conservation efforts with local government and promote education and outreach about the blackmouth shiner and its habitat.
- Evaluate agricultural and nonagricultural best management practices to determine effectiveness, and develop additional conservation measures and guidelines.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report



Bluenose Shiner

Pteronotropis welaka

Photograph by D.G. Bass.

The bluenose shiner grows to two inches in length, is olive-colored with a dark, lateral stripe bordered by a narrow, amber stripe, and a blue "nose," visible only on adult males.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

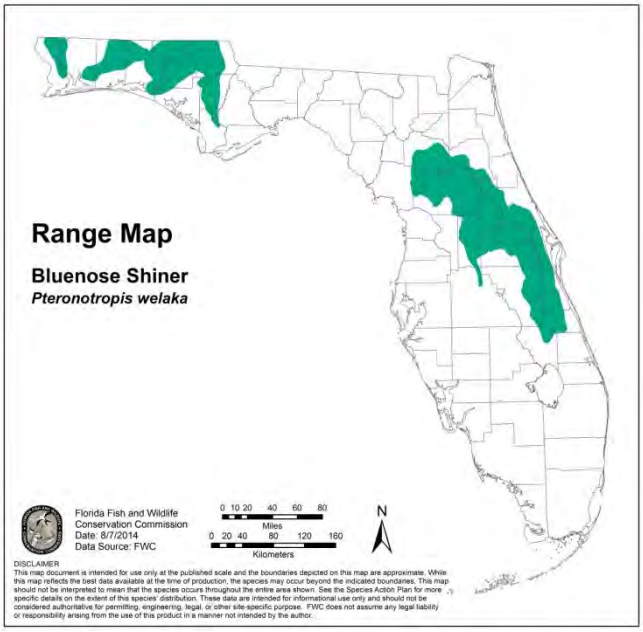
Conservation status of bluenose shiner is improved to a point that the species can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Habitat loss and degradation resulting from changes in water quality and quantity, river impoundments, channel dredging, development, and point-source and nonpoint-source pollution.
- Susceptibility to single events (such as chemical spills, sedimentation due to storm events) is exacerbated because of the species' very limited range.

Conservation Approach

- Maintain or increase the population through maintaining or improving existing water quality and quantity, and habitat characteristics within priority subwatersheds.
- Maintain riparian habitat through adequate buffers.
- Increase understanding of species biology and habitat requirements through rangewide surveys, development of standardized monitoring protocol, and genetic testing.
- Coordinate conservation efforts with local government and promote education and outreach about the bluenose shiner and its habitat.
- Evaluate agricultural and nonagricultural best management practices to determine effectiveness, and develop additional conservation measures and guidelines.



Current Protections

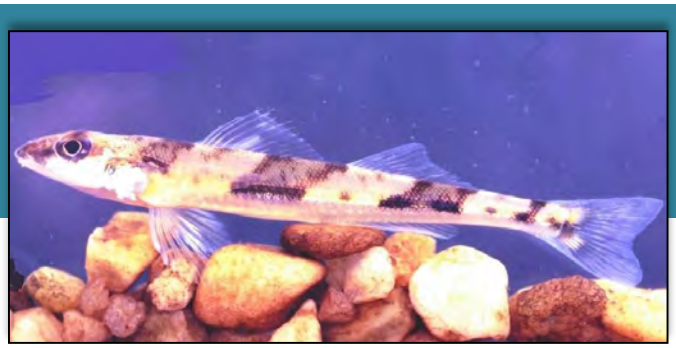
- No person shall take (including harm or harass), possess, or sell any Threatened species, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Crystal Darter

Crystallaria asprella



Photograph by D.G. Bass, FWC.

The crystal darter measures up to five inches in length and inhabits deep, swift raceways in large creeks and rivers. The species is mostly translucent, with four brown saddles over mottled coloration.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

The conservation status of the crystal darter is improved to the point that the species is secure within its historical range.

Identified Threats

- Vulnerability to habitat modification and destruction. Land-use practices that increase the sediment and nutrient loads of streambeds, alterations to the hydrologic regime, and changes to shoreline morphology are primary stressors impacting aquatic taxa.
- Fragmentation of habitat and populations may limit the genetic diversity of the species.
- Nonnative species, such as the flathead catfish *(Pylodictis olivaris)*, may impact crystal darter populations, though this threat requires further research.
- Susceptibility to single events (such as chemical spills, floods, or major hurricanes) is exacerbated because of the species' very limited range.

Conservation Approach

- Collect valid population information to support a thorough status review and development of adequate species protections.
- Compile existing knowledge on species distribution, habitat use, and known threats to inform management and minimize impacts to the species.
- Continue efforts to maintain or improve water quality and habitat quality in waterways where the crystal darter is known to occur.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Harlequin Darter

Etheostoma histrio

Photograph by Dr. Lawrence Page, Florida Museum of Natural History.

The harlequin darter is typically found in medium to large streams with variable currents and substrate type (e.g., rock, mud). The species is always associated with detritus, and feeds exclusively on larval insects.

Status

Removed from Florida's Endangered and Threatened Species List in 2018.

Conservation Goal

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

Identified Threats

- Habitat degradation reduction in water quality
- Habitat fragmentation resulting in loss of genetic fitness of the Florida population
- Physical loss of habitat resulting from dredging and excessive removal of large woody debris

Conservation Approach

- Maintain existing programs and inter-agency coordination to promote improvements in water quality, deadhead logging, and general fish population monitoring within the Escambia River watershed.

Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale, and possession of wildlife.

Resources

- Species Action Plan
- Biological Status Review Report
- Species Conservation Measures and Permitting Guidelines

Key Silverside

Menidia conchorum

Photograph by Dr. Mike Howell, Samford University.

Although this small silverside is known to tolerate a wide range of salinities, it is generally found in protected, saline lagoons and ponds with restricted tidal exchange. Mostly carnivorous, this species eats planktonic crustaceans and insects.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

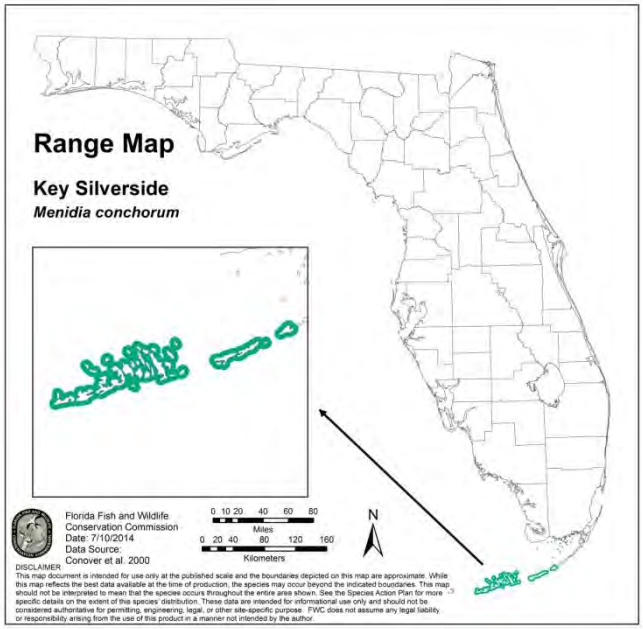
Conservation status of the Key silverside is improved to a point that the Key silverside can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Further reduction of naturally limited habitat, including loss of known sites that have been filled, destroyed, or altered by development, hurricanes, or flooding.
- Potentially incompatible management of nonnative and nuisance species, such as removal of Brazilian pepper *(Schinus terebinthifolius)* near lagoons and ponds and ditching for mosquito control, alter habitat and may reduce reproductive success rates for the Key silverside.
- Introduction of nonnative species, such as the bluegill *(Lepomis macrochirus)*, may also impact Key silverside populations at specific sites.
- Susceptibility to single events (such as chemical spills, floods, or major hurricanes) is exacerbated because of the species' very limited range.

Conservation Approach

- Determine the taxonomic status of the species to inform management and improve protections.
- Increase the known extent of occurrence through habitat management, surveys in potentially suitable habitat outside of the existing known range, and increased understanding of habitat requirements.
- Increase the number of known locations for the species through improvements to detection methods and monitoring protocols.
- Maintain semi-enclosed saltwater lagoon habitats for the Key silverside.



Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Lake Eustis Pupfish

Cyprinodon variegatus hubbsi

Photograph by D.G. Bass, FWC.

The Lake Eustis pupfish is a small (up to two inches), cryptic freshwater fish inhabiting eight lakes in central Florida. Considered a subspecies of the common and widespread sheepshead minnow (*Cyprinodon variegatus*), species of this genus are typically hardy and quite adaptable. While the species is found at fewer than 10 locations in Florida, populations appear to be stable.

Status

Removed from Florida's Endangered and Threatened Species List in 2016**.**

Conservation Goal

Conservation status of the Lake Eustis pupfish is maintained or improved so that the species will not again need to be listed on Florida's Endangered and Threatened Species List.

Identified Threats

- Declines in water quality and quantity that lead to habitat loss and degradation, can affect plant species diversity and abundance, which may impact microhabitat for the Lake Eustis pupfish.
- Nonnative, invasive aquatic plants, such as *Hydrilla verticillata*, can severely degrade habitat.
- Introduction of new predators into the ecosystems inhabited by this species.

Conservation Approach

- Develop an efficient and valid sampling program to document the distribution and abundance of the species to ultimately inform management.
- Determine habitat requirements and document important aquatic habitat to increase understanding of the species' needs and improve conservation efforts.
- Establish a mechanism for communicating important findings and existing knowledge to the public, aquatic resource managers, and other stakeholders.

Current Protections

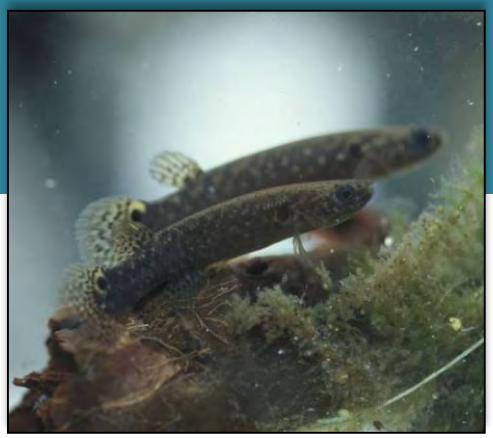
- The Lake Eustis pupfish receives the same protections as other small, nongame fish, as outlined in Rule 68A-1.004(46), F.A.C.; harvest methods are regulated under Rule 68A-23.003, F.A.C.

Resources

- Species Action Plan
- Biological Status Review Report

Mangrove Rivulus

Kryptolebias marmoratus



Photograph by Scott Taylor.

The mangrove rivulus is a small fish (up to 2.3 inches long) with a dark, cryptic coloration. This species inhabits mangrove forests and associated microhabitats, including crab burrows, logs, small pools, and solution pits. A synchronous, self-fertilizing species, individuals produce both eggs and sperm and fertilize internally; the offspring are thus genetically identical to the parent.

Status

Removed from Florida's Endangered and Threatened Species List in 2016.

Conservation Goal

Conservation status of the mangrove rivulus is maintained or improved so that the species will not again need to be listed on Florida's Endangered and Threatened Species List.

Identified Threats

- Destruction and degradation of mangrove habitat with which the species is strongly associated. Coastal development, hurricanes, sea-level rise and climate change, and water quantity and quality contribute to loss of suitable habitat.
- Mosquito control activities, such as impoundments and hydroperiod manipulation, may alter habitat and require further research.
- Harvest for research, due to the species unique ability to clone itself.

Conservation Approach

- Maintain diverse mangrove habitat through management and restoration; by improving understanding of specific habitat requirements of the mangrove rivulus; and through partnerships with land managers, government agencies, nongovernmental organizations, and developers.
- Create and implement conservation guidelines that will benefit this species and its habitat by avoiding the development of sensitive habitat and by minimizing overall impacts during development.
- Maintain or increase the population through determining current size and trend and understanding potential for repopulation of restored habitat.
- Provide adequate protections against overharvest.

Current Protections

- Collection is regulated through the Marine Special Activity License program, pursuant to Chapter 68B-8, F.A.C.

Resources

- Species Action Plan
- Biological Status Review Report

Saltmarsh Topminnow

Fundulus jenkinsi

Photograph of a male saltmarsh topminnow by Gretchen Grammer.

The saltmarsh topminnow typically measures between 1.4 and 1.8 inches in length, though some females may reach 2.4 inches. The species is distinguished by one or two rows of dark round spots along the midline of the body, from the pectoral fin to the base of the caudal fin. This species typically occurs in cordgrass (*Spartina* sp.) and needlerush (*Juncus* sp.) marshes, and shallow water with salinity less than 16 parts per thousand.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

Conservation status of the saltmarsh topminnow is improved to a point that the species can be removed from Florida's Endangered and Threatened Species List and will not again need to be listed.

Identified Threats

- Habitat loss and degradation resulting from changes in water quality and quantity, impoundments, channelization, dredging, ditching, development, and point-source and nonpoint-source pollution.
- Susceptibility to single events (such as chemical and oil spills, floods, or major hurricanes) is exacerbated because of the species' very limited range.

Conservation Approach

- Maintain or increase the population through maintaining or improving existing water quality and quantity, and habitat characteristics within priority subwatersheds.
- Increase understanding of species biology and habitat requirements through rangewide surveys, development of standardized monitoring protocol, and genetic testing.
- Coordinate conservation efforts with local government and develop additional conservation measures and guidelines.
- Continue to assess potential threats and implement conservation strategies to minimize or eliminate the threats.

Current Protections

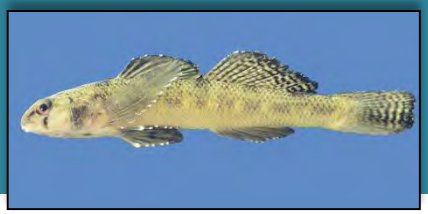
- No person shall take (including harm or harass), possess, or sell any Threatened species, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Southern Tessellated Darter

Etheostoma olmstedi maculaticeps



Photograph by D.G. Bass, FWC.

The southern tessellated darter is typically tan or light brown, with a series of X- or W-shaped markings along its side. In Florida, this species is known only from five locations within the Ocklawaha River Basin; the next nearest population is over 120 miles away in Georgia's Altamaha River Basin.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

Conservation status of the southern tessellated darter is improved to the point that the species is secure within its historical range.

Identified Threats

- Habitat alteration
- Population fragmentation
- Reduced water flows
- Predation by, competition with, or hybridization with introduced species

Conservation Approach

- Pursue additional species information, such as abundance, locations occupied, and habitat preferences.
- Protect known locations and habitats from natural and human-related disturbances.
- Coordinate with regulatory agencies and landowners to improve habitat and protect known populations.

Current Protections

No person shall take (including harm or harass), possess, or sell any Threatened species, as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Black Creek Crayfish

Procambarus pictus

Photograph © Barry Mansell.

The Black Creek crayfish is generally three inches in length. Endemic to northeastern Florida, it inhabits relatively cool, swift, and sand-bottomed streams. Its rusty coloration and speckled pattern allow the species to camouflage during the day among stream bottom detritus, tree roots, and vegetation.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

The conservation status of the Black Creek crayfish is improved to a point that the species can be removed from Florida's Endangered and Threatened Species List and will not need to be listed again.

Identified Threats

- Threats to the high-quality stream habitat this species inhabits, including pollution, changes to water temperature or oxygen content, siltation, damming, and other water quality or quantity changes.
- Improperly controlled effluent from mining sites.
- Road crossings and bridge work (construction or repair) may cause siltation and result in higher levels of water pollution at the site.
- Disease, including apparent fungal infection, though more information is needed to assess this potential threat.
- Increasing urbanization of the area occupied by the Black Creek crayfish may lead to changes in water and habitat quality.

Conservation Approach

- Identify and minimize threats to this species through coordination with landowners and land managers to protect, monitor, and enhance habitat quality at known sites.
- Create and disseminate stream-centered habitat management recommendations to reduce threats, safeguard crayfish, and protect riparian corridors.
- Locate and protect populations outside the Black Creek watershed through continued surveys and efforts to reduce species vulnerability.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Florida Tree Snail

Liguus fasciatus

Photograph by Randy Grau, FWC.

The Florida tree snail has 58 documented color forms. Its conical shell typically measures between 1.5 and 2.5 inches in length. This species is found in tropical hardwood hammock communities of south Florida.

Status

Removed from Florida's Endangered and Threatened Species List in 2016.

Conservation Goal

Conservation status of Florida tree snail is maintained or improved so that the species will not again need to be listed on Florida's Endangered and Threatened Species List.

Identified Threats

- Habitat loss due to loss of hardwood hammocks in the Upper Keys.
- Habitat alteration and disturbance, including removal of humus, tree cutting, and alterations that affect the amount of sunlight penetrating the hammock may make the microclimate within a hammock unsuitable for the Florida tree snail.
- Red imported fire ants *(Solenopsis invicta)* are considered a significant threat because they can predate the Florida tree snail at all life stages and have contributed to the local extinction of another tree snail species.
- Impacts to population and habitat caused by other nonnative species.
- Mosquito control pesticides, which are linked to population declines.

Conservation Approach

- Through inventory and mapping, increase understanding of and inform management for the preservation of color morph diversity.
- Maintain or increase habitat quantity or quality through fee simple or less-than-fee simple acquisition and habitat restoration.
- Improve protections to safeguard the Florida tree snail from take and possession without a permit.

Current Protections

- General Prohibitions and Requirements, Rule 68A-4.001, F.A.C., prohibits the take, transport, sale and possession of wildlife.

Resources

- Species Action Plan
- Biological Status Review Report

Santa Fe Cave Crayfish

Procambarus erythrops

Photograph © Barry Mansell.

The Santa Fe cave crayfish is generally 3.5 inches in length. The species has an unpigmented body, with the exception of a reddish to brown spot on the eyes. As its name implies, this crayfish inhabits subterranean aquatic caves, feeding on any available organic matter.

Status

Listed as state Threatened on Florida's Endangered and Threatened Species List.

Conservation Goal

The conservation status of the Santa Fe cave crayfish is improved to the point that the species is secure within its historical range.

Identified Threats

- Degradation of the aquifer and karst features through exposure to land-borne threats (e.g., water pollution, groundwater withdrawal).
- Limestone mining and waste dumping at or near caves, sinkholes, or other features that link to the subterranean ecosystems inhabited by this species.
- Flooding, which causes flushing of contaminants, may impact subterranean water quality and has been associated with die-offs of a related crayfish species.
- Climate change, which may increase the salinity of the aquifer or lengthen periods of drought, affecting subterranean ecosystems.

Conservation Approach

- Maintain and increase habitat quality at occupied sites through coordination with landowners and managers and ongoing monitoring.
- Identify threats and address them.
- Map the aquifer and determine connectedness of known occupied sites.
- Document and protect additional occupied sites.
- Coordinate with regulators of resource extraction to ensure that this species is considered in planning for future activities.

Current Protections

- No person shall take (including harm or harass), possess, or sell any Threatened species as outlined in Chapter 68A-27, F.A.C., Rules Relating to Endangered or Threatened Species.

Resources

- Species Action Plan
- Biological Status Review Report

Integrated Conservation Strategies

While Species Action Plans identify threats and outline prioritized conservation needs for individual species or groups of species, integrated conservation strategies take a more complete and comprehensive approach and focus on higher-level strategies and integrated actions that benefit multiple species and their habitats. The ICSs will facilitate implementation of key actions outlined in the SAPs while considering emerging issues and potential conflicts. This effort will help focus implementation on areas and issues that will yield the greatest level of conservation for the greatest number of species. The strategies present the current agency approach to increasing collaboration with key partners and stakeholders while minimizing duplication of efforts on issues that impact the species included in this plan. They also describe integration of species needs, habitat needs, staff time, effort, and resources.

Development of the ICSs began with an analysis of the SAPs. Staff, assembled from a variety of FWC sections and divisions, worked in teams on five topics: Research and Monitoring, Habitat Conservation and Management, Incentives and Influencing, Law and Policy, and Education and Outreach. Each team worked to identify high-level issues that influence multiple species. Teams then developed 14 strategies and 72 actions that address the needs of multiple species. Each ICS team identified the SAPs and applicable SAP action number relevant to the integrated conservation strategy and integrated action they developed (see Table 6). The strategies and actions are not in priority order, but represent an effort to discern the actions that will have the most benefit for the highest number of species. The priority of any given action and the Division or Section best suited to implement those actions is outlined in the Implementation section. In most cases, the integrated conservation strategies and integrated actions are applicable to more than just imperiled species, and could benefit many beyond the 57 currently included in Florida's Imperiled Species Management Plan. Not all SAP actions are covered under the integrated conservation strategies because some species face very specific threats and have individual needs that should be addressed.

By implementing the strategies that emerged from this process, the conservation efforts of staff, partners, and stakeholders can be more efficient and effective. These integrated strategies and actions, in combination with prioritized actions identified in the SAPs for individual species, will, over the next 10 years, guide implementation of Florida's Imperiled Species Management Plan.

Prioritization of the key strategies and actions, described in the Implementation section, will be balanced with individual species' needs and priorities. Staff will use these strategies and the associated SAP actions to prioritize regional and statewide efforts. Progress monitoring will be essential during implementation to ensure that approaches to conservation are adapted to account for emerging issues or unanticipated results. Implementing Florida's Imperiled Species Management Plan will require collaboration and coordination across the agency and with our partners and stakeholders.

The integrated conservation strategies are listed by category. Each strategy, and the actions that, when implemented, support progress toward meeting the ISMP goal, is explained in further detail in this chapter.

Research and Monitoring

- ICS 1: Acquire the information necessary to fill critical data gaps that prevent or inhibit the conservation of imperiled species (i.e., increase our knowledge and understanding).
- ICS 2: Conduct surveys and monitor status and trends of imperiled species to determine whether conservation actions are improving current status.
- ICS 3: Survey and monitor habitats occupied by imperiled species to assess habitat quality, evaluate the effectiveness of habitat management actions, and determine how these habitats respond to environmental change.
- ICS 4: Identify, monitor, and respond to threats that may have significant negative impacts on the status of Florida's imperiled species.

Habitat Conservation and Management

- ICS 5: Conduct and support terrestrial and aquatic habitat management practices that increase enhancement and restoration to support self-sustaining populations of diverse and imperiled species.
- ICS 6: Protect sufficient habitat long-term to support imperiled species recovery.
- ICS 7: Direct habitat management to reduce threats in order to sustain important populations of imperiled species.

Incentives and Influencing

- ICS 8: Conserve and manage imperiled species and their habitats on public and private lands by balancing regulations, voluntary stewardship, and use of economic and regulatory incentives.
- ICS 9: Promote the conservation and management of imperiled species and their habitats on private and public lands by providing technical assistance, guidance, and recommendations to local, state, and federal governments; planners; and decision makers.

Law and Policy

- ICS 10: Improve collaboration between FWC and other state, federal, and local permitting and enforcement agencies to address negative impacts to imperiled species and habitats that support essential behaviors.

Education and Outreach

- ICS 11: In collaboration with conservation partners, educate and communicate with key target audiences about the value of prescribed fire and related habitat management for imperiled species.
- ICS 12: Communicate with target audiences that live, work, and recreate in transition zones where water and land connect about the value of these areas and what they can do to conserve the fish and wildlife that live in these habitats.
- ICS 13: Promote coexistence with imperiled species and engage key target audiences in conservation stewardship.

Logistical Support and Infrastructure

- ICS 14: Expand agency and partner infrastructure and capacity to efficiently conserve imperiled species populations and their habitats.

Figure 3. Integrated conservation strategies (ICSs). Organized into six categories, each strategy and its supporting actions will support progress towards achieving Florida's Imperiled Species Management Plan goal.

Research and monitoring

Integrated Conservation Strategy 1

Acquire the information necessary to fill critical data gaps that prevent or inhibit the conservation of imperiled species (i.e., increase our knowledge and understanding).

Data gaps (i.e., information needs) are a significant challenge to implementing conservation efforts (FWC 2012), and they exist for many species. These information gaps include issues such as determining life-history traits, taxonomic validity of a species or subspecies, and habitat requirements and management needs. By addressing these information needs, FWC can effectively set population objectives, establish appropriate survey and monitoring protocols, address threats, implement effective management techniques, and measure the success of conservation efforts (in particular, reassessing the listing status of the species). The Species Action Plans identify a wide range of data gaps for each of Florida's imperiled species and, due to the diversity and scattered distribution of these species across the landscape, methods to fill those gaps will likely vary.

Integrated actions

1.1 Conduct genetic studies to determine taxonomic validity, metapopulation dynamics, and phylogeography of imperiled species.

Rationale

Genetic studies are a feasible and cost-effective tool that can answer a wide variety of questions in the field of wildlife conservation and management. Over half of the Species Actions Plans identify genetic studies as high-priority conservation actions. While it is not necessary for all species, it is an important component of filling data gaps.

In some cases, FWC biologists have the expertise and infrastructure to collect, process, and analyze genetic material, but not always. By expanding the infrastructure and expertise within FWC to process and analyze genetic material, the agency can reduce the cost of conducting genetic studies called for in the SAPs.

1.2 Conduct demographic and life-history studies to obtain information required for establishing population objectives, implementing habitat and/or population management, and developing monitoring programs where needed (see ICS 2).

Rationale

Demographic and life-history studies fill data gaps on population size, structure, and fluctuation (e.g., natality, mortality, migration), as well as diet, habitat characteristics, metapopulation dynamics, and more. Acquiring information on demography and life history will allow FWC and its partners to determine the most effective ways to measure management success as well as identify population changes (see Integrated Action 2.1) and threats (see ICS 4) and effectively target management actions to address those threats.

During the Biological Status Reviews conducted by FWC in 2010, multiple species lacked scientifically defensible information on population size and trend, area of occupancy, and extent of occurrence. Obtaining this information would enable FWC to reevaluate the listing status of species remaining on Florida's Endangered and Threatened Species List due to a lack of sufficient data (see Integrated Action 1.4).

1.3 Identify the minimal and optimal habitat requirements of imperiled species.

Rationale

With the success of many Species Action Plans relying on the conservation of habitat, it is important that the habitat requirements of each imperiled species are thoroughly understood. A better understanding of the relationship between habitat management actions and demography is also needed. Many of the SAPs identify knowledge of habitat requirements as either lacking or incomplete. When the habitat requirements of a species are known, FWC and its partners can more effectively manage the habitat and overcome the threat(s) that triggered the need for listing (see Integrated Action 5.1).

1.4 Using information identified in other conservation strategies and integrated actions, conduct coordinated species assessments of imperiled species.

Rationale

The Millsap Biological Score (Millsap et al. 1990), IUCN criteria (IUCN 2001), and NatureServe (2002) global and state rankings are three tools used in various prioritization processes within FWC to help identify species most in need of immediate research and management action. The state listing process relies on Millsap and IUCN criteria, in particular. Reassessing species status every five years will require updating the Millsap and IUCN scores through a comprehensive literature review for state-listed and delisted species. This should be a coordinated effort, including internal and external partners (e.g., Florida's Natural Areas Inventory [FNAI], the entity responsible for maintaining Florida's NatureServe rankings) with species-specific expertise.

Integrated Conservation Strategy 2

Conduct surveys and monitor status and trends of imperiled species to determine whether conservation actions are improving current status.

Using data needs referenced in ICS 1, this strategy explains how FWC plans to incorporate population trends and species assessments to determine the impacts of management on imperiled wildlife. Species monitoring is recognized in Florida's State Wildlife Action Plan as integral to, and a required element of, wildlife conservation in Florida. To measure the effectiveness of imperiled species conservation efforts and determine whether or when a species can be removed from the imperiled species list (or needs to be relisted), it is necessary to monitor population size, population trend, area of occupancy, and/or extent of occurrence (criteria measured in Florida's imperiled species listing process). Monitoring needs and approaches will vary among species; direct population monitoring is possible and recommended for some species, while for others (e.g., cryptic or fossorial species) alternative approaches, such as habitat monitoring or occupancy modeling, may be needed. The current status of monitoring effort varies widely among the species in the ISMP.

Integrated actions

2.1 Develop and implement a comprehensive survey and monitoring program that encompasses all imperiled species for which it is needed.

Rationale

A comprehensive survey and monitoring program is needed to track the status of imperiled species and to measure the effectiveness of implementing management actions identified in this plan. As part of operational planning for implementation of the ISMP, managers, researchers, and partners should meet annually (or as appropriate) to reprioritize species monitoring needs and determine which monitoring programs to implement, developing a roadmap or operational plan to guide the process. This plan should list the species with and without protocols, and include schedules for both protocol development and

monitoring. Examples of ongoing surveying and monitoring efforts that should be incorporated into this plan include FWC's Wildlife Conservation, Prioritization, and Recovery program and the Florida Shorebird Database.

2.2 Coordinate all known imperiled species monitoring efforts to achieve maximum monitoring efficiency.

Rationale

In part, FWC will rely on survey and monitoring data collected by outside entities. Staff from FWC will identify existing and planned monitoring efforts relevant to imperiled species such as scientific collecting permits and bird banding permits, standardize monitoring protocols as much as possible, share re-sources, and share data. Successful models for this approach include the Florida Shorebird Database and the Seagrass Integrated Mapping and Monitoring Program.

2.3 Develop and distribute standardized survey protocols (that allow for the detection of trends) in a format that can be used by private landowners, developers, consultants, local and state government agencies, and academic institutions.

Rationale

Straightforward, standardized survey protocols will facilitate data collection and compilation and will contribute to our knowledge of species range and habitat occurrence. Survey protocols have already been developed for some of Florida's imperiled species, such as the Florida mouse and the southeastern American kestrel. Standard survey protocols ensure that data collection methods are consistent and that data from different partners are comparable. Within FWC, this effort has been recently expanded under the WCPR program, so that standard protocols are used for species surveys on wildlife management areas. This effort can be expanded to include species currently without survey protocols and to other public lands.

2.4 Develop mechanisms by which species sightings can be reported by the public and FWC's conservation partners in order to enhance the collection of occurrence data, particularly for rare species.

Rationale

A handful of websites and smartphone applications developed by FWC are already being used by the public, FWC biologists, and other conservation partners to capture occurrence information on both high-profile and rare species (see Become a Fish and Wildlife Citizen Scientist - Sightings). For easily recognizable species, this is a cost-effective method that contributes to our knowledge of area of occupancy and habitat use. In an effort to ensure that data collection is reliable, mechanisms to check for accuracy should be developed where feasible. This action is also related to Integrated Action 13.2.

2.5 Develop new, and continue ongoing, citizen science projects that will assist in the overall efforts to survey and monitor imperiled species.

Rationale

Citizen science projects make important contributions to the conservation of some imperiled species. Two current examples of successful citizen science programs are the nesting shorebird and nesting sea turtle programs (see Become a Fish and Wildlife Citizen Scientist - Survey). These programs have not only significantly improved our knowledge of these species (including identification of important nesting sites and habitat use), but also built public support and commitment to their protection. This action is also related to Integrated Action 13.3.

Integrated Conservation Strategy 3

Survey and monitor habitats occupied by imperiled species to assess habitat quality, evaluate the effectiveness of habitat management actions, and determine how these habitats respond to environmental change.

In order to improve the status of imperiled species through habitat acquisition and/or management activities, land managers need a thorough understanding of their distributions, habitat requirements, and management needs (see ICS 1 and ICS 2). While FWC does not have regulatory jurisdiction over many of the habitats that these species depend upon, gathering information from other agencies or groups about these habitats reduces duplication of effort. This information can be established to ensure that Florida's habitats are meeting the needs of imperiled species.

Staff from FWC has noted a need to develop coordinated, statewide habitat monitoring programs that will identify imperiled species habitat in need of management, as well as allow for evaluation of the condition of the habitat and effectiveness of management activities within those habitats. Creation of these programs requires participation by a variety of public and private partners and leveraging existing relationships and resources. Partners should include federal, state, and local agencies, as well as conservation organizations, universities, landowners, private consultants and contractors, and citizen scientists. Significant coordination and commitment from our partnering agencies are needed to adopt and implement standardized monitoring protocols. Existing programs can be a useful foundation for building a habitat monitoring program that could provide useful information on the condition of Florida's habitats. Such information is collected on FWC's lead man-agement areas through the Objective-Based Vegetation Management program. Florida's Wildlife Legacy Initi-ative and its partners compile data on habitat condition (or health) for a variety of terrestrial, freshwater, and marine habitats statewide, and report this information in the Statewide Habitat Reporting System. Many public and private agencies and organizations track the extent and condition of specific habitat types or areas; part-nerships and data sharing will reduce redundancy and maximize efficiency.

Integrated actions

3.1 Develop and implement standardized protocols that will make it possible to evaluate and monitor habitat conditions and the effectiveness of water- and land-management activities within imperiled species habitats, especially in the face of environmental stressors and change.

Rationale

Standardized monitoring protocols that are based on objective habitat measures should be developed and implemented to determine whether or not management activities are producing the habitat conditions (Integrated Action 1.3) necessary to achieve conservation goals for specific species or suites of species. Many conservation entities, along with FWC, often track the extent and condition of similar habitat types on their properties, making it important to develop standardized protocols in a coordinated fashion and build off of methods currently in use. In order to standardize protocols, land managers need to be surveyed to develop a comprehensive list of existing habitat monitoring efforts. That information would then be used to design a habitat monitoring approach that uses existing monitoring efforts and identifies where new efforts are required. Examples of programs that have brought together partners with the goal of building a standardized, statewide habitat monitoring program include the Seagrass Integrated Mapping and Monitoring program and the Coastal Habitat Integrated Mapping and Monitoring Program.

3.2

Maximize habitat monitoring coverage and effort by training FWC staff, partners, and private consultants to conduct sampling using the standardized protocols developed in Integrated Action 3.1.

Rationale

Central to the success of ICS 3 is coordination of habitat monitoring efforts with other entities. This includes entities currently conducting monitoring and those not currently monitoring imperiled species habitats. Joint or coordinated collection efforts can maximize data collection with limited resources, thereby creating efficiencies. Through coordination with partners, FWC staff may be able to determine important areas that lack adequate survey and monitoring activities. These areas can be incorporated into FWC's survey and monitoring programs or those of FWC's partners. Once coordination is in place, a new economic incentive program could be developed to encourage private landowners to participate in monitoring efforts (Integrated Action 8.2).

3.3 Develop a statewide spatial database for storing habitat monitoring data.

Rationale

Information necessary to build a spatial database includes land use/land cover data (e.g., FNAI, water management districts) and species presence/absence data with the associated environmental measures (e.g., canopy cover, water depth). Data would be identified and inventoried based on products developed using mapping techniques within a geographic information system (GIS) (e.g., static maps of conservation areas, likelihood maps of species distribution boundaries, habitat delineations). This compilation of data in a spatial format is a key step in implementing this plan. Examples to build from include these FWC databases: Marine Resources Geographic Information System, Terrestrial Resources Geographic Information System, and Land Management Information Systems.

3.4 Using the database outlined in Integrated Action 3.3, model and map potentially suitable habitat, and current availability, for each imperiled species, identifying important areas for habitat management and/or protection. Once maps are generated, conduct site visits at a percentage of the sites to determine model accuracy and success at categorizing habitat conditions.

Rationale

Mapping species distribution and habitat data will allow FWC and its partners to develop habitat models that predict the relative likelihood of a species occurring in other places. It also allows for tracking conservation status, identifying where to conduct species surveys and habitat monitoring, and helping to identify where to apply various conservation actions (See Integrated Action 5.1 and Integrated Action 6.1). Including information about historic distributions that are no longer intact can lead to the identification of what threats resulted in the habitat change.

The 1994 effort that resulted in *Closing the Gaps in Florida's Wildlife Habitat Conservation System* (Cox et al. 1994) identified high-priority areas in need of conservation and protection. It would be beneficial to build on this effort and incorporate the identification of areas in need of management activities. Another spatially explicit effort to capture species status was recently developed by Georgia's Department of Natural Resources. Conservation Status Assessment Maps for high-priority species were generated using occurrence data and survey methods that have helped Georgia identify range size, survey needs, and high-priority areas for conservation and management action. If implemented, such a method would be useful in meeting Integrated Action 1.4.

Integrated Conservation Strategy 4

Identify, monitor, and respond to threats that may have significant negative impacts on the status of Florida's imperiled species.

Some of the most influential forces affecting imperiled species distributions originate from human-influenced external stressors. These can stem from global sources that influence local conditions or from sources more local in origin. For example, climate change at the global scale is predicted to influence hydrology at local scales on the Florida peninsula, directly affecting species that require specific hydrological conditions. Conversely, pesticide runoff may directly influence only those species with direct exposure. Regardless of the origin, external stressors undoubtedly influence a species' physiology, fitness, and distribution and can have a dramatic effect on the resilience of populations.

Despite the influence of these stressors on Florida's plant and animal communities, little is known about how they regulate populations and affect resilience. Managing agencies and partners must be equipped with the best science and tools available to identify the critical areas and corresponding conservation actions that will increase the resilience of populations and provide the highest probability that they will be restored to conditions that ensure their long-term persistence.

Integrated actions

4.1 Develop new models, and integrate existing ones, that predict land-use patterns under different social, political, and economic scenarios to identify potential areas of conflict between land use and imperiled species distributions.

Rationale

Many imperiled species rely on habitats that are also suitable for human uses. To ensure successful conservation of imperiled species and simultaneously plan for Florida's growing human population, predicting the location and intensity of land-use change is necessary. These predictions will help guide selection of conservation lands needed to preserve parcel size and connectivity required by imperiled species, while reducing potential for conflict with human development. The FWC participates in other state and federal regulatory programs as a review agency. During review, FWC identifies and recommends measures to address fish and wildlife resources to be incorporated into the regulatory processes of other agencies. For example, FWC staff, in coordination with other state agencies, provides comments to federal agencies (e.g., U.S. Army Corps of Engineers) on federal actions, such as projects initiated by a federal agency or permits being approved by a federal agency.

Staff from FWC also coordinates with state agencies such as the Florida Department of Environmental Protection and the five water management districts on the Environmental Resource Permit program, which regulates activities such as dredging and filling in wetlands, flood protection, stormwater management, site grading, dam and reservoir construction, waste facilities, power plant development, power and natural gas transmission projects, oil and natural gas drilling projects, port facility expansion projects, some navigational dredging projects, some docking facilities, and single-family developments such as for homes, boat ramps, and artificial reefs.

4.2 Anticipate and measure selected parameters (specific to a species or habitat) to detect the effects of climate change on imperiled species.

Rationale

Climate change is rapidly developing as a driving force that can exert tremendous influence on individuals and populations. Climate change stressors can include, but are not limited to, predicted changes in rainfall (increase in northern Florida and increase or decrease in the south), increase in temperatures, and sea-level rise. In response to these and other climate change stressors, many plant and animal species are expected to shift their ranges, shift their seasonal activities, or experience altered abundances

(Intergovernmental Panel on Climate Change 2014). Research is currently needed to identify and measure the appropriate parameters to detect the effect of climate change on species and their habitats. For example, measuring the plant structure of a coastal community, particularly focusing on recruitment and survival shifts, could assist with the detection of soil salinity changes due to more frequent inundation. In an effort to better adapt to impacts from climate change stressors, FWC is currently drafting the Florida Adaptation Guide, which will enable FWC and other natural resource management agencies and groups to better address projected impacts of climate change on wildlife and fish species and their habitats. The guide will also provide example adaptation strategies that can be integrated into various programs and planning processes.

4.3 Track water quality and quantity (e.g., minimum flows and levels, water temperature, pH, turbidity, dissolved oxygen, and nutrients) in waters important to imperiled species.

Rationale

Many imperiled species rely on waters that are influenced by human activities. It is necessary to determine which water-quality and -quantity parameters are critical to certain species so that the most important needs are met and to allow prioritization of monitoring efforts. Monitoring key watersheds or collaborating to have access to this type of information can help to ensure that water resources are sufficient to support those species while reducing the likelihood of conflict with human use of water. Information about all water-resource monitoring activities in Florida can be found in the Florida Water Resource Monitoring Catalog (Water-CAT). Water-CAT is a searchable online database sponsored by DEP and the U.S. Environmental Protection Agency. Using Integrated Action 9.5, FWC will engage with coordinating entities regarding water quality and quantity concerns for imperiled species.

4.4 Develop methods to monitor contaminant and disease exposure for imperiled species to minimize and mitigate impacts.

Rationale

Contaminants and diseases have long been implicated in the health of populations and ecosystems. Some of the earliest work identifying the negative effects of the pesticide DDT on organismal health was conducted on the Lake Apopka alligator *(Alligator mississippiensis)* population in the early 1980s. Since then, a number of studies have examined both the acute and chronic effects of toxins on Florida's animals and plants. Similarly, disease has shaped species distributions, and the field of emerging pathogens is rapidly evolving.

4.5 Identify and monitor impacts of nonnative species on fish and wildlife and their habitats.

Rationale

Florida has a long history of accommodating a wide range of nonnative, invasive species. Many were transported to Florida and released intentionally (e.g., *Melaleuca quinquenervia*) and others were released accidentally (e.g., Cuban treefrogs [*Osteopilus septentrionalis*]). The influence of nonnative species on Florida's indigenous plant and animal species is undisputed; entire ecosystems are changing and native species are under increasing pressures. The information collected from this action could be used to inform appropriate management techniques and implement Integrated Action 5.5.

Habitat conservation and management

Integrated Conservation Strategy 5

Conduct and support terrestrial and aquatic habitat management practices that increase enhancement and restoration to support self-sustaining populations of diverse and imperiled species.

Many of the Species Action Plans identify habitat restoration and enhancement as critical to the recovery of imperiled species. Restoration is defined not only as reestablishment of native habitat and ecological functions after disturbance, but also as enhancement (improving habitat features) and rehabilitation (accelerating natural recovery of habitat after disturbance). A crucial element for habitat restoration and enhancement is a well-organized framework for research, monitoring, and evaluation. This analysis of information helps to identify the most effective types of restoration, improves cost effectiveness, and improves models that guide managers as they decide on future habitat improvement projects and maintenance after restoration. This framework is also vital to adaptive management, which capitalizes on the latest science and research to inform management decisions and, ultimately, improve the effectiveness of actions on behalf of imperiled species.

Integrated actions

5.1 Apply known species' habitat requirements to identify areas where appropriate protection, management, and/or restoration actions are needed.

Rationale

Focusing the limited resources available toward priority conservation efforts is crucial to effective management of imperiled species. By directly targeting imperiled species habitats that support essential behavioral patterns (breeding, feeding, and sheltering), agency and partner resources can be used more efficiently to achieve population goals. Examples of management efforts that target specific, known imperiled species habitats can be found in existing FWC and partner efforts such as the Coastal Wildlife Conservation Initiative, Florida's Cooperative Conservation Blueprint, Florida Beaches Habitat Conservation Plan, and Peninsular Florida Landscape Conservation Cooperative. These efforts focus on habitats that support the essential behavioral patterns of imperiled species, including breeding, feeding, and sheltering.

5.2 Implement land- and water-management practices that maintain or improve existing or potential habitat structure and function, including adaptation to both direct and indirect effects of climate change, through conservation, restoration, and/or enhancement.

Rationale

Working with partners who manage large areas of land to conserve imperiled species habitat is essential to reaching and maintaining population goals. The FWC's role is to provide recommendations and identify specific practices that will benefit species while helping agency partners achieve their habitat management goals. Partnering with public and private landowners to implement compatible land-use practices will enhance capacity toward achieving stable populations and, in some cases, species recovery. Examples of programs that partner with large landowners include the Landowner Assistance Program, State Wildlife Action Plan, and Florida Invasive Species Partnership and Cooperative Invasive Species Management Areas. State Wildlife Grants have supported fire strike teams that help partners increase the use of prescribed fire to benefit imperiled species. Examples of other ongoing coordination include FWC's participation in developing the USFWS-NRCS federal Consultation Matrix.

5.3 Promote stable metapopulations by managing suitable habitat and reducing fragmentation through aquatic and terrestrial habitat restoration and enhancement.

Rationale

Aquatic and terrestrial habitat restoration and enhancement have long been demonstrated to improve and stabilize populations of imperiled species. Restoration focused on habitats essential to survival of these species, and directed in Species Focal Areas, will assist in securing populations and providing necessary habitat connectivity throughout their ranges. Given potential climate-related changes, habitat restoration and long-term management should encourage natural colonization of unoccupied habitats and include areas that provide connectivity and long-term stability. Once restoration is completed, appropriate long-term management is necessary. Many habitat management plans for public lands, such as those for Florida aquatic preserves, wildlife management areas, water management district lands, and military base lands provide specific, targeted restoration projects and goals that support imperiled spe-cies. Staff from FWC who review and comment on these types of plans will work to ensure that imperiled species are identified and appropriate guidance to achieve species conservation is provided to managers.

5.4 Restore or enhance coastal, riparian, and streamside habitats to improve or maintain watershed processes that benefit shoreline characteristics and functions important to fish and wildlife.

Rationale

Many imperiled species depend on intact coastal, riparian, and streamside habitat to facilitate movement and support essential feeding and breeding behaviors. Restoration of these areas will increase resilience to sea-level rise, changes in precipitation, and increasing storm activity. This action relates to ICS 12, which promotes the adoption of practices to protect riparian, intertidal, and estuarine zones.

5.5 Implement habitat management techniques that will minimize adverse impacts of nonnative animal or plant populations on imperiled species.

5.6 Use techniques, such as integrated pest management, to minimize habitat degradation from invasive plant species through suppression and control, and strategically coordinate with partners to maximize efficacy.

Rationale for Actions 5.5 and 5.6

Nonnative species, both animal and plant, can alter habitats to the detriment of native communities that support imperiled species. Identifying and using habitat management techniques that reduce the adverse effects of uncontrolled population growth of nonnative species is essential to imperiled species conservation efforts. An example of this can be found with nonnative lionfish (*Pterois volitans*) in Florida waters. Lionfish are generalist predators that can dramatically reduce the population of native reef fish on coral reef systems. Some of the species that lionfish eat include juvenile marine herbivores (e.g., parrotfish [*Scarus* spp.]) that keep algae from overgrowing and competing with reef-building corals. By restoring certain reef coral communities, such as elkhorn (*Acropora palmate*) and staghorn (*A. cervicornis*), coral diversity is improved, allowing reef-building corals to be more resilient to the adverse effects of lionfish predation. Examples of ongoing efforts to address nonnative species through habitat manage-ment include FWC Invasive Plant Management and Florida Invasive Species Partnership and Cooperative Invasive Species Management Areas.

Integrated Conservation Strategy 6

Protect sufficient habitat long-term to support imperiled species recovery.

Species Action Plans identify the need to secure habitat critical to species recovery, either through fee-simple acquisitions, less-than-fee-simple acquisitions, or conservation easements. They also recognize the need to establish and prioritize acquisitions that provide the greatest long-term conservation for the species identified. Land acquisition alone is not likely to reduce the immediate critical threats to many imperiled species, but it is beneficial to the long-term survival of species.

Spearheaded by FWC, Florida's Cooperative Conservation Blueprint has brought together landowners, businesses, and governmental and conservation organizations to build consensus on voluntary, nonregulatory conservation incentives such as payment for the ecosystems services program (with assistance from the Gopher Tortoise Conservation Program and Landowner Assistance Program). The CCB advances elements of Florida's State Wildlife Action Plan and builds on the Critical Lands and Waters Identification Project, which uses a GIS to identify Florida's critical environmental resources in a statewide spatial database.

Integrated actions

6.1 Coordinate with local, state, and federal agencies and partners to identify and prioritize habitat conservation targets critical to the recovery of imperiled species.

6.2 Use all available methods (e.g., conservation easements, partnering, acquisition, protected area designation) to ensure long-term habitat protection for imperiled species in priority areas.

6.3 Use existing, and develop new, conservation programs to create landscape linkages that allow fish and wildlife to move between and among areas of suitable habitat to ensure access to habitat, genetic viability, and shifts in range, especially as these relate to environmental change.

Rationale for Actions 6.1–6.3

Agency-specific acquisition programs alone are inadequate to reduce the immediate critical threats to many imperiled species, but are certainly beneficial to the long-term survival for many, especially those with restricted ranges. With funding limitations at all levels of government, a practical way to achieve this strategy is for multiple agencies to pool resources. To maximize conservation for imperiled species, FWC will work with other state and federal partners through methods described in Integrated Conservation Strategies 8 and 9. Examples of these types of innovative land acquisition programs include NRCS Wetland Reserve Program and USFWS Everglades Headwater National Wildlife Refuge. Assistance has been provided by FWC during the ranking process for these programs and in developing habitat management plans. As an alternative to acquisition, there is also a need to develop and disseminate clear criteria for the designation of Critical Wildlife Areas on publicly and privately owned lands.

Integrated Conservation Strategy 7

Direct habitat management to reduce threats in order to sustain important populations of imperiled species.

Many Species Action Plans identify habitat management actions that go beyond restoration or enhancement to include the addition of structures, protection of sensitive habitats, and control of animal populations through management. For example, spoil islands as artificial habitats, created along portions of Florida's coast, have a history of providing nesting habitat for wading birds. The Spoil Island Working Group, created by DEP's Florida Coastal Office, manages over 130 spoil islands included in the Indian River Lagoon management plan. Other examples include supplemental structures for nesting platforms, nest boxes, or other appropriate structures that aid in sustaining long-term viable populations of specific species.

Habitat protection through access management can include posting, closing, and establishing seasonal buffer

zones with signs and/or symbolic fencing to prevent people, pets, and vehicles from disturbing imperiled species while breeding, foraging, and nesting. Critical Wildlife Areas may be designated where more-intense management is needed for minimizing disturbance and protecting/enhancing habitats for seabirds, shorebirds, and/or wading birds. Critical Wildlife Areas have been established to protect bats, gopher tortoises (*Gopherus polyphemus*), and breeding seabirds, and may be necessary to protect other imperiled species, where circumstances are appropriate.

Integrated actions

7.1 Enhance or continue conservation and protection of habitats (e.g., feeding, breeding, or roosting sites) known to support essential behavioral patterns for state-Threatened species by limiting or preventing species disturbance.

7.2 Establish and/or manage artificial habitats (e.g., spoil islands, impoundments, or jetties) and supplemental structures (e.g., barges, mooring buoys, or boxes) to support imperiled species populations.

7.3 Manage habitat to control predators that directly impact imperiled species populations.

7.4 Restore and enhance habitat to allow for population augmentation or reestablishment in historical ranges.

7.5 Create a comprehensive regional framework for minimizing habitat loss and population impacts on imperiled species.

Rationale for Actions 7.1–7.5

Human activities can alter behavior of imperiled species and pose direct and indirect threats to individuals and local populations. Limiting disturbance through management directed at reducing overlap between human use of habitats and use by imperiled species, especially at critical times (e.g., breeding seasons), is essential to supporting imperiled species populations. Because threats to species can vary widely by region, creating regional frameworks to address threats to a specific area or region is advantageous. This regional approach is described in Objective 4. Directed habitat management activities that can accomplish this include strategically placed plantings and low-impact trail or road placements that direct human activity away from important habitats. Management of artificial habitats can augment imperiled species habitats in areas where natural habitats have been altered and cannot be restored, such as those with incompatible development, or in areas providing travel or migration corridors between important habitats. Certain plant species and terrain can be effectively planted and landscaped to inhibit competitors and predators of imperiled species in areas where conflicts exist. When FWC is not the lead manager of the identified public lands, staff will work though the processes described in ICS 8 and ICS 9 and the corresponding integrated actions.

Incentives and influencing

Integrated Conservation Strategy 8

Conserve and manage imperiled species and their habitats on public and private lands by balancing regulations, voluntary stewardship, and use of economic and regulatory incentives.

Many Species Action Plans identify habitat loss as a primary cause of species decline, and a clear need exists to retain or restore valuable publicly and privately owned lands in some form of conservation. Over 70 percent of

Florida lands are in private ownership, and many of those lands provide important habitat for imperiled species. The long-term survival of these species may rely on our ability to provide financial and regulatory incentives that allow public and private landowners to realize the economic potential of their property in a way that is compatible with imperiled species management.

Integrated actions

8.1 Proactively coordinate with state, federal, and local regulatory agencies, partners, and stakeholders to develop new, and enhance existing, conservation measures that will protect imperiled species and minimize negative effects from proposed activities.

Rationale

Conservation measures (e.g., habitat enhancement actions, best management practices) that can be implemented without going through a regulatory permitting process and improve conservation of imperiled species are of great value, and their development will continue to be a focus. These measures facilitate FWC's role in commenting on proposed projects and coordinating with other state and federal agencies to incorporate these conservation measures into their permit requirements. Proactive technical assistance provided to landowners and developers will help ensure proper implementation of avoidance and minimization measures. Following this guidance will reduce the likelihood of take of individuals during a development project and could satisfy the incidental take permit process for some species.

8.2 Develop new, or enhance existing, economic incentive programs to encourage implementation of habitat management practices consistent with habitat management guidelines for imperiled species (see Integrated Action 6.1 and Integrated Action 9.1).

Rationale

Landowners and developers may be more likely to participate in habitat conservation programs if there are long-term, sustainable economic incentives for maintaining habitat. One example is the Payment for Ecosystem Services model that documents some of the ecosystem services provided by landowners and pays towards long-term sustainability of land uses that support wildlife habitat.

In addition to new incentives, the effectiveness of existing programs could be enhanced by coordinating implementation and evaluating the success of current initiatives to meet landscape conservation goals. For example, existing voluntary programs (such as Partners for Fish and Wildlife offered by USFWS) could be focused by identifying habitat management needs of specific species through existing programs like the CCB.

8.3 Develop new, and enhance existing, conservation tools to provide regulatory certainty and encourage management practices consistent with habitat management guidelines (Integrated Action 9.1) for imperiled species.

Rationale

Federal tools for conservation of species include, but are not limited to, habitat-based agreements (e.g., Habitat Conservation Plans, Candidate Conservation Agreements with Assurances, Conservation Banks). Similar types of agreements for state-listed species could be used to remove disincentives to proactive land management practices that could enhance habitat for imperiled species. These agreements could also provide comprehensive coverage for all species potentially occurring within a proposed site. This approach would be particularly useful when surveys might prove inconclusive, such as with cryptic (i.e., difficult to detect) species. Habitat-based agreements would, in some cases, reduce or eliminate the

need for costly surveys and verification of presence of individual species. Habitat-based agreements could provide for direct financial contribution to the perpetual conservation and management of regionally significant, ecologically connected conservation areas.

Integrated Conservation Strategy 9

Promote the conservation and management of imperiled species and their habitats on private and public lands by providing technical assistance, guidance, and recommendations to local, state, and federal governments; planners; and decision makers.

Many of the Species Action Plans recognize the lack of suitable habitat for imperiled species on public conservation lands. To address the threats facing these imperiled species, a clear need exists to promote and assist partners in habitat conservation and management efforts. Through development and implementation of the ISMP, FWC has increased—and, as appropriate, will continue to increase—resources necessary to provide more consultation, technical assistance, and commenting as it relates to state-listed species. As better management strategies are identified, FWC will influence other public and private landowners through new and existing programs and targeted outreach.

Integrated actions

9.1 Coordinate with internal and external partners to develop species-specific habitat management guidelines for managers of public and private lands.

9.2 Coordinate and influence the implementation of management practices outlined in the management guidelines that will preserve, enhance, maintain, or restore aquatic and terrestrial habitat on public and private lands.

Rationale for Actions 9.1 and 9.2

Species-specific habitat management guidelines will improve management by identifying activities that support and/or maintain habitat features that support essential behavioral patterns. These guidelines constitute technical assistance and will be valuable resources to managers of public and private lands that benefit imperiled species. While technical assistance and information regarding appropriate management activities may be sufficient in some cases, financial and regulatory incentives provide a means to influence the type and implementation of management practices (e.g., technique, timing, and location). A wide variety of FWC divisions and sections will participate in developing and implementing the above actions.

Currently, the largest source of incentive funds for conservation on private lands is the federal Farm Bill, administered through the U.S. Department of Agriculture's Natural Resource Conservation Service (NRCS) and Farm Services Agency. Participation in NRCS's State Technical Committee provides an opportunity to guide implementation of Farm Bill conservation programs (e.g., through project ranking criteria and practices offered under conservation programs). In addition, FWC staff provides technical assistance and training regarding species habitat needs and priority conservation practices for NRCS field staff and program participants.

Coordination with DEP and WMD staff through the Environmental Resource Permit process could allow for an evaluation of wetland mitigation banks that would provide a means to protect gopher frog breeding wetlands, freshwater marsh habitat for sandhill cranes, and habitat for other wetland-dependent imperiled species. Applicants proposing wetland mitigation banks are responsible for conducting wildlife

surveys for wetland-dependent species, providing an opportunity to obtain data regarding the abundance, distributions, and habitat associations of imperiled species on these private properties. Currently, FWC is working with DEP to create incentives for mitigation bank owners to establish and manage habitat for wetland-dependent imperiled species. Other similar coordination opportunities exist with the programs and agencies listed in Table 3.

9.3 Partner with private and public landowners to prioritize important habitat features (breeding, feeding, and sheltering sites) for imperiled species to guide site conservation and management.

Rationale

Limited resources can be effectively applied through prioritizing opportunities to protect habitat features important to imperiled species. We can accomplish this by providing comprehensive habitat management technical assistance to private landowners and by sharing occurrence data, critical and important habitat information, and habitat management guidelines for imperiled species in consultation with partner land-management agencies and other landowners (see Integrated Action 6.1).

9.4 Coordinate with local governments on comprehensive plans and other planning efforts to establish priority areas and programs in their area as they relate to conservation of imperiled species and their habitats.

Rationale

Improving coordination with local governments through the comprehensive growth management plan process will benefit imperiled species, especially when land development regulations are established that address conservation of habitat essential to imperiled species.

Examples might be to assess development fees that could be applied to long-term conservation and management of lands that contain potential habitat for imperiled species, or to designate local conservation lands as habitat banks (Integrated Action 8.3) and use revenues for restoration and management, or to fund a payment for the ecosystem services program (Integrated Action 8.2). Areas preserved through local regulations and ordinances on areas of regional significance will improve connectivity, and the ability to better manage habitat for imperiled species.

9.5 Increase participation in development of basin management action plans, minimum flows and levels, water reservation plans, regional water supply plans, and regulatory reviews of wetland and water resource permits in order to avoid, minimize, or mitigate potential impacts to aquatic imperiled species habitat.

Rationale

Identification and implementation of conservation measures that reduce water-quality impacts within areas of known occurrences of these species will improve habitat conditions for aquatic imperiled species. Potential threats can be addressed during the development of minimum flows and levels, water supply reservoirs or reservations, regional water supply plans, and regulatory review of various permits through coordination with WMDs, DEP, and local governments. By increasing staff involvement, sharing imperiled species occurrence data, setting conservation requirements, and establishing priority areas for ensuring water quality and quantity, FWC will seek to increase the effectiveness of this ongoing effort.

9.6 Encourage and influence land-management activities benefitting imperiled species and their habitats through review of land management plans (e.g., Integrated Natural Resource Management Plans [INRMPs], National Park Service General Management Plans, Conceptual Management Plans, Florida Park Service Unit Management Plans) on private, local, state, and federal lands (see Integrated Action 9.3).

Rationale

Continuing to participate in review or development of applicants' land management plans ensures the incorporation of habitat management considerations and provides opportunities to include measures that benefit imperiled species as well as game species. Assisting with reviews of the Private Lands Deer Management Permit Program management plans, for example, provides documentation of habitat management and of potential benefits to associated imperiled species on large tracts (>5,000 acres) of privately owned lands.

Law and policy

Integrated Conservation Strategy 10

Improve collaboration between FWC and other state, federal, and local permitting and enforcement agencies to address negative impacts to imperiled species and habitats that support essential behavioral patterns.

In situations where imperiled species or their habitats may be impacted by human activities, internal coordination within FWC and with local, state, and federal permitting authorities, will help to determine if regulatory action is required, as well as the appropriate actions necessary to address the impacts. Consistent and efficient implementation of regulatory and law enforcement actions will improve outcomes for both internal and external coordination. Planning in advance for resolution of these conflicts will benefit imperiled species that may be affected. The Division of Law Enforcement will coordinate with biological staff on enforcement strategies to help provide adequate protection for the recovery of species.

Integrated actions

10.1 Develop and implement improved protocols for coordination between FWC and other enforcement agencies to address cases of noncompliance with regulations so that appropriate actions are taken (e.g., code enforcement, enforcement of permit conditions, BMPs) after outreach efforts to reduce negative impacts to imperiled species have been made.

10.2 Develop or improve protocols for coordination with state, federal, and local regulatory agencies that guide implementation of appropriate noncompliance actions (e.g., code enforcement, enforcement of permit conditions, BMPs) after outreach efforts to reduce negative impacts to imperiled species have been made.

Education and outreach

Integrated Conservation Strategy 11

In collaboration with conservation partners, educate and communicate with key target audiences about the value of prescribed fire and related habitat management for imperiled species.

Fire is one of the most important landscape-shaping processes and, in Florida, one of our most valuable habitat management tools. Along with numerous partners and stakeholders, FWC promotes the use of prescribed fire on public and private lands. This strategy was identified because of the many imperiled species that live in fire-dependent natural communities and the challenge of conducting prescribed burns in a controlled manner within an urbanizing state. In order to address the threats facing many of our imperiled species, increased public and partner support is needed for the use of prescribed fire and fire-related habitat management prac-

tices. The integrated actions for this strategy target key audiences including local, state, and federal land management partners; land-use planners; private landowners; and neighbors and visitors to publicly managed lands. Actions focus on the complex adaptations that plants and animals need to keep them abundant and healthy, on how prescribed fire prevents catastrophic damage to human homes and businesses, on the importance of prescribed fire and other habitat management techniques in buffering public lands, and on preserving the ability of land managers to use prescribed fire.

Integrated actions

11.1 Assess the current level of support among key target audiences for the use of prescribed fire and related habitat management practices.

Rationale

Baseline information about knowledge, values, attitudes, beliefs, and general support for prescribed fire among key audiences is fundamental to designing effective outreach and education programs.

11.2 Promote incorporation of prescribed fire management and smoke buffer protection into local land-use planning.

Rationale

Promoting prescribed fire management and smoke buffer protection into comprehensive land-use planning enhances FWC's and partnering agencies' ability to appropriately manage wildlife and their habitats. Staff from various FWC sections should promote the importance of prescribed burning and the concept of buffering the impacts of prescribed fire and smoke to local government planning staff and assist in the comprehensive planning process. This work should be tied into our interaction with local partners in relation to comprehensive growth management plans (addressed in Integrated Action 9.4).

11.3 At the start of each prescribed fire season use a variety of media to communicate with the public and landowners about defensible space and fire-compatible practices.

Rationale

The support of key audiences is crucial to maintaining the ability to use prescribed fire as a management tool. It is particularly important to reach neighboring landowners and recreational users of public lands like FWC-managed wildlife management areas (WMAs). Research by McCaffrey and Olsen (2012) shows that direct contact and face-to-face demonstrations are the most trusted methods of communication, but that multiple sources of information are needed to effectively communicate with a variety of groups.

11.4 Partner with existing groups and experts to develop new partnerships to promote and adopt burning practices that benefit wildlife on public and private lands.

Rationale

In order to increase awareness of the benefits of using prescribed fire, a clear connection should be made to the practical benefits of fire for a manager or landowner. It is critical to tie the benefits of fire to public health and safety. Staff will work to provide clear examples and testimonials of how managers have used fire to meet their agricultural, silvicultural, water management, and recreational goals while benefitting wildlife.

11.5 Develop and test messages about prescribed fire and related habitat management practices, and incorporate them into educational materials.

Rationale

Rather than duplicate efforts for this important issue, it is vital to study the research and materials that have already been developed to communicate with key target audiences. Research (McCaffrey and Olsen 2012) shows that state agencies, especially state forestry agencies, are among the most trusted sources of information about prescribed burns. Most outreach literature available through federal, state, and county sources has limited information about the benefit of fire to Florida wildlife. By working closely with partners to adapt existing outreach materials and create new ones directed at key audiences, we can effectively address the needs of imperiled species. Testing with targeted audiences helps to refine messages for the greatest effectiveness.

11.6 Communicate with key agencies and partners to increase awareness of resources related to prescribed fire and assist in adapting existing resources and developing new materials.

Rationale

A key strategy to increase use of prescribed fire is to support other partners and provide appropriate tools for them to meet their goals. Some partners are unaware of available resources or materials. Staff from FWC will work through regional fire councils and working groups to communicate about the availability of funding opportunities, grants, equipment, and support staff.

11.7 Promote and recognize partners and managers who do an outstanding job of fire management and other management techniques.

Rationale

In order to increase the adoption of wildlife-friendly burning practices (e.g., growing season, mosaic, wetland) on public and private lands, staff will work through existing groups and new partnerships to reinforce appropriate practices. While FWC staff may not be experts in all aspects of technical assistance, they can partner with respected authorities through workshops and established working groups. Recognition from peers in this environment can serve as a positive example for other partners and provide expertise to overcome specific challenges.

Integrated Conservation Strategy 12

Communicate with target audiences that live, work, and recreate in transition zones where water and land connect about the value of these areas and what they can do to conserve the fish and wildlife that live in these habitats.

While the transition zones between land and water are relatively small, conserving them has powerful conservation implications, especially in Florida. Key users' adoption of conservation practices that benefit imperiled species can minimize the threats facing these zones. The integrated actions for this strategy target local governments, state and federal agencies, private landowners, homeowners, waterway users, schools, and nature centers. The actions focus on the importance of maintaining connections between aquatic and upland habitats to facilitate species' needs to move among habitats to find food and mates, raise young, and respond to long-term environmental changes. These actions are designed to improve water quality and quantity while providing people with benefits such as flood protection, buffers from storms, and cleaner drinking water.

Integrated actions

12.1 Assess the current level of awareness, value and knowledge of riparian, intertidal and estuarine zones among key target audiences.

Rationale

Baseline information among key audiences regarding their knowledge, values, attitudes, and beliefs about transition zones is fundamental to designing effective outreach and education programs and evaluating their effectiveness in meeting objectives. While much research has been conducted on this topic, in-depth analysis on the implications for Florida is needed. Staff in FWC's Aquatic Habitat Conservation and Restoration (AHCR) section has already begun developing an aquatic education and outreach plan to investigate the best way to educate key target audiences about a variety of issues, including transition zone management. This plan will benefit both imperiled species and other wildlife.

12.2 Promote the benefits of incorporating development buffers and land-use impacts into local land-use planning near riparian, intertidal, and estuarine zones.

12.3 Promote the use of agency and partner technical assistance in the adoption of wildlife-friendly practices in transition zones.

12.4 Utilize existing infrastructure, partnerships, and programs to promote the adoption of "zone friendly" management practices to key audiences in the transition zones.

Rationale for actions 12.2–12.4

Building on established programs and existing relationships is important to informing key audiences about the benefits of appropriate management in transition zones. In the case of private landowners, FWC's Landowner Assistance Program and groups like University of Florida's Institute of Food and Agricultural Sciences (IFAS) Extension or local governments could be a conduit for distributing information about appropriate yard-management practices. Staff from FWC would develop new articles, presentations, and educational materials and adapt existing ones to create consistent and effective messaging around this topic. This not only addresses homeowners' needs and concerns, but could also apply to local governments in the development process.

12.5 Coordinate with waterway managers and law enforcement to promote safe and appropriate practices for waterway users in important transition zones.

Rationale

Disturbance by waterway users, such as boaters and anglers, can have significant impacts on critical behaviors of the more sensitive aquatic species. Using species biology and targeted geographic areas, staff will adapt existing publications and build on existing programs to emphasize appropriate practices and tips. Direct mailers and materials explaining the potential impact of these practices may also need to be distributed to outfitters, tackle shops, and boating locations.

12.6 Incorporate regional focus on riparian, intertidal, and estuarine zones into local citizen science, stewardship efforts, and community organizations/groups.

12.7 Work with DEP, WMDs, and others as appropriate to incorporate the importance of transition zones for imperiled species into their curricula and appropriate print and electronic materials.

12.8 Develop educational materials about the importance of transition zones to imperiled species, targeted for use by zoos, nature centers, and tourism organizations.

Rationale for actions 12.6–12.8

Direct involvement in community conservation projects serves as a powerful way to increase awareness

and appreciation among Florida residents and visitors of the value of transition zones. It is also an effective means of achieving greater conservation impacts. Incorporating imperiled species information into existing curricula is an efficient approach to increasing the breadth and impact of outreach. Partners and organizations will work with regional staff to design volunteer and citizen science projects related to riparian, intertidal, and estuarine species and habitats. Staff will also work to create materials for tourism development councils in targeted geographic areas to stress the unique nature of the species and habitats.

Integrated Conservation Strategy 13

Promote coexistence with imperiled species and engage key target audiences in conservation stewardship.

The citizens of Florida can have both positive and negative impacts on wildlife and their habitats. This strategy aims to encourage and empower people to make a difference by adopting conservation stewardship practices related to imperiled species. The integrated actions for this strategy target key audiences that include boaters, anglers, hunters, conservation-minded groups and individuals, tourists, business owners, homeowners, schools, private landowners, beachgoers, and motorists. These products will provide practical information that encourages stewardship behaviors. The actions are designed to engage the public in practices and behaviors that will benefit the health and safety of both people and wildlife. These practices can range from picking up food scraps and garbage that might attract nuisance wildlife to monitoring imperiled species. The Species Action Plans describe many projects where citizen scientists are already collecting data, monitoring species, and engaging in stewardship behaviors.

Integrated actions

13.1 Assess among key target audiences the current level of awareness, knowledge, and attitudes toward coexistence with imperiled species.

Rationale

Baseline information among key audiences regarding knowledge, values, attitudes, and beliefs about living with imperiled species is fundamental to designing effective outreach and education programs. While some research has been conducted into nuisance wildlife concerns, many imperiled species are rarely seen by the public. It is important to know how the public's perception of multiple wildlife species impacts their interactions with imperiled species.

13.2 Promote awareness and observation of species and their habitats through a variety of media.

Rationale

In order for citizens and visitors to become more aware of their surroundings and wildlife, they need resources to know where the animals are, what they need to survive, and what threatens their survival. Once they learn how to safely and ethically observe species and how to record specific information, they can begin contributing to the body of knowledge about a species. The additional data provided by citizens will be used as a resource to improve conservation efforts and add to our knowledge of these species. Staff has already developed sighting and survey databases on MyFWC.com for over 20 species. The gopher tortoise program has developed a Florida Gopher Tortoise Smartphone App to allow the public to report sightings and record location data. By providing resources in a variety of locations and with different types of media, a broader audience can be reached.

13.3 Promote involvement in citizen science projects that collect data on, or actively protect, imperiled species and their habitats.

Rationale

Increased stewardship, accountability, and involvement among Florida citizens and visitors will lead to a more-informed public. Opportunities exist to work with key partners to achieve monitoring and management goals for these species. When data gaps or needs are identified, citizen scientists can use scientifically valid protocols to collect data and assist with management. Regional volunteer programs provide some infrastructure for expanding internal operations and many different divisions and sections in the agency work to engage volunteers and citizen scientists on everything from habitat management to public outreach and species monitoring. Integrated Action 13.2 and Integrated Action 13.3 relate to Integrated Action 2.4 and Integrated Action 2.5.

13.4 Identify responsible practices for coexisting with imperiled species.

13.5 Incorporate guidelines for minimizing wildlife disturbance.

13.6 Create a wildlife-wise guide and campaign to encourage key audiences to increase citizen stewardship and accountability.

13.7 Expand FWC's Schoolyard Wildlife Project and Schoolyard Ecosystems program in targeted areas.

Rationale for actions 13.4–13.7

An abundance of research indicates that the majority of Floridians want to take action to benefit wildlife; however, they lack knowledge of what to do and want guidance. The above actions describe the need to provide information and describe responsible practices, while also encouraging citizens to get involved. In order to minimize threats to human safety, key areas of conflict between wildlife and humans should be identified and addressed. Some examples might include guidance for wildlife photography practices, beach recreation guidelines, and homeowner guidelines. Information about state-imperiled species could be incorporated into canvassing efforts for other species or presentations about better-known species that occupy similar ranges and habitats.

When targeted groups increase their participation in conservation stewardship, citizen science, and/or volunteering, they can increase their opportunities to positively interact with wildlife. Citizens and visitors should be aware and knowledgeable about the best ways to interact with different species, particularly imperiled species. In many cases, being wildlife wise may mean staying far away from wildlife and avoiding attracting wildlife with food. Critical aspects of this effort include key community figures modeling behaviors, rewarding participants in public ways, and encouraging reporting of inappropriate behavior.

13.8 Develop education materials and programs that promote and assist private landowners who conserve habitat for imperiled species, building upon the existing Landowner Assistance Program.

13.9 Develop recognition programs for landowners who contribute to species recovery through appropriate land management.

Rationale for actions 13.8 and 13.9

While the Landowner Assistance Program focuses on larger landowners, many species can also benefit from the actions of owners of smaller acreage tracts in appropriate geographic areas. Species Action Plan teams identified a clear need to use multiple targeted tools to engage with landowners at all scales.

Even owners of small parcels can have a large footprint when they choose to manage their backyard habitat. *Planting a Refuge for Wildlife* and the *Living Wildlife Friendly* curriculum are examples of materials that have been developed by FWC and could be adapted to meet the needs of imperiled species and target audiences.

Logistical support and infrastructure

Integrated Conservation Strategy 14

Expand agency and partner infrastructure and capacity to efficiently conserve imperiled species populations and their habitats.

Many Species Action Plans recognize that a more robust support framework is needed for recommended research and management actions to successfully contribute to the conservation of imperiled species. This infrastructure needs to provide essential, universal support functions based on standardized and streamlined protocols and procedures. These functions include systems for managing external funding, people, and equipment, as well as data management systems.

Resources serving these functions will fill similar roles for most species, so standard approaches will maximize effective coordination across species. Standardization of some support functions such as statistical support, data management, and GIS evaluation among partners, will also improve coordination. In some cases, FWC will need to take the lead to promote standardized support functions.

Meeting the needs of all species included in the ISMP

- Integrated Conservation Strategy 14 addresses conservation actions identified in all of the 47 Species Action Plans written for species included in the ISMP.

Integrated actions

14.1 Develop and maintain consolidated data and information management systems to facilitate awareness of, and access to, all existing data relevant to Florida's imperiled species and their habitats.

Rationale

To maximize conservation, data resulting from all planned research actions must be communicated and distributed to those who need it, including land managers, conservation planners, and other researchers. In addition to project-level research data, a database is needed for organizing, housing, and analyzing the monitoring and habitat-management data required to maintain the current biological status of each species. Examples of existing databases within FWC are the Marine Resources Geographic Information System, Terrestrial Resources Geographic Information System, Land Management Information Systems, Wildlife Obs, and Sampling and Monitoring Protocol database.

Data management efforts need to include the substantial amount of data relevant to imperiled species that is generated by partners and stakeholders beyond FWC. Efforts are needed to find, inventory, and share such information. Where sharing data is not feasible (e.g., proprietary data), efforts may be limited to an inventory catalogue to record the nature and location of available data (e.g., Florida's Water-CAT).

14.2 Increase and maintain the information technology capacity necessary to effectively and consistently collect and manage data across FWC and with partner organizations (e.g., Idaho's Fish and Wildlife Information System).

14.3 Identify, or develop, a framework for selecting appropriate research, monitoring, and management strategies.

14.4 Increase capacity to provide appropriate and robust statistical support for research, monitoring, and management activities.

Rationale for actions 14.2–14.4

Appropriate statistical support is essential for robust study design. Data-collection methods need to be appropriate for and consistent with available statistical analyses. Robust statistical analyses allow for better decision-making, which leads to better conservation recommendations.

14.5 Increase capacity to involve partner organizations and volunteers, including youth, in research, monitoring, and management projects initiated across FWC.

14.6 Develop a support framework to leverage, pursue, and manage supplemental, external funding necessary to implement priority conservation actions for imperiled species.

Rationale for actions 14.5 and 14.6

Appropriate support is essential to successfully pursue external funding opportunities to carry out actions specified for all imperiled species. With increasing numbers of funding awards received for imperiled species, needs for support will increase. Assistance is needed to better identify potential funding sources (e.g., SWG, Conserve Wildlife Tag, NOAA). Support also is needed for contract and budget management activities, including reviews for budget development and for amendments.

Table 6. Integrated conservation strategies (ICSs) and integrated actions with corresponding Species Action Plan actions. Actions from the Species Action Plans for each species support and align with the integrated approach

Integrated Conservation Strategy Number	Species	Alligator snapping turtle	American oystercatcher	Barbour's map turtle	Big Cypress fox squirrel	Black Creek crayfish	Black skimmer	Blackmouth shiner	Bluenose shiner	Brown pelican	Crystal darter	Eastern chipmunk	Everglades mink	Florida bog frog	Florida brown snake	Florida burrowing owl	Florida Keys mole skink	Florida mouse	Florida pine snake	Florida sandhill crane	Florida tree snail	Georgia blind salamander	Gopher frog	Harlequin darter	Homosassa shrew	Key ringneck snake	Key silverside	Lake Eustis pupfish	Least tern	Little blue heron	Limpkin	Mangrove rivulus	Marian's marsh wren	Osprey (Monroe County)	Peninsula ribbon snake	Pine Barrens treefrog	Red rat snake	Reddish egret	Rim rock crowned snake	Roseate spoonbill	Saltmarsh topminnow	Sanibel Island rice rat	Santa Fe cave crayfish	Scott's seaside sparrow	Sherman's fox squirrel	Sherman's short-tailed shrew	Short-tailed snake	Snowy egret	Snowy plover	Southeastern American kestrel	Southern tesselated darter	Striped mud turtle	Suwannee cooter	Tricolored heron	Wakulla seaside sparrow	White-crowned pigeon	White ibis	Worthington's marsh wren
ICS 1	Action 1.1	12		1 2	6 7 8 9			8 10 11	8 10 11		15 16 17 18		19	5	5	5	5	2 3 7	6 9		4 6		9 10 11		7	5	1 2			29 30	14		9	4	5		5	29 30		29 30		10	6 8	9	6 7 8 9	7		29 30			6 7 8	11	12	29 30	9		29 30	9
	Action 1.2	3 8	13 14 17 18 19 20 22 25 26	8 9	10 14 15	7 8	13 14 17 18 19 20 22 25 26			11 12 13 14 16 18 19 20	2 10	1 3 4 8	10			4 6 7 9 10	6	11	4 5 8	10 12	11		5 12		2 6 8			2 6	13 14 17 18 19 20 22 25 26	27 28 29	10 11 12 15 16	5	7 8 11 12	10					6	27 28 29		8	10	7 8 11 12	11 13 14	2 6 8		27 28 29	13 14 17 18 19 20 22 25 26	12 13 14 15 16	9	7 9 10	9 10	27 28 29	7 8 11 12	8 11 12 14 16 17	27 28 29	7 8 11 12
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	Action 1.4	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
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	Action 2.5		12				12																						12																		12		7								

*Actions are applicable to all of the Species Action Plans

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ICS 3	Action 3.1	7	4 12 20 21 24	7	3 4 5 10 12 14 15	1 2	4 12 20 21 24	1 2 12	1 2 12	10 17 18	2 8 13	2	7 8 16 17 18	3	6 7 8	1 6	6 7 8	4 6 10	4 5	3 6 10 13	2 9 10 11	1 4	5 7 12 13	7 8 9 11 12 17	3 4 5 6	3 6 7 8	4 6 7	3 4 5 6 7 8 9	4 12 20 21 24	3 9 20 21	10 12 13 17 19	2 4 6	2 4 5 11 16	5	3 6 7 8	4	3 6 7	3 9 20 21	3 5 7	3 9 20 21	5 10 11 12	2 7	1 2 3 10 11 12	2 4 5 11 16	3 14	3 4 5 6	5 6	3 9 20 21	4 12 20 21 24	1 2 4 11 12 14	2 3 8 10 11 21	2 3 6 8	4 8 9	3 9 20 21	2 4 5 11 16	10 11 12	3 9 20 21	2 4 5 11 16
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	Action 5.5													2	4		4				3					4									4	3	4		4																		
	Action 5.6		36				36			3				2	4		4				3					4			36						4	2	4		4																		

Integrated Conservation Strategy Number	Species	Alligator snapping turtle	American oystercatcher	Barbour's map turtle	Big Cypress fox squirrel	Black Creek crayfish	Black skimmer	Blackmouth shiner	Bluenose shiner	Brown pelican	Crystal darter	Eastern chipmunk	Everglades mink	Florida bog frog	Florida brown snake	Florida burrowing owl	Florida Keys mole skink	Florida mouse	Florida pine snake	Florida sandhill crane	Florida tree snail	Georgia blind salamander	Gopher frog	Harlequin darter	Homosassa shrew	Key ringneck snake	Key silverside	Lake Eustis pupfish	Least tern	Little blue heron	Limpkin	Mangrove rivulus	Marian's marsh wren	Osprey (Monroe County)	Peninsula ribbon snake	Pine Barrens treefrog	Red rat snake	Reddish egret	Rim rock crowned snake	Roseate spoonbill	Saltmarsh topminnow	Sanibel Island rice rat	Santa Fe cave crayfish	Scott's seaside sparrow	Sherman's fox squirrel	Sherman's short-tailed shrew	Short-tailed snake	Snowy egret	Snowy plover	Southeastern American kestrel	Southern tesselated darter	Striped mud turtle	Suwannee cooter	Tricolored heron	Wakulla seaside sparrow	White-crowned pigeon	White ibis	Worthington's marsh wren
ICS 6	Action 6.1	1	2 3 4 50				2 3 4 50									20													2 3 4 50	13				2			13		13							13		2 3 4 50	2 3 11			1	13			13	
	Action 6.2		38				38	5 6	5 6	5			23		2	17. 19	2		1		1							38		9				2		2		2		8						1		38	18 22 23						3 26		
	Action 6.3				2			5 6	5 6																																				2						1							
ICS 7	Action 7.1		3 8 9				3 8 9			8 22																			3 8 9																				3 8 9								
	Action 7.2		5				5			2																			5	11				1				11		11							11	5	1 7 8 28 29				11			11	
	Action 7.3		11 37				11 37			6																			11 37																				11 37			4					
	Action 7.4					3		8	8																																													7				
	Action 7.5		1				1									3													1																				1	18								
ICS 8	Action 8.1	17	9 28 29 49	16			9 28 29 49	5 12	5 13		2 5								16					16 21					9 28 29 49													7 11 13							9 28 29 49	18						26		
	Action 8.2		35 36 37 39 40		20		35 36 37 39 40									17		15	13	16			17						35 36 37 39 40	35 36	20					10		35 36		35 36						2 18		35 36	35 36 37 39 40	22 23				35 36		21	35 36	
	Action 8.3	16									23					18	12 13		14				20			11 12									12 13				11 12								9			18 23	17							

Integrated Conservation Strategy Number	Species	Alligator snapping turtle	American oystercatcher	Barbour's map turtle	Big Cypress fox squirrel	Black Creek crayfish	Black skimmer	Blackmouth shiner	Bluenose shiner	Brown pelican	Crystal darter	Eastern chipmunk	Everglades mink	Florida bog frog	Florida brown snake	Florida burrowing owl	Florida Keys mole skink	Florida mouse	Florida pine snake	Florida sandhill crane	Florida tree snail	Georgia blind salamander	Gopher frog	Harlequin darter	Homosassa shrew	Key ringneck snake	Key silverside	Lake Eustis pupfish	Least tern	Little blue heron	Limpkin	Mangrove rivulus	Marian's marsh wren	Osprey (Monroe County)	Peninsula ribbon snake	Pine Barrens treefrog	Red rat snake	Reddish egret	Rim rock crowned snake	Roseate spoonbill	Saltmarsh topminnow	Sanibel Island rice rat	Santa Fe cave crayfish	Scott's seaside sparrow	Sherman's fox squirrel	Sherman's short-tailed shrew	Short-tailed snake	Snowy egret	Snowy plover	Southeastern American kestrel	Southern tesselated darter	Striped mud turtle	Suwannee cooter	Tricolored heron	Wakulla seaside sparrow	White-crowned pigeon	White ibis	Worthington's marsh wren
ICS 9	Action 9.1		3 4 33		3	1 2 11	3 4 33	1 5	1 5		1 2 3 5		1		3	20	3				2				1	3			3 4 33	6			1 2 3		3		3		3	6		3		1 2 3		3	1	6	3 4 33		1 4			6	1 2 3		6	1 2 3
	Action 9.2				20 21	1 2 11					1 2 3 5		1		1		1	15			23														1		1		1							18 19					1								
	Action 9.3		2				2																						2	14 20	18			2				14 20		14 20								14 20	2	11				14 20			14 20
	Action 9.4							6	6							20																										8									25					26		
	Action 9.5							6	6		4									24		3						4 5		10	6							10		10		6							10						10			10
	Action 9.6		34				34	4	4	26											2							34	9								9		9		6						9	34	1	19			9			9	
ICS 10	Action 10.1		8				8			8																		8	17 18								17 18		17 18								17 18	8					17 18			17 18	
	Action 10.2		1 10	4			1 10	6 4	6 4		2 4 5					19						3		3				4	1 10	1 8 9	3 5							1 8 9		1 8 9	2 6							1 8 9	1 10		1 2			1 8 9			1 8 9	
ICS 11	Actions 11.1 to 11.7			6	21	1								1	2	17		15	2	5			2 4													2	2		2			13			19		2 3			22 28			3 6					
ICS 12	Actions 12.1 to 12.8	2 4 17		2 4 16 17		2 10 11 14 16		4 5 6 12	4 5 6 13		4 5 6 21 22 24 27		22	1 8 9 11	3 14		14			4 24		3 7 8		3 4 16 17 20 21				7 11		6 7	6 20 21	2	16 17		14	4 10 11 12	3 14		3 14	6 7	1 2 3 4		2 3 14 15	16 17				6 7			1 3 5 15 16	2	2 4 18 19	6 7	16 17		6 7	16 17

Integrated Conservation Strategy Number	Species	Alligator snapping turtle	American oystercatcher	Barbour's map turtle	Big Cypress fox squirrel	Black Creek crayfish	Black skimmer	Blackmouth shiner	Bluenose shiner	Brown pelican	Crystal darter	Eastern chipmunk	Everglades mink	Florida bog frog	Florida brown snake	Florida burrowing owl	Florida Keys mole skink	Florida mouse	Florida pine snake	Florida sandhill crane	Florida tree snail	Georgia blind salamander	Gopher frog	Harlequin darter	Homosassa shrew	Key ringneck snake	Key silverside	Lake Eustis pupfish	Least tern	Little blue heron	Limpkin	Mangrove rivulus	Marian's marsh wren	Osprey (Monroe County)	Peninsula ribbon snake	Pine Barrens treefrog	Red rat snake	Reddish egret	Rim rock crowned snake	Roseate spoonbill	Saltmarsh topminnow	Sanibel Island rice rat	Santa Fe cave crayfish	Scott's seaside sparrow	Sherman's fox squirrel	Sherman's short-tailed shrew	Short-tailed snake	Snowy egret	Snowy plover	Southeastern American kestrel	Southern tesselated darter	Striped mud turtle	Suwannee cooter	Tricolored heron	Wakulla seaside sparrow	White-crowned pigeon	White ibis	Worthington's marsh wren
ICS 13	Actions 13.1 to 13.9	17	3 9 19 21 27 36 41 42 44 48	13 16 17 18	7 21 22 23		3 9 19 21 27 36 41 42 44 48			2 15 23 30 31 32 33	21 24 26	5 6	11 22		8 11	1 11 12 21	9 14			8 18 19 20 21	17 18 19 20				9 12	8 13			3 9 19 21 27 36 41 42 44 48	40				14 15	8 14		8 13	40	8 13	40					7 19 20 21	13 14		3 9 19 21 27 36 41 42 44 48		7 8 26			15 18 19 20	40		22 23 24	40	
ICS 14	Actions 14.1 to 14.6	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

*Actions are applicable to all of the Species Action Plans

Implementation

Implementation of Florida's Imperiled Species Management Plan over the next 10 years, from 2016 to 2026, will be complex and multilayered. Some actions may require changes in FWC's policies or organization. Some require review of ongoing activities and refocusing of FWC's efforts to conserve imperiled species. All necessitate internal and external communication and collaboration. To successfully achieve the ISMP's goal and objectives, implementation requires active engagement with and participation by partners and stakeholders.

Florida's Imperiled Species Management Plan goal:

With broad public and partner support, conserve or improve the status of imperiled species to effectively reduce the risk of extinction.

Objective 1	Objective 2	Objective 3	Objective 4	Objective 5	Objective 6
• By 2017, conduct necessary research and reevaluate the five species designated as Species of Special Concern.	• By 2020, complete 15 percent of data gap actions identified in Species Action Plans and by 2025, 30 percent.	• By 2025, implement a monitoring plan for all species included in Florida's Imperiled Species Management Plan with an existing survey protocol.	• By 2016, complete a regional assessment for the FWC Northwest region and by 2020 for each of the other FWC regions.	• By 2017, focus at least 10 percent of agency resources on supporting implementation of Florida's Imperiled Species Management Plan and Species Action Plans.	• By 2018, develop a system to account for protections and conservation gains for species included in Florida's Imperiled Species Management Plan throughout the range of FWC engagement with partners and stakeholders.

Figure 4. Goal and objectives of Florida's Imperiled Species Management Plan.

Florida Fish and Wildlife Conservation Commission staff prepared the ISMP with significant support and input from partners and stakeholders, and it serves as a road map to guide us on our journey toward improving the status of Florida's imperiled species. To ensure that the desired future condition is reached, FWC is committed to leading the way. Staff across the agency was challenged and empowered to support the ISMP's implementation. Although each division and office of FWC is involved, the Division of Habitat and Species Conservation (HSC) will take primary responsibility for implementation and progress monitoring, relying heavily on the Fish and Wildlife Research Institute for research needed to fill data gaps and support management decisions.

While FWC will take the lead in developing products and supporting implementation of actions identified in the Species Action Plans and integrated conservation strategies, the agency will still rely heavily on other state and federal agencies, our key partners, and engaged stakeholders to provide the necessary input, support, and resources to successfully implement this plan.

Implementation approach

Reflected within this chapter are the priorities that FWC has identified for this 10-year-plan period, as well as the process and resources needed for implementation. The objectives outlined below are important first steps toward achieving FWC's overall goal, and are based on existing funding and staff resources. They are a focus for the agency, but are not expected to be the only work completed for Florida's imperiled species. Partners and stakeholders are anticipated to participate and provide additional achievements identified within Species Action Plans or integrated conservation strategies that may be outside the scope of these objectives.

Because of the complexity of implementing the ISMP, this plan provides direction and sideboards without detailing how the process is expected to, or will, proceed. The Law and Policy chapter explains the framework for protecting imperiled species, while the Species Action Plans and integrated conservation strategies identify conservation actions that will benefit single species or suites of species, or will aid in program implementation. Included within the Species Action Plans and the integrated conservation strategies are suggestions for how implementing a conservation action could proceed. Successful implementation works across law and policy, Species Action Plans, and integrated conservation strategies and leads us to achieving the outlined objectives, goal, and ultimately the desired future condition. Essential to this process is obtaining and integrating feedback and results so that adaptations and improvements can be made. Directed outreach by agency staff to solicit input and data both internally and externally will be ongoing and incorporated into annual progress reviews. Regularly seeking feedback and results will allow for faster adjustments that may be needed to adapt and improve implementation.

Realizing the goal of the ISMP will take many years, in part because of the magnitude of the challenges facing state-listed species, and in part due to the biology and conservation needs of some species. Progress towards this goal will be incremental, with strategic and practical use of staff resources and partner support focusing on prioritized objectives.

Measurable objectives

Conservation objectives set priorities and provide benchmarks to measure progress towards achieving the ISMP goal. Objectives will be met through implementing actions described in the Species Action Plans and the integrated conservation strategies. Priorities are identified to improve species knowledge, cooperation across the agency in implementation, and the ability to implement at regional and statewide scales. Priorities set at this point will be reviewed and revised as they are accomplished. The ISMP proposes the following objectives, which will be monitored throughout the 10-year implementation period.

Objective 1: By 2017, conduct necessary research and reevaluate the five species designated as Species of Special Concern.

During the Biological Status Reviews in 2010, five species (eastern chipmunk, harlequin darter, Homosassa shrew, osprey of Monroe County, and Sherman's fox squirrel) were identified as data deficient or peer reviewers expressed concern that the quality of the data was not adequate for assessment. Research conducted on the eastern chipmunk during development of the ISMP has provided enough data for an updated BSR, resulting in this species being delisted. For the remaining species, the decision was made to maintain them as Species of Special Concern until more data could be collected or the quality of available data is verified, with a commitment to reevaluate them at a future date. Species Action Plans were developed for these species, with the goal being to determine their conservation status. Table 7 outlines priority actions necessary to determine the status for Species of Special Concern.

Additionally, data published in 2014 (Thomas et al. 2014) indicates that three species of alligator snapping turtles occur in Florida, not one species, as previously thought. Therefore, staff recommended maintaining the alligator snapping turtle as a Species of Special Concern until a Biological Review Group can be reconvened to evaluate this new information, prepare Biological Status Reviews, and recommend listing statuses for all three species. Because the alligator snapping turtle is not considered a data-deficient species, it is not included in Table 7.

Since 2010, FWC has initiated projects to collect data necessary for an updated Biological Status Review of the data-deficient Species of Special Concern.

1. Although the harlequin darter SAP identifies a target of 2020 to complete a status review, ongoing projects are already collecting data, and a review is anticipated prior to 2020.
2. The Homosassa shrew SAP also identifies 2020 as the targeted date for a status review, but projects are underway collecting data, and a completed review is anticipated prior to 2020.
3. For the osprey of Monroe County, data collection is almost complete, and an updated review is anticipated by the end of 2016.
4. The Sherman's fox squirrel SAP identifies a five-year period after plan completion for data collection. However, ongoing research is assessing the taxonomic validity of the subspecies, developing survey protocols, and undertaking improved habitat analyses to better delineate the extent of occurrence and area of occupancy.

Table 7. Priority actions to determine the status of data-deficient Species of Special Concern by 2017.

Species	Biological Status Review Summary	Species Action Plan Objective(s)	Species Action Plan Action(s)
Harlequin darter	The Biological Review Group determined that data were insufficient to evaluate the darter. The estimated geographic range was small enough to trigger listing; however, no additional data were available to determine declines or fluctuations. Some evidence indicated that captures and possibly range had increased in recent years.	Take appropriate actions to collect valid population demographic information to facilitate a thorough status review by 2020 and use existing knowledge to maintain habitat and population levels, and to minimize impacts to populations until proposed actions are completed.	1, 2, 5–14: Completing these actions will develop a sampling protocol to determine detectability, identify extent of occurrence and area of occupancy, and estimate population size. Desired result is enough data to compare with past surveys and baseline for any future surveys.
Homosassa shrew	The BSR group determined that the Homosassa shrew did not meet the criteria for listing. However, during peer review, the lack of current data was identified as limiting the validity of the assessment. Review relied on a morphometric analysis of museum specimens that increased the range of the subspecies. No surveys or monitoring had been conducted.	Take appropriate actions to collect information necessary to allow for a thorough status review by 2020, and use existing knowledge to maintain habitat and population levels and minimize impacts while collecting data for the status review.	3–8: Completing these actions will develop a sampling protocol, initiate surveys to determine extent of occurrence and habitat characteristics for modeling area of occupancy, and provide samples for genetic analysis to delineate range of *Sorex* shrews in Florida.
Osprey of Monroe County	The osprey is listed in Monroe County only, and the BSR group determined that this population met criteria for listing based on declines in the population in the Florida Bay and lower Everglades areas. However, during the peer review period, reviewers were concerned that no information was available about the genetic status of this population, since osprey populations in other parts of the state have increased.	Determine the taxonomic relationship of the nonmigratory osprey population in Monroe County to migratory osprey from peninsular Florida.	4: Completing this action will determine the Monroe County (southern coastal) osprey population's taxonomy through genetic sampling.
Sherman's fox squirrel	The BSR group determined that Sherman's fox squirrel did not meet any listing criteria; however, they expressed concern that the data used in the review was inadequate. Of particular concern was that the habitat information used to develop potential habitat models and occupancy had not been ground-truthed and may have overestimated the area of use.	Determine the level of genetic variation between the different subspecies of fox squirrels (*Sciurus niger shermani, S. n. niger, S. n. avicennia, S. n. bachmani*) potentially occurring in Florida within five years of plan implementation. Determine the extent of occurrence and area of occupancy within five years of plan implementation.	4–9, 14: Completing these actions will provide information for genetic analysis of the fox squirrels of Florida, and gather the information needed to determine the extent of occurrence and area of occupancy.

Objective 2: By 2020, complete 15 percent of data gap actions identified in Species Action Plans and by 2025, 30 percent.

The Biological Status Reviews conducted in 2010 for all state-listed species clearly point out that data on status, trend, and basic habitat requirements for many species are missing or incomplete. During development of Species Action Plans, authors identified prioritized actions to fill data gaps as well as other actions necessary to achieve the SAP goal. Integrated Conservation Strategy 1 organizes more than 350 individual actions from the SAPs into a single strategy to fill data gaps. This strategy focuses on three areas: acquiring genetic information, acquiring life history and demographic information, and identifying optimal habitat requirements. Although the ICSs group actions based on similarity of data collected, in many cases the actions will need to be undertaken at the species level.

Addressing this strategy is a priority for the next 10 years; however, the variety and breadth of species-specific actions will require additional prioritization. Taxa-specific conservation coordinators have begun this task by organizing taxa teams—with staff from research, land management, and imperiled species programs—to develop a clear method to identify priorities. For example, the avian team has identified threat level, need, and feasibility as potential criteria for determining priority projects.

Other criteria to address data gaps may also be incorporated into a prioritization scheme for species and actions that were identified in ICS 1 (filling data gaps). A significant intention of the ISMP is to improve status and reduce threats through successful conservation and possibly reduce the need for state or federal protection; therefore, species petitioned for federal listing could be afforded a higher priority for addressing data gaps. Biological scores indicate level of endangerment and can help assess risk when setting priorities, while action scores provide insight into the knowledge level for a species and for research or monitoring efforts (Millsap et al. 1990, FWC 2012). Biological scores alone are not an adequate measure of threat. Some scores have not been updated recently, and scores are not complete for invertebrate species, possibly making expert opinion of taxa teams a more appropriate measure of threat for some species. Taxa teams may also wish to use rankings provided by Florida Natural Areas Inventory using the Nature Serve system. Cutoffs such as a biological score greater than 30, indicating significant risk (Millsap et al. 1990), or an FNAI ranking of S1 (critically imperiled) (Hipes et al. 2000), can further refine priority species. In some cases, to assure that species being removed from the state list will not need to be relisted, data gaps may need to be considered. Table 8 shows an example of the results from a prioritization process using petitioned status, threat ranking, and those species being removed from the list that are also petitioned species. This example provides a timeline for completing 105 data-gap-related SAP actions over the 10-year period, which represents 30 percent of data gaps filled by 2025. As taxa teams complete individual prioritization processes, they will work across taxa to set priorities and develop a timetable similar to that shown in Table 8. This timetable of actions will be reviewed annually for progress, and to adjust scheduling and incorporate any changes in priority status due to accomplishments, improved conservation, or emerging issues.

Some existing funding opportunities can be used to fill data gaps. Data gaps were identified as a challenge in Florida's State Wildlife Action Plan (FWC 2012), and filling them became a five-year goal for that plan, with State Wildlife Grants funds dedicated to data-gap species annually from 2012 through 2017. These funds have been significant in allowing early work on the Species of Special Concern identified in Objective 1. In 2012, the state legislature approved a Legislative Budget Request that authorized recurring funds to FWC for threatened and nongame species management. These funds, referred to as Threatened and Nongame Species Management (TNSM) funds, have been used to hire additional research staff within FWRI to address the data-gap needs of state-listed species, contract with universities to conduct needed research, and fund survey costs across FWC divisions. Along with federal partners and the Georgia Department of Natural Resources, FWC is

also conducting Coordinated Status Assessments (CSAs), funded by USFWS. The CSA species are those that are petitioned for listing and span multiple states. Ongoing projects listed in Table 8 have been funded through SWG, TNSM, and CSA programs. Since 2012, an average of 10 projects per year have been funded by SWG and TNSM, with an average duration of three years each. Many of these projects address multiple data gap actions, and at this rate of funding, completing 105 data gap actions (30%) seems to be a reasonable objective for the next 10 years.

Progress on all projects targeting threatened and endangered species is reported annually to the state legislature in FWC's Endangered and Threatened Species Management and Conservation Plan. Even with dedicated funding streams, the workload associated with filling data-gaps for so many species requires partner support and participation. As data gaps are filled and actions are completed, additional at-risk species may be suggested by staff or partners in an effort to identify threats and management needs, proactively address conservation challenges, and reduce the likelihood of state or federal protection for these species.

Table 8. Datagap priorities. Addressing datagaps for Species of Special Concern (SSC) is the highest priority; these gaps are outlined in Objective 1.

Listing status	Species	Priority*	Integrated Conservation Strategy 1			Schedule for Implementation										
			Action 1.1	Action 1.2	Action 1.3	Ongoing	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Threatened	Barbour's map turtle	P	1, 2	8, 9	7	X	X									
	Black Creek crayfish	P		7, 8	7	X	X									
	Blackmouth shiner	S1	8, 10, 11		1, 2			X	X	X						
	Crystal darter	S1	15, 16, 17, 18	2, 10	2, 5			X	X	X						
	Florida Keys mole skink	P, 32.7	5	6	6		X	X	X							
	Florida pine snake	P	6, 9	4, 5, 8	4	X	X									
	Florida sandhill crane	P		10, 12	10		X	X	X							
	Georgia blind salamander	P			1	X	X									
	Key ringneck snake	30, P	5		6			X	X	X						
	Little blue heron	31.3	29, 30	27, 28, 29	5, 11			X	X	X	X					
	Reddish egret	31.9	29, 30		5, 11	X	X	X								
	Rim rock crowned snake	P		6	5, 6			X	X	X						
	Saltmarsh topminnow	P			5			X	X							
	Sanibel Island rice rat	P	10	8	1, 2	X	X	X								
	Santa Fe cave crayfish	S1, P	6, 8	10	3, 10					X	X	X				
	Sherman's short-tailed shrew	P, 32	7	2, 6, 8	1, 8	X	X									
	Short-tailed snake	P, 30		5,	4, 5	X	X									
	Snowy plover	P		13, 14, 17, 18, 19, 20, 22, 25, 26	20, 21, 24, 26	X	X	X	X	X	X					
	Southeastern tesselated darter	S1	6, 7, 8	9	8					X	X	X				
SSC	Alligator snapping turtle	P	12	3, 8	7			X	X	X						
Delisted	Gopher frog	P, DL	9, 10, 11	5, 12	5	X									X	X
	Peninsula ribbon snake	30.6, P, DL	5		8								X	X		
	Striped mud turtle	P, 34	11	7, 9, 10	1, 2									X	X	X

* P indicates a species petitioned for federal listing; number denotes the Millsap ranking of 30 or above; and S1 is the FNAI ranking for fish or invertebrates; DL indicates delisted.

Objective 3: By 2025, implement a monitoring plan for all species included in Florida's Imperiled Species Management Plan with an existing survey protocol.

Species monitoring, a critical component of wildlife conservation, provides information on species status and response to management, and is the basis for adaptive management in conservation. Surveying and monitoring needs are identified for most state-listed species and include the need to develop new protocols, refine existing protocols to better fill data gaps or gather information for status reviews, and implement protocols on a wider basis or in a more rigorous manner. The SAP survey and monitoring actions are summarized in ICS 2.

Challenges to effective monitoring can be formidable. Cryptic species are difficult to detect, and testing survey methods and determining detection probabilities will be required in order to have rigorous monitoring protocols for collecting statistically valid data. For some species, information needs will also determine the level of monitoring necessary. For example, some SAPs call for presence and absence surveys to determine occupied habitat, repeated surveys to determine abundance, or surveys to detect offspring or develop estimates of reproductive rates. In each case, the type and intensity of monitoring can vary greatly. Effective monitoring can only result from a coordinated, cooperative effort between FWC, partners, and the public.

The first priority is to develop the monitoring program, or roadmap. This will be done cooperatively by FWC staff and species experts outside the agency, as appropriate. It is important to note that not all species will be monitored: many may not have a protocol developed, status may not require monitoring, or data gained from monitoring may not provide tangible improvements in conservation.

The monitoring program will also need to consider the following.

- Species-specific monitoring needs. The SAPs identify individual species needs for monitoring, but typically leave the details (frequency, extent) to be developed later by statisticians and species experts. The first step in developing a roadmap is to review the SAPs and convene small groups of species experts along with statisticians to assess level of monitoring effort needed.
- Feasibility and importance. Not all species can be effectively monitored. In some instances monitoring may increase disturbance or mortality beyond acceptable levels, or detection rates may be difficult to determine, leaving the data in question. As species experts consider level of effort, they will also need to assess feasibility and importance of including a species within a monitoring plan.
- Protocol development. A component of feasibility is presence of existing protocols for surveying. Many species do not have existing protocols and, if development is feasible, the protocols may take several years of testing prior to implementation. In addition, survey protocols may not be realistic for cryptic species; therefore, developing, testing, and refining protocols is expected to occur.
- Species or habitat monitoring targets. In some cases, monitoring a single species may serve for data on suites of species; and monitoring specific habitat components may be more efficient in assessing habitat targets than more general monitoring (e.g., if downed trees and stumps are important for a species, that feature would be monitored). Targets for what to monitor, and how often, are necessary.
- Resources available. Both funding and staff are limited, and accomplishing monitoring goals needs to be balanced with accomplishing data-gaps projects and completing work to reassess status of Species of Special Concern. Using citizen science, partner agencies, and volunteers may help achieve the monitoring objective. Elements from existing programs, such as Wildlife Conservation Prioritization and Recovery and the Florida Shorebird Alliance will be included (Integrated Actions 2.1 and 2.2) in the monitoring plan.
- Data management and analysis. Monitoring can produce a wealth of data necessary for conservation; however, having an efficient method of storing and accessing data, and staff to analyze it, will be critical to a successful monitoring plan. The roadmap needs to identify the areas where management and

analysis can already absorb monitoring data, and provide an estimate of additional needs. One possible tool for managing some of the information contained in the roadmap is the proposed SWG-funded FWC Species and Habitat Monitoring Catalog, which began in July 2015. The catalog contains metadata for species and habitats such as who is monitoring, what is being monitored (species and habitats), and where (location data) and when (the period and frequency of sampling efforts) monitoring occurs.

Creating the roadmap first will allow implementation of monitoring efforts and data collection without waiting for all protocols to be developed. However, developing protocols for species without any type of standardized monitoring is an important component of this objective (Integrated Action 2.3). For those species that are difficult to detect, testing and refining a protocol becomes even more important to ensure reproducibility. As protocols are developed, species experts and statisticians will need to review the roadmap and consult with partners (e.g., USFWS) to determine placement within the monitoring plan. For example, research efforts through State Wildlife Grants or other state funds are currently developing survey and monitoring protocols for the reddish egret and fox squirrels, which should be complete by 2018. As information is attained and data gaps are filled (see Objective 2), the type of monitoring may evolve based on species information needs and annual review of the monitoring plan by FWRI in consultation with FWC's Species Conservation Planning staff.

A transparent monitoring plan also provides the public and stakeholders with information on why some species are not being monitored and identifies resources needed if more species are to be incorporated. Building capacity for increased monitoring by engaging partners and building stakeholder involvement through volunteering and citizen science projects can occur after the initial monitoring plan is developed. Successful implementation does not require that all species are monitored every year, only that species-specific information needs and realistic opportunities for monitoring have been accounted for. A timeline for developing a monitoring roadmap is shown in Table 9.

Table 9. Timeline for development of a monitoring roadmap.

Action	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Assemble experts to review SAP monitoring actions										
Assess feasibility and identify monitoring targets										
Draft roadmap or monitoring plan										
Develop, test, and refine protocols as needed										
Engage partners, citizen scientists, and volunteers										

Objective 4: By 2016, complete a regional assessment for the FWC Northwest region and by 2020 for each of the other FWC regions.

The purpose of regional assessments is to move multiple planning documents into action at a local level by evaluating identified conservation needs and aligning these with regional FWC priorities, partners, and opportunities. Assessments will identify key conservation actions and strategies for imperiled and at-risk species within the region, entities that have a role in implementation, important public or state conservation lands, and potential private lands where conservation partnership opportunities may exist. Regional assessments are not intended to be a comprehensive look at everything that needs to happen within a region; instead, the assessments will outline a set of priorities that integrate existing plans including, but not limited to, Florida's Imperiled Species Management Plan, Species Action Plans, area-specific Wildlife Conservation Prioritization and Recovery strategies, federal Species Recovery Plans, and Florida's State Wildlife Action Plan. The intent is to create a "playbook" for each of the five FWC regions, outlining the highest priority actions for both species and habitat conservation. Regional assessments, when applied to strategically steer resources (e.g., staff time, funding, partnership-building, targeted technical assistance), should broaden the impact of existing conservation plans and result in quantifiable conservation gains.

This result will be achieved through an assessment that identifies conservation priorities at a regional level and outlines supporting actions. These priorities will fall into the following categories.

- Focal species (priority species warranting specific conservation attention in the region).
- Focal habitats (priority land-cover types within the region).
- Focal areas (areas or sites within the region key to conservation of focal species and habitats).

Some imperiled species are localized to specific areas, while others have a statewide or multiregional presence. The most significant threats and needs for those species could vary across regions, across the state, or even within a region. The regional assessments will consider actions from Species Action Plans as well as integrated actions from integrated conservation strategies, apply the appropriate regional filters (e.g., threats, available conservation lands, habitat connectivity, land use), and then identify key conservation actions and strategies for imperiled and at-risk species within the region. Entities whose work influences wildlife diversity and conservation within the region should be able to use the assessment to understand each other's unique roles and responsibilities, as well as to identify areas where they overlap and can work together.

As part of the regional assessment, a more in-depth evaluation of where imperiled species and their essential habitats overlap will allow focal areas to emerge and resources to be strategically applied. Identifying areas of importance for imperiled and rare wildlife in Florida is not a new concept. In 1994, FWC published *Closing the Gaps in Florida's Wildlife Habitat Conservation System* (Cox et al. 1994), a report that introduced the concepts of strategic habitat conservation areas and regional biodiversity hot spots. The report was updated in 2009 and is now titled, *Wildlife Habitat Conservation Needs in Florida: Updated Recommendations for Strategic Habitat Conservation Areas* (Endries et al. 2009). Regional assessments will build on the information described in these reports, updating priority areas for imperiled and at-risk species conservation, and take the next step toward implementation: incorporating the information into FWC operations and using directed outreach to ensure that the information is utilized by partners and stakeholders.

Through the process of identifying regional conservation actions and Species Focal Areas, entities that should have a role in implementation will emerge. Successful implementation will require active engagement, collaboration, and communication with those entities, many of whom are already key partners and stakeholders. Regional FWC staff will work with partners and stakeholders and provide consultation for conservation, resto-

ration, and management of imperiled species and those habitats supporting essential behavioral patterns. Existing tools such as the Critical Lands and Waters Identification Project and Cooperative Conservation Blueprint will be utilized to inform this process.

The first regional assessment, initiated in early 2015, was conducted for FWC's Northwest region, with subsequent assessments to be focused on each of the other four regions (see Table 10 for anticipated schedule of completion). Each regional assessment will be led by FWC staff, with input from partners and interested stakeholders.

Table 10. Objective 4 implementation: regional assessments development timeline.

FWC Region	2016	2017	2018	2019	2020
Northwest					
North Central					
Northeast					
Southwest					
South					

Objective 5: By 2017, focus at least 10 percent of agency resources on supporting implementation of Florida's Imperiled Species Management Plan and Species Action Plans.

Completing development of the ISMP, and implementing prioritized species actions and integrated conservation strategies, are together identified in one of six strategic initiatives in the FWC's Agency Strategic Plan. To ensure successful implementation of the strategic initiatives, FWC has committed to staff involvement from all levels of the agency, with realignment of resources as necessary. The agency's commitment to successful development and implementation of the ISMP is already evident, with over 100 cross-agency staff involved in development of Species Action Plans and subsequent development of Florida's Imperiled Species Management Plan.

Since SAP development, the agency has already undertaken implementation of actions identified in the Species Action Plans and integrated conservation strategies. Examples include filling data gaps for Species of Special Concern, conducting and testing survey protocols (Homosassa shrew, Sherman's short-tailed shrew, saltmarsh topminnow, and blackmouth shiner), conducting genetics studies (osprey, fox squirrels, and Florida mouse), habitat enhancement (Chassahowitzka WMA, Big Bend WMA, and Tate's Hell WMA), staff support for stewardship and outreach (Critical Wildlife Area technicians and volunteer coordinators), and providing technical assistance (partners, private landowners, and public). Implementation of the ISMP also overlaps with other

agency strategic initiatives (e.g., Expanding Participation in Conservation and Conservation Through Innovation) and, where possible, ISMP priorities are intended to align with agency strategic initiatives. Priorities identified in Table 11 are not the limit for what a division, office, or section may work on, but represent a focus of effort to achieve ISMP objectives. Opportunities may arise to engage in actions not listed as priorities, and these should be considered individually. In many instances, capitalizing on these opportunities will improve conservation; however, opportunistic endeavors should not detract from progress towards priority ISMP strategies and actions.

The diverse nature of the species and actions included in the ISMP requires expertise from across the agency to effectively implement the plan. Objective 5 of the ISMP sets priorities for each division and office; however, achieving these actions is not intended to fall on only those entities. Research needs are driven, in part, by management needs, so researchers and managers must continue to work together to identify funding needs, develop work plans and project proposals, and undertake monitoring or other projects. Law enforcement staff working with species experts and permitting staff will be crucial in developing solid guidance for officers on identifying species and the situations that cause take. Community Relations, Office of Public Access and Wildlife Viewing Services, Office of Information Technology, and species experts within FWRI and HSC will continue to work together to develop citizen science programs and databases for species-sighting reports where called for in the SAPs, and to make the public aware of these programs and the importance of their participation. Identified priorities may or may not be led by a particular division or office; some may provide consultation and expertise without taking on full responsibility for achievement. Table 11 identifies priority strategies and actions relevant to FWC division, office, or program area.

Table 11. Implementation priorities for FWC divisions and offices.

Division or Office	Integrated Conservation Strategy (ICS)	Integrated Action
Habitat and Species Conservation	ICS 1: Data gaps	1.4: Species assessments
	ICS 2: Species monitoring	2.2: Coordinate monitoring programs
	ICS 3: Habitat monitoring	3.4: Test potential habitat maps
	ICS 4: Threats to species	4.1: Model potential land-use conflicts
		4.2: Climate change
		4.5: Nonnative species impacts
	ICS 5: Habitat management	5.1: Species' habitat requirements
		5.2: Build partnerships to improve habitat
		5.3: Habitat restoration and enhancement
		5.4: Restore coastal, riparian, and streamside habitats
		5.6: Integrated pest management
	ICS 6: Protect and manage sufficient habitat	6.1: Habitat conservation targets
		6.2: Long-term habitat protection
		6.3: Habitat corridors
	ICS 7: Population interventions	7.1: Protect essential habitats from disturbance
		7.2 Artificial habitats
		7.3: Manage habitat to control predators
		7.4: Restore habitat for population augmentation
		7.5: Framework for mitigating habitat loss
	ICS 8: Partnership incentives	8.1: Permitting guidelines and conditions
		8.2: Habitat management incentives
		8.3: Habitat protection incentives
	ICS 9: Influencing land conservation and management	9.1: Habitat management guidelines
		9.2: Implementing habitat management guidelines
		9.3: Imperiled species essential habitat
		9.4: Local government coordination
		9.5: Water-quantity and -quality coordination
		9.6: Land management consultation
	ICS 11: Prescribed fire	11.4: Prescribed fire partnerships
	ICS 12: Land and water transition zones	12.2: Land-use planning
	ICS 13: Conservation stewardship	13.4: Coexisting with imperiled species
		13.5: Minimize-disturbance guidelines
Fish and Wildlife Research Institute	ICS 1: Data gaps	1.1: Genetics studies
		1.2: Demographic and life-history studies
		1.3: Habitat requirements
	ICS 2: Species monitoring	2.1: Comprehensive survey and monitoring program
		2.3: Standardized protocols for species monitoring
		2.4: Species sighting reports
	ICS 3: Habitat monitoring	3.1: Develop standardized protocols
		3.3: Spatial database for habitat monitoring data
		3.4: Model and map potential habitat
	ICS 4: Threats to species	4.4: Contaminant and disease
	ICS 14: Infrastructure and capacity	14.1: Data and information systems
		14.2: Information technology capacity
		14.3: Project selection
		14.4: Statistical support
Hunting and Game Management	ICS 5: Habitat management	5.2: Build partnerships to improve habitat
	ICS 7: Population interventions	7.3: Manage habitat to control predators
Freshwater Fisheries Management	ICS 4: Threats to species	4.3: Water quality and quantity
	ICS 9: Influencing land conservation and management	9.5: Impacts to aquatic imperiled species
Marine Fisheries Management	ICS 5: Habitat management	5.5: Minimize nonnative impacts
	ICS 6: Protect and manage sufficient habitat	6.1: Habitat conservation targets
	ICS 12: Land and water transition zones	12.5: Waterway practices
Law Enforcement	ICS 7: Population interventions	7.1: Protect essential habitats from disturbance
	ICS 10: Compliance with rules and permits	10.1 and 10.2: Addressing noncompliance
	ICS 13: Conservation stewardship	13.2: Promote awareness and observations
Office of Information Technology	ICS 2: Species monitoring	2.4: Species sighting reports
	ICS 14: Infrastructure and capacity	14.1: Data and information systems
		14.2: Information technology capacity
Office of Public Access and Wildlife Viewing Services	ICS 2: Species monitoring	2.5: Develop citizen science projects
	ICS 12: Land and water transition zones	12.6: Citizen science, stewardship, and community
	ICS 13: Conservation stewardship	13.3: Promote citizen science projects
Office of Policy and Accountability	ICS 10: Collaboration with permitting and enforcement	10.1 and 10.2: Addressing noncompliance
Community Relations Office	ICS 11: Prescribed fire	11.3 and 11.6: Prescribed fire communication
	ICS 12: Land and water transition zones	12.3: Wildlife-friendly practices
		12.4: Zone-friendly practices
	ICS 13: Conservation stewardship	13.2: Promote awareness and observations
		13.6: Wildlife-wise campaign
Finance and Budget	ICS 14: Infrastructure and capacity	14.6: Support framework for external funding
Legal Office	ICS 10: Compliance with rules and permits	10.1 and 10.2: Addressing noncompliance
Legislative Affairs Office	ICS 8: Partnership incentives	8.1: Conservation measures
		8.2: Economic incentives
		8.3: Conservation tools
Youth Services	ICS 14: Infrastructure and capacity	14.5: Youth involvement in projects
Regional Operations	ICS 9: Influencing land conservation and management	9.4: Establish priority areas

Cross teaming is one way to achieve this objective; however, staff duties and improving efficiencies may also need to be considered. Implementing the ISMP will require a shift in duties for some staff. For example, taxa-specific conservation coordinators, who have served on data gaps and SGCN revision teams for FWLI, assist commenting staff on providing species-specific information during development-project review, provide biological opinions to permitting staff, and identify species needs and methods to address them. During ISMP implementation, conservation coordinators will continue to fill many of these roles, but with an increased focus on listed and at-risk species; they will also take on new roles in assessing progress for the ISMP. In order to meet the ISMP objectives, some duties currently covered by conservation coordinators may shift to other staff or to partner groups. The Species Conservation Planning section of FWC is involved in accomplishing many of the strategies and actions, and ultimately staff of this section will coordinate implementation across the agency and monitor progress towards ISMP objectives. Past planning efforts have listed priority activities, but by delineating responsibility for their implementation, there is greater accountability in achieving the objectives.

The schedule for achieving Objective 5 is shown in Table 12. Monitoring applied resources and evaluating necessary adjustments will be important in achieving this objective. Additional monitoring and adjustments will continue beyond 2020, although the recommended percent of applied agency resources may be adjusted after five years of implementation.

Table 12. Objective 5 implementation timeline.

Action	2016	2017	2018	2019	2020
Directed outreach and coordination for priority actions					
Applied resource monitoring and reporting					
Recommendations for resource adjustments					

Objective 6: By 2018, develop a system to account for protections and conservation gains for species included in Florida's Imperiled Species Management Plan throughout the range of FWC engagement with partners and stakeholders.

The public, partners, and stakeholders interact with FWC in a variety of ways, but to-date no system accounts for conservation gains throughout the wide array of existing FWC programs. Understanding how these interactions impact conservation is needed in order to assess the effectiveness of these programs in implementing the ISMP.

The SAPs and ICSs identified the need to engage with partners and stakeholders in many different ways. Landscape-level planning tools, habitat management information, voluntary conservation actions, and incentives for conservation practices are the primary ways identified for FWC staff to interact with the public and with partners. Existing programs within FWC focus on these areas of interaction, but the SAPs call for specific actions to improve interactions relative to species conservation. When impacts to imperiled species habitats might occur, FWC also works with stakeholders through other agencies in a commenting and technical-assistance

role, and may provide avoidance and minimization measures or accept mitigation through another agency's permitting process (e.g., Environmental Resource Permits issued through DEP or the water management districts). Some land-use actions may trigger the need for FWC permitting, leading FWC to interact with a smaller group of stakeholders. The smallest subset of engagement with the public occurs when FWC law enforcement becomes involved in imperiled species issues; and this involvement is most often in the form of education over compliance. Figure 5 shows the narrowing levels of public engagement, with the focus on broad conservation actions over a strong regulatory approach. Integrated actions follow the narrowing levels of engagement, with more actions focusing on larger landscape conservation and management than on permitting and enforcement. Achieving Objective 6 will require both implementing the integrated actions and accounting for the implementation through many of FWC's existing programs. The Integrated Conservation Strategies chapter further details implementation of these strategies.

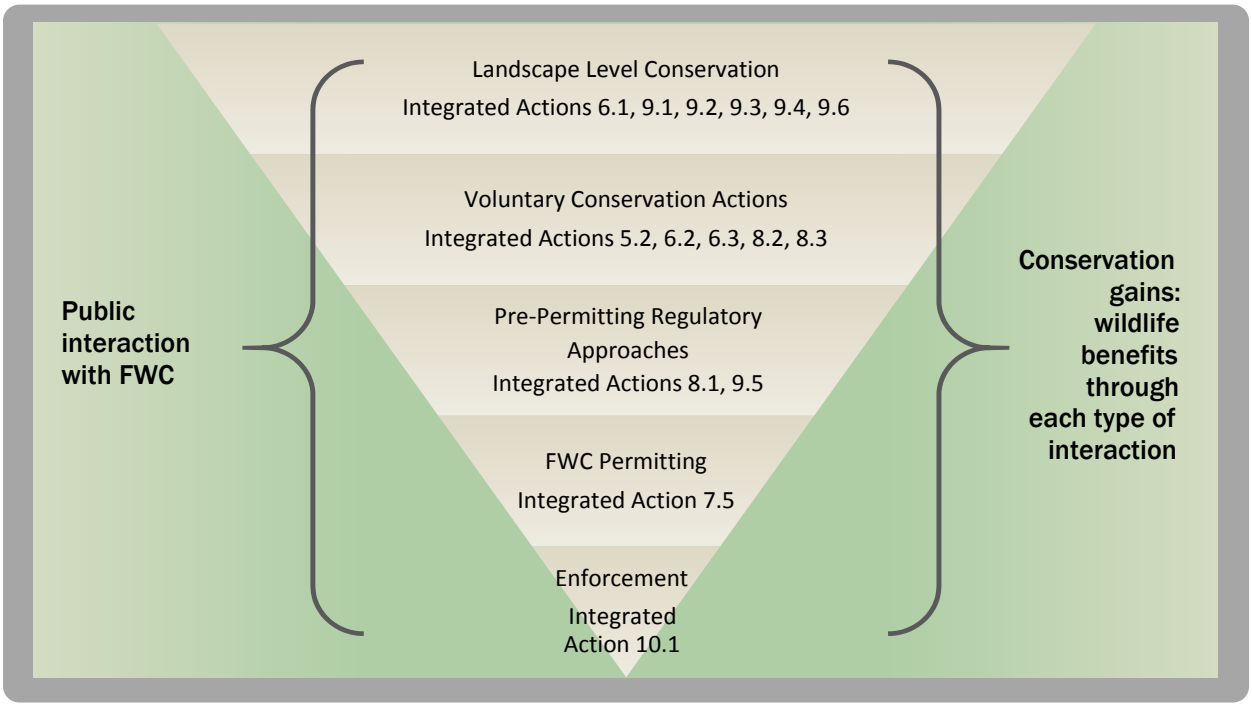

Figure 5. Means by which public interaction with FWC leads to conservation gains.

To accomplish Objective 6, FWC staff and partners will identify, out of a range of interactions described below, the key components that provide the greatest conservation gains. Targets within each of these components (e.g., acres of land management, acres of conservation easements, numbers of permits issued) will be used to account for the conservation within existing programs, and relate how this benefits the species included in this plan. Tracking these components will be the responsibility of those within FWC who administer each program.

Landscape-Level Conservation

Landscape-level conservation is the broadest level of FWC interaction. Influencing broad land-management decisions, along with identifying areas for conservation, supports wildlife diversity and can improve conditions for wildlife. Existing tools such as Florida's Cooperative Conservation Blueprint and the Critical Land and Waters Identification Project can provide the basis for identifying and prioritizing the areas for conservation (Integrated Action 6.1). The regional assessments identified in Objective 4 also play an important role in assessing

landscape issues at regional scales.

Another way that FWC influences landscape-level conservation is by participating in the review and development of comprehensive plans through the comprehensive growth management plan process. Reviewing these plans allows FWC staff, in conjunction with local governments, to identify priority areas for imperiled species and encourage development planning that addresses habitat conservation (Integrated Action 9.4).

The Florida Forever Act (Section 259.105(2a)11, F.S.) requires that land acquired through the Act be managed for imperiled species. One way that FWC ensures this on agency-managed lands is through the Wildlife Conservation, Prioritization, and Recovery program, which identifies focal species on wildlife management areas and provides habitat management guidance to benefit them. Although the WCPR program currently provides input on properties managed by FWC, similar programs for other state conservation lands would be one way to accomplish Integrated Actions 9.1, 9.3, and 9.6. The Florida Forever Act also requires development of Conceptual Management Plans for all state-owned properties, and WCPR guidance is included in these plans to meet the state-mandated requirement to manage for imperiled species. Information generated through regional assessments will broaden our ability to provide input into Conceptual Management Plans.

Staff from FWC also participates in developing and reviewing Integrated Natural Resource Management Plans for Department of Defense lands. Military installations in Florida represent significant areas of undeveloped land, and many of these areas contain important sites for wildlife. By participating in the review of INRMPs, FWC helps to ensure that state-listed species concerns are addressed as part of the land management on Department of Defense properties.

Voluntary Conservation Actions

Voluntary conservation actions allow managers of private and public lands to support wildlife diversity and imperiled species conservation through their land-management practices. Voluntary actions are often supported by programs that provide incentives to private landowners to manage for imperiled species and for wildlife diversity, and FWC leads several of these programs.

The FWC Landowner Assistance Program (LAP) is a cooperative, habitat-based approach that promotes and assists wildlife habitat conservation on private lands, and many of the activities undertaken help to accomplish Integrated Actions 5.2, 6.2, and 6.3. This program provides technical and financial assistance to private landowners interested in restoring and conserving wildlife habitat on their property. It also encourages and promotes voluntary management of wildlife habitat through recognition and awards programs as well as educational workshops and field days. With approximately 70 percent of Florida's undeveloped landscape in private ownership, continued outreach to, and partnership with, private landowners is essential to the effective conservation of high-priority habitats. Although the Florida Forever program has been the nation's largest land-acquisition program, rising land costs and ever-increasing development pressures have limited the ability to conserve Florida's priority wildlife habitats through acquisition alone. Despite the accomplishments of acquisition programs, public entities will simply not be able to purchase all priority conservation lands, nor fund associated management costs. Partnerships with private landowners are essential to the conservation of wildlife in Florida and a critical element to the success of the ISMP. More specifically, developing and supporting private landowner incentive programs is identified in Integrated Action 8.2 and the State Wildlife Action Plan as a high priority for abating multiple statewide threats to Florida's species and habitats of greatest conservation need. Although LAP tracks accomplishments for lands enrolled in the program, understanding how those accomplishments benefit imperiled species management has not been considered to date. Future coordination between LAP staff and conservation planning staff should identify metrics that can be used for tracking imperiled species conservation on enrolled lands, without additional burden to the landowner.

Other voluntary incentive programs that FWC manages through the Species Conservation Planning section include two USFWS programs: Safe Harbor agreements and Candidate Conservation Agreements. Although both programs were developed by USFWS, FWC provides oversight in enrolling participants, monitoring success, and providing species- and land-management expertise to develop goals. Both programs benefit imperiled species through land-management practices and assurances to landowners that those practices will not be regulated or require permitting. Safe Harbors allow landowners to enroll their property at its baseline condition, with the assurance that if they manage the property well and imperiled species are recruited, they will be able to return to the baseline without penalty. Candidate Conservation Agreements outline management actions that benefit one or more species; the target species being those identified as candidates under the federal Endangered Species Act, although state-listed species or at-risk species with no federal status can also benefit. The incorporation of state-listed species, or development of state-level versions of these federal programs, is one way to implement Integrated Action 8.3. Conservation banking and Payment for Ecosystem Services, as part of an incentive package to landowners who would like to conserve land and still receive an economic benefit, are additional avenues to explore in achieving Integrated Action 8.3.

Coordination with other State and Federal Agencies

Pre-FWC-permitting regulatory approaches occur when FWC staff within the Office of Conservation Planning Services provides input on projects that include land-use changes (see Table 3 for a full explanation of these types of regulatory programs). Before issuing permits, the Florida Department of Environmental Protection and water management districts seek input from FWC in an effort to incorporate state-listed species considerations into permits they issue. Species-specific guidance provided to these agencies and incorporated into project designs or comprehensive planning will improve conservation. One of the approaches to permitting take of state-listed species is to allow permits from other agencies that require mitigation (such as wetlands permits) to offset take of state-listed species when that mitigation also achieves conservation benefit as evaluated by the factors described in Rule 68A-27.003, F.A.C. Another option is that other agencies may incorporate FWC's conditions for avoidance and minimization into the permits they issue. In both cases, this may reduce duplicate permitting for the applicant. However, close coordination is needed with other agencies to be certain that statutory authorities will allow this. In addition, FWC staff will need to monitor any issued permits to assess how well they address take of state-Threatened species by meeting rule requirements for incidental take permits. These processes will begin to implement Integrated Actions 8.1 and 9.5. To fully implement Action 8.1, FWC will need to engage directly with county and municipal governments to assure that staff approving development and/or building permits understands FWC's Species Conservation Measures and Permitting Guidelines. Technical assistance on implementing Guidelines should be provided early in any permitting process to help avoid impacts and to minimize the need for FWC permits for take of state-listed species.

In addition to the regulatory programs listed in Table 3, agricultural impacts are considered through the development of wildlife Best Management Practices, as required by Rule 68A-27.007(2)(d), F.A.C. Agriculture, as defined in Section 570.02, F.S., conducted in accordance with Chapter 5I-8, F.A.C., and the wildlife BMPs adopted in Rule 5I-8.001, F.A.C., by the Department of Agriculture and Consumer Service pursuant to Section 570.94, F.S., is authorized and does not require a permit authorizing incidental take despite any other provision of this section or Rule 68A-27.005, F.A.C. Participation in the Florida Forestry Wildlife BMPs and Florida Agricultural Wildlife BMPs program and implementation of these BMPs provides a presumption of compliance with regard to incidental take of specified state-listed species.

FWC Permitting

Permitting by FWC for take of state-listed species is described in the Law and Policy chapter. While implement-

ing Integrated Action 7.5 is a component of the permitting system, it is built on prior work in improving landscape-level planning, voluntary conservation, and FWC involvement in other regulatory programs to avoid impacting imperiled species. When take of state-listed species cannot be reasonably avoided, guidance for minimizing take (as outlined in the Species Conservation Measures and Permitting Guidelines) may be followed. For permitted incidental take of state-Threatened species, the application must demonstrate conservation benefit in accordance with the seven evaluation factors. Multispecies measures for some habitats could cover all potential listed species within that habitat for minimization and mitigation. When mitigation is provided as offset or conservation benefit, funds collected will be maintained by the Wildlife Foundation of Florida, and used for actions outlined in the SAPs and ISMP, including habitat management or acquisition, research, outreach, and development of incentives for voluntary conservation actions.

Law Enforcement

While the focus of effort outlined in the ISMP is primarily nonregulatory, rules are in place that may need enforcement. For example, where overcollection is a concern, rules provide limits on numbers of individuals that can be collected. When necessary, FWC law enforcement will play an important role in enforcing regulations (Integrated Actions 10.1 and 10.2). To effectively use law enforcement, training will be needed on identification of species and of activities that cause take. To enhance the nongame species training beyond that provided at the academy and to provide continuing education to officers, training and awareness of regional issues affecting imperiled species will occur on a regular basis. Expanding officer familiarity with imperiled species can be an important tool to reduce or minimize the need for regulatory requirements or rules. Methods to expand this familiarity will continue to be explored, and online training modules for specific species or issues are already being planned. In-person training by biologists at regional captain's meetings can also be an effective way to allow for extended discussions between biological staff and law enforcement officers about imperiled species. The implementation schedule for Objective 6 is shown in Table 13.

Table 13. Objective 6 implementation timeline.

Action	2016	2017	2018	2019	2020
Identify core components					
Identify tracking targets					
Develop system to track targeted conservation goals					
Implement system					

Implementation resources

As with implementing any plan, successfully achieving the outlined objectives requires the application of appropriate resources. The FWC is committed to leading the ISMP implementation effort by applying substantial

agency resources, as well as working closely with partners and stakeholders to leverage additional support, manpower, and funding. Adjustments can be expected throughout the 10-year period, as additional resource needs are identified and solutions are determined.

Staffing and funding

Agency commenting for impacts to imperiled species and permitting for state-listed species are two additional areas that may need increased staff, because many of the ICS and SAP actions will increase the workload across the agency. As areas are identified that require additional staffing efforts, vacancies should be evaluated across the agency for best use. Fully staffing implementation of the ISMP will require creativity and flexibility. Use of mitigation contributions to fund additional staff, including support for permitting and commenting programs, may need to be considered (see Law and Policy chapter). Contributions collected as part of the permitting process will be held by the Wildlife Foundation of Florida as required by statute; and conservation funds held by the Foundation have an establishment process that identifies allowable expenditures as research, management, outreach, and incentives. Currently, all protected-species permits issued by FWC are no-fee permits, meaning that there is no cost to an applicant when applying for the permit. Assessing a nominal permit-processing fee to each application would allow for greater staff support in the program; however, this option would require legislative approval and is not being considered at this time.

Multiple funding sources that address wildlife diversity conservation, and imperiled species in particular, are available to FWC. Through the Section 6 agreement of the U.S. Endangered Species Act, states are allotted funds based on the number of federally listed species occurring in that state. In addition to these traditional funds, Section 6 provides competitive funding for the development of habitat conservation plans and some land acquisition where it benefits federal species; FWC provides technical guidance for habitat conservation plans and land acquisition, and incorporates concerns regarding state-listed species in these plans.

The State Wildlife Grants program provides funds for species not listed under the Endangered Species Act. Goals set by FWLI guide specific projects eligible for these funds, but they are generally targeted toward improving wildlife diversity. The FWLI's goal to fill data gaps has benefited many state-listed species by providing funds to conduct research. Habitat-level projects and conservation planning tools developed using SWG funds will also play an important role in developing regional priorities and identifying landscape conservation needs that will benefit suites of species.

The state legislature provides dedicated funding for management of threatened and nongame species, and these recurring funds are set aside for projects that address the measurable objectives of the ISMP. Leveraging these funds with those provided by the SWG program allows more projects to be completed, provides match, and can jumpstart projects to assure that needed data are collected within the grant time frame. These funds may also be used to hire temporary staff to help with seasonal survey and monitoring projects, but this is not the preferred option for increasing funding for permitting staff. Other available funding sources include Conserve Wildlife Tag grants through the Wildlife Foundation of Florida nongame tag program. The Foundation sets sideboards in line with agency priorities for selecting projects to receive these funds. Agency-base funds in AHCR and Wildlife and Habitat Management section also provide for land-management activities, which support wildlife diversity conservation. Actions for imperiled species conservation identified by the WCPR program on wildlife management areas are given priority in funding discussions, where appropriate. Examples include participation of staff from FWC's Wildlife and Habitat Management section in collecting data on presence of Florida mice on WMAs and restoration of habitats that support a suite of imperiled upland-species. The Aquatic Habitat Restoration and Enhancement program solicits project ideas to support conservation of imperiled species, and works with staff throughout the agency to implement these projects. An example of this

is the use of funds to restore wetlands for the Sanibel Island rice rat and Florida bog frog.

Additional funding through the RESTORE Act and other oil-spill-related funding has been proposed, but the scope of use for these funds is limited to the Gulf coast and will not apply to all imperiled species. Legislative Budget Requests may need to be considered in future years to meet the implementation needs of the ISMP.

Implementation process

The ISMP has more strategies and actions than can be reasonably accomplished in a five- or 10-year period, so priorities have been identified through the objectives. Management that allows for adaptation based on feedback from implementation will allow for better-informed decision-making and improved future actions.

The ISMP is part of an overall imperiled species management approach to support the full array of wildlife diversity in Florida. Implementation therefore needs to address how the ISMP fits into the bigger picture of FWC programs and to provide flexibility as actions are implemented, species status is improved, and additional species are reviewed for inclusion. The Law and Policy chapter provides structure for protections, but this structure allows for latitude and creativity in implementation. Species threats and conservation actions are outlined in SAPs along with information on how to best achieve the actions. The ICSs looked across all these actions to identify areas of commonality to increase efficiency and provide guidance on how to achieve these actions. The measurable objectives set priorities for FWC and represent our commitment to imperiled species conservation in Florida; achieving the full breadth of SAP and ICS actions will require the full support and participation of stakeholders and partners. As part of the adaptive process, input from staff and partners will help to identify implementation areas that are working well and those that need additional effort. Emerging issues can be identified early with effective internal and external communication, and these issues can then become part of the adaptive process of implementing the ISMP. Providing clear and frequent messages about how we are improving, and will continue to improve, imperiled species management will help maintain support and momentum during implementation. Annual progress reports and five-year reviews will provide formal opportunities to engage with staff, partners, and stakeholders. Interim feedback is welcomed and should be directed to the ISMP Coordinator within the Species Conservation Planning section in the Division of Habitat and Species Conservation.

Following the 2010 Biological Status Reviews, and continuing after Species Action Plan development, work on implementation has begun in advance of the final ISMP. In many of the ISMP objectives schedules, the time frames include “ongoing” with a very short time to completion. In most cases, this is a result of beginning work on those actions prior to completing the ISMP. Implementation is fluid and needs to incorporate feedback loops to address changes and progress. The following sections lay out progress to date, as well as progress monitoring, reporting, review, and revision, along with how to address amendments to the plan and species evaluations.

Progress to date

Adoption of the new conservation model (initiated with the 2010 rule changes in Chapter 68A-27, F.A.C.) set a course for significant work to be completed over the next several years. Even during development of Florida’s Imperiled Species Management Plan, a focus toward improved imperiled-species management was already underway. Iterated throughout the Species Action Plans is the need to fill data gaps on the species and their habitats. Obtaining additional information allows for improved conservation management decision-making.

Projects funded with agency trust funds, as well as state and federal grants, will fill data needs, improve or

protect habitat, and expand partnership opportunities, and they include the following.

- Research and Monitoring. Emphasis is on research necessary to determine future listing status of Species of Special Concern (e.g., eastern chipmunk, harlequin darter, Homosassa shrew, osprey, Sherman's fox squirrel). In 2013/14 the legislature approved funding for Threatened and Nongame Species Management, and priority earmark for these funds has been SSC data gaps. Additional funding through State Wildlife Grants, existing internal funds, Conserve Wildlife Tag grants, and federal partners has been used to support research and monitoring efforts for data gaps, and projects have been initiated for all SSC. New data will allow FWC to re-evaluate the status of these SSC species in 2017 and 2018. Many other species identified in Table 8 as having data gaps, such as the Barbour's map turtle, Georgia blind salamander, blackmouth shiner, Sanibel Island rice rat, Sherman's short tailed shrew, and gopher frog, have all had targeted survey efforts funded.
- Citizen Science. Volunteer coordinators for FWC have been partially funded through money earmarked for threatened and nongame species. A project to build and install kestrel boxes is one example of how an imperiled species has benefited while planning is ongoing.
- Model development for improved habitat occupancy and species range mapping products.
- Directed habitat management for species such as shorebirds through establishment and management of Critical Wildlife Areas and southeastern American kestrels through addition of nesting boxes in potential habitat. Coordination on ISMP species has also directed funding for habitat management on agency Wildlife Management Areas.
- Increased social media postings about imperiled species and wildlife diversity.

Progress monitoring and reporting

The ISMP covers 57 state-listed species in 46 Species Action Plans; identifies more than 900 species-specific actions and, through the integrated conservation strategies, outlines additional multispecies actions. Prioritizing these actions, setting objectives, and undertaking the work of implementing the ISMP were described in this chapter. However, a critical component to assessing the ISMP's success is measuring progress and adapting priorities and work plans as needed. Progress will be measured at each level: species actions, integrated conservation strategies, and objectives for identified priorities.

At the species level, maintaining accountability for achieving SAP-related actions will be the responsibility of taxa-specific Conservation Coordinators within the Species Conservation Planning section of FWC. The five Conservation Coordinators serve as experts on avian, mammal, reptile and amphibian, invertebrate, and fish species; and they function as a point of contact for imperiled and at-risk species conservation for internal and external partners. The Conservation Coordinators participated in development of the SAPs, serve on the State Wildlife Action Plan goal team for funding data gaps, and maintain FWC's information on existing conservation programs for their taxa. Although they may also initiate actions and participate in other aspects of the ISMP, accounting for implementation of the SAPs will be a new role. Conservation Coordinators will work across the agency and with partners to assess progress towards actions through coordination with SAP authors, FWLI staff, FWRI staff, and partner agencies.

Species-specific conservation progress will be reported annually through updates to the Conservation Action Tables that corresponds to each Species Action Plan. The Conservation Action Table outlines each SAP action, leads for implementation, urgency, and estimated cost to implement, among other things. Updates will docu-

ment the status of SAP conservation actions, provide information on any new threats or challenges, and highlight areas for partner involvement. In addition to annually updating progress towards SAP implementation, species-specific conservation will be reported through ongoing outreach. This may include highlighting completed or recently initiated projects through FWC's social media, press releases, or other publications. Again, newly identified challenges, successes, and opportunities for involvement will be published. Efforts directed toward individual species conservation are also provided annually to the Florida Legislature in the Florida Threatened and Endangered Species Conservation and Management Plan progress reports.

The integrated conservation strategies are multispecies actions grouped for efficient implementation. In some cases, achieving ICS integrated actions will be monitored as part of individual SAP action monitoring. The integrated actions are also captured in the priority objectives, and monitoring these objectives will provide some ICS monitoring as well. Since opportunities may arise to implement additional ICSs beyond those captured in the ISMP measurable objectives, annual reporting will include progress on integrated conservation strategies and integrated actions as part of the ISMP portion of the Florida Threatened and Endangered Species Conservation and Management Report.

Measurable objectives are set for a 10-year time frame, but progress on objectives will be monitored at five-year intervals. Measurable objectives link back to ICS and SAP actions, so progress towards achieving goals can be assessed yearly. At the five-year review, a State of the ISMP report will provide an update on progress, as well as a preview of anticipated revisions.

Review and revision

The ISMP will be reviewed after five years of implementation, and progress on measureable objectives evaluated. Review will include input from stakeholders and assessment of existing measurable objectives and will summarize progress on SAPs and ICSs. As part of the adaptive process, priority actions may be reassessed, or additional actions added, if objectives with a time frame less than five years have been met. Emerging issues may also lead to reevaluation of objectives, and adjustments to priorities within objectives. Revision of the ISMP is planned at 10 years because the long-term nature of achieving many of the strategies and actions requires an extended window for implementation and, therefore, evaluation. For example, filling data gaps will require research that may take several years to complete for each species. Stakeholder and partner input will be an important part of the 10-year revision, with both a statewide and regional approach for evaluating success and identifying needed updates. During the revision process, SAPs also will be updated as needed, and priorities and measurable objectives will be assessed, and new or updated ones identified. The ICSs will be reviewed for functional implementation, and regional assessments will be evaluated as an implementation tool.

Revision milestones

- ISMP review: five years
- ISMP revision: 10 years
- Species Action Plan revision: seven years, phased schedule

Species Action Plan revision

The Species Action Plans are part of the ISMP and, as such, will undergo scheduled revisions. Annual reporting of species-specific conservation efforts will allow staff to determine, based on achieving the SAP objectives, when revisions are necessary; however, at a minimum, SAPs will be reviewed within a seven-year window. The long-term nature of some actions and the wide variety of actions across SAPs makes a shorter revision window

impractical; however, waiting longer may miss opportunities to more accurately reflect species status with knowledge gained during implementation. In some instances, if emerging issues or significant changes dictate, revision and the addition of actions may need to occur within a shorter time frame, at the discretion of species experts and taxa coordinators. Not all SAPs will be revised in the same year; staff will develop a rolling schedule.

Species of Special Concern reassessment

One of the objectives of the ISMP is to collect data on the Species of Special Concern and to reassess their status by 2017. Reevaluation of these species will occur following the same process as the original status review, with a Biological Review Group being convened to conduct the review of additional information and prepare an updated biological status review. Following peer review of the biological status review report, the Commission will make a final determination on whether listing is warranted, and FWC staff will have six months to complete the revised SAP. Once revised, the SAP and any rule changes will go to the Commission for approval. Once approved, Chapter 68A-27, F.A.C., will be updated accordingly, with each reevaluated species moved within the rule to either Threatened status or to the individual chapter or section for nonlisted species. As with species coming off the list in the initial rule revisions, SSCs, if delisted, may have additional protections to ensure their conservation.

Species Evaluation Requests

The process and timelines outlined in Rule 68A-27.0012, F.A.C., guides the consideration of requests for species to be added to Florida's Endangered and Threatened Species List. Any person, or persons, may submit a species evaluation request to the Commission. If a species evaluation request is deemed complete and passes the biological vulnerability screening (also described in rule), then a Biological Status Review will be completed. If listing is warranted, a SAP will be completed within one year of Commission approval of the recommended listing status. The species will be added to Rule 68A-27.003, F.A.C., as state Threatened following Commission approval of the SAP and any revised rules for species protection. The ISMP objectives will be evaluated and staff directed to include actions for newly added species in their work plans, as appropriate, and in the implementation of the current ICSs. During the ISMP's 10-year revision, the species will be fully incorporated into the document.

A person, or persons, may also request that a Threatened species be removed from the state's Threatened list. This process will again follow that laid out in Rule 68A-27.0012, F.A.C., for species evaluation requests and, if delisting is warranted, the SAP will be updated and the listing status changed upon Commission approval of the revised SAP and any rules associated with the change in status. As with other delisted species, additional protections to prevent relisting may be incorporated into rule.

Amendments to Florida's Imperiled Species Management Plan

The ISMP will have an online format that will allow for amendments and additions. Although formal revision is planned at 10 years, annual review of policies and rulemaking may trigger the need for changes and/or additions. Any new or amended Species Action Plans, rules, and/or Species Conservation Measures and Permitting Guidelines will be presented to the Commission annually for review and approval; if approved, they will take effect immediately and be available online as part of the ISMP additions. These additions will not be incorporated into the ISMP text until the planned revision, but will be an approved component incorporated into implementation.

Impacts Assessment

This section addresses the anticipated impacts of implementing or not implementing Florida's Imperiled Species Management Plan. Economic impacts are assessed using information provided by the public and agencies, and through the analysis of known and projected factors. Ecological impacts are assessed through evaluation of the intended outcome; consideration of any unavoidable, unintended outcomes; and information collected from previously implemented similar actions. Social impacts are often the most difficult to project, but information from existing programs, projects, and previously implemented management actions will be considered.

These impact assessments are conducted by FWC with the assistance of additional professional economists in accordance with the definition of *Management Plan* in Chapter 68A-27, F.A.C., which states, "The management plan shall…consider and evaluate anticipated economic, ecological, and social impacts of implementing or not implementing the management plan including a projection of costs of implementing the management plan and identification of the funding sources for the costs as determined through involvement of affected stakeholders and public input." Moreover, specific changes to rules in the Florida Administrative Code may result in an economic impact. Section 120.54(3)(b), F.S., requires that all new or changed administrative rules undergo a process to determine the estimated action's regulatory costs by completing a Statement of Estimated Regulatory Costs (SERC). Working with a professional economist, FWC evaluated the 33 proposed rule changes and determined that only one would meet the dollar threshold defined in Section 120.54(3)(b), F.S. Table 17 lists each rule and the determination regarding impacts that may require a SERC to be completed.

Ecological impacts

Anticipated ecological impacts were added as a requirement for state management plans in accordance with Chapter 68A-27, F.A.C., in part to assess benefits to humans and other wildlife resulting from management plan implementation. Some imperiled species are sentinels for environmental health, and actions that benefit them are likely to benefit other species. Measures implemented to protect one species, however, may not necessarily protect all species or all habitats within an ecosystem, and some measures may actually harm other taxa. These impacts are important considerations during the ecological assessment.

Potential positive impacts

Each species addressed in the ISMP plays a role in its unique environment. For some, interconnectedness is observable: the Florida mouse, gopher frog, and Florida pine snake, for example, all inhabit, and are at least partially dependent upon, gopher tortoise burrows. Conservation actions designed to benefit one of these species are likely to positively impact each of them. Increased use of prescribed fire across the landscape is the focus of many Species Action Plan actions and is an integrated conservation strategy; by implementing this strategy, many species in fire-maintained habitats will benefit. Creating new or restoring existing wetlands is likely to benefit many wading birds and amphibians like the Florida bog frog and gopher frog. State law requires the water management districts to establish and maintain minimum flows and levels (Chapter 373, F.S.). A minimum flow is "the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area" (Section 373.042(1), F.S.). In coastal areas, flows below the minimum flows and levels can deprive estuaries of important freshwater inflows necessary for healthy habitat and can cause saltwater intrusion into the aquifer. The FWC has provided input in the development of these minimum flows and levels

for springs and rivers where state-listed species occur. Conservation of spring and riparian habitats can preserve the natural resources of estuaries and adjacent wetland ecosystems. The importance of many imperiled species to the ecological welfare of upland, wetland, and aquatic habitats in Florida should not be underestimated.

The FWC has also been active in developing programs to reduce entanglement with marine debris and fishing line. Entanglement in fishing gear (hooks and monofilament or fishing line) is a significant source of mortality of brown pelicans (Schreiber and Mock 1988) and hundreds of fish, birds, and terrestrial animals in Florida are entangled in monofilament every year. Wildlife can ingest monofilament or become tangled in it, leading to drowning, starvation, infection, gastrointestinal problems, or loss of limbs (e.g., flippers, tails, wings). Staff from FWC works with various organizations to reduce entanglements in fishing gear through outreach, research, gear recovery, and gear modifications. Decreasing monofilament waste protects many organisms and makes human recreation safer and more enjoyable.

Potential negative impacts

Many wildlife species require some type of habitat management, whether done with natural or manmade tools. For example, impacts to gopher tortoise burrows during relocation may have negative effects on other dependent species, such as the Florida mouse, because these species may be more difficult to find. Mowing or roller-chopping in areas where prescribed fire is difficult to use may benefit some species, but could adversely affect “sand swimmers” such as federally listed 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, decisions will need to be made on a species- and site-specific basis. For example, while fire is a powerful restorative tool critical to the health of some natural communities, some species may be at risk from prescribed fire, especially if applied during key life-cycle phases. These potential impacts should be carefully considered, and management adapted accordingly. Whenever highly imperiled species (especially those restricted by geography or habitat) coexist, land managers should prioritize the needs of those species facing higher risk of extinction.

Social impacts

Although no studies have been conducted to evaluate social impacts of the ISMP’s implementation, we anticipate that conservation actions associated with those species that are more visible and charismatic will result in greater social impact than actions associated with cryptic, lesser-known species. Fox squirrels and burrowing owls, for example, are easily recognizable species, and where they inhabit urban areas they typically exude a high tolerance for human presence. Implementation of the components of the ISMP that are designed to benefit these species may thus have increased social impacts. Parker and Wang (1996) interviewed 879 Florida residents who were at least 18 years old and found that more than 90 percent of the respondents felt that laws protecting endangered species were very or somewhat important, particularly for large charismatic species like the manatee. The Santa Fe cave crayfish, conversely, inhabits a very small area in a relatively rural part of Florida and is restricted to underground aquatic caves. As with other lesser-known species, the social impacts associated with conservation actions designed to benefit this species are anticipated to be minimal.

It is important to note, however, that implementing actions which improve water or habitat quality are often perceived as positive and may carry increased positive social impacts due to the potential benefit to humans and other species. For example, reduced fuel loads resulting from prescribed fire benefit people by reducing the possibility of wildfire. Restored wetlands provide recharge sites for the aquifers and can absorb high levels

of rainfall, reducing flooding in nearby communities.

Actions focusing on education related to specific behaviors may also have a social impact. For example, Integrated Conservation Strategy 13 promotes the concept of conservation stewardship, with a specific action to increase citizen participation in reporting species locations. The data can benefit conservation efforts, but response to documenting imperiled species could vary. Some citizens may be upset by the idea that their neighbors could report imperiled species on adjacent properties, while others may feel positively and be more likely to become engaged in conservation of those species. When developed, campaigns that encourage communities to adopt a "wildlife wise" approach may suggest keeping cats indoors or limiting dogs on beaches to specific locations, actions that might have an impact on individuals' perceived freedom to manage their pets and recreate as they see fit. Social impacts may also result from the effects of incidental or intentional take permitting on developments or facilities, limiting anticipated adverse impacts to state-listed species. These can have a negative impact on developers and the projects they work on. In contrast, their effect might be positive for those residents and citizens of an area who are opposed to new developments in their neighborhoods because of the result they may have on their current quality of life. The effects may also impact the placement of public facilities, affecting the availability of public access to recreation areas or water bodies.

Economic impacts

Florida's Imperiled Species Management Plan is intended to benefit the citizens of Florida and may result in measurable economic benefits, such as financial gains to wildlife-dependent businesses or the restoration of diminished ecological-services. However, the program may also entail costs, including agency administrative and management related expenses and may also impact private businesses and other economic interests. Policy makers within FWC must consider both the marginal improvements (benefits) and marginal costs of their proposed action as part of their policy evaluation.

In their 2011 analysis of the economic benefits of wildlife viewing in Florida, Southwick Associates (2013) found that the total economic effect from 2011 wildlife viewing activities in Florida ranged from $2.7 billion upwards to $4.9 billion ($2.9 billion by residents and nearly $2.0 billion by nonresidents). Travel expenses alone generated $2.7 billion in total economic effects and 44,623 jobs were created (Southwick 2013). Florida was the number one state in 2011 for total days of wildlife viewing by nonresident visitors, according to the USFWS (USFWS 2014). Of those coming to view wildlife, most resident and nonresident viewers were interested in observing, feeding, or photographing birds, predominately shorebirds, wading birds, and waterfowl (Southwick 2013). Many of the species addressed by this plan contribute significantly to wildlife viewing in Florida.

Table 14. Examples of stakeholders and interest categories.

Interest in imperiled species management	Examples of interested stakeholders
Agriculture	Forestry production, silviculture, livestock and crop production
Primary industry	Manufacturing, service industries, and mining
Conservation organizations	Defenders of Wildlife, Conservancy of Southwest Florida, Audubon Florida, Sierra Club, The Nature Conservancy, Florida Wildlife Federation, Florida Native Plant Society
Land development	Florida Chamber of Commerce, Florida Homebuilders Association
Local government agencies	County, city, municipal governments
Research and academic	University and private researchers
Commercial service	Consultants providing wildlife services
Private landowners	Ranchers, homeowners, private developers
Military, federal, or state land managers	U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, U.S. Forest Service, Florida Forest Service, Florida Department of Environmental Protection, Eglin Air Force Base, Water Management Districts
State government agencies	Department of Transportation, Department of Agricultural and Consumer Services, Enterprise Florida
General public	Individuals, neighborhood associations, concerned citizens
Recreational interests	Anglers, hunters, boaters, and wildlife viewers
Animal welfare	Humane Society of the U.S., ASPCA

Costs associated with implementing the plan

The direct costs to FWC were estimated through an internal FWC budget review of all anticipated labor and capital costs related to implementing the ISMP. Likewise, FWC estimated any anticipated redirection of existing labor and capital assets and reported these as agency opportunity costs.

In state fiscal year 2013-2014, the Florida Legislature approved an appropriation of $443,036 to improve the Commission's ability to manage and conserve Florida's Threatened and nongame fish and wildlife species, with a goal of reducing Florida's Endangered and Threatened Species List. Of this appropriation, $136,128 was considered start-up costs and nonrecurring. These funds provided the ability to contract with universities and private firms; hire Other Personal Services staff; and purchase supplies, equipment, and vehicles to achieve the following.

1. Develop and implement management plans that will result in effective management of state-Threatened species, removal of species from the state-Threatened and Species of Special Concern lists, and prevention of new listings.
2. Develop and implement research and monitoring programs to determine the status of wildlife populations that are state Threatened or in danger of becoming state Threatened and develop effective management actions to ensure their recovery and conservation.
3. Implement conservation actions, such as habitat management, population management, and providing landowner incentives, which will result in the recovery and conservation of these species.

An additional $798,675 in federal grant funding from the State Wildlife Grant program was secured and provided five years of funding to support the development and initial implementation of the ISMP (through June 30, 2016). Over the next five years, additional grant funding will be sought to ensure that the goal, objectives, and conservation actions of the ISMP are achieved. These efforts will entail an indeterminate sum of FWC matching funds and time commitments for writing grant proposals, estimated to be $111,000. The total funds needed from grants, excluding the FWC request for proposal opportunity costs, is estimated to be $4,085,000. Considered opportunity costs, these funds are only available for work tied to ISMP implementation. Examples of funding sources that could be sought include the State Wildlife Grant program administered by FWC, one or more of the National Fish and Wildlife Foundation grant programs, the Fish and Wildlife Foundation of Florida's Conserve Wildlife Tag grant, the U.S. Fish and Wildlife Service's Section 6 Conservation Grants, Habitat Conservation Planning grant, or similar activity (see full SERC [Environmental Economics, Inc. 2016]) for additional detail). In total, these actions represent an agency opportunity cost of approximately $5.5 million over five years, or $1.1 million annually. Currently, FWC spends approximately $28 million dollars annually on conservation and management for state- and federally listed species, so ISMP-specific changes are less than 1% of the existing budget for listed species. Other public agencies (federal, state and local) are expected to incur additional expenses related to the enforcement of the ISMP, totaling $1.5 million annually.

In addition to the initial start-up costs for the ISMP, FWC will redirect funds from other purposes to assist in its implementation. To estimate these recurring costs, the agency conducted an in-house review of its anticipated changes in marginal costs to both labor and capital in the form of conservation actions. Conservation actions will serve to achieve the objectives and actions outlined in the integrated conservation strategies and Species Action Plans. 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. In total, when combined with funds allocated to support new grants, FWC anticipates redirecting at least $2.6 million in resources to support the ISMP over the next 10 years. This is a measure of the indirect agency costs that would be committed to this effort and not available for other FWC functions.

A Framework to evaluate the economics of the ISMP and the Statement of Estimated Regulatory Cost

Florida's Imperiled Species Management Plan is intended to benefit the citizens of Florida and may result in measurable economic benefits, such as financial gains to wildlife-dependent businesses or the restoration of diminished ecological-services. However, the program may also entail costs, including agency administrative and management related expenses and may also impact private businesses and other economic interests. On either side of the ledger, policy makers should consider both the marginal benefits (improvements) and marginal costs of their proposed action as part of their policy evaluation. *Marginal benefit* refers to the amount people are willing to pay or give in order to obtain additional goods or services. *Marginal costs* are those costs associated with producing additional units of goods or services. This analysis will focus on the marginal costs associated with protecting or managing species, those costs that go beyond existing costs related to these species.

With good record keeping, many historic cost data for agencies are relatively easy to document. Even though finding cost data for private concerns may entail extensive surveys and complex analyses to reliably document, they are typically obtainable. On the other hand, estimating the economic benefits of marginal improvement in ecological services is more problematic. First of all, it is difficult to identify and tie an ecosystem's component services to human values. Even if these services are important to humans, if they lack clear markets it may be even more difficult to assign them monetary value. Yet, in spite of these difficulties the economic theory and

methodology to support the effort is well established and widely cited in the literature.

Regulatory cost is formally addressed in Chapter 68A-27, F.A.C., when it states, "[t]he management plan shall…consider and evaluate anticipated economic, ecological and social impacts of implementing, or not implementing the management plan including a projection of costs of implementing the management plan and identification of the funding sources for the cost as determined through involvement of affected stakeholders and public input." Furthermore, Section 120.54(3)(b), F.S., encourages all new or changed administrative rules undergo a process to determine the estimated action's regulatory costs, and in some circumstances this is required with the completion of a SERC. There are no commensurate statutory requirements for addressing marginal benefits; consequently, most economic analyses focus exclusively on changes in marginal costs.

The ISMP is a new, comprehensive conservation approach and thus there is little historical data upon which to project future cost estimates. Given this, more precise estimates of cost to implement will be incorporated as part of the ISMP's five-year formal review.

Background - benefits and costs: a taxonomy

To help clarify interpretation of the economics and costs vs. benefits, a simple taxonomy may be helpful.

Costs

Costs associated with the ISMP can be defined as simply the amount paid or charged for something, or the loss resulting from an action. Costs can be further 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 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 homeowners adjacent to a noisy new airport or reduced biodiversity resulting from excessive use of pesticides.

Like any public project, the ISMP entails costs of all types. 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 ISMP. 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 effects on the economy at-large 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 nonmarketable 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 benefit/cost analysis (BCA) or SERC. 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 15 groups the basic types of costs and their typical availability. This can be viewed as the guiding taxonomy or framework for conducting either a BCA or SERC. 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 15. Taxonomy of possible costs (C) resulting from ISMP implementation.

I. Program development and implementation Costs	II. Indirect Costs from the program (almost never considered)
1. Direct Costs i. Directly budgeted agency expenditures made for the program ii. Direct costs to outside firms and other public agencies	1. Economic impact from successfully implementing the program: negative impacts on business sectors – impact on economic growth (gross domestic product)
2. Opportunity Costs (not directly identified in program budget) i. Agency costs in redirected labor and capital ii. Outside of agency costs in labor and capital	2. Negative externalities from successfully implementing the program: indirect costs i. Lost use value (directly measureable) ii. Lost non-use value (indirectly measurable)

Table 15 Summary:
CI.1 – ISMP direct costs – both
CI.1.i within FWC, and
CI.1.ii outside FWC
CI.2 – ISMP opportunity costs – both
CI.2.i within FWC, and
CI.2.ii outside FWC
CII.1 – Economic impact of redirecting funds among sectors of the economy from a successful ISMP
CII.2 – Negative externalities - Non-market value of the opportunity-cost of lost ecological services from a successful ISMP
CII.2.i – Lost use value
CII.2.ii – Lost nonuse value

Benefits

The benefits resulting from the ISMP are often referred to as the consumer's surplus or the value generated by this good or service to its user(s). This would represent the value imperiled species provide to people who value these animals and/or their associated habitat. When the good or service is privately produced it is considered private profit. In the case of most (if not all) imperiled species, no profits are generated to the regulatory agency and these benefits are captured by the consumers of benefits associated with the ISMP. Much like costs, benefits can be valued both directly and indirectly. 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 ISMP, these benefits would include improvements to an economy resulting from implementation of the ISMP and restoration of one or more imperiled species. There are also indirect benefits that typically lack market value. In this case these benefits would include items such as improved ecological services and other non-market amenities such as improved wildlife viewing and hunting, for example. Anticipated benefits of the ISMP's implementation are outlined in Table 16.

Reporting benefits resulting from the ISMP is not required by the SERC; however, they are necessary to complete any BCA and useful to assist policy makers to see a more complete picture of their policy decisions.

Table 16. Taxonomy of possible benefits (B) of ISMP implementation.

I. Direct project Benefits	II. Indirect Benefits
1. Added, improved or restored marketable goods/services i. Direct effects ($) ii. Positive impact on economy	1. Added, improved or restored nonmarketable goods/services i. Use value (Directly measureable) ii. Non-use value (Indirectly measureable)

Table 16 Summary:
BI.1 – Direct project benefits
BI.1.i – Direct economic effects – directly measureable economic benefits accruing to private firms and/or people as a result of the ISMP
BI.1.ii – Positive economic impact on economy – the indirect and induced economic affects also known as the economic ripple effects resulting from the actions in BI.1.i
BII.1 – Indirect project benefits
BII.1.i – Gained use value – value gained by people who use the resource benefited by the project – no actual transfer of money
BII.1.ii – Gained non-use value – value gained by people who do not directly use the resource benefited by the project – no actual transfer of money

Statement of Estimated Regulatory Costs

In Florida, Statement of Estimated Regulatory Costs requirements are limited to documenting the incremental changes in costs. As a result, a SERC will only track actual direct and indirect costs. More specifically, the criteria established by the SERC as prescribed by Section 120.54(3)(b), F.S., would limit cost items to CI.1, CI.2, and CII.1 in Table 15.

By statute, the SERC must adhere to the following format.

- An economic analysis showing whether the regulatory action directly or indirectly (CII.1)
  - Has an adverse impact on economic growth.
  - Has an adverse impact on private sector job creation or employment.
  - Has an adverse impact on private sector investment in excess of $1 million in the aggregate within five years after implementation of the rule
  - Has an adverse impact on business competitiveness, including the ability of persons doing business 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 the implementation of the rule (CII.1).
  - Is likely to increase regulatory costs, including any transactional costs, in excess of $1 million in the aggregate within five years after the implementation of the rule (CI.1, CI.2).
- A good-faith estimate of the number of individuals and entities likely to be required to comply with the rule, together with a description of the types of individuals likely to be affected by the rule (CI.2).
- 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 rule (CI.1, CI.2).
- Estimate of any anticipated effect on state or local revenues (CII.1).

- 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 rule. As used in this section *transactional costs* are the 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 in complying with the rule, additional operating costs incurred, the costs of monitoring and reporting, and any other costs necessary to comply with the rule (CI.1, CI.2).
- An analysis of the impact on small businesses as defined by Section 288.703, F.S., and an analysis of the impact on small counties as defined in Section 120.52, F.S. The impact analysis for small business must include the basis for the agency's decision not to implement alternatives that would reduce adverse impacts on small businesses (C.II.1).
- Any additional information that the agency determines may be useful.

Biological staff from FWC and an economist from Florida Agriculture and Mechanical University reviewed the proposed Florida Administrative Code rule changes listed in Table 5 to determine which would likely trigger an economic cost of $1 million over five years (or $200,000 annually). A summary of this review can be found in Table 17, and the full SERC (Environmental Economics, Inc. 2016) is available for review. For rule changes thought likely to meet the impacts threshold as defined in Section 120.54(3)(b), F.S., a more detailed analysis was completed.

Over the past 5 years, only 25 permits were processed for incidental take of the state-listed species included in the ISMP. Examples of the mitigation provided by these types of projects varied from establishment of conservation easements, land acquisition, monetary donations, and addition of nest boxes to make habitat more suitable. Nine of the 25 provided no mitigation due to the status of the species or the type of permit that was being issued for human safety reasons. Economic analyses will be conducted for each Species Conservation Measures and Permitting Guidelines as they are developed, and the guidelines will continue to seek to use existing processes to limit additional regulatory impacts. The results of these analyses will be monitored by FWC to determine alternatives and ways to reduce costs by looking for new approaches to permitting and options that streamline the permitting process. It is expected that most of the economic loss experienced by these sectors will be captured by other sectors within the state's economy with little to no overall adverse economic impact.

The proposed revisions to the Rule 68A-27.003, F.A.C., will not restrict the ability of Florida businesses to compete in other states or domestic markets. Changes in regulatory and transactional costs for permitting of ISMP-related species were undetermined at the time of this report. However, the efficiencies gained will likely offset the potential costs as described above.

Because most of the species proposed for listing are either range limited or cryptic, only one proposed rule change, in paragraph 68A-27.003(2)(e), was determined likely to warrant a formal SERC; the others were considered unlikely to increase marginal costs to the statutorily-significant level (see Table 17). Within this proposed rule change, three groups of species are to be added to Florida's Endangered and Threatened Species List under Rule 68A-27.003, F.A.C., which may result in an economic impact more than $1 million over five years (or $200,000 annually) as defined in Section 120.54(3)(b), F.S. Following statutory protocol, FWC worked with an economist to conduct a preliminary SERC to estimate both the direct and opportunity costs associated with this proposed rule change.

The ISMP covers 37 Threatened species; 14 of these are already included as Threatened, while 23 were formerly Species of Special Concern that, when evaluated in 2010, were found to meet the criteria for Threatened

status. For many citizens, increasing protections for 23 species in the state may cause some concern; however, the specific impacts of these status changes need to be considered on a species-by-species basis.

Fourteen of the 23 species with increasing protections are found only in a small portion of the state with limited economic, social, or ecological impacts from a statewide perspective. These range-limited species include the Barbour's Map turtle, a species confined to four watersheds in the panhandle. This turtle occupies rivers designated as Outstanding Florida Waterways, for which DEP has the authority to establish rules that provide for the special category of waterbodies under Section 403.061(27), F.S., and additional considerations for activities, construction, or discharges must be considered. For species like the Santa Fe cave crayfish, a range-limited species found in only six caves in two counties in north central Florida, we anticipate negligible costs for the change in listing status. While the change in status may impact the private owners of four of the caves, or farming activities in the vicinity of the caves, conservation measures to protect this species are already covered under agricultural BMPs, and Section 810.13, F.S., prohibits dumping materials into caves.

Four of the species fall under the policy for Permitting Standards for Incidental Take of Cryptic Species, which outlines the importance of seeking information on species to meet the definition of scientific benefit. These include species like the Florida pine snake, Georgia blind salamander, Sherman's short-tailed shrew, and Florida Keys mole skink. For the Florida Keys mole skink, which is confined to Monroe County, changes to the listing status will not have negative economic impacts because verified sighting information and associated habitat characteristics can constitute a scientific benefit for applicants interested in acquiring an incidental take permit.

Fourteen of the species are included by the water management districts and DEP as wetland dependent; for these species, the ISMP proposes a new, streamlined approach to consider regulatory processes that address wetlands and incorporate protections for state-listed species. If the permits issued by other agencies adequately address FWC requirements for issuing a listed-species take permit, then these regulatory processes can fulfill the requirements of Chapter 68A-27, F.A.C., with minimal additional application process. The ISMP and species-specific Guidelines allow existing state processes for wetland permitting to address take with minimal additional mitigation costs. In order to create additional efficiencies, FWC is working with other state agencies, and much of the mitigation that is required for these wetland habitats may already be creating conservation gains for wetland dependent species. An analysis by economists Hazen and Sawyer (2016) found that the draft permitting guidelines for the Everglades mink, which includes this policy to allow state wetland permitting to address mitigation, resulted in no increased regulatory costs for that species. Consideration of these other regulatory processes when addressing take of state-listed species is among the approaches presented in the Law and Policy chapter. These include species such as Marian's marsh wren, Scott's seaside sparrow, Wakulla seaside sparrow, and Worthington's marsh wren (collectively referred to as the saltmarsh songbirds); saltmarsh top minnow; and southern tessellated darter. The saltmarsh songbirds are dependent on salt marshes dominated by smooth cordgrass (*Spartina alterniflora*) and black needlerush (*Juncus roemerianus*), much of which is under public ownership or regulated by DEP. Review of the last five years of permitting and commenting data found that FWC was asked to comment on approximately 2,600 projects with the potential to impact wildlife statewide, and of those projects nearly 40% were wetland related; potential impacts to wildlife were identified in less than half of these (1,121 projects), and 27% of those projects were wetland permitting projects, leading us to believe that at least a quarter of all projects will have increased efficiencies from the rule changes.

Most of the proposed rules that remove regulation or simply clarify rule language will not result in an economic impact to Floridians. Table 17 summarizes these potential considerations for assessing impacts of changes in listing status and Table 18 summarizes the factors that were considered in the assessment of potential costs associated with rule changes from Rule 68A-27.003, F.A.C.

Some rule changes reduce or eliminate regulation, providing potential benefits to some Florida citizens. The addition of a section to Rule 68A-16.003, F.A.C, which allows take of inactive nests of birds not listed as state Threatened, will align that rule with the policy on Nest Removal for Inactive Single-Use Nests of State-Threatened Birds, and eliminate the requirement for permits to remove these inactive nests. The FWC's Osprey Nest Removal Guidelines will be updated as part of implementing associated policies. Another change within the rule structure is to allow management plans or permitting guidelines to provide authorizations for certain activities. These authorizations are in lieu of any permitting needs, and should streamline regulation associated with some actions that also benefit human safety, such as right-of-way maintenance that improves sight lines and sign visibility for drivers in areas occupied by imperiled species. And finally, by adding human safety as a potential reason for issuing intentional take permits, FWC can increase capacity to respond effectively to situations where state-Threatened species and human safety are in conflict.

Eight species with increasing protections have been petitioned for federal listing. These include the reddish egret, Sanibel Island rice rat, Sherman's short-tailed shrew, and Key ringneck snake. Though increasing state regulations may have some cost to the citizens of Florida, development and implementation of the ISMP may help preclude federal listing, which may be a cost savings to the public. As of 2016, 19 species included in this plan have been petitioned for federal listing with the USFWS. Before recommending final listing actions, USFWS can consider the regulatory approaches and conservation actions outlined in this plan and the individual Species Action Plans, and these documents may help to preclude federal listing. Costs associated with regulatory actions for federally listed species are typically much higher than those associated with state-listed species, so precluding federal listing would be a benefit to the citizens of Florida. From 1989-2010, state and federal agencies spent an average of over $631 million per year on listed species (Surridge and Li 2014). Despite this expenditure, Surridge and Li (2014) found that only 48 percent of listed species have been reported as stable or improving in the long term, highlighting the need to take action to preclude listing and to prioritize actions that could reallocate funding for at-risk species. An analysis conducted by the Balmoral Group projected that the total costs associated with avoidance, minimization, and mitigation for the wood stork (*Mycteria americana*) came to an annual total of $2,593,810 (Balmoral Group 2016).

For some species that are remaining state Threatened, Species Conservation Measures and Permitting Guidelines have been drafted and released for public review. For many of the species that are considered wetland dependent or rely on water bodies for essential behavioral patterns (i.e., to breed, feed, and shelter), it can be difficult to assess the costs associated with conservation measures and permitting guidelines. For example, the Balmoral Group's 2016 analysis found that since the ERP process is already required for species like the Florida sandhill crane, and the costs incurred whether or not cranes are present, the costs are incremental and the incremental change in processing costs is relatively small (Balmoral Group 2016). The private sector's total estimated regulatory costs associated with the Florida Sandhill Crane Conservation Measures and Permitting Guidelines range from $1,485,319 to $2,370,499 annually. Over five years, the estimate goes up to $12,076,915 because of the anticipated increase in the annual number of permits reviewed and issued. Almost all experts interviewed for the analysis indicated that it was difficult to separate costs of sandhill crane guideline compliance from existing costs to comply with freshwater wetland protection rules and as such, this estimate can be considered an upper bound.

Species Conservation Measures and Permitting Guidelines can also be consistent with existing regulations and guidance. For species in Monroe County, like the white-crowned pigeon and many state-listed reptiles like the Key ringneck snake and the Florida brown snake, the Monroe County Development Code addresses impacts to critical habitats like mangrove islands and tropical hardwood hammock, and is consistent with the draft Guide-

lines (Hazen and Sawyer 2016). Many of the specific conservation measures for white-crowned pigeons described in the draft Guidelines are already required by existing land development regulations in Monroe County. Monroe County environmental regulations state that hardwood hammocks greater than 12 acres are located in the Native Area land use (zoning) district, and regulations and clearing requirements for these areas are discussed in Section 130-3941 of the Monroe County Land Development Code. These regulations are similar for the Village of Islamorada and the City of Marathon, and mitigation costs are based on the replacement costs of specific plants and trees and can range from $5,000 to $60,000 per site. According to Monroe County, a standard hammock lot has about 3,000 square feet of clearing, which usually results in a mitigation fee ranging from $5,000 to $15,000, and occasionally close to $20,000 (Hazen and Sawyer 2016). These fees are directed to the Monroe County Environmental Land Management and Restoration Fund, which is used only for land management and not land acquisition. The Monroe County Comprehensive Plan Land Authority purchases properties for conservation purposes, including hardwood hammocks. For those costs not covered by the county regulations, it is estimated that costs to avoid, minimize, and offset take of state-listed species in patches of tropical hardwood hammock greater than 12 acres in size could be up to $127,640 over the next five years (Hazen and Sawyer 2016).

For cryptic species that inhabit forested wetlands, like the Everglades mink, estimating costs for implementing draft Guidelines relies heavily on the jurisdiction of other state agencies like DEP and the South Florida Water Management District. An economic analysis conducted by Hazen and Sawyer (2016) estimated that if implemented, surveys, avoidance, and minimization measures could range between $14,804 and $42,382 per site, with mitigation credits ranging from $34,560 to $172,000 per credit of freshwater forested wetland. Many of the avoidance measures outlined in the draft Guidelines (such as avoiding killing or injuring mink when observed, and allowing Everglades mink observed during construction activities to move safely away) are likely to have minimal costs. The ERP process can act as a multispecies option for Everglades mink and other species that use shallow freshwater marshes, swamp forests, coastal marshes, and mangroves. In many cases, mitigation provided through the ERP process may be sufficient to cover take of Everglades mink and would likely already be required by landowners planning to develop land on or near freshwater wetlands where mink are expected to roam. The draft Guidelines, relative to what is already required of the landowner under Florida's ERP regulations, are expected to incur no marginal cost (Hazen and Sawyer 2016).

Table 17. An evaluation of proposed Florida Administrative Code rule changes with respect to economic impacts.

	Rule Title/Division/ Chapter/ Section	Rule/ Subsection/ Paragraph/ Sub-paragraph	Summary of change	Economic Impact
May result in economic impacts per Section 120.54(3)(b), F.S.	68A-27.003 Designation of Endangered and Threatened Species; Prohibitions	Title	Rule title should be "Florida Endangered and Threatened Species List; Prohibitions."	No economic impact.
		(2)(new paragraph)	Add the Florida bog frog and Georgia blind salamander to the list. Requires adding a new paragraph for amphibians to subsection.	The Florida bog frog is considered range limited and only occurs in wetlands on the Eglin Air Force Base installation in Florida's western Panhandle. The Georgia blind salamander is considered a cryptic species and the Permitting Standards for Incidental Take of Cryptic Species policy applies. Estimated economic impact would not meet the impact thresholds as defined in Section 120.54(3)(b), F.S.
		(2)(new paragraph)	Add the Black Creek crayfish and Santa Fe cave crayfish to the list. Requires adding a new paragraph for crustaceans to the subsection.	The Black Creek crayfish and Santa Fe cave crayfish are both considered range-limited species. Estimated economic impact would not meet the impact thresholds as defined in Section 120.54(3)(b), F.S.
		(2)(a)	Add language: "or when such conduct is authorized in a management plan as defined in this chapter and approved by the Commission, or as authorized in Commission-approved guidelines" to exempting conduct authorized by management plan from the prohibition on take, possession, or sale of a Threatened species.	No economic impact. Eliminates regulatory requirements by allowing activities to be authorized in management plans without permitting requirements.
		(2)(c)	Add the bluenose shiner, saltmarsh topminnow, and southern tessellated darter to the list.	The bluenose shiner, saltmarsh topminnow, and southern tessellated darter are all considered range-limited species. Estimated economic impact would not meet the impact thresholds as defined in Section 120.54(3)(b), F.S.
		(2)(d)	Add the Barbour's map turtle, Florida Keys mole skink, and Florida pine snake to the list.	The Barbour's map turtle is considered a range-limited species. The proposed rule change and protections for this species would not be a significant change from the current regulatory standard. The Florida Keys mole skink and Florida pine snake are both considered cryptic species and the Permitting Standards for Incidental Take of Cryptic Species policy applies. Estimated economic impact would not meet the impact thresholds as defined in Section 120.54(3)(b), F.S.
		(2)(d)	Remove the Lower Keys populations of the peninsula ribbon snake and striped mud turtle from the list.	No economic impact.
		(2)(e)	Add the American oystercatcher, black skimmer, Florida burrowing owl, little blue heron, Marian's marsh wren, reddish egret, roseate spoonbill, Scott's seaside sparrow, tricolored heron, Wakulla seaside sparrow, and Worthington's marsh wren to the list.	Species to be added to the Florida's Endangered and Threatened Species List under rule 68A-27.003 may result in an economic impact more than $1 million over five years (or $200,000 annually) as defined in Section 120.54(3)(b)., F.S. A more detailed analysis will be conducted to evaluate the level of economic impacts prior to final rule adoption. If that additional analysis shows that the impact will exceed $1 million over five years (or $200,000 annually), a Statement of Regulatory Cost will be completed and included in the final rule noticing process. Some of the species proposed for listing, such as the Scott's seaside sparrow, Wakulla seaside sparrow, and Worthington's marsh wren are range limited and the estimated economic impact would not meet the impact thresholds as defined in Section 120.54(3)(b), F.S.
		(2)(f)	Add the Sanibel Island rice rat and Sherman's short-tailed shrew to the list.	The Sanibel Island rice rat is considered a range-limited species and only occurs on Sanibel Island, Florida. The Sherman's short-tailed shrew is considered a cryptic species and the Permitting Standards for Incidental Take of Cryptic Species policy applies. Estimated economic impact would not meet the impact thresholds as defined in Section 120.54(3)(b), F.S.
		(2)(f)	Remove the Florida mastiff bat from the list.	No economic impact (is now federally listed as Threatened under the Endangered Species Act).
		(2)(g)	Remove the pillar coral from Florida's Endangered and Threatened Species List.	No economic impact (is now federally listed as Threatened under the Endangered Species Act).
Will not result in economic impacts per Section 120.54(3)(b), F.S.	68A-9.002 Permits to Take Wildlife or Freshwater Fish for Justifiable Purposes	(1)	Add language for "other federal authorizations."	No economic impact.
	68A-12.004 Possession or Sale of Birds or Mammals; Taxidermy Operations and Mounting Requirements	(11)(b)1.	Change Rule 68A-13.002 to Rule 68A-16.001 in the subparagraph.	No economic impact.
	68A-16.003	New section	Add section that no state permit is needed to take inactive nests, or parts thereof, of birds not listed in 68A-27.	No economic impact. Will ease the regulatory burden on some entities.

(continued) will not result in economic impacts per Section 120.54(3)(b), F.S.

Rule Title/Division/ Chapter/ Section	Rule/ Subsection/ Paragraph/ Sub-paragraph	Summary of change	Economic Impact
68A-25.002 General Provisions for Taking Possession and Sale of Reptiles (continued)	New subsection	Add a subsection or add language to an existing subsection to prohibit the take and possession of peninsula ribbon snakes and red rat snakes in the Lower Keys.	No economic impact (rule change does not change current requirements for these species).
	(6)(a)2.d.	Add the Lower Keys population of the striped mud turtle to the list of turtles that may not be taken from the wild.	No economic impact (rule change does not change current requirements for this species).
68A-26.002 Regulations Relating to the Taking of Amphibians	(1) or new subsection	Add language that excludes Pine Barrens treefrogs and gopher frogs from the rule allowing take of frogs.	No economic impact (rule change does not change current requirements for these species).
68A-27.0012 Procedures for Listing and Removing Species from Florida's Endangered and Threatened Species List	(4)	Remove the subsection.	No economic impact.
68A-27.005 Designation of Species of Special Concern; Prohibitions; Permits	(1)	Remove the subsection.	No economic impact.
	(2)(b)	Remove the bluenose shiner, saltmarsh topminnow, southern tessellated darter, Lake Eustis pupfish, and mangrove rivulus from the Species of Special Concern list.	No economic impact.
	(2)(c)	Remove the Florida bog frog and Georgia blind salamander from the Species of Special Concern list.	No economic impact.
		Remove the Pine Barrens treefrog and gopher frog the Species of Special Concern list.	No economic impact.
	(2)(d)	Remove the Barbour's map turtle, Florida Keys mole skink, and Florida pine snake from the Species of Special Concern list.	No economic impact.
		Remove the Lower Keys population of the red rat snake and Suwannee cooter from the Species of Special Concern list.	No economic impact.
	(2)(e)	Remove the American oystercatcher, black skimmer, Florida burrowing owl, little blue heron, Marian's marsh wren, reddish egret, roseate spoonbill, Scott's seaside sparrow, tricolored heron, Wakulla seaside sparrow, and Worthington's marsh wren from the Species of Special Concern list.	No economic impact.
		Remove the snowy egret, white ibis, brown pelican, and limpkin from the Species of Special Concern list.	No economic impact.
	(2)(f)	Remove the Sanibel Island rice rat, Sherman's short-tailed shrew, and Florida mouse from the Species of Special Concern list.	No economic impact.
	(2)(g)	Remove the Florida tree snail from the Species of Special Concern list.	No economic impact.
	(2)(h)	Remove the Black Creek crayfish and Santa Fe cave crayfish from the Species of Special Concern list.	No economic impact.
68A-27.007 Permits and Authorizations for the Take of Florida Endangered and Threatened Species.	(2)(a)	Add language to allow intentional take for human safety.	No economic impact. Reduces regulatory requirements and improves agency capacity to respond to human safety issues.
	(2)(b)	Remove the language that specifies a different permit issuance standard for the blackmouth shiner, striped mud turtle, Florida mastiff bat, and pillar coral.	No economic impact.
	(2)(f)	Add "Intentional" in front of "take" at the beginning of the sentence.	No economic impact.

Table 18. State-Threatened species, and the potential factors to consider in assessing impacts. These factors were applied when evaluating potential social, economic, and ecological impacts.

Species	Potential factors considered in impacts assessment				
	Increasing Protection	Range Limited	Cryptic	At Risk	Wetland Dependent
	Species formerly on the Species of Special Concern list that, when evaluated in 2010, were found to meet the criteria for Threatened status.	Species that occur in only 1 or 2 counties, or in narrow strips of habitat in up to 5 counties.	Species that may be difficult to detect, even when using standard survey techniques.	Species that are undergoing evaluation for federal listing.	Species that are designated wetland dependent, and wetland-related regulatory processes and permitting might apply.
American oystercatcher	X				X
Barbour's map turtle	X	X		X	X
Big Cypress fox squirrel					X
Black Creek crayfish	X	X		X	
Black skimmer	X				X
Blackmouth shiner		X			
Bluenose shiner	X				
Crystal darter		X			
Everglades mink			X		X
Florida bog frog	X	X			X
Florida brown snake (Lower Keys)		X	X		
Florida burrowing owl	X				
Florida Keys mole skink	X	X	X	X	
Florida pine snake	X		X	X	
Florida sandhill crane				X	X
Georgia blind salamander	X	X	X	X	
Key ringneck snake		X	X	X	
Key silverside		X			
Least tern					X
Little blue heron	X				X
Marian's marsh wren	X	X			X
Reddish egret	X				X
Rim rock crowned snake		X	X	X	
Roseate spoonbill	X				X
Saltmarsh topminnow	X	X		X	
Sanibel Island rice rat	X	X		X	X
Santa Fe cave crayfish	X	X		X	
Scott's seaside sparrow	X	X			X
Sherman's short-tailed shrew	X	X	X	X	X
Short-tailed snake			X	X	
Snowy plover					X
Southeastern American kestrel					
Southern tessellated darter	X	X			
Tricolored heron	X				X
Wakulla seaside sparrow	X	X			X
White-crowned pigeon		X			X
Worthington's marsh wren	X	X			X

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