

**A Species Action Plan for the
Saltmarsh Topminnow
(*Fundulus jenkinsi*)**

**Final Draft
November 1, 2013**



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Cover photographs of male (top) and female (bottom) saltmarsh topminnow courtesy of Gretchen Grammer

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EXECUTIVE SUMMARY

A biological assessment of the saltmarsh topminnow (*Fundulus jenkinsi*) determined that the species warranted listing as Threatened on the Florida Endangered and Threatened Species List. With stakeholder assistance, Florida Fish and Wildlife Conservation Commission (FWC) staff developed this plan to guide recovery of the species. The goal of this plan is to improve the conservation status of the saltmarsh topminnow to the point that the species can be removed from the Florida Endangered and Threatened Species List and will not again need to be listed.

The objectives of this plan are to maintain or increase the saltmarsh topminnow population and its preferred habitat types within 10 years of this plan's implementation. A major strategy for achieving these objectives is to maintain the existing water quality, water quantity, and habitat characteristics. While much is known about the specific habitat requirements of the saltmarsh topminnow, achieving these objectives will require research and monitoring efforts by cooperating agencies on public and private lands.

Specific actions proposed to increase understanding of saltmarsh topminnow biology and its habitat requirements include: range-wide surveys to determine population densities, habitat associations, and new occurrence locations; identification and quantification of threats to survival; restoration of historic occurrence locations; assessing existing agricultural and other nonpoint source wildlife conservation measures; education and outreach; and, coordination with local governments and other agencies to develop a standardized survey protocol, create development guidelines, and provide land use planning assistance.

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

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GLOSSARY OF TERMS AND ACRONYMS

BMPs: Best Management Practices. Generally, BMPs represent methods, measures or practices that are developed, selected, or approved by various agencies to protect, enhance and preserve natural resources including wildlife habitat. They include, but are not limited to, engineering, conservation, and management practices for mining, agriculture, silviculture, and other land uses, that are designed to conserve water quality and quantity, soil and associated nutrients, and to simultaneously control nonpoint and point source pollution and other impacts to natural resources including aquatic and terrestrial wildlife habitat.

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

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

DEP: Florida Department of Environmental Protection

DEP-BARC: Florida Department of Environmental Protection's Bay Area Resource Council

DOACS: Florida Department of Agriculture and Consumer Services

EAFB: Eglin Air Force Base

EPA: United States Environmental Protection Agency

ERP: Environmental Resource Permitting program, administered by the Florida Department of Environmental Protection and the water management districts under Chapter 373, Florida Statutes.

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

GLOSSARY OF TERMS AND ACRONYMS

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

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

FWCG: Florida Wildlife Conservation Guide, an online resource that facilitates effective land use planning, project design, and the management of natural communities, with a focus on wildlife conservation.

F.S.: Florida Statutes

GIS: Geographic Information System

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

HCP: Habitat Conservation Plan

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

ISMP: Imperiled Species Management Plan

ITP: Incidental Take Permit

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

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

IWRM: Integrated Water Resource Monitoring Network. The Integrated Water Resource Monitoring Network Program is a multi-level or "tiered" monitoring program designed to answer questions about Florida's water quality at differing scales. The program is supported by several DEP water quality monitoring groups in Tallahassee and in regional (district) offices. In general, Tier I addresses statewide and regional (within Florida) questions, Tier II focuses on basin-specific to waterbody-specific questions, while Tier III answers site-specific questions.

LAP: Landowner Assistance Program, a federal cost-share program administered by the FWC.

GLOSSARY OF TERMS AND ACRONYMS

LDR: Local Government Land Development Regulations

Lentic: Standing or relatively still water; lakes, ponds, and wetlands

Lotic: Actively moving water; streams, springs, or river systems.

MFLs: Minimum Flows and Levels, the minimum water flows and/or levels adopted by the District Governing Board as being necessary to prevent significant harm to the water resources or ecology of an area resulting from permitted water withdrawals. MFLs define how often and for how long high, average and low water levels and/or flows should occur to prevent significant harm. When use of water resources alters the water levels below the defined MFLs, significant ecological harm can occur.

NANFA: North American Native Fishes Association

NMFS: National Marine Fisheries Service, a branch of the National Oceanic and Atmospheric Administration.

NOI: Notice of Intent

NOAA: National Oceanic and Atmospheric Administration

NPDES: National Pollutant Discharge Elimination System

NRCS: Natural Resources Conservation Service, a branch of the United States Department of Agriculture and Consumer Sciences

NTU: Nephelometric Turbidity Units. A property of particles in water is that they will scatter a light beam focused on them. Measuring this scattering of light is a measure of turbidity in water. A nephelometer is the instrument that measures this scattering of light by the small particles. The units of turbidity from a calibrated nephelometer are called nephelometric turbidity units (NTU).

NWFWMD: Northwest Florida Water Management District

OFW: Outstanding Florida Water, as defined in Chapter 62-302.700, Florida Administrative Code.

PAC: Percent Area Covered

SL: Standard Length

SMZ: Special Management Zone: The Special Management Zone (SMZ) is a BMP which consists of a specific area associated with a stream, lake, or other waterbody that is designated and maintained during silviculture operations. The purpose of the SMZ is to protect water quality by reducing or eliminating forestry related inputs of sediment,

GLOSSARY OF TERMS AND ACRONYMS

nutrients, logging debris, chemicals and water temperature fluctuations that can adversely affect aquatic communities. SMZs provide shade, streambank stability and erosion control, as well as detritus and woody debris which benefit the aquatic ecosystem in general. In addition, the SMZ is designed to maintain certain forest attributes that will provide specific wildlife habitat values. Snags, den and cavity trees as well as mast producing trees, left in the SMZ, are necessary to meet habitat requirements for certain types of wildlife.

SQL: Structured Query Language

SSC: Species of Special Concern. Protected under 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.”

Take: As defined in 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.

TMDL: Total Maximum Daily Load. A scientific determination of the maximum amount of a given pollutant that a surface water can absorb and still meet the water quality standards that protect human health and aquatic life.

TNC: The Nature Conservancy

Turbidity: Cloudiness or haziness of water caused by suspended particles invisible to the naked eye, similar to smoke in air. The measurement of turbidity is a key test of water quality.

USACE: United States Army Corps of Engineers

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

USGS: United States Geological Survey

Wildlife Conservation Actions: This term includes the activities designed to restore, maintain or enhance fish and wildlife populations or their requisite habitat. This term also includes those provisions that avoid or minimize the chance for incidental take of listed species of wildlife when conducting activities specifically designed for land or water use objectives other than wildlife.

WMD: Water Management District(s)

WQ: Water Quality

INTRODUCTION

Biological Background

The saltmarsh topminnow (*Fundulus jenkinsi*) is among the smallest of the *Fundulus* minnows, usually between 35 and 45 mm (1.38 and 1.77 in) standard length (SL), with some females reaching 60 mm (2.36 in) SL (Gilbert and Relyea 1992, Thompson 1999). The key distinguishing feature is 1 or 2 rows of 12 to 30 dark round spots along the midside of the body from above the pectoral fin to the base of the caudal fin (tail fin). In addition, males may have a lemon-yellow color on the anal fin (Gilbert and Relyea 1992, NMFS 2009).

B.W. Evermann (1892) described and named the species from specimens collected in eastern Texas. The saltmarsh topminnow has been collected from Galveston Bay, Texas to Pensacola/Escambia Bay, Florida. Recent work by Lopez et al. (2011) indicates that the species may be more widely distributed than thought. In Florida, the range is limited to Perdido Bay and Pensacola/Escambia Bay estuaries (Gilbert and Relyea 1992, Thompson 1999, Peterson et al. 2003, NMFS 2009, Lopez et al. 2011). Lopez et al. (2011) surveyed to Apalachicola Bay since habitat was similar to other parts of its known range. No specimens were found east of the Pensacola/Escambia Bay estuaries, possibly due to limited sampling. [Figure 1](#) indicates where the saltmarsh topminnow has been collected or observed in Florida, along with its potential habitat (saltmarsh).

Research of the life history and specific habitat requirements of the saltmarsh topminnow has increased over the past few years due to the federal listing as a Species of Concern. The species typically occurs in cordgrass (*Spartina* sp.) and needlerush (*Juncus* sp.) marshes, and in shallow water with salinities < 16 parts per thousand (ppt) (Lopez et al. 2010, Peterson et al. 2003). Lopez et al. (2011) also indicated that higher mean catch-per-unit-effort occurred when there was low to moderate *Spartina* stem density (25 stems/0.25 m² [25 stems/2.7 ft²]), depth was < 25 cm (9.8 in), bank slope was < 15°, and turbidity was < 30 NTUs. In other words, Lopez found these fish have very specific conditions under which they are found. They also found that the small, dendritic (many branches stemming off from main waterway) creeks off the main channel are significant features that allow the species to have access to the higher marsh habitats. The saltmarsh topminnow is a batch spawner (a fish which sheds eggs multiple times throughout a spawning season, rather than within a short period), with spawning usually occurring after spring tides, from late February to August (Lopez et al. 2010). It is believed that most *Fundulus jenkinsi* have a limited life span (annual) which could have a significant effect on their population levels (Thompson 1999).

Conservation History

The saltmarsh topminnow (*Fundulus jenkinsi*) was listed by the Florida Game and Fresh Water Fish Commission (predecessor to the Florida Fish and Wildlife Conservation Commission [FWC]) as Threatened in 1977, and then reclassified as a Species of Special Concern in 1979. The National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS) identified the saltmarsh topminnow as a Species of Concern in 1991. The NMFS and the United States Fish and Wildlife Service (USFWS) filed a 90-day finding on a petition to list the saltmarsh topminnow as Threatened or Endangered under the Endangered Species Act in 2011. The USFWS will be making the final determination per a 2011 agreement

with NMFS. The Nature Conservancy (TNC) has developed, through a NMFS grant, a Gulf-wide “Conservation Plan for the Saltmarsh Topminnow (*Fundulus jenkinsi*)” that identifies 85 strategic actions (Sutter and Hayes 2011). Several management plans have been developed for lands and waters within the Perdido, Escambia, Blackwater, and Yellow River basins and the Pensacola/Escambia Bay. These include the Blackwater River Watershed Stewardship Plan (Blair et al. 2010), the Gulf Coastal Plain Ecosystem Partnership’s Aquatic Management Plan for the Watershed of the Western Panhandle of Florida and Southern Alabama (TNC 2006), the Yellow River Management Aquatic Preserve Management Plan (Florida Department of Natural Resources 1991), the Integrated Natural Resources Management Plan for Eglin Air Force Base (Science Applications International Corporation [SAIC] 2012), and the Pensacola Bay Watershed Management Guide (Florida Department of Environmental Protection and Bay Area Resources Council [DEP-BARC] 2005). These plans contain recommendations for habitat management and restoration activities within the basins. While these plans were not designed for specific conservation and management of the saltmarsh topminnow, they contain strategies and recommendations that support the conservation needs identified within this plan. Some of these plans have received some funding for implementation, but additional funding and cooperation with state and local governments is needed.

The Northwest Florida Water Management District (NFWFMD) Lower Escambia River Water Management Area, NFWFMD Garcon Point Water Management Area, Yellow River Marsh Aquatic Preserve, and Eglin Air Force Base (EAFB) contain known occurrence locations of the saltmarsh topminnow. Potential habitat is located on the following conservation lands: International Paper Company Conservation Easement, Dutex Mitigation site (NFWFMD), and EAFB. The Garcon Ecosystem and Escribano Point Florida Forever Projects both contain potential saltmarsh topminnow habitat.

For all waters of the state, the Florida Department of Environmental Protection (DEP) has defined 5 surface water classifications, based upon their designated use, with specific water quality (WQ) criteria for each classification under Rule [62-302.400, F.A.C.](#) In addition to its surface water classification, a waterbody may be designated as an Outstanding Florida Water (OFW), under Rule [62-302.700, F.A.C.](#) An OFW is a waterbody designated as worthy of special protection because of its natural attributes. OFW designations overlay surface water classifications and are intended to preserve existing ambient WQ. DEP’s website provides a [factsheet about OFWs](#). The Perdido and Blackwater rivers and the Yellow River Marsh Aquatic Preserve, which contain saltmarsh topminnows and their potential habitat, have been designated OFWs. OFWs receive more stringent protections from DEP and the Water Management Districts (WMDs) when projects (e.g., dredge and fill or wastewater discharge) are reviewed for permitting. Chapters 253, 258, and 373, of the [Florida Statutes](#) (F.S.) authorize the Environmental Resource Permit Program (ERP). In addition, Chapter 403 of the F.S. is used as part of this program to govern activities that may pollute Florida’s ground and surface waters, including wetlands. The ERP program and WQ protections should provide additional support for maintaining or improving the WQ and habitat needed by the saltmarsh topminnow.

The Florida Department of Agriculture and Consumer Services (DOACS) has developed agricultural best management practices (BMPs) that are designed to benefit water quality and

water conservation while maintaining or even enhancing agricultural production. The primary BMP that might benefit the saltmarsh topminnow habitat is the silviculture BMP.

Threats and Recommended Listing Status

In 2010, the FWC directed staff to evaluate the status of all species listed as Endangered, Threatened, or Species of Special Concern that had not undergone a status review in the past decade. To address this charge, staff conducted a literature review and solicited information from the public on the status of the saltmarsh topminnow. The FWC convened a biological review group (BRG) of experts on the saltmarsh topminnow to assess the biological status of the species using criteria specified in Rule [68A-27.001, F.A.C.](#) This rule includes a requirement for BRGs to follow the Guidelines for Application of the International Union for Conservation of Nature (IUCN) Red List Criteria at Regional Levels ([Version 3.1](#)) and Guidelines for Using the IUCN Red List Categories and Criteria ([Version 8.1](#)). FWC staff developed an initial draft Biological Status Review report (BSR), which included the BRG's findings and a preliminary listing recommendation. The peer-reviewed draft and the reviewers' input were incorporated into a [final report](#).

The BRG reviewed collection information and threats as part of the status review. The Imperiled Fishes Survey Investigations collected the saltmarsh topminnow at 8 sites in Perdido Bay, Escambia Bay, Blackwater Bay, and East Bay (Bass et al. 2004). Additional collections were made by Peterson et al. (2003) and Lopez et al. (2011). These collections (see [Figure 1](#)) represent sampling from 5 locations as defined for the listing evaluation by IUCN. Primary threats to this species include changes in water quality and quantity, channelization or ditching in the saltmarsh, dredging, habitat alteration, encroachment of urbanization, and point source and non-point source pollution. The Deepwater Horizon oil spill into the marshes of Louisiana, Mississippi, and Alabama has unknown consequences to the overall distribution and habitat throughout the known range of the saltmarsh topminnow.

Based on the literature review, information received from the public, the BRG findings, and peer-review input, FWC staff recommended the saltmarsh topminnow remain listed as Threatened on the Florida Endangered and Threatened Species List. The BRG found the saltmarsh topminnow met the following criteria for listing as Threatened:

- Criterion B Geographic Range. Extent and Area of occupancy less than 2,000 km² (772 mi²); severely fragmented or exist in ≤ 10 locations; continued decline, observed, inferred or projected in area, extent and/or quality of habitat; and
- Criterion D Population very small or restricted: population with a very restricted area of occupancy or number of locations such that it is prone to the effects of human activities or stochastic events within a short time period in an uncertain future.

It is possible the saltmarsh topminnow area of occupancy in FL has always been < 2,000 km² (< 772 mi²). As such, conservation actions should focus on overcoming the triggered subcriteria by reducing the fragmentation or increasing the number of locations to greater than 10, or by reducing decline in the extent and quality of habitat.

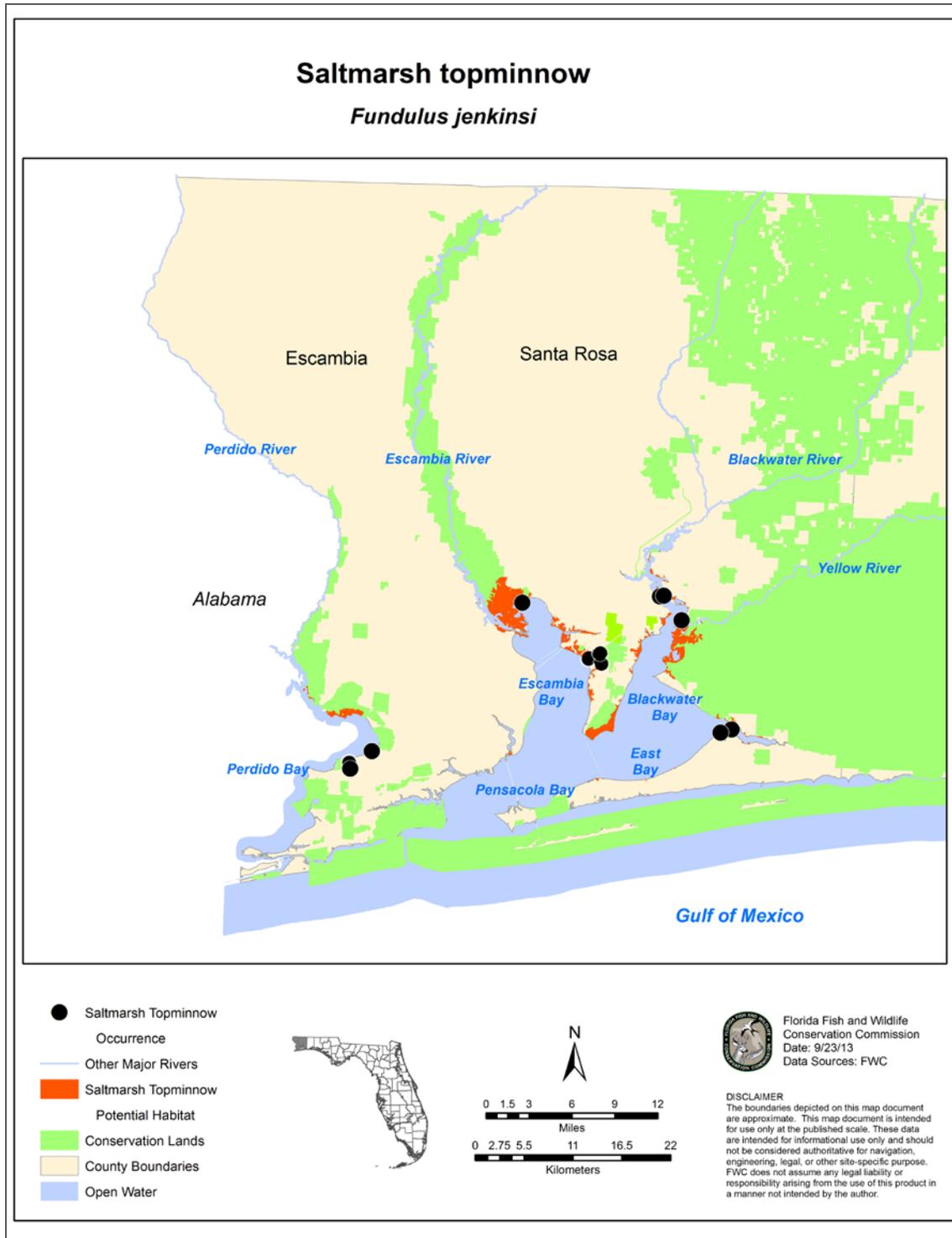


Figure 1. Documented occurrences of and modeled potential saltmarsh habitat for the saltmarsh topminnow (*Fundulus jenkinsi*).

CONSERVATION GOALS AND OBJECTIVES

Goal

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

Objectives

I. Establish connections between areas of known occupancy on the Escambia River, Blackwater River Delta and Bay, and Garcon Point within 10 years of this plan's implementation.

Rationale

The known locations within the Escambia River, Blackwater River Delta and Bay, and Garcon Point areas are fragmented and presumably do not allow for gene flow to occur. The extent of suitable habitat is unknown. Some of the areas may not be currently acceptable and may also contain species that out-compete the saltmarsh topminnow. There may be more connections that are unknown due to limited survey information on the species. Additional occurrences between locations would indicate that fragmentation might be limited and no longer a factor in the listing criteria.

II. Maintain a stable population in known areas of occupancy within the Escambia River, Blackwater River Delta and Bay, Garcon Point, East Bay, and Perdido Bay over the next 10 years of this plan's implementation.

Rationale

There has been a loss of saltmarsh habitat, conversion of wetlands and increased development in known areas of occupancy. Changes in the extent of saltmarshes due to sea level rise may also modify or cause a decline in available or potential habitat. A *stable population* is defined here as being consistently present at the historic sampling locations within the natural confines of population fluctuation observed due to climatic conditions instead of anthropogenic causes. Maintaining high-quality habitat and a stable population address the listing Criterion B.

III. Survey similar saltmarsh habitat within the known range and east of the known range to increase the area of occupancy to > 10 locations within 10 years of plan implementation.

Rationale

Multiple locations are necessary to avoid substantial losses to the greater populations due to a catastrophic event and climate change. The species range is thought to extend eastward to the Apalachicola River and Bay. There may be locations in its historic range that we are not aware of due to limited information on the species. If additional locations are found within the known range as well as new locations to the east (due to similar potential habitat), this will increase the area of occupancy and possibly the number of locations to greater than 10 for the species.

IV. Increase the population size to > 1,000 mature individuals in each of the known areas of occupancy within the Escambia River, Blackwater River Delta and Bay, Garcon Point, East Bay, Perdido Bay, and throughout its historical range.

Rationale

The main threats likely include habitat conversion, degradation, and alteration of saltmarsh structure due to increased development and non-native, invasive species. If changes occurred in a few of the known areas of occupancy, there could be substantial losses in the entire population. There is likely a need to maintain the genetic diversity of the species among locations. Improved monitoring and surveys may help identify the population size and increase the known number of locations where they occur. Both would address the reasons for listing under Criteria B and D.

CONSERVATION ACTIONS

The following sections describe the conservation actions that will make the greatest contribution toward achieving the conservation objectives. Actions are grouped by category (e.g., Habitat Conservation and Management, Population Management). The Conservation Action Table ([Table 5](#)) provides information on action priority, urgency, potential funding sources, likely effectiveness, identified partners, and leads for implementation.

Habitat Conservation and Management

It should be noted that the majority of the Habitat Conservation and Management Actions, which are predicated on water quality and quantity maintenance, are under the authority and require active participation of the DEP and the NFWFMD, EAFB, the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA). The habitat management of estuarine areas containing saltmarsh topminnows has received attention with the development of the Blackwater River Watershed Stewardship Plan (Blair et al. 2010), the Gulf Coastal Plain Ecosystem Partnership's Aquatic Management Plan for the Watershed of the Western Panhandle of Florida and Southern Alabama (TNC 2006), and the Pensacola Bay Watershed Management Guide (DEP-BARC 2005). These plans were developed primarily as a means for local and regional government entities to better preserve, protect, and restore areas within the planning boundaries.

Saltmarsh habitat management, non-native species controls

Action 1 Maintain the vegetative structure of the cordgrass (*Spartina* sp.) and needlerush (*Juncus* sp.) saltmarsh in the areas where the saltmarsh topminnow currently is known and may occur.

Spartina and *Juncus* saltmarsh forms the boundary between the uplands and marine environments. It provides a natural upland buffer from tropical storms and floods. Natural and extreme changes usually maintain the natural composition of the saltmarsh. However, in many cases it is necessary to conduct controlled burns to maintain the saltmarsh. Burns are necessary to remove encroachment of shrubs and other upland plants. Many of the conservation lands within the Perdido and Escambia Bay System apply a 10- to 15-year burn interval (D. Clayton, NFWFMD, personal communication). In addition, several non-native species may occur within the *Spartina* and *Juncus* saltmarsh due to proximity to human development. Chinese tallow trees (*Sapiem sebiferum*) and torpedo grass (*Panicum repens*) are the primary non-native plant species that require monitoring and removal within the saltmarsh community. These non-native species displace native wetland plant species.

Action 2 Limit the use of hardened structures and dredging in known saltmarsh topminnow occurrence locations and potential habitats. Encourage the use of living shorelines as an alternative to hardened structures.

The use of seawalls and other hardened structures at the upland interface with saltmarsh causes additional erosion and changes in the saltmarsh community. Mitigation for these structures is difficult and may not have the desired positive or no-net-loss outcome. These structures and their cumulative impacts are a major threat to the species' habitat (Mattheus et al. 2010). Living

shorelines use a combination of natural breaks (e.g., created oyster reefs) coupled with planting of seagrass behind the breaks. This eventually creates additional seagrass habitat along with increases in oyster reef structure. Dredging in the saltmarsh is as great a concern and threat. “The Environmental Resource Permit Program (ERP) regulates activities involving the alteration of surface water flows. This includes new activities in uplands that generate stormwater runoff from upland construction, as well as dredging and filling in wetlands and other surface waters. ERP applications are processed by either the DEP or one of the Water Management Districts (WMDs), in accordance with the division of responsibilities specified in operating agreements between the Department and the water management districts. The ERP Program is in effect throughout the State (DEP [Website](#)). FWC will continue to coordinate with these entities to ensure permitted activities do not degrade saltmarsh topminnow populations or habitat.

Saltmarsh Habitat Restoration

Action 3 Restore the natural hydrology and vegetative structure of altered saltmarsh habitat within the potential range of the saltmarsh topminnow.

Silviculture and mosquito control activities have altered the hydrology in many areas of the Perdido and Escambia Bay System. Several of the conservation lands within the area contain altered habitat and some lands are in the process of restoring hydrology by filling in ditches or creating ditch blocks (D. Clayton, personal communication). Many areas on the Garcon Point peninsula have significant hydrologic alteration and altered vegetation. Many of these are private lands with some being part of the NFWMD Garcon Point Water Management Area. Identification and prioritization of areas in need of restoration is necessary in order to address the listing criteria of continued decline in the extent and quality of habitat. Prioritization criteria should be developed as additional habitat and water quality information is obtained.

[Monitoring and Research](#) programs may identify additional areas in need of restoration. Once identified, individual plans and monitoring programs should be developed based upon site-specific needs and specific habitat requirements for the saltmarsh topminnow. Once restored, it will be important to maintain habitat and water quality in these areas through regulatory and inter-governmental mechanisms. [Monitoring and Research](#) programs should evaluate success, including re-colonization, at restoration sites.

Water Quality and Quantity

Action 4 Water quality and habitat parameters need to be maintained in known saltmarsh topminnow occurrence locations and potential habitats.

Action 5 Upgrade the existing database, or establish a new fisheries database to contain comprehensive, species-specific collection data that includes negative capture data, sampling staff, sampling protocol, associated environmental data (habitat and water quality characteristics, vegetation species and composition, tidal conditions, adjacent land use), and fish communities.

Species that occupy a small geographic area with few locations are vulnerable to natural or anthropogenic catastrophes that can cause permanent extirpation. Thus, physical habitat and

water quality and quantity in these locations must be identified and associated environmental parameters determined in order to guide conservation and management. Habitat and WQ information obtained from sampling, modeling, model verification, and determination of species habitat needs should be provided to regulatory agencies for use in their programs. There are several regulatory agencies in Florida, ranging from local to federal levels of government, that work together to maintain quality aquatic habitats. The EPA, USACE, DEP, and the WMDs monitor and regulate WQ and quantity to maintain healthy conditions for aquatic plants, fish, and wildlife ([Appendix 1.](#)).

FWC will coordinate monitoring efforts and provide the most current population survey data in order to maximize WQ protections for the saltmarsh topminnow through regulatory agencies. In addition, this information may identify any occurring changes that result in the need for additional sampling and research within the specific basins.

Action 6 Participate with the NFWFMD, DEP, and local governments to avoid, minimize, or mitigate any potential impacts to saltmarsh topminnow habitat, which includes water quality and quantity. This will require FWC participation in the development of the Minimum Flows and Levels (MFL), Water Reservation, Regional Water Supply Plans, and regulatory review of permits.

In general, the DEP or a WMD cannot issue permits for new direct discharges of wastewater into OFWs if the discharge would lower ambient (existing) WQ. In most cases, this deters new wastewater discharges from directly discharging into an OFW. New direct discharges of stormwater must have 50% greater treatment applied than would otherwise be required. The DEP or a WMD also may not issue permits for indirect discharges that would significantly degrade a nearby waterbody designated as an OFW. Permits are issued through the ERP program. Stormwater construction permits under the National Pollutant Discharge Elimination System (NPDES) are issued separately by the DEP or the WMDs. The NPDES program areas of regulation include municipal storm sewer systems, industrial stormwater and discharge, and stormwater construction activities. The FWC will continue to coordinate with these entities to ensure permitted activities do not degrade saltmarsh topminnow populations or habitat.

Action 7 Participate with, and develop outreach material for, DEP, NFWFMD, DOACS, local governments, federal agencies, and the public to identify and implement conservation measures that reduce water quality impacts from unpaved roads, agriculture, silviculture, riparian zone management, and development within known areas of saltmarsh topminnow occurrence.

Action 8 Increase protection of saltmarsh topminnow habitat through opportunities provided via regulatory permit requirements, conservation lands management, county comprehensive plan land-use classification, fee-simple or less-than-fee-simple acquisition, or the potential to develop a USFWS Habitat Conservation Plan (HCP) for Panhandle Florida river basins for federally-listed and certain state-listed fish species (including the saltmarsh topminnow).

The extent of riparian zones or buffers needed to protect fish and wildlife resources vary throughout the United States and especially the Southeast. Several studies have looked at the effectiveness of various riparian buffers in reducing pollutants and sedimentation and providing

fish and wildlife habitat benefits (Wegner 1999, Mayer et al. 2006). Much of the literature, existing regulations, and best management practices recognize that determining buffer width depends upon the slope of the land, rainfall, soil characteristics, catchment size and hydraulic loading, floodplain and wetlands, land use, impervious surfaces, and vegetation surrounding the wetland or waterbody. Wegner (1999) suggests 3 buffer guideline options for WQ and habitat conservation. These guidelines apply to both perennial and intermittent streams. One is a fixed width buffer; the other 2 options are variable width buffers dependent upon slope and proximity to wetlands. The minimum buffer width, in all options, is 15.2 m (50 ft). The “conservative option” has a base width of 30.5 m (100 ft) plus 0.6 m (2 ft) per 1% of slope, extending to the edge of the floodplain, and includes adjacent wetlands. Wegner’s guidelines are supported by Mayer et al. (2006), who evaluated the riparian buffer effectiveness at removing nitrogen by vegetative cover, hydrologic flow path, and buffer width and soil type. The USFWS developed recommended guidelines, for buffer widths that start with options for reducing nutrient and sediment inputs, for establishing wildlife corridors. These buffer widths vary from 9.14 to 457.2 m (30 to 1,500 ft), with 30.5 to 91.4 m (100 to 300 ft) recommended for aquatic systems (USFWS 2001). [DOACS BMPs](#) include riparian buffers for silviculture and other agricultural practices. For more information on riparian buffers and other protections, see [Appendix 2](#).

An evaluation of riparian buffer widths is included as part of [Monitoring and Research](#). The evaluation may also include estimates of sea level rise and the need to maintain natural progression of saltmarsh habitat. Riparian and streamside management should be considerate of any additional conservation measures and other species requirement measures that may be identified through [Monitoring and Research](#). In addition, riparian areas in the known occurrence collection sites ([Figure 1](#)) and any restoration zones should be evaluated in the future land use maps of the local government comprehensive plans to determine if they are receiving adequate protection.

The FWC will participate with DEP, NFWFMD, USACE, DOACS, and other entities to identify riparian zones associated with saltmarsh topminnow subpopulations ([Action 6](#)). Conservation measures that may be developed through [Monitoring and Research](#) should be implemented to reduce water quality impacts associated with riparian zone activities ([Action 7](#)). In addition, FWC will identify opportunities to increase protection of saltmarsh topminnow habitat through county comprehensive plan land-use classification, land acquisition, conservation easements, or development of USFWS HCPs.

Table 1. Summary of habitat conservation and management preliminary recommendations.

<p>Preliminary recommendations for management of saltmarsh topminnow WQ and quantity habitat</p>	<ul style="list-style-type: none"> • Maintain saltmarsh habitat through a combination of controlled burns and non-native species controls. • Maintain or enhance WQ parameters in known occurrence areas and potential habitat areas, as depicted in Figure 1, through review and coordination of projects with the NFWFMD, DEP, USACE, EPA, and local government. • Limit the use of hardened structures (e.g., seawalls and breakwaters) within or adjacent to the <i>Spartina</i> and <i>Juncus</i> saltmarsh. Encourage the use of living shorelines. • Review permits and coordinate assessments of potential project impacts to saltmarsh topminnow populations, WQ, and habitats in potential saltmarsh habitat and any restored areas with the NFWFMD, DEP, USACE, EPA, and local governments. • Participate with DEP and the NFWFMD in the collection of WQ and habitat information at known and potential collection sites for use in the development of WQ trend analysis.
<p>Preliminary recommendations for riparian habitat management of saltmarsh topminnow</p>	<ul style="list-style-type: none"> • Maintain appropriate riparian buffers to maintain natural functions and vegetative structure of the saltmarsh and to address saltmarsh movement due to rising sea level. • Identify parcels adjacent to potential saltmarsh habitat for possible acquisition or conservation easements through continued participation and coordination with state, local, and non-profit land acquisition agencies. • Restore natural hydrology and functions of the saltmarsh by filling or blocking mosquito (and other) ditches.
<p>Preliminary recommendations for habitat restoration in areas of saltmarsh topminnow occurrence or potential range</p>	<ul style="list-style-type: none"> • Assess known locations to identify environmental parameters that may be critical to the saltmarsh topminnow survival (see Monitoring and Research) and develop plans to recreate those vital habitat parameters if possible.

Population Management

Population management actions, including potential augmentation or reintroduction, are not identified at this time. Information collected through monitoring and research may result in actions necessary to address population management needs.

Monitoring and Research

The BRG determined that the small population size of saltmarsh topminnow and continued decline in habitat quality, and the small extent of occurrence and area of occupancy (less than 2,000 km² [772 mi²]) of the saltmarsh topminnow, warranted retention of the saltmarsh topminnow on the Florida Endangered and Threatened Species List. The BRG determined, however, that existing data, literature, and knowledge may not be sufficient to address the objectives and actions necessary to achieve the goal of removing the species from the list. The following research and monitoring actions are designed to address data gaps and can be broken into categories, including: desktop habitat analysis, habitat and population studies, genetic analysis, and development of BMP assessment research.

Desktop Analysis

A comprehensive, species-specific Geographic Information System (GIS)/ Structured Query Language (SQL) database needs to be developed. [Figure 1](#) shows the occurrence of saltmarsh topminnow based upon current published studies (Peterson et al. 2003, Bass et al. 2004, Lopez et al. 2011). Historic and recent records for all rare and imperiled fish are currently compiled into a GIS database. However, this database does not include sufficient information (e.g., sampling staff, sampling methods, and description of associated environmental and fish community parameters) needed for additional analysis. Nor do these datasets include sites where the saltmarsh topminnow was sought but not collected (negative data). Modifications to the existing, or creation of a new database may be necessary to capture this information ([Action 5](#)).

Additional GIS datasets that may be useful for future analysis are:

- Land use and owner information
- Public (state and federal) land boundaries
- Conservation areas and easements
- Water supply and reservoir sources
- Coastal marshes, tidal creeks and tidal portions of coastal rivers
- Unpaved roads and other potential pollution sources
- Water management district information highlighting areas with minimum flows and levels

Development of detailed maps and a comprehensive database will assist in identifying current and historic sites, selecting sites for potential sampling, prioritizing sites needing protection, identifying historical sites where habitat information is lacking, identifying priority sites for restoration, and comparing habitat characteristics between sites.

Action 9 Develop a habitat suitability model based on collection data, habitat parameters, and environmental variables. Use the model to identify potential new populations and sites, and factors contributing to habitat loss at historical sites. Verify the model's accuracy by sampling identified potential sites to determine if the saltmarsh topminnow is present.

Action 10 Develop and implement FWC sampling and habitat evaluation protocols, and provide training to FWC staff, consultants, and partners. This will aid efforts to identify locations,

identify water quality and habitat needs, determine abundance, and estimate the size of saltmarsh topminnow populations and subpopulations within the current, historical range, and potential range.

Action 11 Develop comprehensive conservation measures that identify saltmarsh topminnow habitat requirements, habitat management recommendations, and methods to abate threats from various land use activities.

Prioritization

GIS and SQL databases will assist with development of prioritization models or schemes.

Prioritization is needed to differentiate between locations within sub-watersheds that have:

- High conservation value for saltmarsh topminnows, are protected (state, federal, WMD, local government lands), and should continue to be protected;
- High conservation value for saltmarsh topminnows, but are potentially at risk of future alteration (through development, invasive species, sea level rise, etc.);
- Good habitat for saltmarsh topminnows, but are in currently developing or threatened areas; or
- Been degraded but have restoration potential.

Sites could be further ranked based on the type of future alteration likely to occur. Risk from future alterations is difficult to assess given the lack of knowledge regarding saltmarsh topminnow habitat needs and tolerances. Historical locations once occupied by saltmarsh topminnow that contain suitable habitat should be considered for reintroduction efforts with high priority over historical sites that need habitat restoration. The prioritization and information learned from additional survey and monitoring activities may aid in the identification of new locations and conservation opportunities. Conduct Habitat Suitability Modeling in GIS to evaluate occupied habitat quality and define, delineate, and establish areas of critical habitat that should be protected ([Action 9](#)).

Habitat and Population Studies

Research and monitoring programs and their implementation (collection methods) should be based on clear objectives and best scientific judgment. A watershed level sampling design is needed to update species distribution information, properly characterize occupancy, accurately determine population trends, and determine the influence of both in-stream and landscape attributes on saltmarsh topminnow populations. Additionally, site-specific sampling is needed to determine persistence, stability, probability of detection, and to characterize site occupancy on a microhabitat level ([Action 10](#), [Action 5](#)). This multi-scale approach will allow inferences about population status and trends on both a temporal (watershed) and spatial (site-specific) scale. Although recent research examined habitat linkages to life history and trophic (nutritional) ecology (Lopez et al. 2010, Lang et al. 2012) and reproductive condition of the saltmarsh topminnow (Lang et al. 2011, 2012), more information is necessary, particularly on populations occurring in Florida, to elucidate habitat preferences.

Sampling design and collection methods.—Saltmarsh topminnows can be collected in Florida while sampling under the FWC’s lentic and lotic long-term monitoring programs, if appropriate gear is used. Gear may include Breder traps and small seines along the

edge of tidal creeks (Fulling et al. 1999, Peterson et al. 2003), 1 m² (1.2 yd²) drop samplers, 0.25 m² (0.3 yd²) throw traps, lift nets on tidally inundated marsh (Rozas and Minello 1997), and electrofishing gear (e.g., Triton 9) in deeper water with low salinities (up to 8 parts per thousand) of tidal creeks and rivers. Proper gear selection and sampling design are crucial to accurate estimates of population densities of fishes that use shallow water estuarine habitats and intertidal marsh surfaces (Rozas and Minello 1997). Waterbodies should be sampled annually and utilize a stratified-random design for sample site selection. While these protocols may be appropriate to monitor community structure, another approach may be needed for long-term monitoring of saltmarsh topminnow. A more intensive study may be required to ascertain any seasonal or geographical variation in reproduction and body condition in Florida's saltmarsh topminnows ([Action 10](#)).

Saltmarsh topminnows are rare and often not recaptured at sites of known occupancy, and non-detection cannot necessarily be attributed to extirpation or changes in the population; non-detection may be attributed to detection differences. Therefore, sampling methods using multiple gear types should be investigated in order to determine the best and most appropriate collection method to address both the difficulty in habitat sampling and detection issues.

Habitat information.—For this species, the influence of water quality, vegetation and micro-habitat, riparian requirements that affect temperature, structure, stream flow conditions, fish associates, and fish community structure are little understood. Once identified, sites need individual plans and monitoring programs based upon site-specific needs and species-specific habitat requirements. After habitat quality is assessed, areas of degraded habitat may be identified for restoration. Areas where there is riparian management or established buffer zones may be locations suitable for specific monitoring to determine the effectiveness of conservation actions. This may result in modified recommendations for habitat management ([Action 7](#), [Action 11](#)).

Fish community data may be necessary for inclusion with saltmarsh topminnow presence and abundance data; saltmarsh topminnow-fish community relationships have not been examined. A better understanding of important ecological interactions, such as competition for key resources and predator-prey associations, is needed. Physical habitat information is necessary for inclusion with saltmarsh topminnow presence and abundance data, so that important species habitat preferences can be further delineated. Current FWC monitoring protocols recommend the collection of physical habitat characteristics and fish community data for each sampled site. Additional habitat characteristics may be considered for collection in future saltmarsh topminnow-sampling efforts. Habitat and water quality preferences should become part of the conservation measures that will be developed as new information is available ([Action 7](#), [Action 11](#)). These habitat characteristics should also provide information on where additional sampling should occur to determine if saltmarsh topminnows are present in new areas ([Action 9](#)).

Action 12 Monitor the success of actions to protect saltmarsh topminnows and their habitat. Implement changes where necessary.

Current FWC fishery-monitoring protocols recommend recording:

- Physical habitat characteristics (e.g., water temperature, conductivity, salinity, dissolved oxygen, pH, depth, turbidity [secchi depth])
- A qualitative description and percent area covered (PAC) of shore type
- PAC of shore type canopy
- PAC of aquatic macrophytes, woody debris, and other forms of structure
- Minimum, maximum and average depth encountered along the transect
- Water clarity (or turbidity)
- Co-dominant substrate type
- Fish community data for each sampled transect

Additional habitat characteristics such as site-specific flow or distance to mainstem may be considered for collection in future saltmarsh topminnow-sampling efforts. Maximum depth, percent coverage of vegetation, conductivity, and fish community data should be retained in future imperiled fish species sampling efforts. Habitat and water quality preferences should be included in conservation measures. These habitat characteristics should also provide information on where additional sampling should occur to determine if imperiled fish species are present in new areas.

Genetic analyses

It would be beneficial to develop a tissue-sample protocol using the least-invasive techniques for non-destructive collection of tissue samples (e.g., blood, fin clips, external swab, etc.) for genetic analysis. Using the least-invasive technique would ensure the fish can be returned to the collection site alive and in good condition (Taberlet et al. 1999). The FWC recommends tissue samples be collected from saltmarsh topminnows to examine genetic variability, within and among subpopulations, to indicate diversity and population structure from sites throughout the saltmarsh topminnow range in Florida and other Gulf Coast states (i.e., Texas, Louisiana, Mississippi, and Alabama). This information would be crucial if translocation or reintroduction becomes necessary for the recovery of this species.

Development of BMP assessment research

Much of the research conducted by DOACS and DEP in the development of the agricultural BMPs focused on macro-invertebrate species and WQ subject to regulatory requirements. While the BMPs did not focus on habitat needs of fish and wildlife, the subsequent result may have provided habitat benefits to these resources; however this has not yet been fully evaluated. In addition, DEP and the WMDs promote the use of other BMPs as a means of non-point source management (see [DEP Nonpoint Website](#)). Many of these may abate some threats to the saltmarsh topminnow; however existing agricultural BMPs designed to minimize impacts to wetlands and WQ should be evaluated for their effectiveness with regard to listed species ([Action 7](#)).

To further this effort, additional assessment and research should consider:

- Identifying known locations of saltmarsh topminnows that may be influenced by agricultural land uses and/or BMPs within state or conservation lands,
- Developing methodologies and a research plan to evaluate current agricultural and non-agricultural practices and the effectiveness of existing and proposed BMPs applicable to land uses in known saltmarsh topminnow habitats, and,
- Working with the landowners, DOACS, and DEP to implement research plans to evaluate existing and proposed BMPs as needed, after initial studies have been conducted on conservation lands.

Table 2. Summary of monitoring and research preliminary recommendations.

<p>Habitat and Population Studies</p>	<ul style="list-style-type: none"> • Develop a training program on fish identification, collection techniques, and collection of habitat parameters to allow non-FWC individuals and stakeholder groups to assist sampling efforts at known sites and in the search for new saltmarsh topminnow sites. • Develop a protocol for determining presence and absence for use by consultants and permit applicants.
<p>Development of BMP Assessment Research</p>	<ul style="list-style-type: none"> • Develop methodologies and a research plan to evaluate the effectiveness of existing and proposed BMPs applicable to land use threats in known saltmarsh topminnow habitats.

Rule and Permitting Intent

Action 13 Develop permitting guidelines that identify management needs and habitat requirements.

As a Threatened species, the saltmarsh topminnow is protected under [Chapter 68A-27, F.A.C.](#) The protective measures contained in Chapter 68A-27, F.A.C. should provide adequate protections for the species. These rules prohibit harm and harassment of Threatened species. Thus, informing the public, FWC law enforcement, and others about what actions are likely to result in a violation of the rules is important. The permit requirements and exemptions as currently provided in Chapter 68A-27.007(2), F.A.C. are applicable to the saltmarsh topminnow. However, modifications are needed to the intentional take permitting requirements and for scientific collection permits that occur within potential saltmarsh topminnow habitats to help further our understanding of the distribution and trends within known populations, recolonization of historic new locations, and community structure where the saltmarsh topminnow is collected.

In accordance with existing rules, any permit holders for intentional take may also be required to:

- Notify FWC law enforcement of the dates when intentional collections for scientific or conservation purposes will occur and the location of the anticipated collection efforts
- Within 30 days of the collection effort, provide FWC the coordinates of collections of the Threatened species and a voucher specimen (or location where voucher specimen is located)
- Within 30 days of the collection effort, provide FWC the number of individuals collected, released, and kept for vouchers

Coordination with other agencies and other stakeholders (e.g., North American Native Fish Association [NANFA]) toward outreach regarding and implementation of these rules and permit requirements will be necessary.

Law Enforcement

Action 14 Develop a training module for FWC Law Enforcement and baitfish suppliers for identification of saltmarsh topminnow.

The FWC's Division of Law Enforcement, in conjunction with federal, state, and local partners, is responsible for enforcing Florida's wildlife and fisheries laws. Biologists from FWC and other saltmarsh topminnow subject matter experts will educate law enforcement officers through the development, circulation, and interpretation of information on saltmarsh topminnow identification, distribution maps, and other training materials ([Action 14](#)). The saltmarsh topminnow is a species that could potentially be seen in the baitfish market, and proper identification tools will be important for documenting violations of Florida's wildlife laws.

An important component of the enforcement strategy is ensuring compliance through public education. FWC law enforcement officers understand the importance of explaining wildlife laws to the public to avoid unintentional violations ([Action 6](#), [Action 7](#)). However, FWC law enforcement officers actively pursue and recommend prosecution for those who intentionally violate wildlife laws. FWC law enforcement officers also educate the public on how to identify and report violations. The FWC's Division of Law Enforcement administers the Wildlife Alert Program, which receives information via a toll-free number (1-888-404-3922) that is answered 24 hours a day, 7 days a week. Cash rewards are offered to callers who provide information about any illegal activity that results in an arrest. Callers may remain anonymous and are not required to testify in court.

Incentives and Influencing

Influencing

County growth management plans and land development regulations provide an avenue by which FWC can inform and influence land and water uses that are relevant to the conservation of Florida's fish and wildlife, including state-listed species. [Figure 1](#) identifies areas known or having potential to harbor saltmarsh topminnow. The BSR and this plan identify the threats to the saltmarsh topminnow, as well as specific permitting recommendations that specify means to avoid, minimize, or mitigate activities associated with the threats to the saltmarsh topminnow

(see [Table 1](#)). The FWC offers conservation planning services to local governments during growth management plan development as well as during consideration of plan amendments and associated development proposals ([Action 6](#), [Action 7](#), [Action 8](#)).

To promote an understanding of technical assistance and incentives available to landowners, FWC typically provides information to local governments regarding species management, permitting options, and incentive programs that are available to applicants, developers, landowners, and the public. The FWC is working to develop comprehensive conservation measures to address the saltmarsh topminnow and its habitat needs ([Action 11](#)), the implementation of which can be encouraged through local land development reviews (see [Incentive Programs](#)). However, [Chapter 163.3184, F.S.](#) indicates that a county may not require as a condition of processing a development permit that an applicant obtain a permit or approval from any other state or federal agency unless the agency has issued a notice of intent (NOI) to deny the federal or state permit before the county action on the local development permit.

The FWC's Landowner Assistance Program (LAP) advances species conservation objectives through public-private conservation partnerships. These programs are voluntary and some offer financial assistance to landowners implementing conservation plans (see [Incentive Programs](#)). Participation in any of these incentive programs would provide FWC opportunities to gather information on private agricultural lands or those slated for development. FWC assistance in evaluating the effects of development practices on the saltmarsh topminnow population would help provide FWC necessary information to develop better avoidance, minimization, and mitigation options for agriculture and development on private landowners' property ([Action 7](#)).

Incentive Programs

The FWC currently takes advantage of several programs that promote conservation by providing technical and financial assistance to private landowners ([Action 8](#)). The FWC partners with other state and federal agencies to administer the Forest Stewardship Program, Wildlife Habitat Incentives Program, Wetlands Reserve Program, Environmental Quality Incentives Program, Partners for Fish and Wildlife Program, and the Cooperative Conservation Blueprint. These programs are voluntary and some may provide financial incentives, depending on annual appropriation, for wildlife conservation and habitat management on private lands. Florida also provides tax incentives including property tax exemptions under [§196.26, F.S.](#) for landowners that put a perpetual conservation easement on their land. Additional incentives may include exemption from permits for activities that enhance wildlife activities such as mowing, roller-chopping, and tree stand thinning, as long as they are not a precursor to development. Any number of these incentive programs may be applicable for protecting the riparian habitat and water quality in the saltmarsh topminnow habitats identified in [Figure 1](#).

The Habitat Conservation Plan (HCP) concept was originally developed as a required piece of the application for a federal Incidental Take Permit (ITP). This type of permit authorizes the take, as defined in the Endangered Species Act, of listed species incidental to a lawful activity. The intent of the HCP is to make sure the effects of issuing a take permit are adequately minimized or mitigated. While it may not be practical to develop individual HCPs for many of the aquatic federally- and state-listed fish species, FWC is investigating the potential for the

development of a “watershed-based HCP” for multiple aquatic species that are both state- and federally-listed in the basins containing saltmarsh topminnow.

Conservation banking is another program available to private landowners interested in habitat conservation. Conservation banking for listed species is comparable to mitigation banking in that lands are permanently protected and can be used to offset development related adverse impacts to wildlife resources, including habitats. The FWC may consider developing or supporting conservation banking for species in the same watersheds as the saltmarsh topminnow.

Wildlife Conservation Measures.— Approximately 65% of Florida land is used for some form of agriculture. Florida’s fish and wildlife, including many state-listed species, occur on lands or in streams adjacent to lands utilized for agriculture. The FWC is currently working with the DOACS and landowners engaged in agriculture to identify wildlife conservation measures that may contribute to avoidance and minimization of take ([Action 7](#)).

Use of these wildlife conservation measures could preserve or enhance habitat or avoid take of the saltmarsh topminnow by identifying factors such as:

- The preferred timing of clearing and construction,
- Methods of clearing and re-vegetating,
- Preferred locations and methods of stormwater management features,
- Preservation of on-site ecosystem features,
- Preferred location of open space and green space and conservation areas,
- Inclusion of development or density buffers, or
- Inclusion of conservation easements over conservation areas.

Incentives for incorporating these conservation measures into development proposals could include reduced or expedited permitting, reduced permitting fees, local or state recognition, tax incentives, or density bonuses.

Table 3. Summary of incentives and influencing recommendations to local governments and private landowners in the potential habitat areas and areas under restoration.

<p>Influencing</p>	<ul style="list-style-type: none"> • Provide assistance to local governments on the conservation measures that should be considered for incorporation into their local land development regulations. • Provide an information packet to local governments detailing incentives to both public and private entities for the purchase, conservation, restoration, or enhancement of listed species habitat. • Provide to local governments and landowners a set of conservation measures to address the saltmarsh topminnow and its habitat needs.
<p>Incentive Programs</p>	<ul style="list-style-type: none"> • Through the LAP, provide outreach to landowners in the priority and restoration areas regarding the various incentive programs available for the conservation of the species. • Provide assistance to NFWFMD, DEP, local government, and other land acquisition entities in acquiring conservation easements, when the property cannot be purchased fee-simple, or to acquire riparian habitat adjacent to known locations of saltmarsh topminnow. • Provide information to landowners and local governments on the development of a “watershed based HCP” that could replace the need for a federal ITP.
<p>Wildlife Conservation Measures</p>	<ul style="list-style-type: none"> • Determine the use and effectiveness of the existing multi-agency BMPs and identify further refinements that may be needed for the protection of saltmarsh topminnow habitat.

Education and Outreach

Education and outreach are important components of managing imperiled aquatic species ([Action 7](#), [Action 14](#)). Individuals who are well-informed regarding the merits of imperiled species and their supporting habitat can encourage conservation measures to secure those species’ continued survival. Both formal and informal settings can serve as opportunities to provide information about imperiled species.

Key messages about saltmarsh topminnow include:

- Their service as indicators of habitat condition, WQ, and water quantity.
- Specific needs for continued survival.
- Unique characteristics and benefits to the ecology of a region.

A unified and comprehensive approach to education and outreach will serve to inform the public, at their own pace, regarding the means and needs to protect saltmarsh topminnow.

Coordination with Other Entities

[Appendix 3](#) provides a discussion of intergovernmental coordination requirements and authorities within Florida. The [Habitat Conservation and Management Actions](#) identify many monitoring and regulatory programs that are under the authority of and require active participation by several regulatory agencies. It is imperative that FWC coordinate and participate with these agencies to effectively preserve and protect the saltmarsh topminnow and its habitat ([Action 2](#), [Action 6](#), [Action 8](#)). The development of specific conservation measures ([Action 11](#)) should also provide additional guidance to the regulatory agencies for use in pertinent programs. The FWC will continue to collaborate with and provide information to local governments regarding species management, permitting guidelines, and assistance programs available to landowners and the public.

County growth management plans and land development regulations (LDRs) provide opportunity for FWC to influence land and water uses relevant to fish and wildlife conservation. [Table 1](#) contains many recommendations that could be included into the comprehensive plans and LDRs as a means to avoid, minimize, or mitigate activities associated with the threats to the saltmarsh topminnow ([Action 2](#), [Actions 6-8](#)). The FWC offers conservation planning services to local governments during growth management plan development as well as during consideration of plan amendments and associated development proposals. Early coordination with FWC can streamline FWC's review and approval process.

Chapter 163.3177, Florida Statutes, requires that county comprehensive growth management plans include a conservation element. The conservation element must include the identification of areas within the county that are locations of important wildlife or habitat resources, including State-listed species. This element must contain principles, guidelines, and standards for conservation that restrict activities known to adversely affect the survival of these species. The FWC is identified as a state agency authorized to review county growth management plans and, including any amendments to ensure important state fish, wildlife, and habitat resources are adequately considered. In addition, local government land development regulations require conditions for land and water uses that specify how such uses will be administered to be consistent with the conservation element of the county growth management plans. Therefore, interagency collaboration on the review and development of the conservation element of these plans is essential for ensuring that they consider wildlife habitat within the county.

Local governments can assist FWC in obtaining new occurrence information by adding questions to their development applications asking for information on what listed species surveys have been conducted on the property, or by inspecting parcels for the presence and absence of saltmarsh topminnow (simplified survey protocol). Requiring notification of FWC staff that saltmarsh topminnows or saltmarsh topminnow habitat has been identified on-site prior to issuing clearing or building permits should expedite FWC's review and approval ([Action 7](#)).

Land development is governed by a variety of federal, state, and local government growth management and permitting processes or requirements. FWC offers conservation planning services to these regulatory agencies and encourages early meetings and coordination efforts to determine presence or absence of listed species on-site and to plan for other important fish, wildlife, and habitat issues ([Actions 6-8](#)).

The [Florida Wildlife Conservation Guide](#) (FWCG) is an online resource that facilitates effective land use planning, project design, and the management of natural communities, with a focus on wildlife conservation. Developed by the FWC in partnership with the USFWS and the Florida Natural Areas Inventory (FNAI), its purpose is to provide an accessible repository of wildlife life history, habitat management guidelines, and conservation recommendations. The FWCG aims to provide a common platform of ecologically based wildlife information based on best available scientific information. As a dynamic resource, it is maintained with current guidelines and recommendations for wildlife management and protection, and includes numerous links to relevant external sources of information. The FWCG will have the specific information related to the saltmarsh topminnow and necessary conservation measures once they are developed ([Action 11](#)).

Local governments and other agencies also play a substantial role in saltmarsh topminnow conservation and management by providing protected and managed areas for the species. Many local governments have created habitat-acquisition and management programs, which can provide important assistance in achieving the goal and objectives of this plan. The FWC will continue to coordinate with local governments and other agencies to help ensure that local land-acquisition programs and county comprehensive plan's policies and implementing ordinances are: 1) consistent with the goal and objectives of this plan and 2) focused on acquisition priorities for saltmarsh topminnow and other imperiled species ([Action 8](#)).

Table 4. Summary of coordination with local governments and state and federal agencies preliminary recommendations.

<p>The FWC will continue to assist and encourage local governments and state and federal agencies to:</p>	<ul style="list-style-type: none"> • Ensure that WQ parameters are maintained at existing or improved levels in areas of known occurrence; and that any regulatory projects consider impacts to saltmarsh topminnow populations and habitats. • Coordinate with FWC before permits that may affect WQ or habitat are issued. • Consider information on saltmarsh topminnow habitat needs and WQ and quantity needs that could be used in the development of MFLs. • Identify areas containing saltmarsh topminnow for possible acquisition or conservation easements. • Incorporate into LDRs and other regulatory provisions to maintain appropriate riparian buffers to maintain natural functions and vegetative structure of the saltmarsh. • Evaluate known occurrence locations to identify environmental parameters that may be critical to the saltmarsh topminnow survival and to develop plans with intergovernmental assistance to recreate those critical habitat parameters if possible. • Incorporate the conservation measures necessary for species conservation.
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Table 5. Saltmarsh Topminnow (*Fundulus jenkinsi*) Conservation Action Table

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

Objective(s) Addressed	Team Assigned Priority Level	Action Item Number	Action Items	Conservation Action Category	Ongoing, Expanded or New Effort?	Authority	Man Power	Estimated Cost To Implement	Funding Source(s)	Lead for Implementation: FWC Program(s) and/or Section(s)	External partners	Likely Effectiveness	Feasibility	Urgency
1, 2	1	1	Maintain the vegetative structure of the cordgrass (<i>Spartina</i> sp.) and needlerush (<i>Juncus</i> sp.) saltmarsh in the areas where the saltmarsh topminnow currently is known and may occur.	Habitat Conservation & Mgmt	EXPANDED	NO	YES	TBD	Unknown	HSC	DEP, NFWFMD, Landowners, TNC	High Likelihood of Success.	Feasible with assistance.	Yes- habitat degradation is one of the main threats to the species.
2, 4	1	2	Limit the use of hardened structures and dredging in known saltmarsh topminnow occurrence locations and potential habitats. Encourage the use of living shorelines as an alternative to hardened structures.	Habitat Conservation & Mgmt, Coordination with Other Entities	EXPANDED	NO	YES	TBD	Unknown	HSC	DEP, NFWFMD, USACE, USFWS, NMFS, Local Government	Moderate Likelihood of Success.	Feasible with assistance.	Yes- habitat degradation is one of the main threats to the species.
2, 3, 4	1	3	Restore the natural hydrology and vegetative structure of altered saltmarsh habitat within the potential range of the saltmarsh topminnow.	Habitat Conservation & Mgmt, Monitoring & Research	EXPANDED	NO	YES	TBD	Unknown	HSC, FWRI	DEP, NFWFMD, USACE, USFWS, NMFS, Local Government, Landowners, TNC	High Likelihood of Success.	Feasible with assistance.	Yes- habitat degradation is one of the main threats to the species.
1,2	1	4	Water quality and habitat parameters need to be maintained in known saltmarsh topminnow occurrence locations and potential habitats.	Habitat Conservation & Mgmt, Coordination with Other Entities, Monitoring & Research	EXPANDED	NO	NO	TBD	Unknown	HSC	DEP, NFWFMD, USACE, USFWS, NMFS, Local Government, Landowners, TNC	High Likelihood of Success.	Feasible with assistance.	Yes- habitat degradation is one of the main threats to the species.
1, 4	2	5	Upgrade the existing database or establish a new fisheries database to contain comprehensive, species-specific collection data that includes negative capture data, sampling staff, sampling protocol, associated environmental data (habitat and water quality characteristics, vegetation species and composition, tidal conditions, adjacent land use) and fish communities.	Habitat Conservation & Mgmt, Monitoring & Research	NEW	YES	NO	TBD	Unknown	FWRI	DEP, NFWFMD	High Likelihood of Success.	Very feasible.	Yes- This may be as simple as adding tables to the existing database that FWRI maintains.
2,3,4	1	6	Participate with the NFWFMD, DEP, and local governments to avoid, minimize, or mitigate any potential impacts to saltmarsh topminnow habitat, which includes water quality and quantity. This will require FWC participation in the development of the Minimum Flows and Levels (MFL), Water Reservation, Regional Water Supply Plans, and regulatory review of permits.	Habitat Conservation & Mgmt, Incentives & Influencing, Coordination with Other Entities	ONGOING	NO	NO	\$25-50k	Existing funds	HSC	NFWFMD, DEP, local governments	High Likelihood of Success.	Very feasible.	This is needed as part of ERP and other permitting reviews.; This will be done once NFWFMD or the Counties re-start the water supply planning process; This will be done once NFWFMD starts the MFL process
2,3,4	1	7	Participate with, and develop outreach material for, DEP, NFWFMD, DOACS, local governments, federal agencies, and the public to identify and implement conservation measures that reduce water quality impacts from unpaved roads, agriculture/silviculture, riparian zone management, and development within known areas of saltmarsh topminnow occurrence.	Habitat Conservation & Mgmt, Monitoring & Research, Law Enforcement, Incentives & Influencing, Education & Outreach, Coordination with Other Entities	EXPANDED	NO	YES	TBD	Unknown	HSC	NFWFMD, DEP, DOACS, Federal agencies, local governments, conservation organizations, private landowners	There has already been some effort to reduce sedimentation from unpaved roads in some of the counties. But it requires funding and commitment to undertake the effort. This will have moderate effectiveness depending on who the audience for the various outreach products are developed.	Very feasible.	Can be done at any time in the process. Correcting unpaved road issues may have differing urgency depending upon where the project is located.
2, 4	1	8	Increase protection of saltmarsh topminnow habitat through opportunities provided via regulatory permit requirements, conservation lands management, county comprehensive plan land-use classification, fee-simple or less-than-fee-simple acquisition, or the potential to develop a USFWS Habitat Conservation Plan (HCP) for Panhandle Florida river basins for federally-listed and certain state-listed fish species (including the saltmarsh topminnow).	Habitat Conservation & Mgmt, Incentives & Influencing, Coordination with Other Entities	NEW	NO	YES	\$100k+	Unknown	HSC	Local Government, DEP, NFWFMD, DOACS, TNC, Universities, Alabama Agencies	Could be effective if local government and landowners consent to the land use change; HCP process could be very effective but will be a substantial process.	Very feasible but will be dependant on support and cooperation of outside entities.	HCP process and land use change can be done at any point the process. However, if the HCP process is started early it may provide a start for data collection and early implementation of management.

Table 5. Saltmarsh Topminnow (*Fundulus jenkinsi*) Conservation Action Table

Objective(s) Addressed	Team Assigned Priority Level	Action Item Number	Action Items	Conservation Action Category	Ongoing, Expanded or New Effort?	Authority	Man Power	Estimated Cost To Implement	Funding Source(s)	Lead for Implementation: FWC Program(s) and/or Section(s)	External partners	Likely Effectiveness	Feasibility	Urgency
1,3	3	9	Develop a habitat suitability model based on collection data, habitat parameters, and environmental variables. Use the model to identify potential new populations and sites, and factors contributing to habitat loss at historical sites. Verify model accuracy by sampling identified potential sites to determine if the saltmarsh topminnow is present.	Habitat Conservation & Mgmt, Monitoring & Research	NEW	YES	YES	\$100k+	Unknown	FWRI	Universities	This will take some time to develop and will rely on the data collected from the monitoring program.	Very feasible, but requires initial sampling to occur at known locations first.	Yes- needed to fill in data gaps.
1,3	1	10	Develop and implement FWC sampling and habitat evaluation protocols, and provide training to FWC staff, consultants, and partners. This will aid efforts to identify locations, identify water quality and habitat needs, determine abundance, and estimate the size of saltmarsh topminnow populations and subpopulations within the current, historical range, and potential range.	Habitat Conservation & Mgmt, Monitoring & Research, Coordination with Other Entities	NEW	YES	YES	TBD	Unknown	FWRI	NANFA, DEP, NFWFMD, NMFS, USFWS, Universities	High likelihood of success.	Very feasible.	Yes- needed to fill in data gaps; needed to help implement the sampling program and ensure that non-agency staff or volunteers understand the proper collection methods.
2,4	1	11	Develop comprehensive conservation measures that identify saltmarsh topminnow habitat requirements, habitat management recommendations, and methods to abate threats from various land use activities.	Habitat Conservation & Mgmt, Monitoring & Research, Protections & Permitting, Education & Outreach, Coordination with Other Entities	NEW	YES	YES	TBD	Unknown	HSC, FWRI	NANFA, DEP, NFWFMD, DOACS, NMFS, USFWS, Universities	High likelihood of success.	Very feasible.	Yes- Very critical to conservation of the species.
2,4	2	12	Monitor the success of actions to protect saltmarsh topminnows and their habitat. Implement changes where necessary.	Habitat Conservation & Mgmt, Monitoring & Research	NEW	YES	NO	TBD	Unknown	FWRI	NANFA, DEP, NFWFMD, NMFS, USFWS, Universities	This may be moderately effective and will require completion of other actions to implement.	The feasibility will be determined by the information collected from other actions.	Must be done after other actions are taken.
2, 4	2	13	Develop permitting guidelines that identify management needs and habitat requirements.	Monitoring & Research, Protections & Permitting, Incentives & Influencing, Coordination with Other Entities	NEW	YES	YES	TBD	Unknown	HSC, FWRI	USFWS, NMFS, NFWFMD, DOACS	High likelihood of success.	Very feasible.	Yes- Very critical to conservation of the species.
2,4	1	14	Develop a training module for FWC Law Enforcement and the baitfish suppliers for identification of saltmarsh topminnow.	Law Enforcement, Education & Outreach	NEW	YES	YES	\$0-25k	Existing funds	OPAWVS, CR, HSC, LE	USFWS	This would allow LE to be able to adequately enforce regulations.	Very feasible.	Can be done at any time in the process.

Acronyms used in this table:

- DEP: Florida Department of Environmental Protection
- DOACS: Florida Department of Agricultural and Consumer Services
- FWRI: Fish and Wildlife Research Institute, the research branch of the Florida Fish and Wildlife Conservation Commission
- HSC: Habitat and Species Conservation, a Division of the Florida Fish and Wildlife Conservation Commission
- LE: Law enforcement
- MFL: Minimum flows and levels
- NANFA: North American Native Fishes Association
- NMFS: National Marine Fisheries Service
- NFWFMD: Northwest Florida Water Management District
- OPAWVS: Office of Public Access and Wildlife Viewing Services, administered by the Florida Fish and Wildlife Conservation Commission
- TBD: To be determined
- TNC: The Nature Conservancy
- USACE: United States Army Corps of Engineers
- USFWS: United States Fish and Wildlife Service

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APPENDICES

Appendix 1. Cooperating agencies/programs aimed at maintaining aquatic habitat quality.

The Florida Department of Environmental Protection (DEP) created the Integrated Water Resource Monitoring Network (IWRM) Program as a multi-resource, multi-level or “tiered” comprehensive monitoring network, designed to answer questions about Florida’s water quality (WQ) at differing scales. Tier I monitoring is comprised of 2 monitoring efforts - status monitoring and trend monitoring - which are designed to answer state-wide and regional questions.

The status-monitoring network performs a statewide sweep each year to report on the overall condition of Florida’s waters. The surface water trend-monitoring network consists of 76 fixed location sites in streams and rivers that are sampled on a monthly basis. The sites are usually located at the lower end of a drainage basin and where possible, are placed at or close to a U.S. Geological Survey (USGS) flow gauging station. These sites enable DEP to obtain chemistry, discharge, and loading data at the point that integrates the land use activities of the watershed (see [DEP website](#)). Data from both networks comprise part of Florida’s biannual Water Quality Assessment 305(b) Report to the EPA, a requirement of the Federal Clean Water Act.

Tier II monitoring, under the IWRM, includes basin assessments and monitoring required for total maximum daily load (TMDL) development. DEP must develop TMDLs for waterbodies where one or more WQ standards are not met. The TMDL is a scientific determination of the maximum amount of a given pollutant that surface water can absorb and still meet the WQ standards that protect human health and aquatic life. Water bodies that do not meet WQ standards are identified as “impaired” for the particular pollutants of concern (e.g., nutrients, pathogens, metals, etc.) and TMDLs must be developed, adopted and implemented for those pollutants to reduce the level of impairment. The threshold limits on pollutants in surface waters are set forth primarily in Rule 62-302, Florida Administrative Code. DEP provides information on the status and development of TMDLs through their [website](#). Coordination with DEP on the location of saltmarsh topminnows and any WQ and habitat information collected at inhabited sites will be important to improving or maintaining the aquatic habitat.

Florida’s water management districts have several programs related to ensuring that water supply needs of both people and natural systems are met. Minimum Flows and Levels (MFLs) are established for lakes, streams, rivers, wetlands, springs and aquifers in order to prevent significant harm to the water resources or ecology of an area resulting from permitted water withdrawals. Establishing MFLs is a requirement of the State Legislature under Subsection 373.042, Florida Statutes. MFLs identify a range of water flows and/or levels above which water might be permitted for consumptive use. Consumptive Use Permits allow the holder to withdraw a specified amount of water, either from the ground or from or surface water (such as a canal, a lake or a river). The water can be used for a public water supply; to irrigate crops, nursery plants, or golf courses; or for industrial processes. Individual homeowners using water from their own private well for household purposes do not need Consumptive Use Permits. The water management districts develop regional water supply plans for meeting the needs of future development within their basins while also maintaining protection of natural systems. The plans

may identify the additional use of traditional supplies, such as ground and surface waters, or the development of alternative supplies such as use of reclaimed water, demineralization of brackish water, desalination of seawater, or increased water conservation.

The Northwest Florida Water Management District and the St. Johns River Water Management District are initiating development of MFLs in most of the river systems that contain saltmarsh topminnows. As part of the Research and Monitoring, information that is gathered regarding specific habitat and WQ needs of the saltmarsh topminnow will be provided to the for consideration while they develop the 5-year priority lists and timeframes for MFL plan development and in the actual development of individual MFLs in waterbodies containing saltmarsh topminnows.

Appendix 2. Riparian buffers and management.

Best management practices (BMPs) are designed to protect WQ by reducing, or eliminating, inputs of sediments, nutrients, logging debris, chemicals and temperature fluctuations from development, mining, silvicultural and agricultural practices. The silviculture BMP (DOACS 2011) identifies a Special Management Zone (SMZ) whose width is based on the size and type of waterbody, soil type (erodible) and slope of the site. The SMZ ranges in size from 9.14 m to 91.44 m (35 ft to 300 ft). The primary SMZ adjacent to OFW waterbodies is 61 m (200 ft). The USFWS has recommended 100 ft riparian buffers along the mainstem of rivers that contain gulf sturgeon critical habitat and 100 ft buffers for streams and rivers containing listed mussel habitat for various agricultural practices receiving federal funding (NRCS Conservation Matrix 2011). The FNAI Inventory (Conservation Needs Assessment Report 2011) and the Critical Lands and Waters Identification Project (Oetting et al. 2012) have also identified for planning purposes 1,000 ft buffers along all rivers and streams based upon the need for removal of nutrients from septic tanks and upland land uses. However, regulatory requirements under ERP/Non-point source permitting typically only require 25 ft buffers from wetlands for specific WQ parameters. The Blackwater River Watershed Stewardship Plan (Blair et al., 2010) reviewed the adequacy of buffers within the Blackwater River watershed. They recommended that minimum buffer widths of 50 ft be implemented along the river and its tributaries throughout the watershed. They went on to recommend that local governments should adopt comprehensive planning polices and land development regulations that require or encourage riparian buffers.

If direct land acquisition is not feasible for the preservation of areas containing saltmarsh topminnows, alternative conservation methods may need to be considered. Conservation easements are one of the most effective tools available for the permanent conservation of private lands in Florida. “A conservation easement is a restriction placed on a piece of property to protect its ecological or open space values. It is a voluntary, legally-binding agreement that limits certain types of uses or prevents development from taking place now and in the future. In a conservation easement, a landowner voluntarily agrees to donate or sell certain rights associated with his or her property, such as the right to subdivide, and a private organization or public agency agrees to hold the landowner’s promise not to exercise those rights” (The Nature Conservancy, 2003). The application of conservation easements by private landowners has successfully protected and retained large tracts of wildlife habitat while meeting expectations for natural resource conservation. Parcels greater than 40 acres under permanent conservation easements are eligible for a tax exemption under §196.26, F.S.; parcels less than 40 acres must meet other requirements and be approved by the Acquisition and Restoration Council. In some cases, conservation easements enable the landowner to qualify for tax benefits under the Internal Revenue Service rules. Additional information on Conservation Easements and Acquisition can found through in the [Florida Wildlife Conservation Guide](#).

Appendix 2, Literature Cited

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Appendix 3. Coordination with other entities.

Florida's growth management law places significant responsibility for land and water use decisions on local governments. Achievement of Florida's species conservation plans will necessitate local government land and water use plans and regulations that recognize important state fish and wildlife resources, including habitat, and provide adequate provision for their conservation. The Florida Fish and Wildlife Conservation Commission (FWC) will continue to collaborate with and provide information to local governments regarding species management plans, permitting guidelines and assistance programs that are available to landowners, as well as the public.

Chapter 163.3161, Florida Statutes requires that county comprehensive growth management plans include a conservation element. The conservation element must include the identification of areas within the county that are locations of important fish, wildlife, or habitat resources, including state-listed species. This element must contain principles, guidelines, and standards for conservation that restrict activities known to adversely affect the survival of these species. FWC is identified as a state agency authorized to review county growth management plans and plan amendments to ensure important state fish, wildlife and habitat resources are adequately considered. Further, local government land development regulations require conditions for land or water use that specify how uses will be administered consistent with the conservation element of the county growth management plan.

County growth management plans and land development regulations (LDRs) provide an avenue by which FWC can inform and influence land and water uses that are relevant to the conservation of Florida's fish and wildlife, including state-listed species. Because local governments use the land development regulations or ordinances to govern development under their jurisdiction, and because local governments often address habitat potentially occupied by state listed species, coordination with FWC can streamline FWC's review and approval process. Such coordination with the local government may include such things as working with local governments to include questions in their development applications regarding listed species surveys on the property, or by working with the local governments to facilitate their inspection of parcels for the presences and/or absence of imperiled species (simplified survey protocol). Notifying FWC staff of the potential for an imperiled species or its habitat to occur on-site prior to issuing clearing or building permits will allow FWC staff the opportunity to work with the local government and the applicant regarding imperiled species state permitting requirements early in the local permitting process:-

Land development is governed by a variety of federal, state, and local government growth management and permitting processes or requirements. Some of the processes may include Joint Coastal Permits, Environmental Resource Permits (wetland, stormwater, or non-point source), Sector Plans, Developments of Regional Impacts, Master Planned Unit Developments, and Mitigation Banking Permits. Most state and water management district (WMD) permits require consideration of potential impacts to listed species and their habitats. Local governments and other state or federal agencies often conduct site visits prior to clearing and development. These site visits occur early in the regulatory process, often well before permitting begins. By participating in site visits, project scoping meetings and pre-application reviews as part of an

interagency review team, FWC can help determine presence/absence and help address avoidance, minimization, or mitigation prior to the permitting process. An Interagency Review Team would also provide FWC the opportunity to participate in large scale local-government planning efforts, would be able to coordinate with other permitting agencies to reduce redundancy in recommended conditions, and would be able to help large developments plan to avoid habitat impacts. These early meetings and coordination efforts also give local governments and other agencies the opportunity to determine presence or absence of listed species on-site as well as other important fish, wildlife, and habitat issues.

FWC will develop and provide protocol for determining the presence and absence of imperiled species to assist local governments and the regulatory agencies in protecting habitat for the imperiled species. Once presence is determined, FWC can assist the applicant to avoid incidental take permitting by providing conservation measures such as appropriate site design, or could provide mitigation options such as purchase of land or contribution to a trust fund for conservation of the species or participation in a Habitat Conservation Plan (HCP). This is also a good opportunity to make the applicant aware of any FWC incidental take permits or authorizations.

Local governments and other agencies also play a substantial role in imperiled species conservation and management by providing protected and managed areas for imperiled species. Many local governments have created habitat-acquisition and management programs, which can provide important assistance in achieving the goal and objectives of this management plan. The FWC will continue to coordinate with local governments and other agencies to help ensure that local land-acquisition programs and the comprehensive plan's implementing ordinances and policies are: 1) consistent with the goal and objectives of this plan; and 2) focus on acquisition priorities for imperiled species and other important wildlife species.

This plan identifies areas known to or having potential to support saltmarsh topminnow and encourages research efforts to further determine current distribution and preferred habitats. This plan also identifies the threats to the saltmarsh topminnow, as well as the need to identify preliminary recommendations that specify means to avoid, minimize, or mitigate activities associated with these threats (see [Habitat Conservation and Management](#); [Monitoring and Research](#); and [Rule and Permitting Intent](#)). FWC offers conservation planning services to local governments during development of growth management plans, as well as during consideration of plan amendments and associated development proposals.