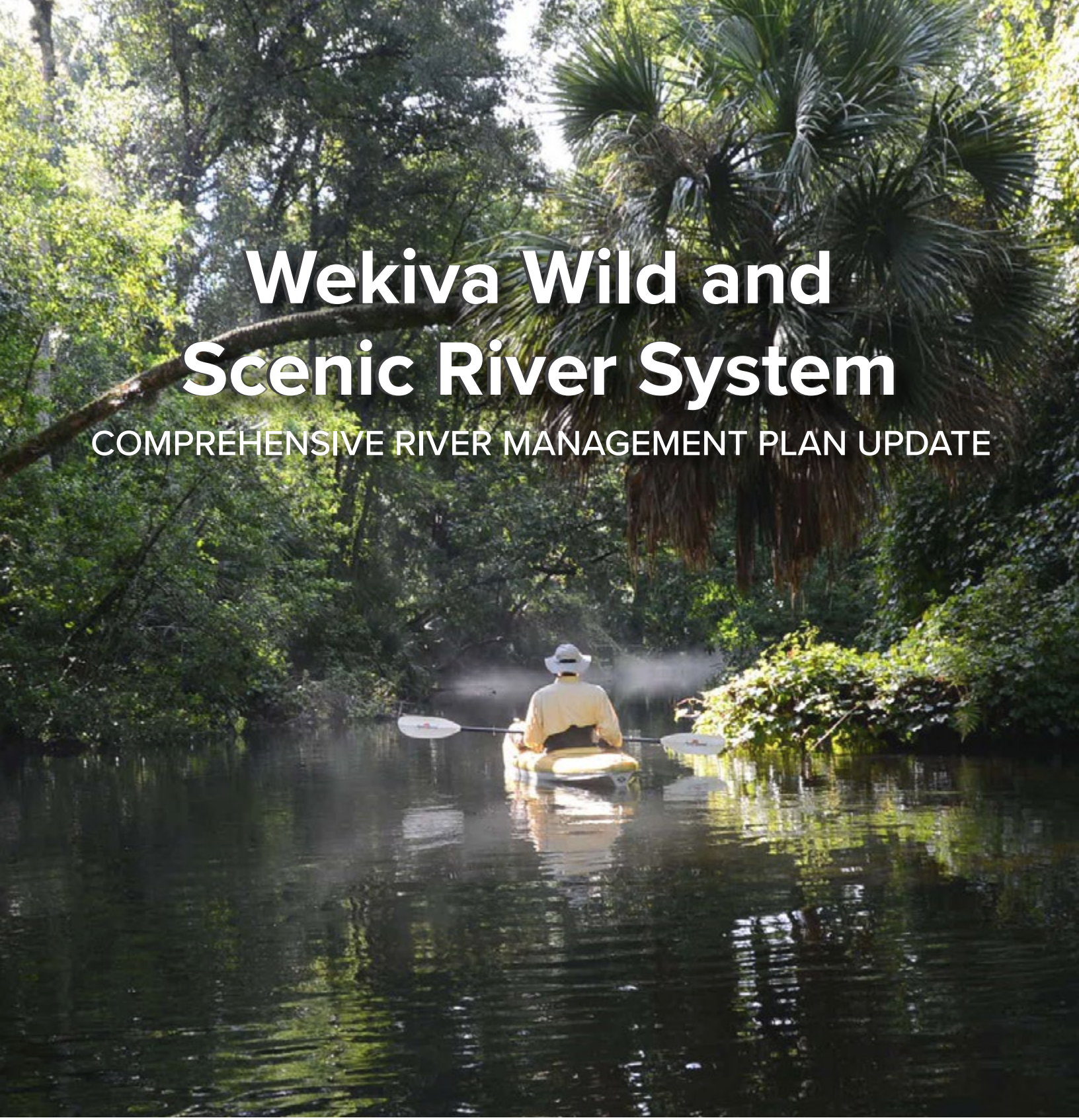

Wekiva Wild and Scenic River System

COMPREHENSIVE RIVER MANAGEMENT PLAN UPDATE

Prepared for the
Wekiva Wild and Scenic River System Management Committee

In partnership with
The National Park Service

September 2023

Prepared by

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With

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List of Acronyms

ACOE - U.S. Army Corps of Engineers

BMAP - Basin Management Action Plan

CRMP - Comprehensive River Management Plan

CUP - Consumptive Use Permit

DFC - Desired Future Condition

ECFRPC - East Central Florida Regional Planning Council

ERP - Environmental Resource Permit

FDACS - Florida Department of Agriculture and Consumer Services

FDEP - Florida Department of Environmental Protection

FDOH - Florida Department of Health

FDOT - Florida Department of Transportation

FDHR - Florida Division of Historical Resources

FNAI - Florida Natural Areas Inventory

FOWR - Friends of the Wekiva River

FWC - Florida Fish and Wildlife Conservation Commission

LCWA - Lake County Water Authority

MFL - Minimum Flows And Levels

NPS - National Park Service

OFW - Outstanding Florida Water

ORV - Outstandingly Remarkable Value

OSTDS - On Site Storage and Treatment Disposal System

PFA - Priority Focus Area

SJRWMD – St. Johns River Water Management District

SSF - Seminole State Forest

TMDL - Total Maximum Daily Load

WSSP - Wekiwa Springs State Park

Acknowledgments

This update to the Wekiva Wild and Scenic River System Comprehensive River Management Plan (CRMP) was prepared for the Wekiva Wild and Scenic River System Management Committee. Members of the Committee, listed below, provided guidance from the inception of the project through various drafts of the material included in the CRMP update. We are appreciative of their participation, review, and comments.

- Friends of the Wekiva River, Inc. - **Nancy Prine**, Chair
- U.S. National Park Service – **Jaime Doubek-Racine**
- Wekiva Wild and Scenic River System - River Ambassador - **Ashley Konon**
- Florida Department of Environmental Protection, Florida Park Service – **Robert Brooks**
- Florida Department of Environmental Protection, Wekiva River Aquatic Preserve – **Barbara Howell**
- Florida Department of Agriculture and Consumer Services, Seminole State Forest – **Joe Bishop**
- Florida Fish and Wildlife Conservation Commission – **Tom Shupe**, **Early Lundy**, the late **Jay Holder**
- St. Johns River Water Management District – **Susan Davis**, **Kimberley Eisele**, **Rob Mattson** (retired)
- Audubon of Florida – **Charles Lee**
- East Central Florida Regional Planning Council – **Commissioner Lee Constantine**
- Orange County – **Elizabeth Johnson**, **Beth Jackson**
- Seminole County – **Jim Duby**, **Shannon Wetzel**
- Lake County – **Steve Crawford**
- Apopka - **Mayor Bryan Nelson**
- Longwood – **Mayor Tony Boni**
- Altamonte Springs – **April Davis**

Nancy Prine, chairperson of the Wekiva Wild and Scenic River System Management Committee was engaged in all aspects of the update to the Plan. She provided direction related to committee presentations, format of the document, public outreach, and the Arc StoryMap, among many other things. **Ashley Konon**, the Wekiva Wild and Scenic River System Ambassador, was equally involved in providing background on the current methods of public engagement, the status of the website and social media platforms, and logistics during workshops and field trips on the river and at recreation sites. **Jaime Doubek-Racine**, the U.S. National Park Service's (NPS) representative on the Wekiva Wild and Scenic River System Advisory Management Committee provided guidance on the process of updating the CRMP, insight relative to the NPS Director's Order 46 and Reference Manual 46: Wild and Scenic Rivers, and edits and review of the Plan. We thank the Friends of the Wekiva River, Inc. for serving as the local representative for the National Park Service and our partner on the project.

Rob Mattson, recently retired from the St. Johns River Water Management District (SJRWMD), provided water quality data, relevant scientific literature, and a thoughtful review of sections of the Plan related to water quality and quantity. We appreciate his input on this update to the Plan, and his work at the SJRWMD for many years prior to retirement.

We thank private concessionaires Wekiva Island, Wekiva Falls, and Kings Landing for use of their facilities, which allowed their patrons to participate in the on-line surveys. We thank the more than 100 participants who attended in person and online meetings, and for responding to online surveys and mapping exercises to provide input on priorities considered in the update to the CRMP.

We want to recognize the contributions of the late **Jay Holder**. Jay was a member of the Wekiva Wild and Scenic River System Management Committee, as a representative of the Florida Fish and Wildlife Conservation Commission. Jay was working on numerous important studies within the St. Johns River Basin, including comprehensive surveys of native and non-native fish, habitat assessments of listed species, and investigations into the loss of native aquatic vegetation. Jay had a tremendous amount of knowledge and passion for the St. Johns River, the Wekiva River and its unique spring systems. Jay's legacy will continue through the continuation of his work on the fish and aquatic habitats of the Wekiva River System.

The Project Team

Jay Exum, Ph.D., Exum Associates, Project Director

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Table of Contents

List of Tables

List of Figures

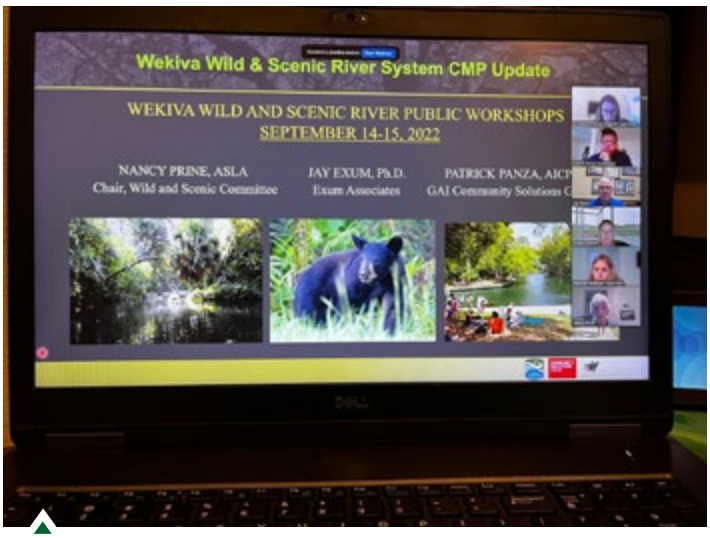
1.0
Executive Summary

This report provides an update to the Wekiva Wild and Scenic River System Comprehensive River Management Plan (CRMP) approved by the Wekiva Wild and Scenic River System Advisory Management Committee in May 2012. This update is compiled in 10 chapters with two additional chapters dedicated to literature cited and appendices. It builds on the template provided by the 2012 CRMP but is intended to be more streamlined by using hyperlinks to additional information, and relegation of some material to appendices. Frequent communication with current members of the management committee ensured collaboration and improved all aspects of the document. Comments from public workshops and online surveys were useful in focusing Goals and Actions, and in making recommendations for improving the website, social media applications, and digital marketing.

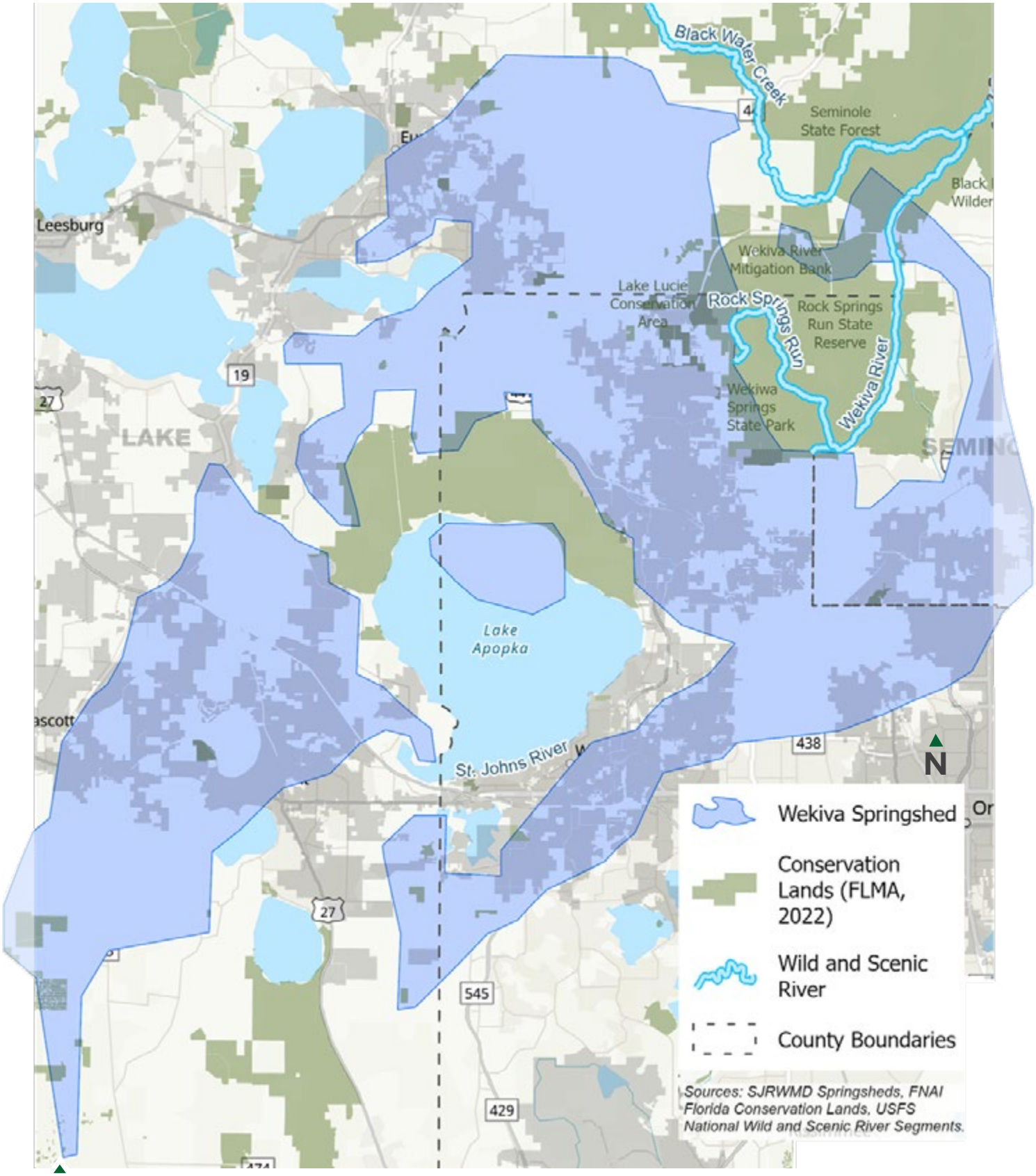
In 1968, Congress created the National Wild and Scenic Rivers System (Public Law 90-542; U.S.C. 1271-1287) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations (https://www.nps.gov/orgs/1912/index.htm). On October 13, 2000, due to its free-flowing condition and Outstandingly Remarkable Values, the Wekiva River System, comprised of the Wekiva River, Rock Springs Run, Wekiwa Springs Run, and Black Water Creek, was officially designated as a national Wild and Scenic River. The Wekiva River System, located in Orange, Seminole, and Lake Counties encompasses a surface water drainage of approximately 242 square miles. A subsurface springshed extends south and west of the surface water basin and includes areas of high recharge to the Floridan aquifer, a critical source of water for the 31 springs in the Wekiva River System.

In-Person Public Meeting at Wekiwa State Park Rec Center 09/14/22

Wekiva Committee Meeting at Wekiva Island 11/29/22



Zoom Public Meeting/Presentation 09/15/22



Springshed For the Wekiva River System

In addition to its free-flowing condition, the Wekiva Wild and Scenic River System possesses five outstandingly remarkable values (ORVs), which include: 1) scenic, 2) recreation, 3) wildlife and habitat, 4) historic and cultural, and 5) water quality and quantity. The Wekiva River includes separate and distinctive Wild, Scenic and Recreational segments. The Wekiva Wild and Scenic River System Management Committee, made up of a broad coalition of state and local partners, led in coordination by the National Park Service, is formally tasked with ensuring those ORVs are protected and enhanced in perpetuity.

Threats to natural resources in the Wekiva basin are due in part to the expansive human population that live nearby. Based on data from the 2020 U.S. Census, almost 2.3 million people live within 30 miles of the Wekiva Wild and Scenic River System. North of these population centers is the Wekiva to Ocala Greenway, a network of conservation lands that extends from Wekiwa Springs State Park to the Ocala National Forest. South of the approximately 400,000-acre national forest, conservation lands within and connected to the Greenway total more than 100,000 acres owned by federal, state, local, and private entities.

The update to this CRMP is divided into 12 chapters. It provides an historical perspective, accomplishments since 2012, a summary of public engagement efforts, the state of the river, goals and actions, the role of partner agencies, proposed monitoring, literature cited and appendices.

Chapter 3 provides a description of each river segment, including Wekiwa Springs and Wekiwa Springs Run, Rock Springs and Rock Springs Run, the Wekiva River, and Black Water Creek. Although Seminole Creek and the Little Wekiva River provide significant sources of water, they are not a part of the Federally-designated Wekiva Wild and Scenic River System.

Recreational Segment of The Wekiva River System - Wekiwa Springs

Wekiwa Springs Run

Wild Segment of The Wekiva River System - Black Water Creek

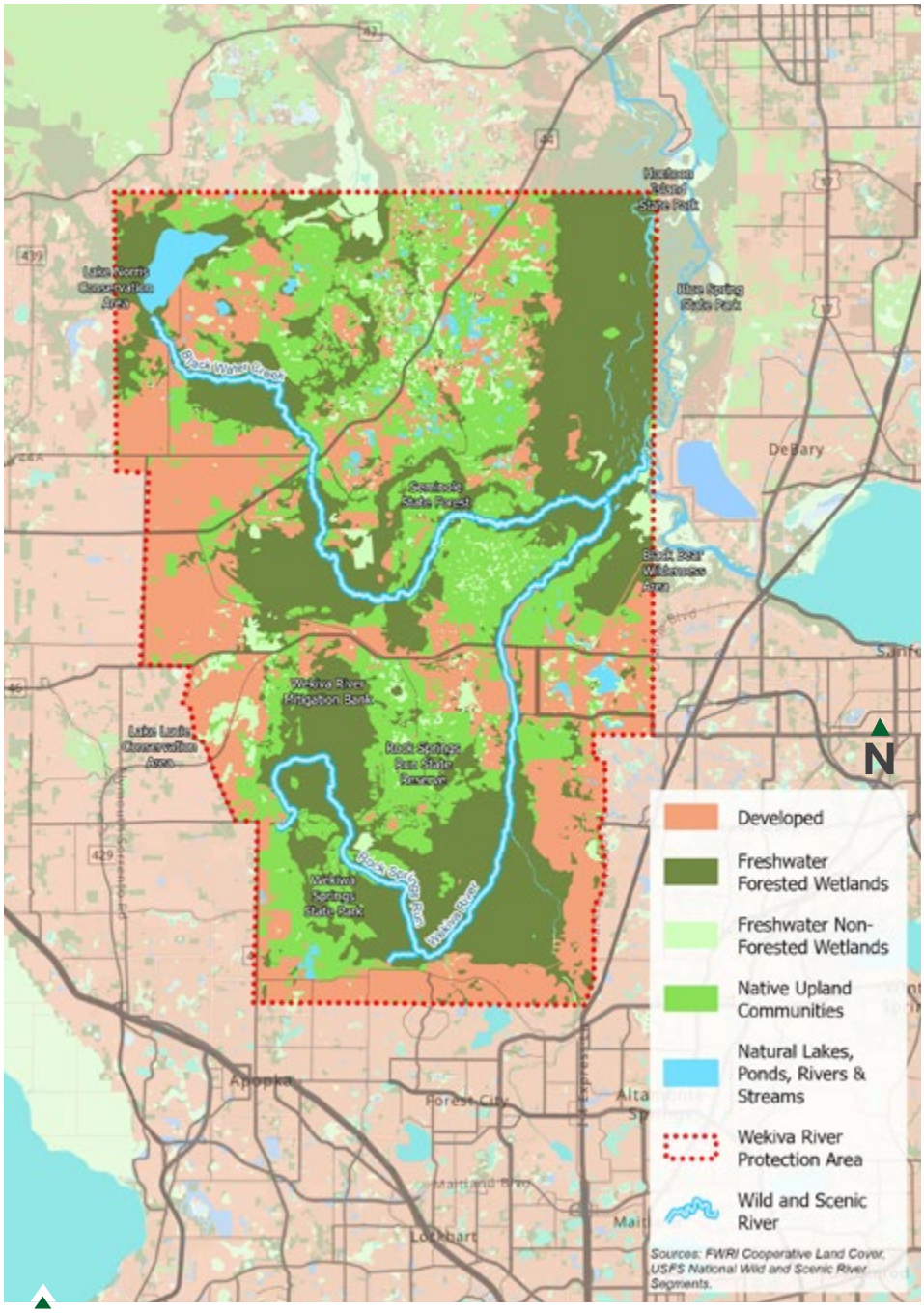
Rock Springs

The Friends of the Wekiva River, Inc. and the East Central Florida Regional Planning Council collaborated on a study in 2021 to assess the economic value of natural resources in the Wekiva basin. Employment in government and private businesses related to the natural resources of the Wekiva River System accounted for 499 jobs, $60 million in output sales, and $23 million in personal income according to the study.

The store at Kings Landing

The effects of climate change on the Florida peninsula will result in increasing temperatures and what are likely to be heavy, episodic rain events. A decrease in the number of days with temperatures below freezing will likely affect vegetative communities and could result in a shift northward of subtropical plants. Some models indicate that the dry season may be prolonged, which could cause a reduced flow in the Wekiva River System, and greater saltwater intrusion. Environmental monitoring, along with adaptive management strategies are necessary to ensure protection of the ORVs.

Chapter 4 provides a description of the river environment, including natural resources, historic and cultural resources, and recreation resources. A map of developed land and natural communities in the Wekiva River Protection Area shows that developed areas total 28% of the 121,000-acre area. Wetlands of all types comprise approximately 45%, and native upland communities about 27% of the area.



Natural Communities in the Wekiva River Protection Area

An extensive list of plants and animals known to occur within the Wekiva Wild and Scenic River System is provided in the Unit Management Plan for Wekiva River Basin State Parks and the 10-year Management Plan for Seminole State Forest. A list of potentially occurring Threatened or Endangered species was obtained through a request for an Element Occurrence Report by the Florida Natural Areas Inventory, and Table 3 summarizes the data. Notable species of plants and animals are described in the listed species section of Chapter 4.

Water Hyacinth: an invasive plant that occurs in the Wekiva River System

Vermiculated Sailfin Catfish: an invasive fish that occurs in the Wekiva River System - photo provided by the late Jay Holder

The Wekiva River Aquatic Preserve Management Plan provides a list of exotic plants found in the Preserve, which should be representative of exotic species in the river system. Category I plants found in wetland and aquatic habitats include wild taro, common water-hyacinth, green hygro, hydrilla, Peruvian primrosewillow, torpedograss, elephantgrass, and paragrass. Exotic plants in the Wekiva Wild and Scenic River System are managed by the Florida Fish and Wildlife Conservation Commission (FWC) and the U.S. Army Corps of Engineers. Recent studies by the FWC on exotic fish that occur in the river system found brown hoplo, blue tilapia, vermiculated sailfin catfish, walking catfish, and chanchitas to be prevalent.

An extensive summary of historic and cultural resources is provided in this update to the CRMP. The historical record has been summarized in numerous other documents, and an attempt was made to verify and update the references. Humans have lived in the Wekiva basin for thousands of years and evidence of their presence is summarized in records in the Florida Master Site File maintained by the Florida Division of Historical Resources. The cultural history of the Wekiva basin is equally fascinating, including the history of communities that developed around Wekiwa Springs (formerly known as Clay Springs), and the importance of the river to travel into Central Florida prior to the advent of railroads. In 1941 the Apopka Sportsman Club purchased land in the Wekiwa Springs area and sold this land to the state in 1969. Wekiwa Springs State Park was established in 1970.

Ethel residents in 1912

Recreation Hubs for the Wekiva River System

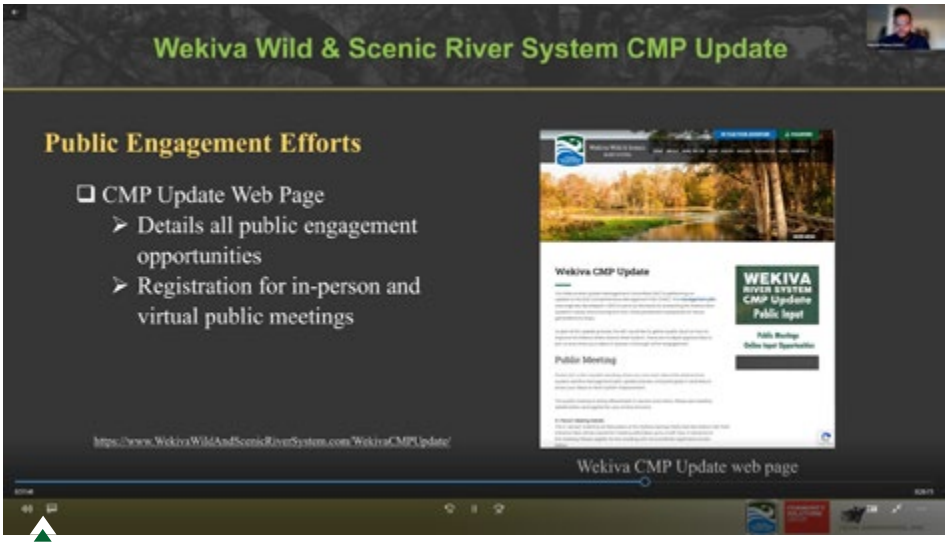
Recreational resources are focused around 12 recreational hubs with various amenities at each hub. The services provided at each hub are outlined in Table 4. A summary of the recreation resources for each segment of the river is also provided in the recreational resources section of Chapter 4.

Chapter 5 lists accomplishments that were substantially completed after the 2012 CRMP. These accomplishments are summarized in four categories: Wild and Scenic River System Management Committee and River Ambassador activities, Wekiva Wild and Scenic River System Management Committee funded initiatives, Non-Governmental Organization initiatives, and state and local government actions. Highlights include, among many other things:

- Development and installation of new unified signage branding the national Wild and Scenic River logo across the Wekiva River System
- Production of two paddling guides covering the Wekiva River and Black Water Creek
- Creation of, and updates to the Wekiva Wild and Scenic River System website
- Participation as a stakeholder for both Basin Management Action Plans
- Funding for research on Florida black bear movements at the urban interface with Rock Springs Run State Reserve and Wekiwa Springs State Park
- Collaboration with agencies responsible for designing and building the Wekiva Parkway bridge over the Wekiva River (and wildlife underpasses)
- Surveys of submerged aquatic vegetation and fish populations.

Kiosk at Lake Norris Conservation Area with Paddle Guide and Wild and Scenic River System Information

A summary report on the public engagement conducted for this updated CRMP is included as **Appendix A**. This updated CRMP provides a general overview of the responses from the public, including an in-person workshop, a Zoom workshop, an online survey, and input from a mapping exercise that was posted on the Wekiva Wild and Scenic River System website. **Appendix B** provides a summary of recommendations related to the digital marketing strategy.



Screenshot from the Zoom presentation

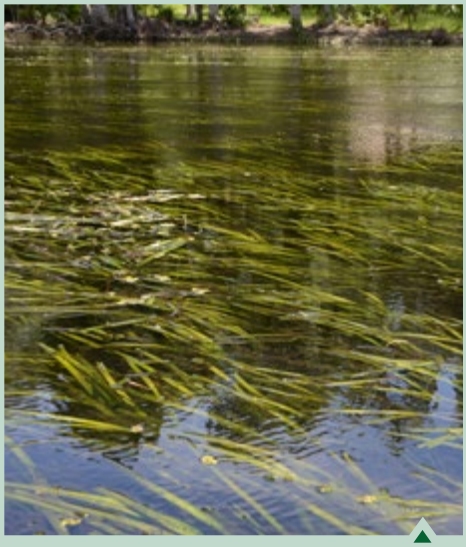
Chapter 7 is titled "State of the River System," and it includes a description of the existing conditions of the river by highlighting the assets and identifying threats and impacts for each ORV. Recent monitoring data and scientific literature are provided to affirm the characterizations and status of each ORV.

Assets associated with the Scenic ORV include:

- More than half of the river system flows through public conservation lands characterized by native aquatic and wetland vegetation
- The river's Wild and Scenic segments provide predominantly unobstructed views of natural communities along the river.

Threats and impacts to the Scenic ORV include:

- Alteration of shoreline vegetation, physical structures, and litter
- Excessive algae growth and the loss of native submerged aquatic plants that affect the experience of river users, particularly in Wekiwa Springs Run
- Roadway bridges associated with the Wekiva Parkway, SR 44, and various local roads obstruct natural views of the river surroundings.



Eelgrass Beds in the Wekiva River

Assets of the Recreation ORV include:

- A diversity of recreational opportunities at 12 hubs throughout the river system
- A paddling guide with information on distances between access points, services available, and the names of campgrounds, springs, and access points.

Threats and impacts associated with the Recreational ORV include:

- Shoreline erosion, vegetation alteration, and vandalism and erosion of historic shell middens
- Navigational impairments after major storms
- The potential for diminished user experiences due to increasing use and user conflict.

Shoreline Erosion at Kings Landing

People Recreating at Kelly Park

The Wildlife and Habitat ORV was characterized in two general aspects in the 2012 CRMP: aquatic and wetland habitats, as well as the wildlife corridor encompassed by the Wekiva to Ocala Greenway.

Assets of aquatic and wetland habitat include:

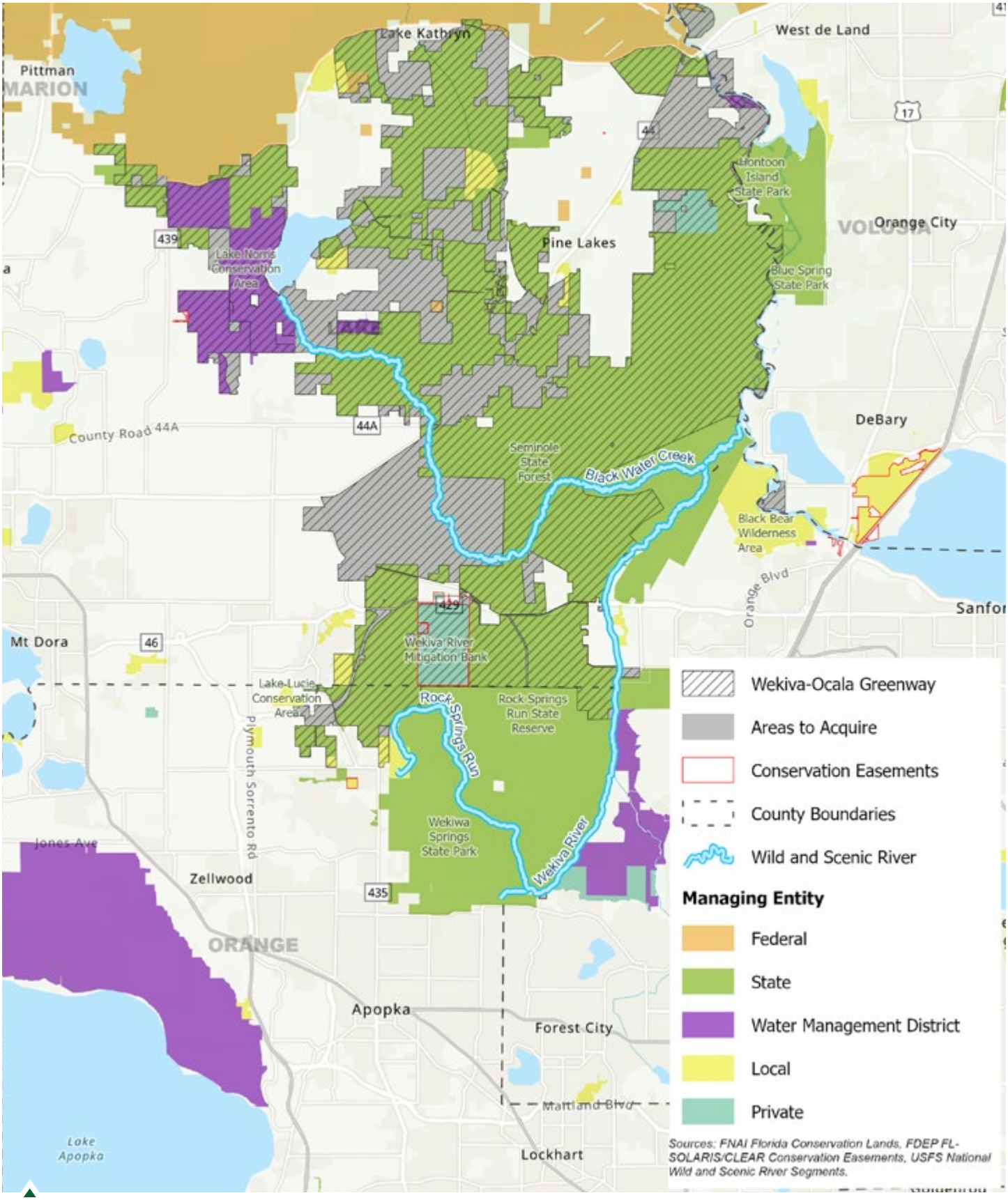
- A diverse assemblage of native fish, extensive eelgrass communities, and the presence of several listed species, including bluenose shiner.

Threats and impacts to aquatic and wetland habitat include:

- The potential loss of the native aquatic macrophyte community
- An increasing prevalence of algae mats and filamentous cyanobacteria.

Invasive island apple snail & native apple snail

Periphyton on Eelgrass in the Wekiva River



Conservation Land Management in the Wekiva to Ocala Greenway

Assets associated with the Wekiva to Ocala Greenway include:

- Almost 60,000 acres within the Greenway in permanent conservation
- The Central Florida black bear population is the largest in the state.

Threats and impacts to the Wekiva to Ocala Greenway would result from:

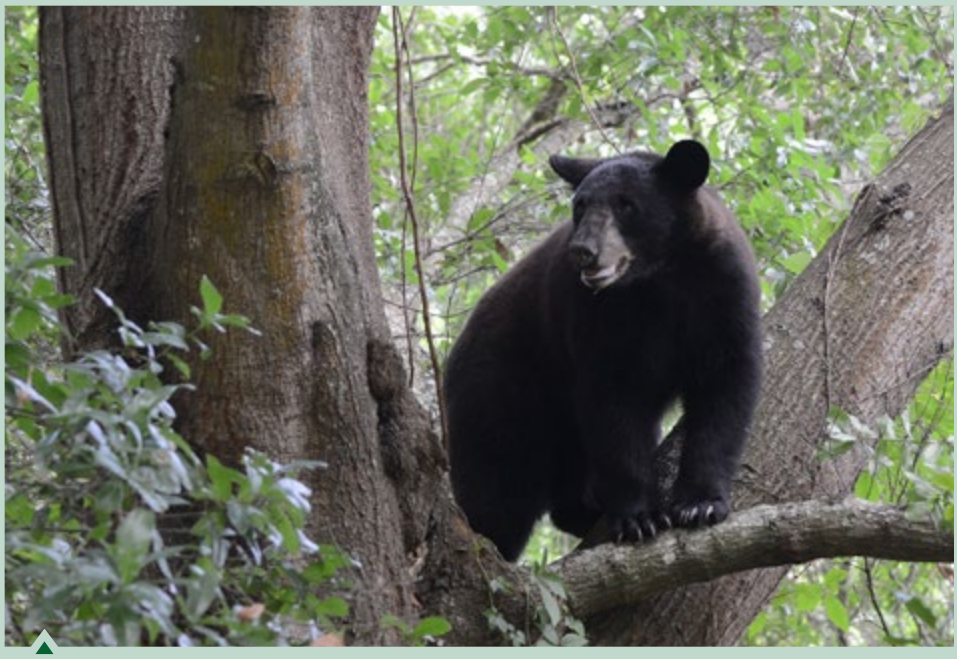
- Incompatible land uses in the remaining 22,000+ acres of the Greenway that are not yet in public ownership or under conservation easement.

Assets of the Historic and Cultural ORV include:

- The substantial history of investigations and published literature on historical and cultural resources over small areas of the Wekiva River System.

Threats and impacts to Historic and Cultural ORV include:

- A void of knowledge on the extent of resources over much of the Wekiva River System
- Vandalism, soil compaction, and bank erosion on the Shell Island midden and other middens on the Wekiva River.



Black Bear

Buffalo Tram Campsite

Buffalo Tram Campsite is a historic primitive campsite on the west side of the river within Rock Springs Run State Reserve. The campsite can only be accessed by canoe or kayak.

The conditions and influencing factors associated with water quality and quantity are treated separately in the Plan:

Assets of the Water Quality ORV include:

- Nutrient loads have not increased since the designation of the Wekiva River System as a Wild and Scenic River
- Nitrate concentrations in water emanating from springs diminish as it moves downstream.

Threats and impacts to the Water Quality ORV include:

- Continued water quality degradation from fertilizers and septic systems and saltwater intrusion
- Despite the prevalence of a multifaceted system of regulations and projects to protect water quality in Wekiwa and Rock Springs, nitrate loads remain 4 to 5 times above target.

Assets of the Water Quantity ORV include:

- Flow rates from Wekiwa and Rock Springs have been above the target for the last 4 years.

Threats and impacts to the Water Quantity ORV include:

- Unlike Wekiwa and Rock Springs, flow rates in Palm Springs have been substantially below targeted goals for the last 40 years, and it is unknown whether the troubling trends in flow for Palm Springs are an indicator of future trends for the other springs in the Wekiva River System.

Water Quality

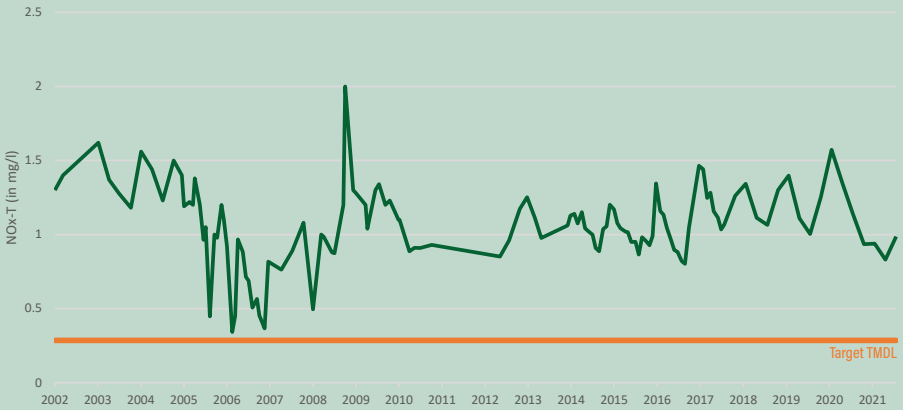
Nitrate-Nitrite Concentrations 2002-2022

Target TMDL (0.286 mg/l)

Nitrogen in excess amounts can cause eutrophication, which, particularly in a spring system, may result in changes in the types of plants and animals that live in the spring run.

20-year Average **1.06 mg/l**

Over the past 20 years, nitrate-nitrite concentrations have been consistently about 4 times the target concentration for Wekiwa Springs.



Water Quantity

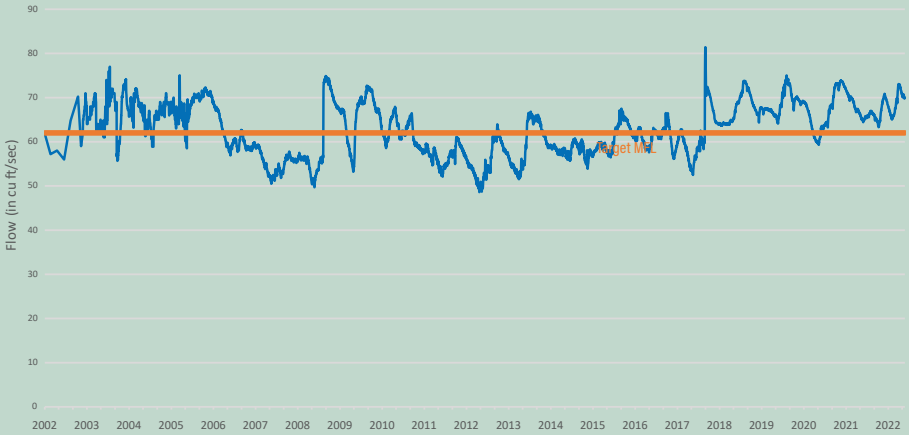
Flow Rates 2002-2022

Target MFL for Wekiwa Springs (62 cu ft/Sec)

The amount of water moving down a river at a given time and place is referred to as its discharge, or flow, and is measured as a volume of water per unit time, typically cubic feet per second.

20-year Average
62.73 cu ft/sec

Data from 2010 - 2018 seemed to indicate a flow rate below the target for minimum flows, but recent flow rates have been above target. An evaluation of the patterns of flow in Wekiwa Spring and other springs in the basin is ongoing to assess the effects of groundwater pumping across the springshed.



Chapter 8 summarizes Goals and Actions to alleviate or prevent the threats and impacts to the river system described in Chapter 7. Successful completion of these Goals and Actions will require frequent review by the Wekiva Wild and Scenic River System Management Committee and the involvement of groups that have not previously participated in Committee meetings in the past. Responsible entities include members of the Wekiva Wild and Scenic River System Management Committee, private recreation providers, Non-Governmental Organizations, and Rollins College. Goals and Actions, along with entities responsible for executing them, are provided in Table 6 of the CRMP.

Chapter 9 summarizes Wild and Scenic River partner agency regulations and management plans that protect and restore natural resources in the Wekiva Wild and Scenic River System. An overview of the regulatory framework for federal, state, and local governments with jurisdiction over natural resources in the Wekiva basin is provided. Also included in this chapter are summaries of the management plans implemented by state and local agencies over thousands of acres of natural lands in the basin.

Longleaf Pines at Wekiwa Springs State Park

Recreationists and Paddlers on the Wekiva River System at Wekiva Island

Paddlers on Rock Springs Run

Chapter 10 provides an initial outline for future monitoring, research, and reporting for each ORV. Key Monitoring actions include:

- Conduct user surveys approximately every 5 years to assess satisfaction with recreation experiences on the river system or assess and monitor public feedback and engagement through digital platforms.
- Continue water quality sampling and measuring flow data from springs and surface waters of the Wekiva River System.
- Assess proposed and completed projects and progress towards the defined goals for water quality improvement in the two Basin Management Action Plans (BMAP) covering the river system.
- Assess progress on revisions to the Minimum Flows and Levels (MFL) that are being developed by the SJRWMD for the Wekiva River and select springs.
- Map aquatic vegetation in the Wekiva River System to create a baseline of native aquatic vegetation. Assess these conditions annually.
- Assess areas of rampant algal growth, particularly filamentous algae, and its effects on aquatic ecosystems within the Wekiva River System.
- Track acquisitions and the purchase of conservation easements within the remaining 22,000+ acres in the Wekiva to Ocala Greenway.
- Complete a comprehensive survey of historic and cultural resources.
- Evaluate the effectiveness of public outreach efforts by assessing website traffic, responses to emails, social media likes and shares, etc.

Survey Being Conducted at Kelly Park

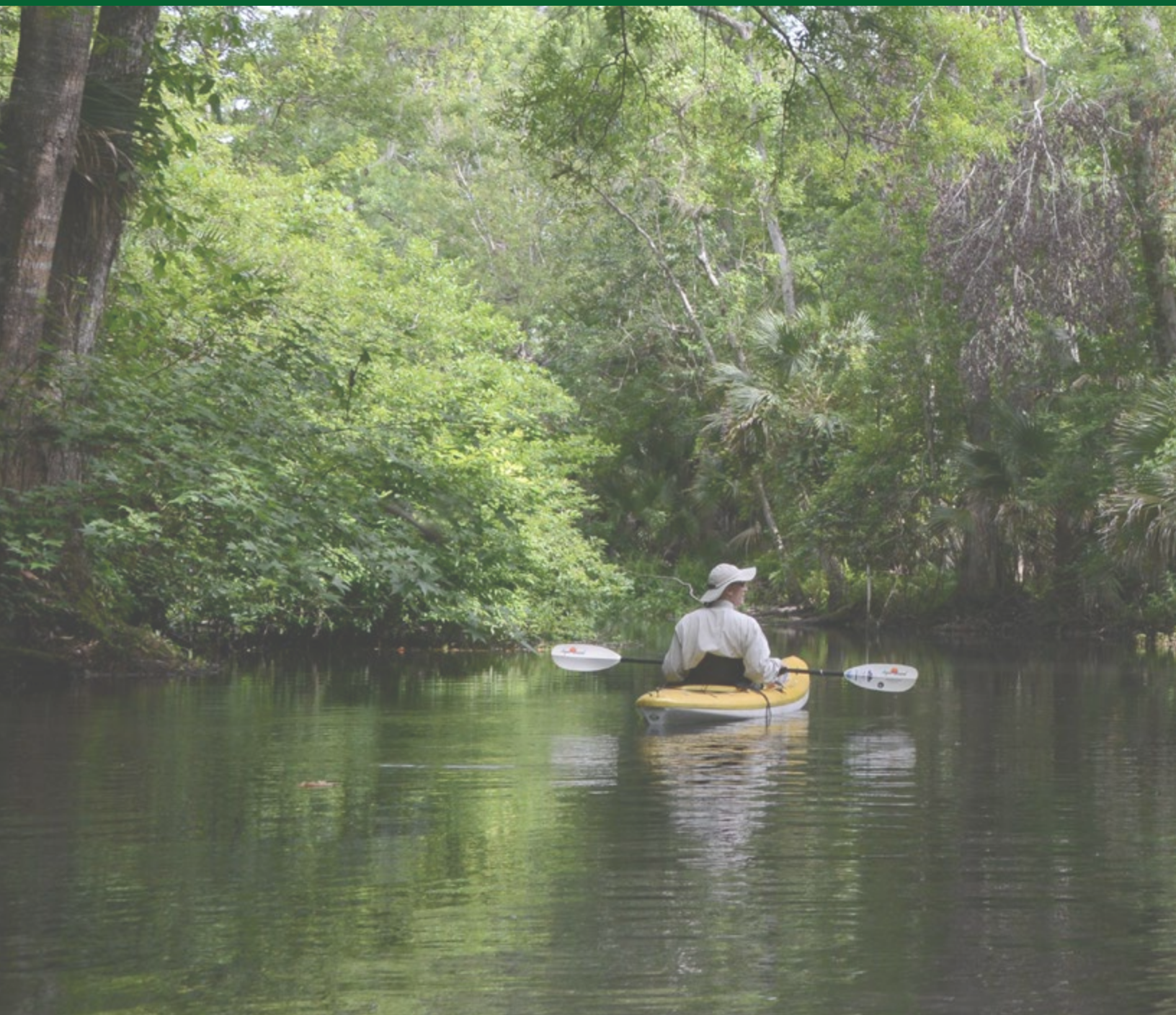
Native Wetland Vegetation on Rock Springs Run

Bank fishing in Black Water Creek from Moccasin Springs Camp

Chapter 11 lists the literature cited in the report, and **Chapter 12** provides appendices of information referenced in the body of the report. Appendices include the public engagement summary report, digital marketing recommendations, the Florida Natural Areas Inventory Element Occurrence Report, lists of incomplete BMAP projects, applicable federal and state laws and regulations, and the objectives and actions of management plans implemented by local and state partners on the Wekiva Wild and Scenic River System Management Committee.

Motorized boat on the Wekiva River

Black Water Camp in Seminole State Forest

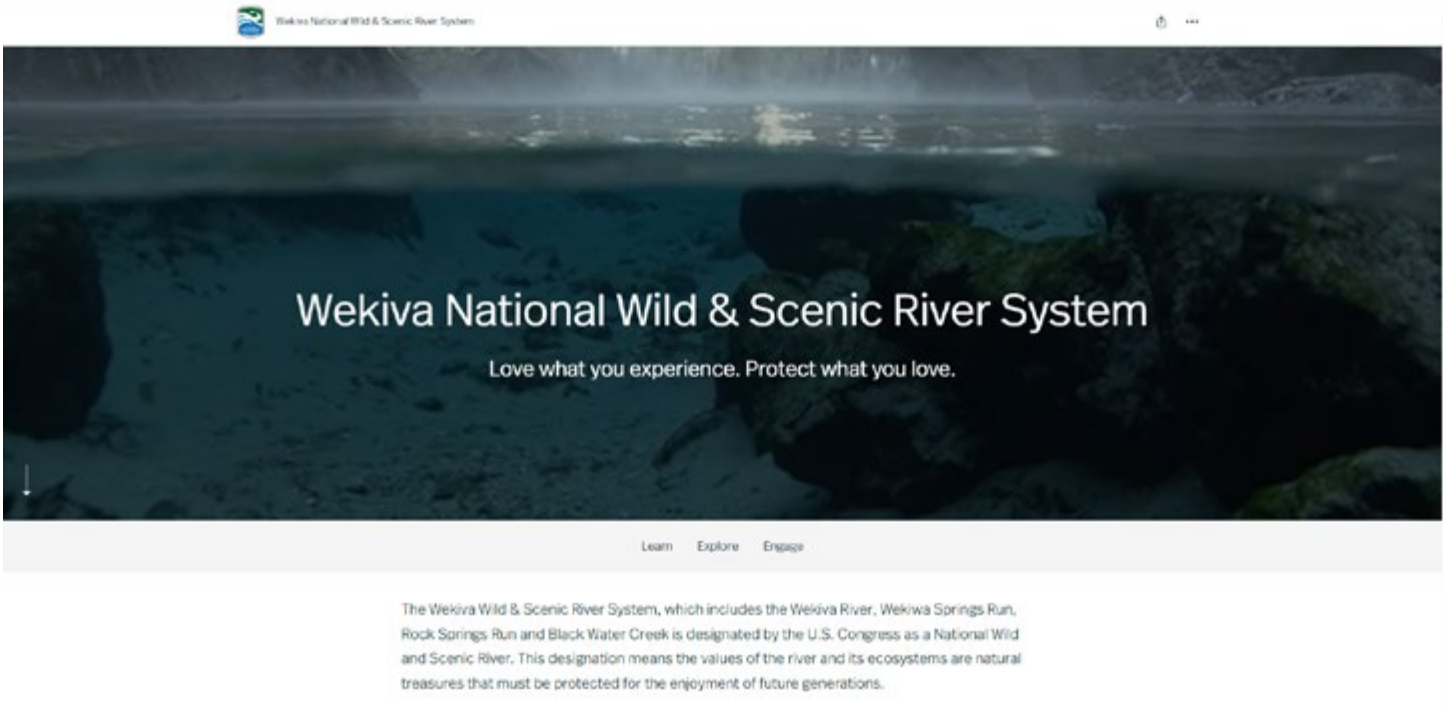


2.0
Introduction

Purpose of this Update

This update to the 2012 Wekiva Wild and Scenic River System Comprehensive River Management Plan (CRMP) provides management direction for protecting and enhancing the Outstandingly Remarkable Values (ORVs). The update to the original CRMP provides background information on the history, environment, and character of the Wekiva River System; defines current conditions in a "State of the River" chapter; identifies regulations and management provided by agency partners; and sets Goals and Actions for implementation by the Wekiva Wild and Scenic River System Management Committee. These Goals and Actions are necessary to achieve desired future conditions. The updated CRMP has a streamlined format, hyperlinks to websites for additional details, and a focus on actions that require the efforts of members of the management committee and/or external groups to implement. An Arc StoryMap (a web-based application that merges GIS maps with narrative text and other multimedia content) was created as a part of this update to the CRMP. The Wekiva River StoryMap summarizes natural and cultural resource topics and highlights recreation opportunities in the Wekiva River System. It is available to the public at: https://storymaps.arcgis.com/stories/a672c13379864a4a834237c01b96f97a. Finally, the CRMP update includes enhancements to the Wekiva River System digital and social media infrastructure for improved communication with interested users, and to increase public stewardship and support for protecting the River.

The elements of the 2012 CRMP that are consistent with this format were used as a template for this updated plan. Frequent communication with management committee members improved all aspects of this document. Comments from public workshops held on September 14 and 15, 2022, and responses to online surveys were useful in defining management priorities and gave insight into the public outreach approach included in this plan. **Appendix A** is the Public Engagement Summary report. Engagement with the Wekiva Wild and Scenic River System Ambassador on public outreach and digital media resulted in the compilation of recommendations for improving digital media marketing. These recommendations are summarized in Chapter 6.0 of this report and in detail in **Appendix B**.



Screeshot of the Wekiva Wild and Scenic River System StoryMap

As established by Public Law 106-299 - Wekiva Wild and Scenic River Act 2000, the Wekiva Wild and Scenic River System Management Committee members include representatives from: the Florida Department of Environmental Protection: Wekiva River Aquatic Preserve and Wekiwa Springs State Park; land managers from the Florida Department of Agriculture and Services: Seminole State Forest; representatives from Orange, Lake, and Seminole counties; representatives from the cities of Altamonte Springs, Longwood, and Apopka; members of non-governmental organizations (NGOs) with interest in protecting natural resources of the river system, the Friends of Wekiva River, Inc.; representatives from the Florida Fish and Wildlife Conservation Commission and the National Park Service. Public managers in the basin all have management plans required by local ordinance or state statute, and these documents are referenced but not duplicated in this report. Likewise, Goals and Actions in the 2012 CRMP that are covered by the management plans of these agency partners were not included in the Goals and Actions in this update. The Committee was clear that this updated CRMP needed to be more concise and action-oriented. Only those Goals and Actions approved by the committee that were feasible to implement and substantive in context were included in this update to the CRMP. Goals and Actions approved by the Committee were selected based on feasibility and substance to ensure the protection of the ORVs.

History of the Wekiva Wild and Scenic River System

In 1968, Congress passed the Wild and Scenic Rivers Act (Public Law 90-542). This Act recognizes the values of certain rivers and their associated ecosystems as outstanding natural treasures that must be protected for the enjoyment of future generations. The National Wild and Scenic Rivers System was created to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations (National Wild and Scenic Rivers | www.rivers.gov |).

In 1996, at the request of local advocates, Congress passed Public Law 104-311 authorizing the study of the Wekiva River, Rock Springs Run, and Seminole Creek as possible additions to the National Wild and Scenic Rivers System. After the Wekiva River Study was completed and published in 1999 (NPS 1999), the Wekiva River, together with Rock Springs Run, Wekiwa Springs Run, and Black Water Creek were designated by act of the United States Congress as a National Wild and Scenic River on October 13, 2000 Public Law 106-299. Figure 1 depicts the location of the Federally-designated Wekiva Wild and Scenic River System.

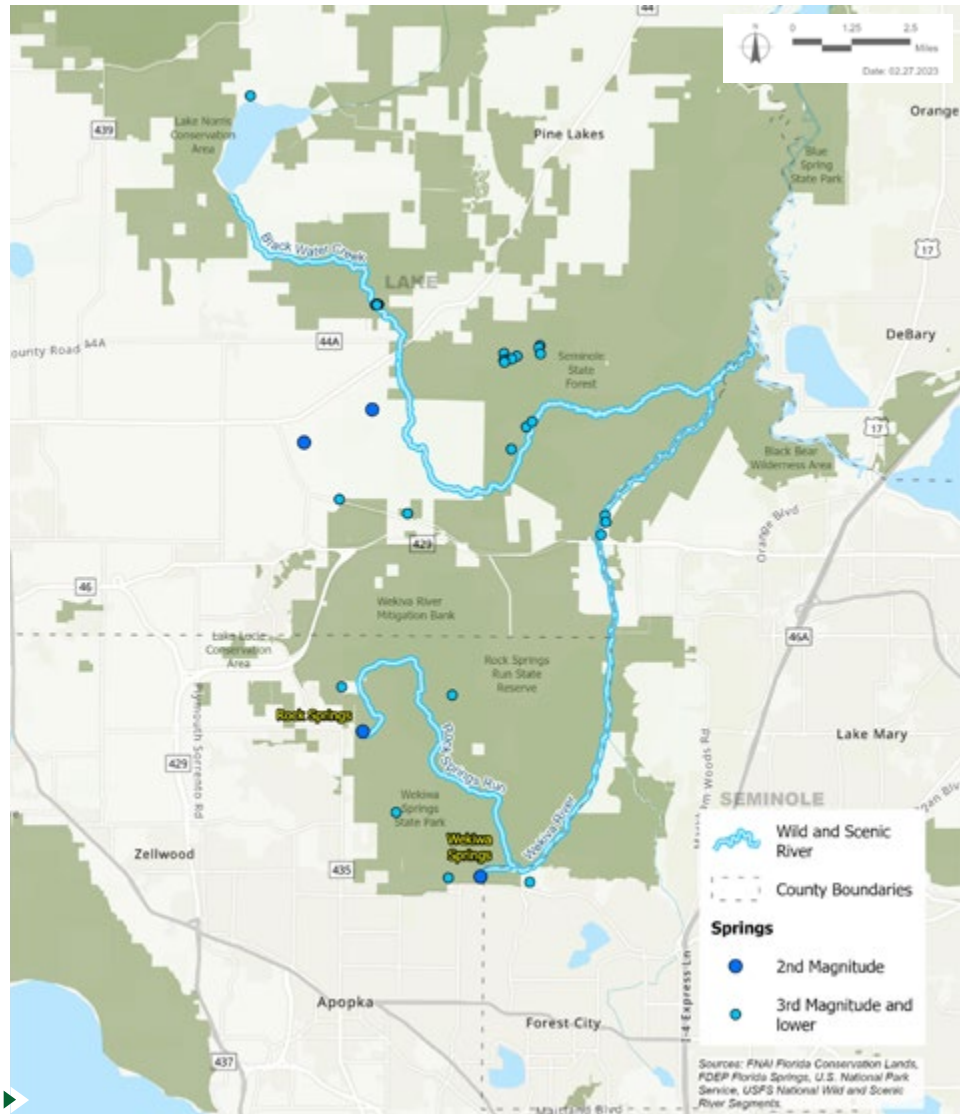


Figure 1. *Location of the Wekiva Wild and Scenic River System*

In 1988, a canoe trip organized for Governor Bob Martinez down the Wekiva River moved him to push the Florida legislature for comprehensive environmental regulations and funding for land acquisition in the Wekiva basin. The 1988 Wekiva River Protection Act required Orange, Lake and Seminole counties to amend their local comprehensive plans and land development regulations to protect water quality and quantity, wetlands, wildlife, habitat, and vegetation in the Wekiva River Protection Area. The Act established the area as a natural resource of importance, required the East Central Florida Regional Planning Council to adopt policies for the protection of special resources within the area, and directed the FDEP (then the Department of Natural Resources) to acquire lands for conservation and recreation within the area. The Act also required the St. Johns River Water Management District to establish certain protection zones in the Wekiva River System to prevent harm to the system, and required the District to develop a groundwater basin resource availability inventory for the area and establish certain minimum water levels and flows within the area and the Wekiva basin (Baker 1988).

The Wekiva River System is located within Orange, Seminole, and Lake counties. The surface water drainage basin is approximately 242 square miles, with its northernmost extent reaching into Marion County (Figure 2). A significant portion of this area is in public ownership. The subsurface Wekiva springshed is the area in which water from the surface percolates and travels underground to eventually emerge from springs in the Wekiva River System. This springshed encompasses an area extending beyond the surface water basin, primarily to the south and west (Figure 3).

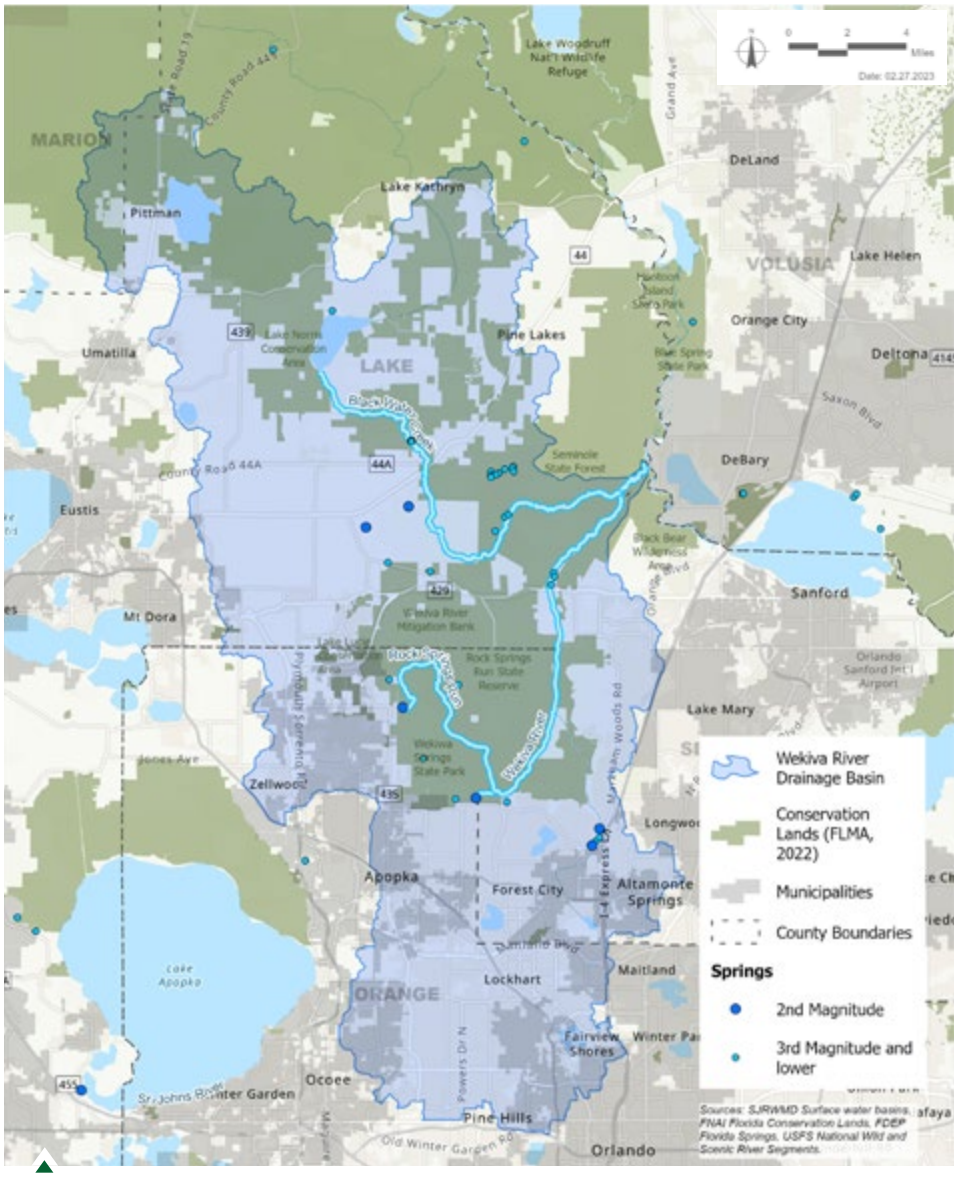


Figure 2. *The Surface Water Drainage Basin for the Wekiva River System*

Boulder - Also known as Cub Springs

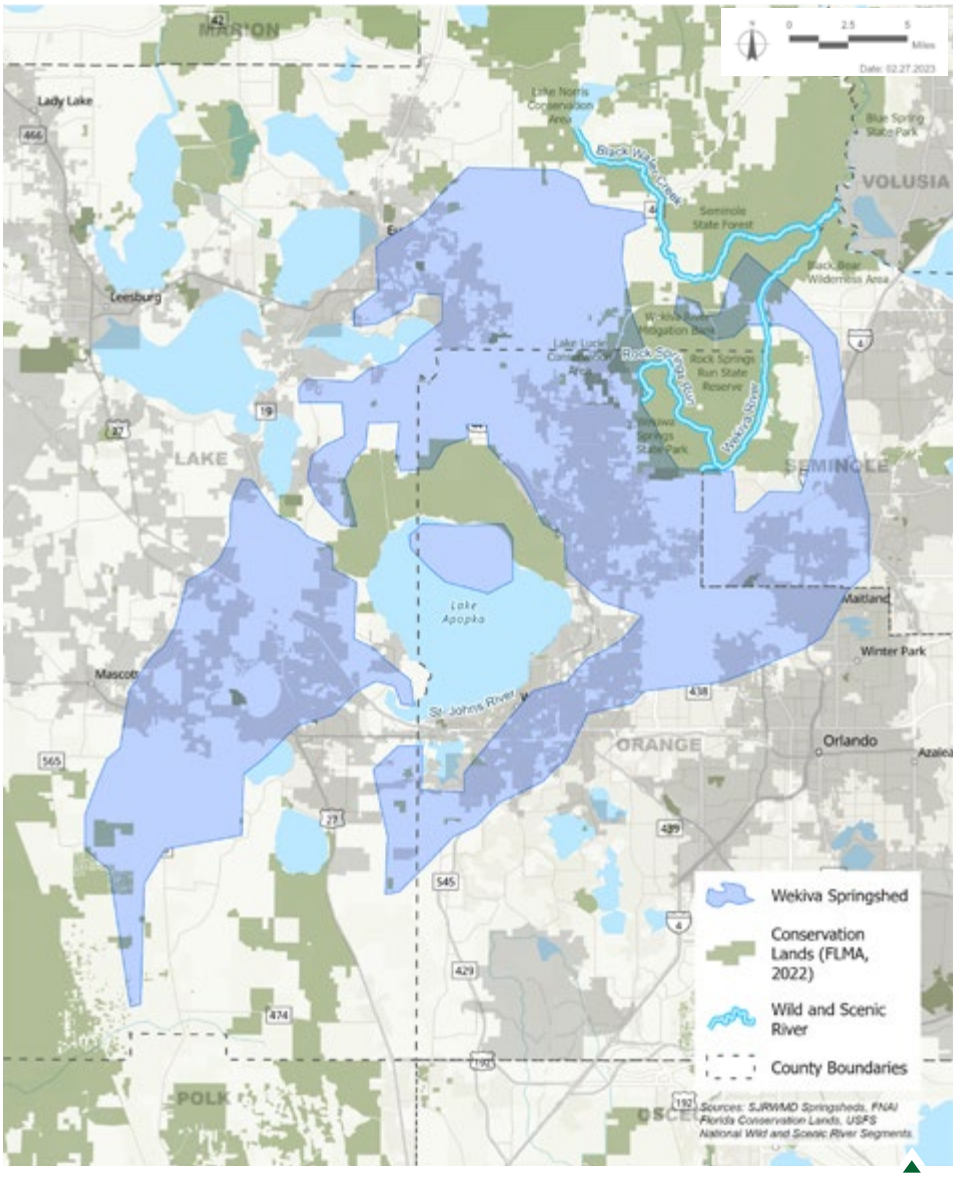


Figure 3. *The Subsurface Springshed for the Wekiva River System*

Rock Springs Run in Kelly Park

In May 2012, the Wekiva River System Advisory Management Committee completed the Wekiva Wild and Scenic River System CRMP. This document:

- provided background information on the Wekiva River System,
- described the current ecological setting for each river segment,
- identified resource-based recreational opportunities,
- provided a plan for public education and outreach, and
- defined approximately 275 actions to meet the goals and objectives of each outstandingly remarkable value (ORV).

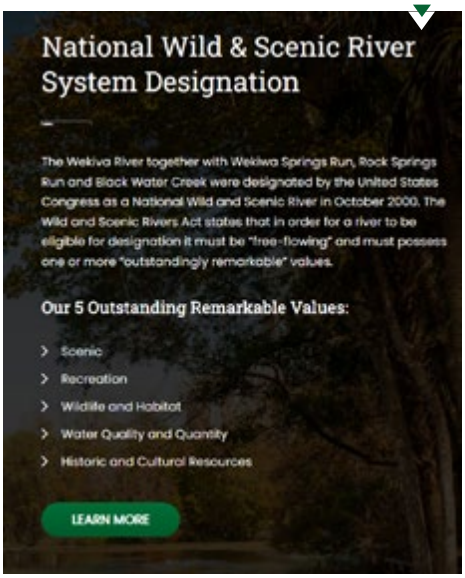
Reports compiled before and after the 2012 CRMP provide substantial background information on ecology, geology, water quality and quantity, and economic values and threats to the natural resources and recreation activities in the Wekiva area. These include technical documents related to water quality and stormwater management (MACTEC 2010, Camp, Dresser and McKee, Inc. 2006) and the establishment of Total Maximum Daily Loads (TMDL) for the Wekiva River System (FDEP 2008). Based in part on data and conclusions from these documents, Basin Management Action Plans (BMAPs) were approved for the Wekiva River and other surface waters (FDEP 2015), and for Wekiwa and Rock Springs (FDEP 2018).

The efforts of the Wekiva River Basin Coordinating Committee (appointed by former Governor Jeb Bush) resulted in recommendations related to land use and development standards and guidelines related to the proposed Wekiva Parkway (Wekiva River Basin Coordinating Committee 2004). The Friends of the Wekiva River. Inc. sanctioned reports covering threats to natural resources of the Wekiva River System (Phelan 2010, the Wekiva Coalition 2002, Denton 1992) and a report on the economic impact of the

Wekiva River area (East Central Florida Regional Planning Council 2021).

Documents that supported the Wekiva Wild and Scenic River System designation included the original Study document (NPS 1999) and the Environmental Assessment for the CRMP (NPS 2011). Additionally, a User Capacity Study was conducted that provided recommendations to alleviate environmental and recreational impacts associated with visitor use (Exum Associates, Inc. 2020). In sum, these documents and community efforts provide a wealth of information on the history and evolving land-use and regulatory conditions surrounding the Wekiva River System prior to and since the designation of the Wekiva Wild and Scenic River System in 2000.

Screeshot from the Wekiva Wild and Scenic River System Website Describing the ORVs and National Wild & Scenic River System Designation



Outstandingly Remarkable Values (ORVs)

The Wekiva River System was selected for Wild and Scenic protection because the river segments were found to be free-flowing and possessed five ORVs associated with the river environment. ORVs are the resources or values that make the river worthy of the extra protection offered by the Wild and Scenic Rivers Act (NPS 2011). The five ORVs for the Wekiva River System are scenic, recreation, wildlife and habitat, historic and cultural, and water quality and quantity.

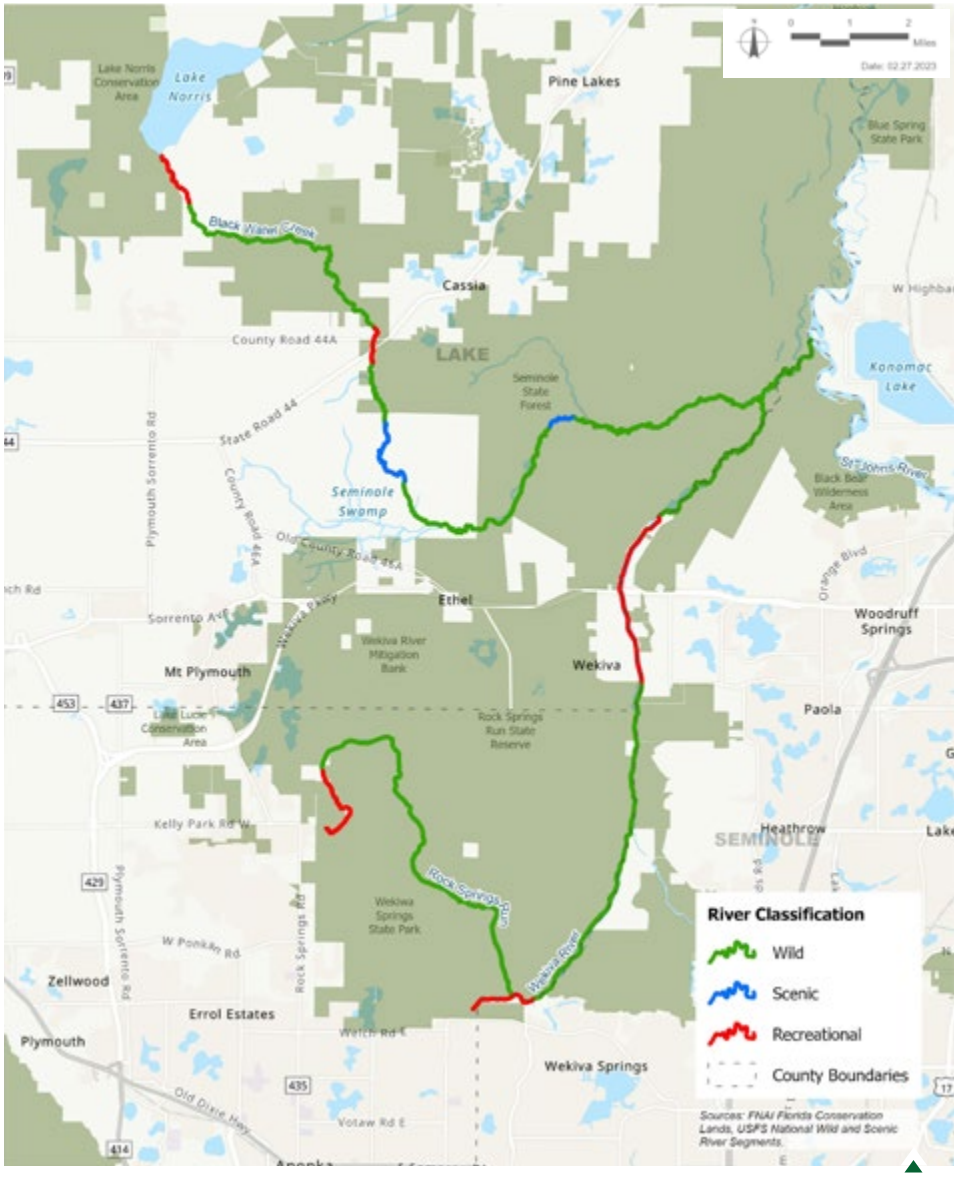


Figure 4. *Wild, Scenic, and Recreational classifications for the Wekiva River System*

River Segment Classifications

The Wild and Scenic River classification as wild, scenic, or recreational is based on the level of development within the river's corridor and along its shoreline, including the degree of access present on the date of designation. (Reference Manual 46: Wild and Scenic Rivers, Chapter 2 Section 2.1.1.3 River Classification - https://www.nps.gov/subjects/policy/upload/RM-46_04-12-2021-2.pdf.) The assignment of river classifications for the Wekiva River (**Figure 4**) was compiled using criteria established in the Wild & Scenic River Study Process (Interagency Wild and Scenic Rivers Coordinating Council 1999). Criteria for key attributes related to water resources development, shoreline development, accessibility, and water quality are defined for each classification. The Interagency Wild and Scenic Rivers Coordinating Council (1999) provided definitions for each river category:

Wild

Wild river segments – those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

Scenic

Scenic river segments – those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped but accessible in places by roads.

Recreational

Recreational river segments – those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversions in the past.

Wild Segment of the Wekiva River at Rock Springs Run

Scenic Segment of the Wekiva River at Seminole State Forest

Recreational Segment of the Wekiva River at Wekiva Island

Wekiva Parkway History and Update

A network of limited-access expressways have been designed and constructed around municipal Orlando by a partnership between the Central Florida Expressway Authority, the Florida's Turnpike Enterprise, and the Florida Department of Transportation (FDOT) since the 1960s. As a part of this comprehensive plan, a design study for a section proposed to cross the Wekiva River was conducted in the late 1980s. Concern for natural resource impacts associated with this highway was so broad and intense that the project was placed on indefinite hold. (It was placed on hold because FDOT determined there was insufficient need at the time to justify the project.) Due to the threat from incremental impacts associated with the expansion of SR 46 and encroachment from development, discussions about a uniquely sensitive design for a limited access road through the Wekiva River basin were reinitiated. The Wekiva River Basin Coordinating Committee was appointed to evaluate the proposed expressway and comprehensive ways to protect natural resources in the basin. The recommendations of this committee were embraced by the Florida Legislature, which developed an unprecedented and comprehensive strategy for protecting natural resources in a large study area encompassing the Wekiva River basin. The legislature established the Wekiva Parkway and Protection Act, which was signed by Governor Jeb Bush in 2004. Among many other things, the Wekiva Parkway and Protection Act established the Wekiva River Basin Commission, provided guiding principles for the design of the Wekiva Parkway, and limited the number of interchanges associated with the limited access expressway. It also defined a Wekiva River Study Area, which required further investigations of water quality and quantity impacts (**Figure 5**).

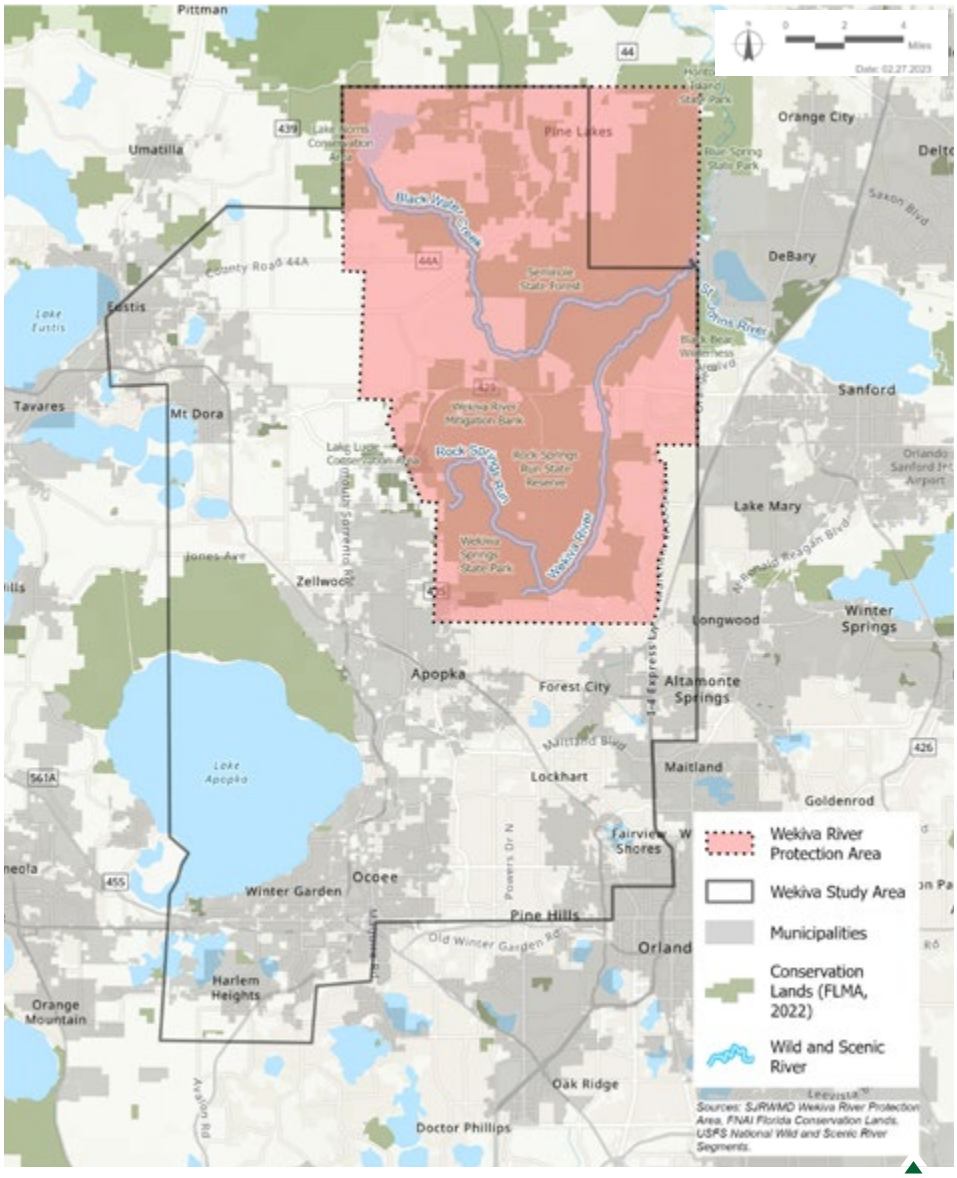


Figure 5. *Locations of the Wekiva River Protection Area and the Wekiva River Study Area*

Section 6 of the Wekiva Parkway traverses east-west through the corridor of conservation lands of the Wekiva to Ocala Greenway. This section extends from the SR 429 interchange east of Camp Challenge Road in Lake County to near Longwood-Markham Road in Seminole County. The project included a new, higher bridge with a slightly arched design over the Wekiva River and no piers in the river. Along with the river bridge, three other wildlife bridges allow animals to pass between Seminole State Forest, Rock Springs Run State Reserve, and the Lower Wekiva River Preserve State Park. In total, the wildlife bridges span nearly 7,700 feet and include wildlife fencing to encourage animals to pass through the underpasses (FDOT 2017). At the time of the publication of this updated CRMP, the Parkway is substantially complete, but final construction is not expected to be finished until late 2023.

The Wekiva Parkway bridge over the Wekiva River

Wekiva to Ocala Greenway

The Conservation and Recreation Lands (CARL) program was established by the Florida legislature in 1979 to acquire lands of environmental and cultural significance. In 1989, the CARL program was replaced by Preservation 2000, and funding was increased to $3 billion for conservation land purchases. In 1998, a replacement program called Florida Forever continued the focus on acquisition of lands important to natural and historical resources. In 1995, a corridor of more than 80,000 acres named the Wekiva to Ocala Greenway was defined to protect wildlife and the Wekiva and St. Johns river basins. The Greenway was established to connect Wekiwa Springs State Park, Seminole State Forest, Rock Springs Run State Reserve, the Lower Wekiva River State Reserve, and Hontoon Island State Park with the Ocala National Forest (Figure 6).

The Wekiva to Ocala Greenway is categorized as a Critical Natural Lands project, which includes regions that support a complex network of landscape scale natural areas. These include large hydrological systems, lands with significant natural communities, and corridors linking large landscapes. For the Wekiva to Ocala Greenway, key attributes include:

- Natural communities
- Landscape connectivity
- Biological diversity
- Water restoration
- Flood protection
- Protection of surface waters
- Aquifer recharge
- Recreation access
- Archaeological and historical resources
- Priority trail networks
- Proximity to population centers

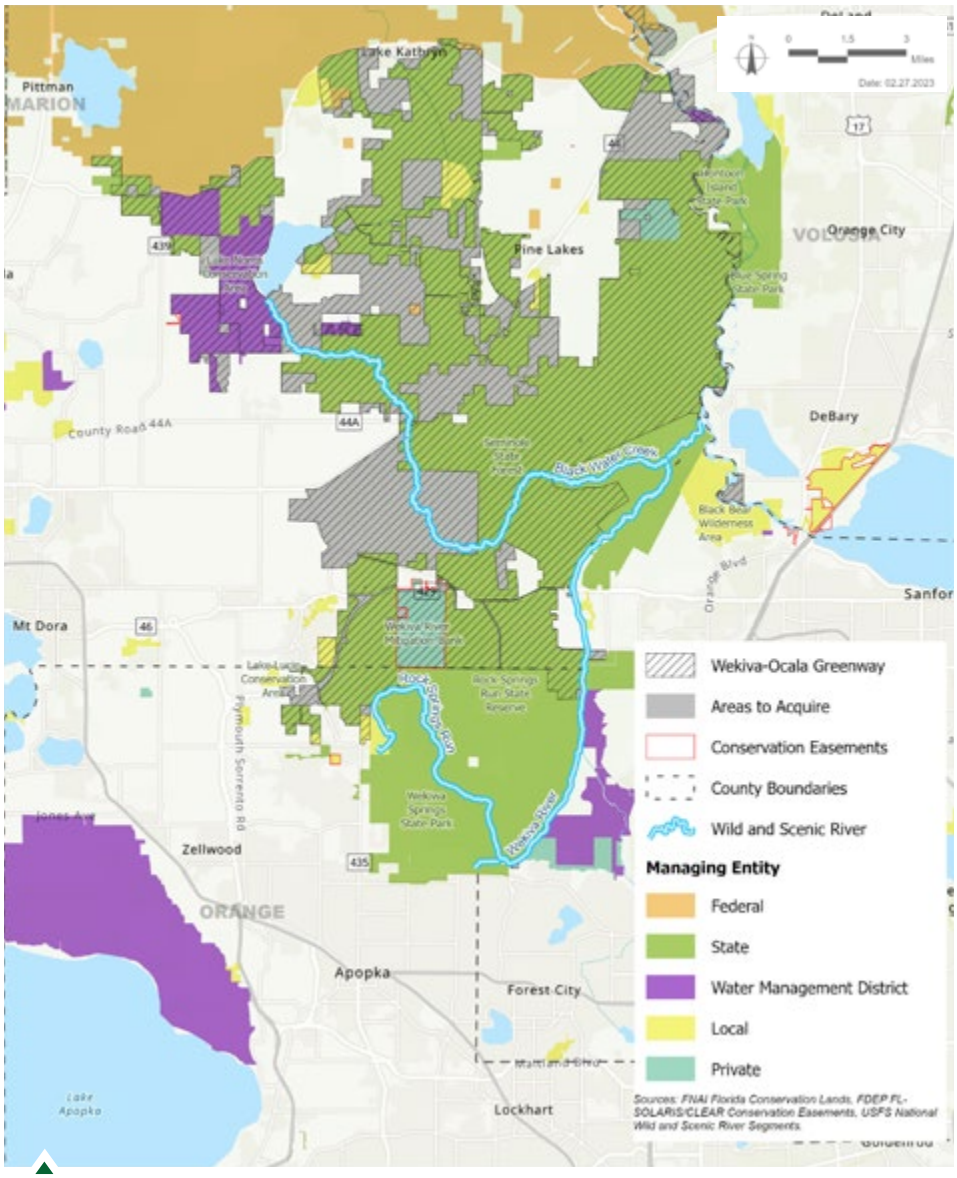


Figure 6. *Conservation Land Ownership in the Wekiva to Ocala Greenway*

Although more than 70% of the Greenway has been acquired for conservation purposes, there are still more than 22,000 acres left to acquire, either by fee simple acquisition or through the purchase of a conservation easement. So far, the vast majority of acquisitions have been fee simple; less than 2% have been through less than fee acquisitions. At the December 2022 meeting of the Acquisition and Restoration Council, the Wekiva to Ocala Greenway was prioritized as the number three Critical Natural Lands project for acquisition funding.

The Greenway protects rare natural communities like scrub habitat in Seminole State Forest

The Greenway protects Florida-endemic plants like yellow milkwort (Polygala rugelii)

The Greenway is an important ecological corridor for the central FL bear population

3.0
Background

Context

The clear waters of the springs, spring runs, and the Wekiva River; the unspoiled waters of Black Water Creek; and the mosaic of sandhills, flatwoods, hammock, scrub, and wetland communities all contribute to make the Wekiva River System a unique resource of national value (NPS 1999).

Demographics

All counties in the basin have experienced considerable population growth and urban expansion within recent decades, with the Orlando metropolitan area being a primary growth catalyst. Based on data from the 2020 U.S. Census, almost 2.3 million people live within 30 miles of the Wekiva River System (https://www.census.gov/quickfacts/fact/table/seminolecountyflorida,orangecountyflorida,lakecountyflorida/POP010220). According to U.S. Census figures for 2020, the largest percentage increase in population during the past 2 decades occurred in Lake County, where population rose almost 30 percent from 297,052 in 2010 to 383,956 in 2020. During the same time, Orange County experienced a 25 percent increase from 1,145,956 to 1,429,908, and the Seminole County population increased by 11 percent from 422,718 to 470,856.

Land Ownership

Figure 6 depicts conservation land ownership in the Wekiva to Ocala Greenway. Several additional parcels in conservation ownership occur outside the Greenway and are included if they are connected to lands within it. Almost 60,000 acres of conservation lands have been protected through fee simple ownership or conservation easement. These lands and other conservation lands adjacent to the Greenway are linked to more than 400,000 acres in the Ocala National Forest. Table 1 provides a breakdown of the federal, state, water management district, local, and private ownership in the corridor including the Wekiva to Ocala Greenway. The Florida Department of Environmental Protection (FDEP) - Division of Recreation and Parks (also known as the Florida Park Service) manages approximately 41,000 acres of state conservation land in the Wekiva basin, which includes Wekiwa Springs State Park, Lower Wekiva River Preserve State Park, and Rock Springs Run State Reserve. In addition, the FDEP - Office of Resilience and Coastal Protection has special management responsibility over 8,000 acres of sovereign submerged land designated as the Wekiva River Aquatic Preserve. The Florida Department of Agriculture and Consumer Services (FDACS) – Florida Forest Service manages over 30,000 acres which comprise Seminole State Forest. These lands form a natural corridor between Florida Park Service conservation lands and the Ocala National Forest. The St. Johns River Water Management District holds title to more than 7,500 acres in the basin, including the Wekiva River Buffer Conservation Area and the Lake Norris Conservation Area.

Table 1. Entities responsible for managing conservation lands in the Wekiva to Ocala Greenway

Managing Entity	Acreage	Percentage
Federal	520.9	
State	50,566.8	85.3
Water Management District	4,911.7	8.3
Local	1,166.4	2.0
Private	2,149.2	3.6
Total	**59,315.0**	**100.0**

The Lake County Water Authority (LCWA) purchased lands in the Wekiva basin, including Lake Tracy Preserve, Wolf Branch Sink Preserve, and Bear Track Preserve. Various lands within the Wekiva basin have also been acquired by counties and municipalities for conservation and nature-based recreation. Orange County properties containing portions of the Wekiva River System include the 355-acre Kelly Park, which includes Rock Springs and a portion of Rock Springs Run; Lake Lucie Conservation Area (163 acres); Sand Hill Preserve (83 acres); and Pine Plantation (40 acres). Seminole County owns and manages the 105-acre Wilson's Landing Park on the Wekiva River.

The Nature Conservancy owns 631 acres of forested wetlands (Hollywood Pines) abutting Lower Wekiva River State Park Preserve on the St. Johns River in Lake County, and Audubon of Florida owns a 649 acre tract (Sabal Point Sanctuary) adjacent to the Wekiva River in Seminole County. The parcel is held for conservation purposes and managed in conjunction with adjacent water management district lands.

Wekiva Falls Resort (Privately Owned)

Seminole County's Wilson's Landing Park

River Segments, Springs, and the Wekiva River Aquatic Preserve

All Wekiva Wild and Scenic River segments covered in this plan have been designated as Outstanding Florida Waters (OFWs) under Ch. 62-302.700(1) of the Florida Administrative Code. Although this status gives these segments the highest protection from water quality degradation possible under state regulatory programs, it does not completely prohibit surface water discharges or eliminate sources of pollution.

Wekiwa Springs and Wekiwa Springs Run

Wekiwa Springs is an artesian spring located within Wekiwa Springs State Park. Wekiwa Springs Run flows approximately 0.8 mile before connecting with Rock Springs Run to form the Wekiva River. Wekiwa Springs is a second magnitude spring with exposed limestone from the Hawthorn Formation just below the water's surface around the main spring vent. The spring discharges water at approximately 62.28 cubic feet per second (40.3 million gallons of per day) (Seong and Wester 2019) from at least five horizontal caverns 14 feet below the surface in a kidney shaped pool (FDEP 2017). The spring and its vicinity are popular for swimming and sunning activities. The bank adjacent to part of the headwaters pool has been bulk-headed, and ladders provide swimmer access to the water. Facilities near the main spring area include a canoe concession, snack bar, playground, two picnic pavilions, restrooms, a visitor center, a serenity garden, and paved parking. A portion of the slope leading down to the spring is maintained as a grassy area for sunbathing, picnicking, and viewing the spring and run. Erosion associated with the path to the canoe launch and the steep, sodded slope to Wekiwa spring has been documented, and plans for restoration and erosion control are expected to be implemented soon.

Rock Springs and Rock Springs Run

Rock Springs, another second magnitude spring in the Wekiva River System, is located in Kelly Park, a 355-acre park owned by Orange County. The primary discharge of Rock Springs originates from the base of a partially submerged limestone bluff and produces an average discharge of approximately 55.63 cubic feet per second (36.0 million gallons of water per day) (Seong and Wester 2019). Rock Springs Run flows north, then east and south for a total of approximately 9 miles before joining Wekiwa Springs Run to form the Wekiva River. Most of the land adjacent to Rock Springs Run is in public ownership and there are no road crossings or bridges over it.

Wekiva River

The Wekiva River flows approximately 14.2 miles from the confluence of Wekiwa Springs Run and Rock Springs Run to the St. Johns River. The Wekiva River is fed by a combination of natural springs as well as about 130 square miles of surface watershed in north Orange County and northwest Seminole county, and approximately 201.5 square miles of surface watershed in Lake County (Orange County Water Atlas 2001, Lake County Water Atlas 2001). Seong and Wester (2019) found that when flow in the Wekiva River was less than 150 cubic feet per second, discharge from Wekiwa Springs alone could correspond to over 40% of the flow, and when all springs are combined, this contribution can be as high as 90% of the river flow. Miami Springs (also known as Sweetwater) Run/Canal flows into the

Wekiva River approximately 0.25 mile downstream from its origin. Wekiva Falls Run/Canal, a 2,000 foot tributary originating at Wekiva Falls campground, merges with the Wekiva River approximately 1.5 miles south of the Wekiva Parkway bridge. Black Water Creek joins the Wekiva River approximately 1.3 miles upstream of the confluence of the Wekiva River and the St. Johns River.

Black Water Creek and Seminole Creek

Black Water Creek's headwaters are at Lake Dorr in the Ocala National Forest. Upstream of the confluence with Seminole Creek, Black Water Creek is maintained by groundwater seepage, two second-order magnitude springs, and outflow from Lake Norris. The creek falls an average of 1.9 feet per mile over 16 miles between Lake Norris and the Wekiva River. It has an expansive floodplain and a sinuous and braided channel with an abundance of deadwood snags. Through this stretch, Black Water Creek has four road crossings, including Sand Road within Seminole State Forest, SR 44, CR 44A, and Lake Norris Road just south of Lake Norris. Seminole Creek, a tributary of Black Water Creek, originates at Seminole Springs and travels across private lands. Not all Black Water Creek is navigable, depending on water level and downed trees or other vegetation that may inhibit passage. Black Water Creek is a part of the designated Wekiva Wild and Scenic River System; Seminole Creek is not.

Scenic segment of Black Water Creek

Little Wekiva River

The Little Wekiva River basin receives drainage from an urbanized 42-square-mile area west and north of downtown Orlando. The river flows north for 15 miles from Lake Lawne just north of SR 50 in Orange County through Altamonte Springs in Seminole County. The flow of the Little Wekiva is augmented by five springs. Although the Little Wekiva River provides a significant source of water into the Wekiva River, it is not a part of the Wekiva Wild and Scenic River System.

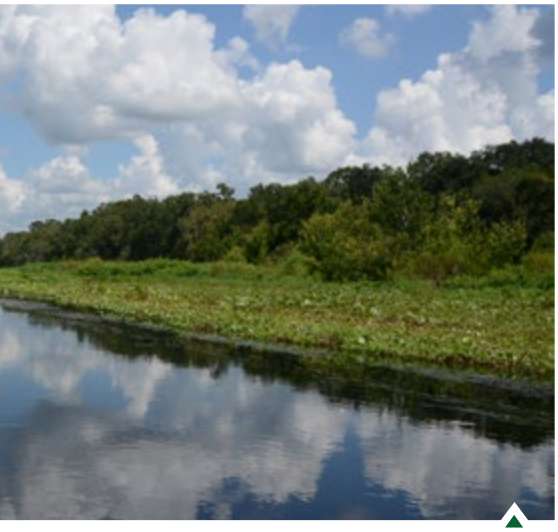
Springs

There are 31 named springs within the Wekiva River System (FDEP 2018) (see **Figure 1**). Six of these flow directly or indirectly into the Wekiva River, four flow into Rock Springs Run, five flow into the Little Wekiva River, and 16 flow into the Black Water Creek and Seminole Creek drainage basin. Wekiwa, Rock, Seminole, and Messant springs are second magnitude springs. The remaining 27 are lower-order springs. The flow from Florida's springs generally travels through a karst network of underground conduits and porous limestone, and eventually emerge at the surface. The water that appears at spring boils may have been under the ground for days, weeks, months, years, or decades, depending upon its path from the surface and through the aquifer.

Wekiva River Aquatic Preserve

Florida's Aquatic Preserves are administered by FDEP's Office of Resilience and Coastal Protection as part of a network that totals 41 aquatic preserves. The Wekiva River Aquatic Preserve includes a substantial section of the St. Johns River from Lake Monroe north beyond Lake Beresford to SR 42. The initial Wekiva River Aquatic Preserve was established in 1975 and for a period of time was the only inland, freshwater Preserve in the state (all the others being coastal). The Preserve includes all of the Wekiva River and Wekiwa Springs Run and a portion of Rock Springs Run, as well as approximately 5 miles of the Little Wekiva River (**Figure 7**). Long-term goals of the Aquatic Preserve include protecting/enhancing ecological integrity, restoration of natural conditions, engaging local communities in protection, and improving management effectiveness.

Rock Springs Run



Wekiva River

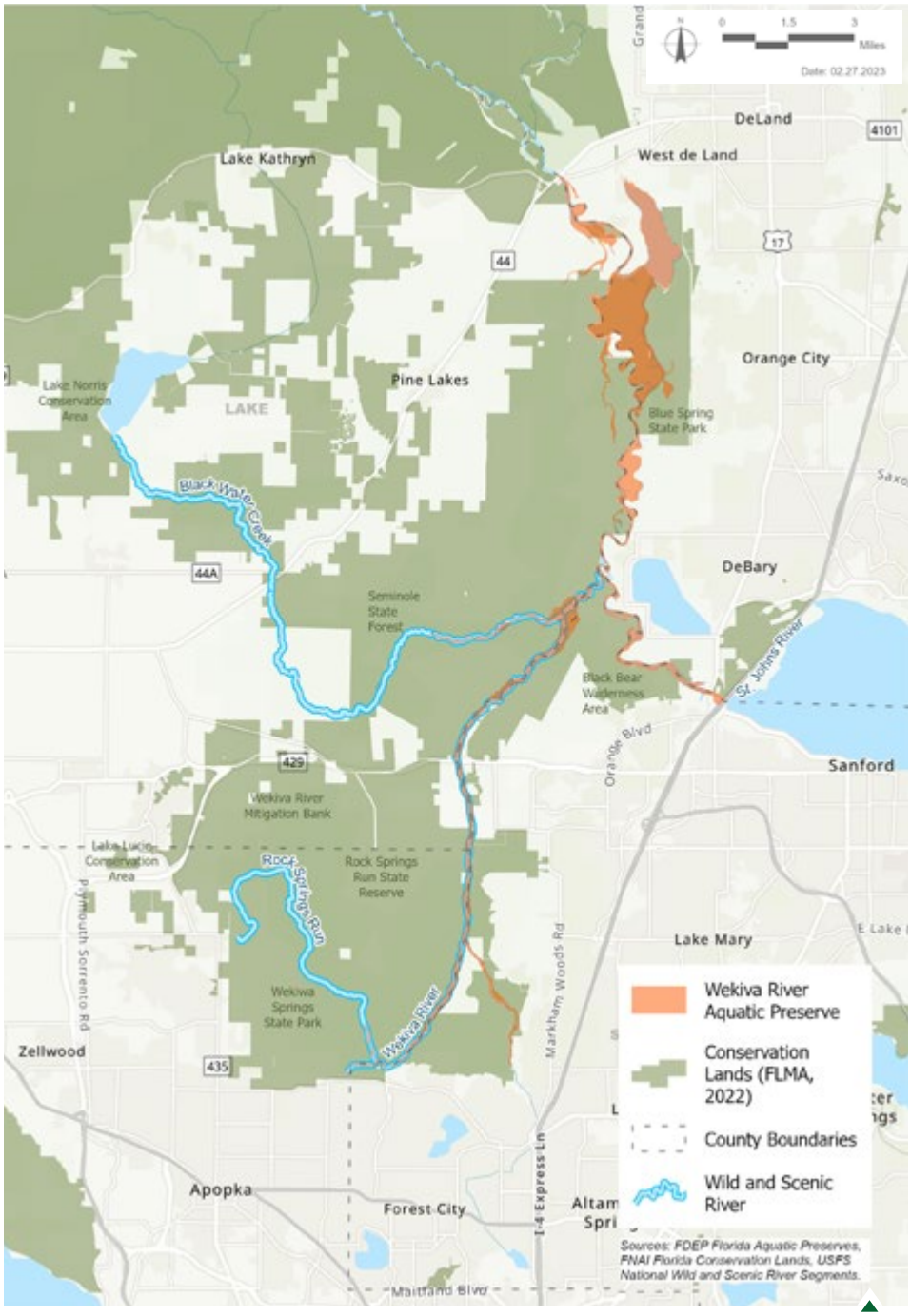


Figure 7. *Location of the Wekiva River Aquatic Preserve*

The Economic Impact of the Wekiva River Area

The Friends of the Wekiva River, Inc. and the East Central Florida Regional Planning Council (ECFRPC) collaborated on a study to assess the economic value of the resources in the Wekiva basin. (ECFRPC 2021). The purpose of this study was to evaluate the economic impact of the natural resources and assess what degradation might do to the economic benefits provided to residents of Florida. Using standard economic models, staff from the ECFRPC found that employment in government and private businesses related to the natural resources of the Wekiva River System accounted for 499 jobs, $60 million in output/sales, and $23 million in personal income. Revenue from these related services were determined to contribute $35 million to Florida's gross domestic product, and most of this economic activity is in Lake, Orange, and Seminole counties. The ECFRPC study also found that deterioration of the Wekiva River's aquatic values could result in the loss of about 40 jobs per year and an annual loss of almost $5.8 million in sales and close to $4.3 million in the personal income of the state's residents.

Erosion on pathway at campground in Kelly Park

Climate Change

The Florida peninsula has warmed more than 1 degree (F) during the last century and sea levels are increasing about 1 inch every decade. In the future, heavy rainstorms are expected to become more severe, and rising temperatures are likely to reduce the number of days with temperatures below freezing (EPA 2016). Increasing temperatures cause greater evaporation, which increases humidity, average rainfall, and the frequency of heavy rainstorms in many places. But these same underlying conditions contribute to drought in other areas (EPA 2016), which could increase wildfire threats (Seminole County 2020) and saltwater intrusion, cause a reduced flow in the Wekiva River System, and cause a northward shift in vegetative communities (Mulkey 2007). Higher temperatures, flashy rainfall events and extended drought have been shown to promote cyanobacteria blooms in shallow lakes in Central Florida, and these conditions may be more prevalent in the future (Havens et al. 2017).

The integrity of the natural systems in the Wekiva basin have already been compromised by land use changes, groundwater pumping, stormwater runoff, and increased nutrients in ground and surface waters. Dramatic changes in rainfall including the potential for more flooding and/or drier dry seasons could exacerbate these conditions. Though a changing climate is assured, how it will manifest is unclear. Consequently, long-term monitoring is necessary to assure that the effects of climate change do not degrade water quality, diminish flow rates in the river system, cause exotic species to prevail over natives, and threaten the diversity of species across the Wekiva to Ocala Greenway.

Herb

Alligator on Rock Springs Run

icide Control Of Exotic Plants Covering Eelgrass Beds

Erosion at Sand Lake canoe launch site on Black Water Creek

Shark Tooth Spring in Seminole State Forest

4.0

The River Environment

Natural Resources

Geology/soils

The Wekiva River System lies in the physiographic region known as the Wekiva Plain, an area slightly lower in elevation than the surrounding Marion Uplands, Mount Dora Ridge, and Orlando Ridge (USDA Soil Conservation Service 1990). The Wekiva Plain appears to have been "cut down" during periods of receding sea level. When recurrent rises in sea level inundated the lowered area, deposited sediments contributed to the present Wekiva Plain. The surface and near surface deposits in the area range from unconsolidated sands to well hardened limestones and dolomites. The Hawthorn Formation, a sandy phosphatic limestone of late middle Miocene age (approximately 13 million years old) underlies the entire area (Scott 1983), and outcrops of this formation are exposed at Rock Springs and Wekiwa Springs. These historical formations have resulted in vast wetland floodplains and expansive areas of high aquifer recharge that replenish the Floridan aquifer and provide the source of water for those spring discharges (Figure 8).

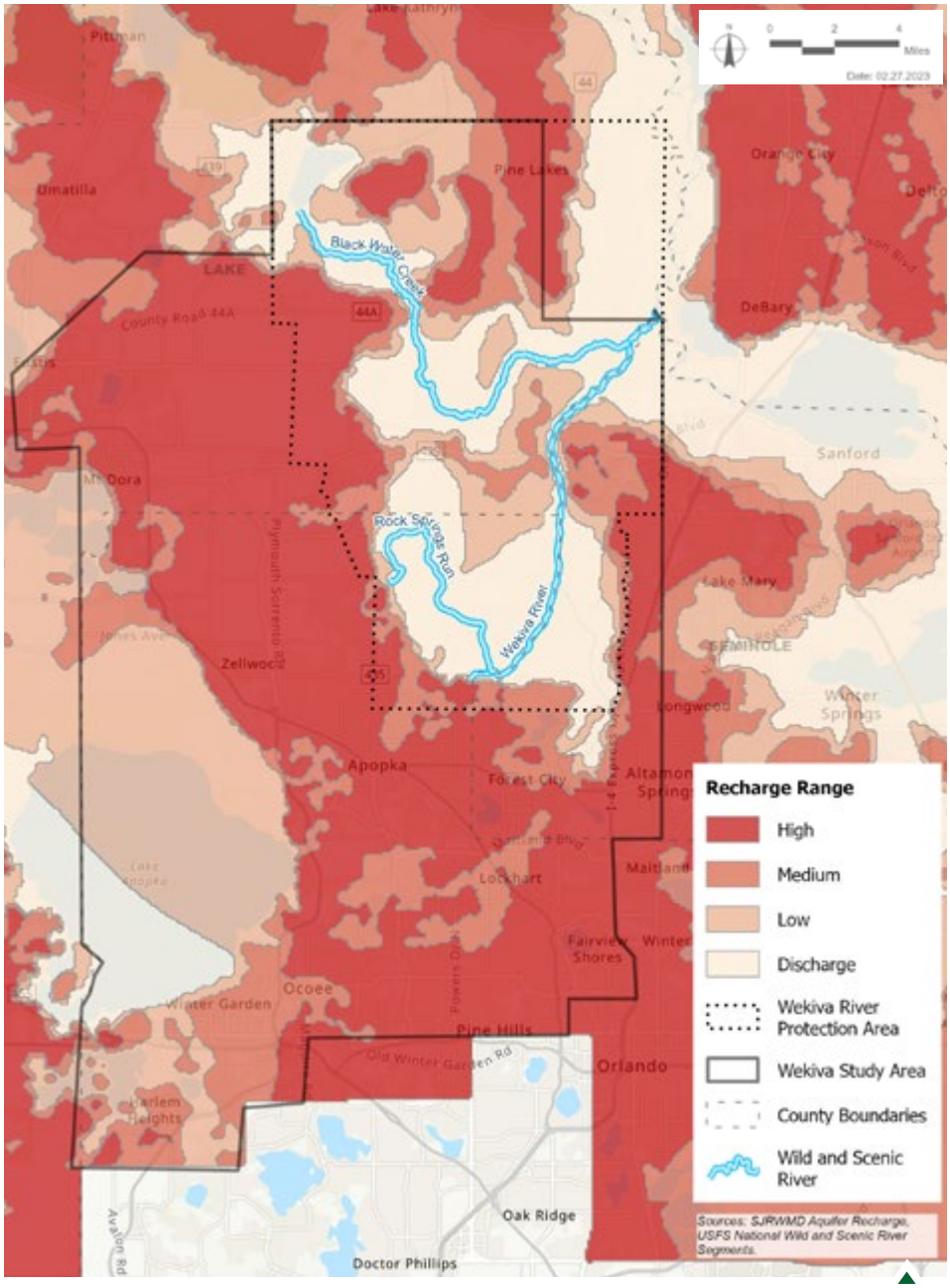


Figure 8. Aquifer recharge rates in the vicinity of the Wekiva River System

Natural Communities

The Unit Management Plan for the Wekiva River Basin State Parks (FDEP 2017) identified 23 natural communities using the methodology of the Florida Natural Areas Inventory. An excellent description of these communities, and their Desired Future Conditions is included in that Plan. The 10-year management plan for Seminole State Forest also used the protocol established by the Florida Natural Areas Inventory (FNAI) to map natural communities in the forest. Projections of the historical extent of each community, a description of current conditions, and management needs to achieve defined objectives are provided in the 10-year management plan.

These management plans, and others prepared by local governments and the St. Johns River Water Management District (SJRWMD), provide details for ongoing management of natural communities. **Figure 9** was prepared to provide a concise context of natural and altered communities within the Wekiva River Protection Area. **Table 2** summarizes the acreages of each natural and disturbed community within this approximately 120,000 acre area surrounding the Wekiva River System. These data are based on the Florida Fish and Wildlife Conservation Commission's cooperative land cover mapping system, which uses the Florida Natural Areas Inventory (FNAI) protocol for natural communities and a previous system for land use mapping developed by the Florida Department of Transportation. The 34,075 acres of developed land are located primarily along the fringes of the Wekiva River Protection Area, but the altered land uses within the Wekiva to Ocala Greenway conflict with objectives for protecting the ecological linkage associated with this wildlife corridor. Wetlands of all types comprise almost half (45.3%) of the Wekiva River Protection Area and are the most assured of long-term protection due to public ownership and multiple layers of environmental regulations. Conversely, the native upland communities, particularly those adjacent to developed land, are most vulnerable to encroachment from incompatible land uses.

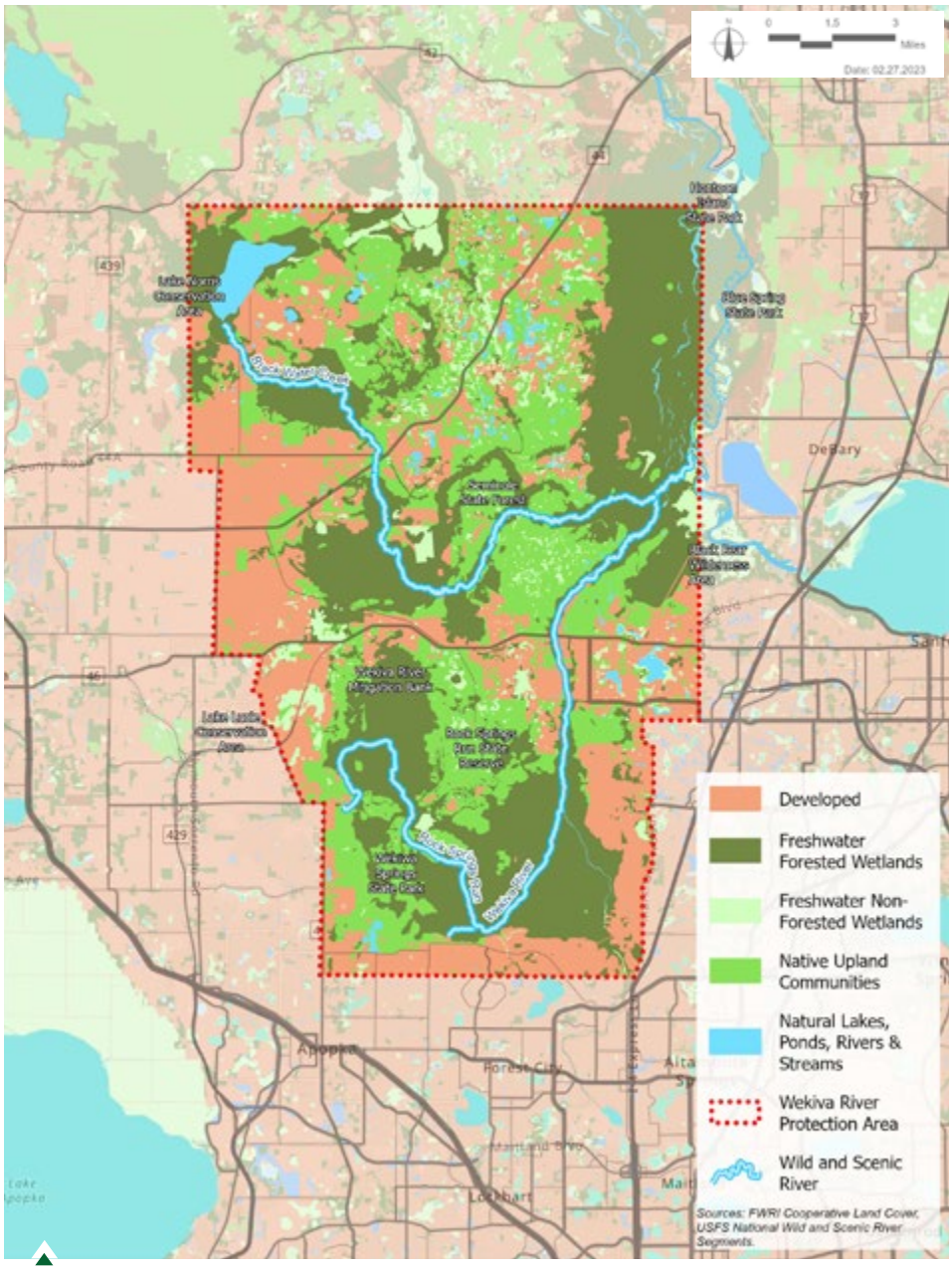


Figure 9. *Natural communities and developed areas in the Wekiva River Protection Area*

Table 2. *General land use types, including developed and natural communities within the Wekiva River Protection Area*

Cover Type	Acreage	Percentage
Developed	34,075	28.0
Native Upland Communities	32,474	26.7
Freshwater Forested Wetlands	45,532	37.4
Freshwater Non-Forested Wetlands	6,341	5.2
Natural Lakes, Ponds, Rivers & Streams	3,320	2.7
Total	**121,743**	**100**

Fish and Wildlife

Addendum five of the Unit Management Plan for Wekiva Basin State Parks (FDEP 2017) and an exhibit N of the 2011 10-year Management Plan for Seminole State Forest (FDAC 2011) provide lists of plants and animals known to occur on these state-owned lands. Data from Christmas Bird Counts and BioBlitz events (Exum unpublished data) have supplemented these lists. These data show a diversity of taxa in a range of natural communities from xeric habitats such as scrub and sandhill to aquatic habitats including rivers, spring runs, and springs.

The location of the Wekiva River Basin in Central Florida results in a blend of species more common to more northern areas of the Southeast as well as subtropical species more common in south Florida. Listed species associated with scrub and sandhill habitats, springs and spring runs, and wetland and aquatic habitats are documented in the state plans referenced above. Also important, the natural corridors provided by the Wekiva River System and Wekiva to Ocala Greenway provide habitat for migratory and highly mobile species including many dozens of bird species, Florida black bear (*Ursus americanus floridanus*), and West Indian manatee (*Trichechus manatus latirostris*).

Florida Black Bear with Cub in the Wekiva Basin

Listed species

In order to evaluate the potential for occurrence of state- or Federally-listed species of plants and animals within the Wekiva basin, an Element Occurrence (EO) Report was obtained from the FNAI (**Appendix C**). The FNAI maintains a compendium of data on observations of listed species, locations of and species present in rookeries, wintering habitat for manatees, and information on unique natural communities and geologic formations. **Table 3** provides a list of those state- or Federally-listed species that are a part of the "biodiversity matrix" determined by FNAI to have been observed or have potential for occurrence in the study area. For the purposes of this update to the CRMP, we defined the study area for evaluating listed species to include a 0.5 mile-wide corridor over each river segment. Consequently, the list is focused on aquatic and wetland species, plus those species and habitats, including scrub and sandhill, that occur near the aquatic ecosystems of the Wekiva River System.

Table 3. *State- and Federally-listed Threatened and Endangered species with potential to occur in proximity to the Wekiva Wild and Scenic River System. (Based on Element Occurrence Report compiled by the Florida Natural Areas Inventory for the study area.)*

Taxonomic Category	Common Name	Scientific Name	Likelihood of Occurrence	State Status	Federal Status
Plants	Ashe's savory	*Calamintha ashei*	Potential	T	
	Beautiful pawpaw	*Deeringothamnus pulchellus*	Potential	E	E
	Britton's beargrass	*Nolina brittoniana*	Likely	E	E
	Celestial lily	*Nemastylis floridana*	Likely	E	
	Chapman's sedge	*Carex chapmannii*	Documented	T	
	Cutthroatgrass	*Coleataenia abscissa*	Potential	E	
	Florida beargrass	*Nolina atopocarpa*	Likely	T	
	Florida bonamia	*Bonamia grandiflora*	Potential	E	T
	Florida hasteola	*Hasteola robertiorum*	Potential	E	
	Florida mountain-mint	*Pycnanthemum floridanum*	Potential	T	
	Florida spiny-pod	*Matelea floridana*	Potential	E	
	Florida willow	*Salix floridana*	Likely	E	
	Giant orchid	*Pteroglossaspis ecristata*	Documented	T	
	Hartwrightia	*Hartwrightia floridana*	Potential	T	
	Large-flowered rosemary	*Conradina grandiflora*	Potential	T	
	Lewton's polygala	*Polygala lewtonii*	Potential	E	E
	Many-flowered grass-pink	*Calopogon multiflorus*	Potential	T	
	Nodding pinweed	*Lechea cernua*	Likely	T	
	Okeechobee gourd	*Cucurbita okeechobeensis*	Potential	E	E
	Ocala vetch	*Vicia ocalensis*	Potential	E	
	Piedmont jointgrass	*Coelorachis tuberculosa*	Documented	T	
	Pinesap	*Monotropa hypopithys*	Potential	E	
	Pondspice	*Litsea aestivalis*	Potential	E	

Taxonomic Category	Common Name	Scientific Name	Likelihood of Occurrence	State Status	Federal Status
Plants	Rugel's pawpaw	*Deeringothamnus rugelii*	Potential	E	E
	Sand butterfly pea	*Centrosema arenicola*	Documented	E	
	Scrub buckwheat	*Eriogonum longifolium var. gnaphalifolium*	Likely	E	T
	Scrub lupine	*Lupinus aridorum*	Potential	E	E
	Scrub stylisma	*Stylisma abdita*	Potential	E	
	Star anise	*Illicium parviflorum*	Documented	E	
	Carter's warea	*Warea carteri*	Potential	E	E
	Clasping warea	*Warea amplexifolia*	Potential	E	E
	Yellow fringeless orchid	*Platanthera integra*	Potential	E	
Fish	Bluenose Shiner	*Pteronotropis welaka*	Documented	ST	
Amphibian	Striped Newt	*Notophthalmus perstriatus*	Documented	ST	
Reptiles	American Alligator	*Alligator mississippiensis*	Likely	FT(S/A)	SAT
	Eastern Indigo Snake	*Drymarchon couperi*	Documented	FT	T
	Gopher Tortoise	*Gopherus polyphemus*	Documented	ST	
	Pine Snake	*Pituophis melanoleucus*	Documented	ST	
	Sand Skink	*Plestiodon reynoldsi*	Potential	FT	T
	Short-tailed Snake	*Lampropeltis extenuata*	Likely	ST	
Birds	Florida Burrowing Owl	*Athene cunicularia floridana*	Potential	ST	
	Florida Sandhill Crane	*Antigone canadensis pratensis*	Likely	ST	
	Florida Scrub-Jay	*Aphelocoma coerulescens*	Documented	FT	T
	Little Blue Heron	*Egretta caerulea*	Potential	ST	
	Red-Cockaded Woodpecker	*Dryobates borealis*	Potential	FE	E
	Wood Stork	*Mycteria americana*	Likely	FT	T
Mammal	Florida Manatee	*Trichechus manatus latirostris*	Potential	FT	T

***T**=Threatened,* ***E**=Endangered,* ***ST**=State-Threatened,* ***FT**=Federally-Threatened,*
***FE**=Federally-Endangered,* ***T(S/A)**=Threatened due to similarity of appearance*

Florida Scrub Blue Jay

Peninsula Cooters in Wekiwa Springs State Park

Many of the species referenced in **Table 3** occur, or have the potential to occur, on public lands and waters dedicated to management of habitat conditions ideal for the unique needs of the listed species. Potential conflicts with long-term protection include incompatible land uses, lack of management, water quality degradation, hydrologic alteration, and invasion by exotic species. State and local partners on the Wekiva Wild and Scenic River System Management Committee have responsibility for managing properties under their purview, and each property is guided by a plan that address listed species and their management needs. For details on these species, refer to state and local management plans on publicly owned properties. Some general comments here on several of the species is warranted because of the relevance of habitat for listed species to the goals and actions in this CRMP update, particularly those species that are aquatic or wetland dependent.

Scrub or Sandhill Species

Many of the plants on this list (e.g., sand butterfly pea, giant orchid, scrub buckwheat, nodding pinweed, Britton's beargrass, Florida bonamia, and Ashe's savory) are scrub or sandhill species, and these communities have a high priority for restoration and management on existing public lands. Similarly, managing for the habitat conditions preferred by vertebrates that depend on scrub or sandhill communities (e.g., eastern indigo snake, gopher tortoise, pine snake, sand skink, short-tailed snake, and Florida Scrub-Jay) is the priority for public land managers in the Wekiva basin. However, where these plants and animals might occur on private properties is not well known, and these communities are particularly vulnerable to impacts from development. A continued focus on scrub and sandhill restoration and appropriate fire management will be necessary on public lands to assure the protection of these species in perpetuity.

Aquatic or Wetland-dependent Species

Plants:

Another group of the plants on this list are aquatic or wetland dependent (e.g., Chapman's sedge, Piedmont jointgrass, star anise, celestial lily, Florida beargrass, Florida willow), and their protection is more assured by public land ownership and the myriad regulations that protect these communities. One species of note is the state endangered star anise, a Florida endemic. Wekiwa Springs State Park has the largest known population of star anise within its highly restricted habitat in Florida (FDEP 2017). Since this species is locally abundant in suitable habitat, additional mapping of its distribution on other publicly owned lands is warranted to protect numerous distinct populations of this species.

Wetland-dependent Birds:

The FNAI database for listed species of wading birds is focused on rookeries, and, based on the FWC database, there have been no active wading bird rookeries on the Wekiva River System since 1999. Even though there may not be an active rookery at this time, little blue herons (as well as the state-Threatened tri-colored heron (*Egretta tricolor*) are common on the river and have been observed on every Audubon Christmas bird count in the Wekiva River count circle for the past 30 years (Wekiva River Count Circle unpublished data). The Federally-Threatened wood stork is frequently observed foraging in aquatic habitats of the

Wekiva basin, but there are no known rookeries for wood storks in the Wekiva basin. Florida sandhill cranes are known to nest in shallow marshes in the Wekiva basin and forage in open habitats maintained by mowing or fire. The Federally-Endangered snail kite (*Rostrhamus sociabilis*), has been documented during several Christmas Bird Counts in the Wekiva River Count Circle, presumably due to the expansion of the range of the exotic island apple snail (*Pomacea sp.*), a known prey of the highly mobile raptor.

Striped Newts:

Striped newts have been observed within at herbaceous marshes near scrub communities on Rock Springs Run State Reserve and Seminole State Forest. These observations are near the southern extent of this species which occurs only in southern Georgia and northern Florida (https://myfwc.com/wildlifehabitats/profiles/amphibians/striped-newt/). Terrestrial adults use sandhill habitats during the non-breeding season, but they can also inhabit scrub, scrubby flatwoods, and mesic flatwoods that surround breeding ponds. Striped newts prefer open habitats managed with prescribed fire rather than habitats encroached by hardwoods (https://myfwc.com/wildlifehabitats/profiles/amphibians/striped-newt/).

Bluenose Shiner:

Gary Warren, FWC biologist, stated that the bluenose shiner was “moderately abundant in the Wekiva River and Rock Springs Run” (unpublished presentation from a 2012 BioBlitz). Parsley et al. (2020) observed dozens of bluenose shiners during sampling of the Wekiva River and Rock Springs Run in 2019. Both Warren and Parsley et al. noted that the quality of habitat for bluenose shiners was good in the Wekiva River and Rock Springs Run, and that additional sampling would likely reveal greater numbers across the river system.

Snails/Cave Crayfish:

Three small, unique snails have been documented in springs of the Wekiva River System. These endemic species have been petitioned for listing by the U.S. Fish and Wildlife Service and are candidates for listing by the state of Florida. They include the Wekiwa Springs hydrobe (*Aphaostracon monas*), the Wekiwa siltsnail (*Floridobia wekiwae*), and the Rock Springs siltsnail (*Floridobia petrifons*), which were initially discovered in the 1960s and described by F. G. Thompson. Their presence has been recently documented by FWC biologists, and the *Floridobia* species were determined to be locally abundant in Wekiwa and Rock Springs and the runs near the spring discharge (Gary Warren, FWC biologist, pers. com). They are a distinctive part of the ecology of the numerous springs of the Wekiva system, and recent sampling may yield additional species not yet known to science. The Orlando cave crayfish (*Procambarus acherontis*) is restricted to groundwater sites associated with six or seven spring cave systems of the lower Wekiva River basin. It was documented in surveys conducted prior to 2000 but not confirmed in recent investigations (FDEP 2017).

West Indian Manatee:

Though no formal surveys for the Federally-Threatened manatee are conducted in the Wekiva River System, the Save the Manatee Club provided a compilation of recent observations (Save the Manatee Club unpublished data). Between March and November 2022, 16 separate observations of manatees were documented, and these observations undoubtedly represent only a fraction of the number of manatees in the Wekiva River System. The recorded observations included females with calves and groups of manatees as large as 12 individuals. Manatees were documented at various locations along the Wekiva River System, including at Wekiwa Springs, in Rock Springs Run near Kelly Park, and several miles up the Little Wekiva River. Recent outreach to local residents by the Save the Manatee Club, the Wekiva River Ambassador, and FDEP likely generated the influx of data on manatee observations. But it is also probable that the loss of submerged and floating aquatic vegetation in other tributaries of the St. Johns River has made the Wekiva River System more valuable to manatees.

Little Blue Heron

Wood Stork

Exotic Species

The Wekiva River Aquatic Preserve Management Plan (FDEP 2014, page 147) provides a list of exotic plants found in the Preserve and their status as defined by the Florida Exotic Pest Plant Council (now the Florida Invasive Species Council). Notable Category I plants found in wetland and aquatic habitats include wild taro (*Colocasia esculenta*), common water-hyacinth (*Eichhornia crassipes*), green hygro (*Hygrophila polysperma*), hydrilla (*Hydrilla verticillata*), Peruvian primrosewillow (*Ludwigia peruviana*), torpedograss (*Panicum repens*), elephantgrass (*Cenchrus purpureus*), and paragrass (*Urochloa mutica*). The Aquatic Preserve Management Plan also references Asian clam (*Corbicula fluminea*) and the island apple snail; two species of reptiles: false map turtle (*Graptemys pseudogeographica*) and red-eared slider (*Trachemys scripta elegans*); and the wild hog (*Sus scrofa*).

Exotic plants in the Wekiva River System are managed by the FWC and the U.S. Army Corps of Engineers (ACOE). The ACOE controls exotic plants only in the approximately 5 miles of the Wekiva River prior to the confluence with the St. Johns River. The FWC controls exotic plants in the remainder of the navigable portions of the Wekiva River System and the navigable portions of the Little Wekiva River. The annual work plan for maintaining these aquatic resources (https://app.myfwc.com/hsc/pmars/waterbodySchedule.aspx) includes objectives to reduce impacts to native plants from exotic species and to remove downed trees to maintain navigation.

The island apple snail is an invasive exotic snail that has been observed in the Wekiva River near the confluence of the St. Johns River. The net consequences of this exotic herbivore to the ecology of the Wekiva River are unclear since they are known to be consumed by limpkins (*Aramus guarauna*) and snail kites.

Parsley et al. (2020) studied trends in fisheries in spring runs of the St. Johns basin, including Rock Springs Run and the Wekiva River. Although exotic fish species did not represent a significant portion of the species or biomass collected (likely due to the relative ineffectiveness of the sampling gear for these species), five species were present in the Wekiva River System. These included armored catfish (brown hoplo) (*Hoplosternum littorale*), blue tilapia (*Oreochromus aurea*), vermiculated sailfin catfish (plecos) (*Pterygoplichthys disjunctivus*), walking catfish (*Clarias batrachus*), and chanchitas (*Cichlasoma dimerus*). While these species do not appear to currently be a dominant component of the fishery in the Wekiva River System, they may congregate in the springs (sailfin catfish) or the spring runs (blue tilapia) seasonally.

Exotic blue tilapias - Photo provided by the late Jay Holder

The Exotic Chanchita - Photo provided by the late Jay Holder

The Exotic Brown Hoplo - Photo provided by the late Jay Holder

Historic and Cultural Resources

This assessment takes into consideration cultural and historic resources, including archaeological, whose existence is related to the river system. Physical remains of these resources have been recorded in the Florida Master Site File maintained by the Florida Division of Historical Resources (FDHR).

For millennia, the Wekiva basin has provided abundant natural resources for human occupation. Numerous archeological and historic sites have been recorded in the region. Remains of extinct Pleistocene megafauna and herd animals have been found with the distinctive fluted projectile points made by Paleo-Indians (11,000–8000 BC) (Milanich 1994).

The most readily identifiable sites of the Early Archaic Period (8000–6000 BC) are the mounds and middens along riverbanks. These features are typically domestic refuse heaps of shell, stone tools, animal bone, ceramics, and other artifacts (Weisman 1993). The first major occupation of the St. Johns River valley occurred during the Mount Taylor Period (6000–2000 BC), as evidenced by large freshwater shell middens, burials in a wet environment, and stemmed, broad-bladed projectile points (Milanich 1994). The Orange Period (2000–500 BC) marked the appearance of ceramics, an apparent increase in population size, sociopolitical complexity, and territorial range (Milanich 1994). The St. Johns Period (500 BC–AD 1565) showed a continued preference for mound building, but the latter part of the period was also marked by profound changes in Native American life, including European influences (Milanich 1994).

European artifacts are occasionally found in St. Johns Period burial mounds and middens (Milanich 1994, Milanich and Fairbanks 1980). Most of the sites in the Wekiva River basin date from the Orange and St. Johns II periods (ca. 2500 BC to post AD 800) (Weisman 1993). Hernando DeSoto's Florida expedition (1539–1540) marked the beginning of a steep decline in Native American populations in the state. During the next 150 years, Timucuan Indians were forced to migrate or succumbed to European diseases (Milanich 1994). Other tribes fled to north Florida from invasions of their homelands in Georgia and Alabama in the 1700s (Tebeau and Marina 1999). There is evidence that Seminole Indians, who primarily descended from these cultures, used the Wekiva River headwaters for hunting and traveled the river as a route to the St. Johns River (Shofner 1982).

In 1842, at the close of the Seminole War, the Armed Occupation Act provided 160 acres to any man who would live on the property and cultivate 5 acres (https://stluciehistoricalsociety.net/indian-river-colony/). By the mid-1800s, the Wekiva basin was used by settlers for farming and milling lumber and grain. The area around Rock and Wekiwa Springs became a focal point for early settlers. The town of Clay Springs was started around Wekiwa Springs, and the spring outlet served as a landing spot for suppliers (Shofner 1982).

Cotton farming and logging were major endeavors near Rock Springs Run, which was dammed by William Delk to power a sawmill, gristmill, and cotton gin (Shofner 1982). Another sawmill was built on the upper Wekiva River, and a gristmill operated at Wekiwa Springs until the Civil War. A mound indicating the site of the dam for this mill remains along Mill Creek. During the Civil War, a Federal Company camp was located at Rock Springs (https://stars.library.ucf.edu/cgi/viewcontent.cgi?article=1155&context=cfm-texts).

In 1865, shortly after the Civil War, steamships and barges used Clay Springs as a loading and unloading point. The town of Clay Springs supported a wharf and warehouse for cargo steamers navigating the St. Johns River to the Wekiva River from the town of Mellonville, now called Sanford (Shofner 1982). Around 1875, the settlement of Markham was established and supported by the railroad system and Wekiva River. Three sites relate to this time in the Markham Woods area, including an African American cemetery and church. (Weisman and Newman 1993).

The South Florida Railroad broke ground in 1880 to connect Sanford, Longwood, Maitland, Orlando, and eventually Tampa as part of the Plant System (Francke 1984). Shortly thereafter, the Sanford–Lake Eustis rail line was built, with stops at Sorrento, Mount Dora, Eustis, Paola, and the former Town of Ethel in what is now Rock Springs Run State Reserve (Francke 1984). The wooden bridge that crossed the Wekiva River (near what is now Lake Markham Road) burned, and much of the original rail bed was removed. Portions of this railroad network have since been converted into a bike trail as part of the Seminole County Rails to Trails program.

The tourism industry arrived in the 1880s in what was then known as Clay Springs, which in 1906 was renamed Wekiwa Springs. Facilities included a hotel, a sanitarium, cabins, a picnic area, bathhouses, and a rail toboggan ride (https://www.floridastateparks.org/learn/history-wekiwa-springs). The hotel and other recreational facilities operated until the Great Depression, after which the buildings either burned or were dismantled.

By the late 1800s, making turpentine was also an important economic activity in the area. Many "cat-faced" pines and clay turpentine pots can still be found in the flatwoods and sandhills of public lands in the Wekiva basin. The logging of cypress in the bottomlands of the Wekiva and St. Johns rivers also began at this time.

Before major roads were built, rivers served as a main form of transportation via steam and paddlewheel boats. The economic base of the region during the first part of the 20th century was primarily cattle and ranching, along with farming, citrus groves, lumber, and turpentine. By 1900, railways dominated the export of the region's fresh produce to urban markets (McCorkle 1992). Timber logging became widespread in the region by the late 1930s.

Some old logging (or tram) roads and railroad grades still exist across the Wekiva River System. An elevated grade occurs in the sandhill community at Wekiwa Springs State Park. Some of the old tramways are still visible, while others built through the floodplain swamp and hydric hammock communities have been removed and the communities have revegetated. Remnant pilings from a bridge crossing for one of these logging trams can still be seen in the river at the Buffalo Tram camp site. Evidence of old logging equipment and portions of the railroad tramway remain on public lands in some areas.

In 1941, the Apopka Sportsman's Club purchased land in the Wekiwa Springs area from the Wilson Cypress Company for hunting, fishing, and other recreational uses. In 1969, the state purchased the property from the sportsman's club for Wekiwa Springs State Park, which opened in 1970 (https://www.floridastateparks.org/learn/history-wekiwa-springs).

Clay Springs Boathouse, Circa 1880

Wekiva Lagoon 1940, Source WSSP

Recreational Resources

Twelve public and private parks, preserves, and boat launches along the Wekiva River System comprise hubs of recreational activities. **Table 4** illustrates the general activities that are located at each of the recreational hubs. Details of the available experiences and characteristics of each hub are provided below. **Figure 10** depicts the locations of the 12 hubs of predominantly river-based recreation in the Wekiva River System.

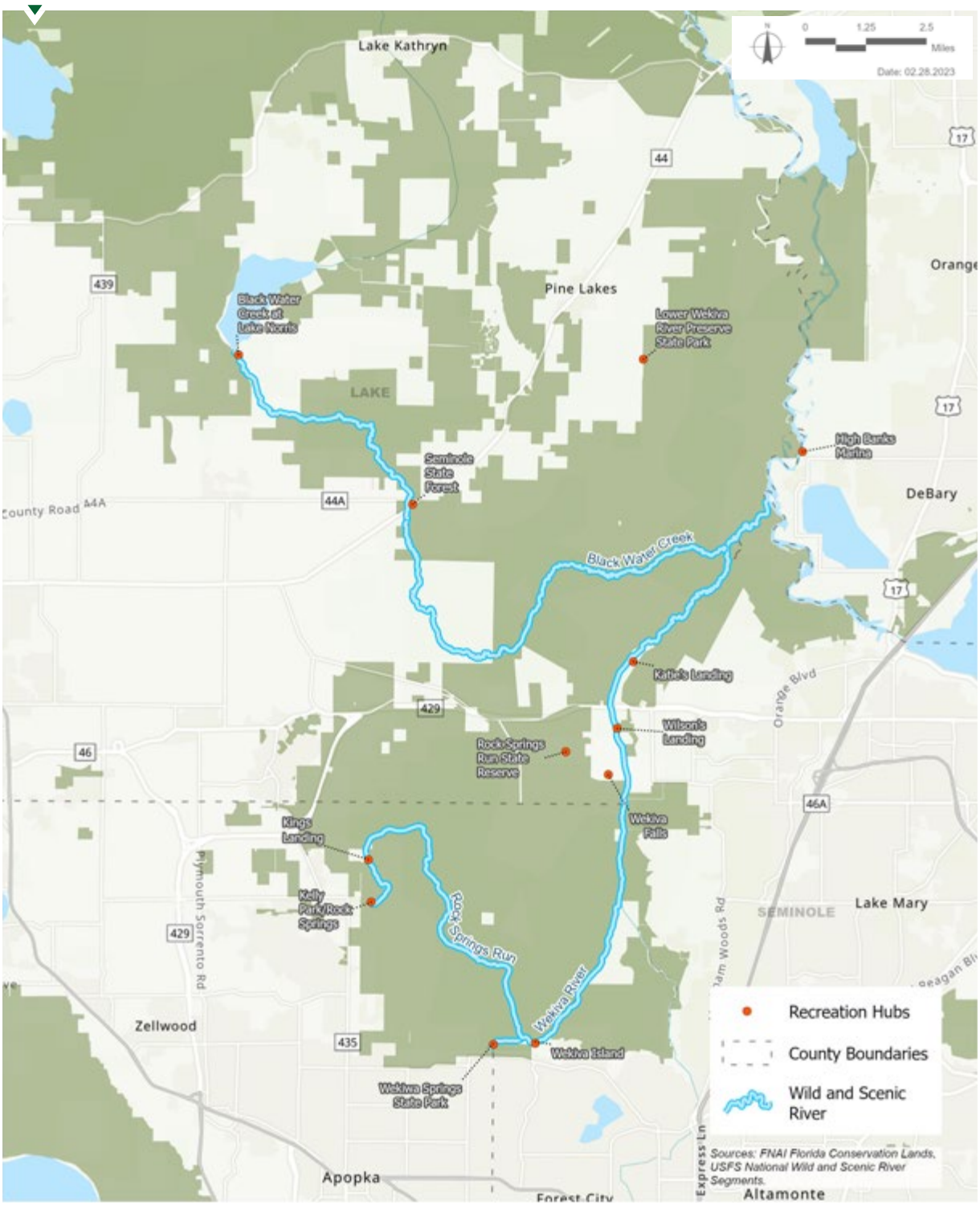
Table 4. *Recreation services at recreation hubs within the Wekiva Wild and Scenic River System*

Recreation Hub	Hiking	Biking	Water Access	Picnic Areas	Primitive Camping	RV-accessible Camping	Equestrian	Concessions	Hunting
Kelly Park	■	■	■	■	■	■		■	
Kings Landing			■					■	
Wekiwa Springs State Park	■	■	■	■	■	■	■	■	
Wekiva Island			■	■				■	
Wekiva Falls	■	■	■	■	■	■		■	
Wilson's Landing	■		■	■					
Katie's Landing			■	■					
Seminole State Forest	■	■	■	■	■		■		■
Lower Wekiva River Preserve State Park	■	■			■		■		
Rock Springs Run State Reserve	■	■		■	■	■	■		■
Lake Norris Conservation Area	■	■	■	■	■				
Highbanks Marina			■					■	
Totals	8	7	10	9	7	4	4	6	2

dark blocks represent affirmative responses for recreation services ■

Concessions Building at Kelly Park

Figure 10. *Locations of the hubs of predominantly river-based recreation in the Wekiva River System*



Wekiva River and Wekiwa Springs Run

Access to the Wekiva River and Wekiwa Springs Run is available from public lands (state and county), private businesses/boating operations, private residential properties, and the St. Johns River. Table 5 provides a description of services relevant to river access along the entire Wekiva River System. Designated public access along the Wekiva River includes Wilson's Landing County Park and Katie's Landing, with Wekiwa Springs State Park providing public access to Wekiwa Springs Run. Private canoe/kayak facilities that offer access along the Wekiva River include Wekiva Island and Wekiva Falls Resort. A private canoe/kayak concessionaire also operates within Wekiwa Springs State Park, and a concessionaire, Adventures in Florida, currently provides canoes and kayaks for rent and shuttling within the Wekiva area for a fee.

Public Lands along the Wekiva River

Data from Dr. Robert Brooks, Wekiva River Basin State Parks manager, show that recreation use has expanded within Wekiva Basin Parks to an average of more than 500,000 total visitors per year. This includes visitors to Rock Springs Run State Reserve and the Lower Wekiva River Preserve State Park, but the vast majority of visitors were concentrated in the approximately 9,500-acre Wekiwa Springs State Park (WSSP). Revenue generated from these visitors exceeded $1.8 million in fiscal year 2021–22.

Recreational opportunities at WSSP include swimming, hiking, biking, horseback riding, snorkeling, wildlife watching, fishing, picnicking, camping, and canoeing/kayaking. Wekiwa Springs State Park Nature Adventures is the park's concessionaire. They operate the gift/sundry shop; sell refreshments, including hamburgers and hotdogs; and rent canoes, kayaks, paddle boards, and lockers. Their daily boat rentals total approximately 200 on weekends and 60 on weekdays, during the busiest season (March to November). Picnic locations and shelters are provided in the areas around Wekiwa Springs and Sand Lake. A playground is in the spring picnic area, along with a volleyball area and horseshoe pit. The park has 8 miles of equestrian trails, 9 miles of biking trails, and 13.5 miles of hiking trails (https://www.floridastateparks.org/parks-and-trails/wekiwa-springs-state-park/experiences-amenities-0). WSSP also provides 60 full-facility campsites, along with a primitive camping area. Primitive camping opportunities provided along Rock Springs Run within WSSP include two canoe camping sites

Table 5. *River access recreation services along the Wekiva Wild and Scenic River System*

River Segment/Site	Canoe/ Kayak Rental	Concessions Available	Restrooms	Shuttle Services	Staff On-Site	Canoe Launch	Powerboat Launch
Rock Springs Run							
Kelly Park		■	■		■		
Kings Landing	■	■	■	■	■	■	
Wekiwa Springs Run							
Wekiwa Springs State Park	■	■	■		■	■	
Wekiva River							
Wekiva Island	■	■	■		■	■	■
Wekiva Falls	■	■	■		■	■	■
Wilson's Landing	■		■			■	
Katie's Landing			■			■	
Black Water Creek							
SSF Day Use Area						■	
Lake Norris Conserv. Area						■	
St. Johns River							
Highbanks Marina		■	■			■	■
Totals	5	6	8	1	5	9	3

dark blocks represent affirmative responses for recreation services ■

(Otter Camp and Big Buck Camp). A museum/visitor center houses exhibits on natural and cultural history. A 1.2-acre site known as Serenity Garden at Wekiwa Springs is proposed to enhance the quality of the park experience for visitors with diverse abilities and special needs. The garden will create a unique sensory experience for individuals such as wounded warriors, fragile seniors, people in wheelchairs, veterans with PTSD, those on the autism spectrum, and the vision impaired (Don Philpott, Wekiva Wilderness Trust, pers. comm.).

Lower Wekiva River Preserve State Park spans about 6 miles of the St. Johns River, the lower 4 miles of the Wekiva River, and the lower reaches of Black Water Creek. Recreational activities within the approximately 17,400-acre state park include canoeing/kayaking, horseback riding, primitive horse camping, hiking, biking, and wildlife watching (FDEP 2017). Canoeists and kayakers can travel through the park along the St. Johns River, the Wekiva River, and Black Water Creek; however, the park's only designated launch/takeout site is at nearby Katie's Landing. Visitors can use the self-guided 2.5-mile nature trail at the south end of the park to get an overview of the park or they can travel some of the 18 miles of multiuse trails on foot, horseback, or bike. Lower Wekiva River Preserve State Park also offers primitive horse camping in designated areas of the northern portion of the park, and horse stalls and corrals are available. Camping reservations are made via Wekiwa Springs State Park (https://www.floridastateparks.org/parks-and-trails/lower-wekiva-river-preserve-state-park/experiences-amenities-0#:~:text=The%20Florida%20National%20Scenic%20Trail,preserve%20off%20State%20Road%2044).

Katie's Landing is a public canoe/kayak launch site located just north of the Wekiva Parkway. It is managed as part of Wekiva River Basin Park system and includes restrooms and picnic areas with grills under live oak canopies. Just south of the Wekiva Parkway about 1.5 miles upstream of Katie's Landing is Wilson's Landing, a 105-acre Seminole County property that includes a canoe/kayak launch site on the Wekiva River. Other facilities include a pier on the Wekiva River, a pavilion, restrooms, paved parking, and large, multipurpose fields.

Rock Spring Run State Reserve includes a large stretch of the Wekiva River, which runs along its eastern boundary. More detailed information about Rock Springs Run State Reserve is provided in the summary for Rock Springs Run on the following page.

Museum/Visitor Center Exhibit at Wekiwa Springs State Park

Private Concessionaires along the Wekiva River

Wekiva Island is a privately owned facility that offers 22 small boat slips for rent, along with over 250 canoes, kayaks, and paddleboards. They sell beer, wine, and food and host frequent events and entertainment that bring in crowds that gather in cabanas along the Wekiva River or at the bar, food truck, or volleyball court. This private facility is also used as a takeout point for boats rented from Kings Landing along Rock Springs Run.

Wekiva Falls Resort, along the Wekiva River, offers canoe and kayak rentals. Resort guests can also use the marina to launch small power boats for a fee. Non-guests can also access the small boat ramp for a fee. Wekiva Falls Resort has more than 800 recreational vehicle (RV) sites, along with laundry, showers, a fishing and camping supply store, picnic sites, and a beach for swimming surrounding a large artesian well that flows to the Wekiva River (https://wekivafalls.com/wp-content/uploads/sites/9/2022/06/Wekiva-Falls-RV-Resort-Media.pdf).

Canoes and kayaks for rent at Wekiva Falls Resort

Rock Springs Run

Rock Springs Run twists and turns for 8.5 miles as it winds its way to the Wekiva River through mesic and hydric flatwoods, and floodplain swamp. A few private homes and cabins can be seen for the first quarter mile of the Run, but the remainder of the Run is undeveloped as it flows through public land. Rock Springs and the upper parts of Rock Springs Run can be accessed from the Orange County-owned Kelly Park. Canoeists and kayakers access Rock Springs Run from the privately-owned Kings Landing. Three primitive campsites along the Run can be reserved through Wekiwa Springs State Park.

Public Lands along Rock Springs Run

Kelly Park is home to Rock Springs, which emerges from a cleft in a limestone outcropping and is the primary source of flow for Rock Springs Run. The 355-acre park is managed by Orange County Parks and Recreation Division (https://www.ocfl.net/cultureparks/parks.aspx?d=22&m=dtlvw#.YvK-E-zMKWA). Recreational activities in Kelly Park include swimming, snorkeling, tubing, picnicking, hiking, biking, volleyball, wildlife watching, and camping (25 full facility campsites and a primitive camping area are available). Many visitors rent or bring innertubes and tube from the spring to the main swimming area. Because of significant traffic problems associated with congestion near the entrance to the park, Orange County implemented a program to reduce attendance at the park a few years ago. Each day, the park admits 280 cars in the morning, and provides 50 vouchers for visitors that are allowed to return at 1 p.m. This results in a total attendance of about 1,350 people per day every day in the summer when local schools are on break. After that, the park generally fills to capacity on weekends until the first cold weather. As a result of this approach, Kelly Park's attendance in 2021 shrunk by approximately 50% compared with attendance in 2015, from 261,490 to 131,482 visitors (Jon Dunn, park manager, pers. comm).

Rock Springs Run State Reserve spans the shoreline of both Rock Springs Run and the Wekiva River. The Reserve encompasses more than 14,000 acres and includes xeric and mesic flatwoods, scrub, floodplain swamp, and miles of shoreline on both waterways. There is no access to the Wekiva River or Rock Springs Run within the Reserve. Access is now provided via Rock Springs Reserve Road and Wekiva River Road in Sorrento. The new entrance road leads directly to primitive camping sites and the horse riding concession.

Activities on Rock Springs Run State Reserve include hiking, horseback riding, canoe camping, horse camping, wildlife watching, fishing, and hunting. Primitive camping opportunities on the Reserve include two canoe camping areas (Indian Mound Camp on Rock Springs Run and Buffalo Tram Camp of the Wekiva River), but these are reserved for canoeists and kayakers. Guided trail rides and horse rentals are available. Hunting is allowed in the part of Rock Springs Run State Reserve designated as a Wildlife Management Area at selected times during hunting seasons. Camping is allowed at the horse barn and the river campsites during scheduled hunts. Horses are restricted during most scheduled hunting days (archery, muzzleloading, and general gun hunts) but horses are allowed during small game hunts. Rock Springs Run State Reserve currently provides more than 17 miles of multiuse trails for hiking, biking, and equestrian use (https://www.floridastateparks.org/learn/trails-rock-springs-run). The Friends of the Wekiva River proposed a hiking trail network based on natural communities within the Reserve. The proposed trail network covers approximately 25 miles in loops that overlap and provide a myriad of opportunities for short out-and-back hikes and longer loops through most of the natural communities on the Reserve. FDEP is considering the proposed trail network in association with the new road configuration.

Wekiwa Springs State Park includes a large stretch of Rock Springs Run, which runs along its northern border. Wekiwa Springs State Park is described above in the summary for the Wekiva River and Wekiwa Springs Run.

Private Concessionaires along Rock Springs Run

Kings Landing is a private canoe livery just downstream from Kelly Park. Canoeists from Kings Landing often travel upstream along what is known as the emerald cut to the boundary of Kelly Park and back to Kings Landing. Canoeists and kayakers can also go downstream and come back upstream without the need for shuttling. Canoeists and kayakers that take the 8.5-mile run down Rock Springs Run to Wekiva Island at the upper reach of the Wekiva River frequently use a shuttle service between Wekiva Island and Kings Landing. All the tours can be led by a guide for an additional fee.

Kelly Park - Orange County Parks and Rec Directional Sign

Paddle Rental - Private Concessionaire at Kings Landing

Black Water Creek

Black Water Creek flows out of Lake Norris and runs through Seminole State Forest; various privately owned parcels, including the 5,300 acre Seminole Woods tract; Lower Wekiva River State Preserve; and lands owned by the SJRWMD on its way to the Wekiva River. As its name implies, Black Water Creek exhibits high color (the "tea color") in the water column due to dissolved organic compounds. Although 17.9 miles long, the Creek is much less accessible than other parts of the river system. There are launch sites at the Lake Norris Conservation Area and at the Sand Road crossing in Seminole State Forest, by permit only. Dense vegetation and downed trees make some sections of Black Water Creek impassable, but for the sections that are navigable, the Creek offers a backcountry paddling experience. The Creek is not navigable between Lake Norris Road and the confluence of Seminole Creek. (Signs have been installed along the creek south of Lake Norris Road, north of CR 44A and south of SR 44, to warn the public of this condition.) The portion of Black Water Creek within Seminole State Forest east of the confluence with Seminole Creek and continuing to the Wekiva River is periodically cleared to allow passage of canoes and kayaks. Canoes and kayaks can also access the lower reach of Black Water Creek from its confluence with the Wekiva River.

Public Lands along Black Water Creek

Seminole State Forest (SSF) includes more than 30,000 acres and is managed by the Florida Forest Service (FDACS, Florida Forest Service 2011). SSF contains extensive areas of mesic flatwoods, hydric hammock, floodplain swamp, and bay swamp. Approximately 4,300 acres of scrub, managed intensively for the Federally-Threatened Florida Scrub-Jay (*Aphelocoma coerulescens*) occur on SSF. Recreation opportunities in the forest include hiking, horseback riding, canoeing/kayaking, picnicking, camping, fishing, wildlife watching, biking, and hunting. Access is available from SR 44 and SR 46. A state forest use permit is required for drive-in access. Day use entrance fees are paid via remote payment with instructions given online and at the entrances. SSF provides three designated river access points suitable for nonmotorized boats along Black Water Creek. Two of the access points are from campsites and one is a day-use launch site. More than 20 miles of multiuse trails are available for hiking, biking, and equestrian use (https://www.fdacs.gov/Forest-Wildfire/Our-Forests/State-Forests/Seminole-State-Forest). There are five reservation, drive-up primitive campsites. Three of these are group sites and another three are reservation hike-in primitive campsites. Two of the reservation campsites are accessible by paddling on Black Water Creek (Moccasin and Black Water Camp). Three camp zones are located along the Florida National Scenic Trail. These hike-in sites are for trail users. One additional hike-in campsite is located on the adjacent Lower Wekiva River Preserve State Park and is accessible from the Lower Wekiva Loop trail. Hunting is allowed in a part of SSF designated as a Wildlife Management Area at selected times during hunting season.

The Lake Norris Conservation Area is 3,660 acres in size and was purchased by the SJRWMD to protect the extensive hardwood swamp on the western shore of Lake Norris and the shoreline of Black Water Creek (SJRWMD 2009). The upland portion of the conservation area consists of improved pasture, scrub, and planted pine. Available recreation activities include hiking, wildlife viewing, primitive camping, fishing, horseback riding, bicycling, and canoeing. Canoes have been available for public use through the Lake County Water Authority (LCWA), which has helped manage the conservation area. Recently, Lake County has taken responsibility for the conservation area and will likely be managing recreation activities in the future.

The Lower Wekiva River Preserve State Park includes a significant stretch of Black Water Creek. The Park is described in the recreational summary for the Wekiva River, and Wekiwa Springs Run shown above.

Private Concessionaires along Black Water Creek

Two private concessionaires, Adventures in Florida and Venture Outdoors, currently provide canoes and kayaks for rent, and shuttling to and from Black Water Creek for a fee.

Paddlers on Black Water Creek

Black Water Camp on Black Water Creek

St. Johns River Paddling Towards Highbanks Marina

St. Johns River

Public/Private Concessionaires along the St. Johns River

Volusia County operates and maintains the Highbanks boat launch for powerboats and canoes/kayaks. The boat launch is on the St. Johns River a little over 1.5 miles downstream from its confluence with the Wekiva River. Vehicular access is from the end of W. Highbanks Road in DeBary. Launching boats is free and the ramp is open 24 hours a day.

5.0

Accomplishments Since The 2012 CRMP

Dozens of actions identified in the 2012 CRMP have been completed or are ongoing. Some of these have been completed by local or state agencies that are members of the committee, others have been conducted by environmental groups focused in the Wekiva area, and other initiatives have been funded by the Wekiva Wild and Scenic River System Management Committee. Highlights of some of the actions that have been completed by one or more of these entities are summarized below.

Wekiva Wild and Scenic River System Management Committee and River Ambassador Activities

- Designed new unified signage incorporating the National Wild and Scenic River logo, and installed at all access points, resting areas, and bridges within the Wekiva River System and where roads enter the Wekiva basin.
- Incorporated the Wild and Scenic logo into presentations, publications, flyers, displays, and other visual media relating to the Wekiva River System produced by or for the National Park Service.
- Developed flyers, displays, and other material that describes regulations and guidelines relating to recreational use of the River System, and placed them at various river access points in the River System.
- Implemented BearWise strategies through signage and the use of bear-resistant trash cans at recreation hubs with frequent bear activity.
- Assisted with the distribution of bear-resistant trash cans in residential communities at the wildland/urban interface in the Wekiva basin.
- The Wekiva Wild and Scenic River System River Ambassador created a social media platform and compiled a list of friends and followers for communication on events, volunteer opportunities, educational experiences, etc.
- Engaged with the agencies responsible for designing and building the Wekiva Parkway bridge over the Wekiva River (and wildlife underpasses), consistent with purposes of the Wekiva Parkway and Protection Act and Section 7 of the National Wild and Scenic River Act, to enhance habitat connectivity and corridors for wildlife movement.
- Hosted, organized, and led dozens of paddling groups, hikes, volunteer opportunities for community science, and guided tours with local experts to increase awareness and stewardship of the Wekiva Wild and Scenic River System.

Wekiva Wild and Scenic River System Management Committee Funded Initiatives

- Provided funding for research on Florida black bear movement patterns at the urban interface with Rock Springs Run State Reserve and Wekiwa Springs State Park.
- Conducted a User Capacity Study to assess impacts to natural resources from recreational activities and to evaluate the experience of resource-based recreational users on the Wekiva River system.
- Contracted with the University of Florida during the User Capacity Study to conduct a survey of the experience of recreation users in the River System.
- Funded the removal of debris after a major storm event along the stretches of Black Water Creek and Rock Springs Run to restore navigability to these sections of the River System.
- Provided funding for the construction of an erosion and sediment control basin (bioswales) near the river access point at Wilson's Landing in Seminole County.
- Funded the production of two publications of the paddling guide covering the Wekiva River System with information on distances between access points; services available at each trailhead; GPS coordinates for river segments; locations of springs; and the names of river segments, campgrounds, springs, and access points.
- Produced a graphic for the interpretive paddling trail on Black Water Creek.
- Updated the Wekiva Wild and Scenic River System website to serve as a repository for information and as a focal point for social media communication.
- Funded turtle research by the North American Freshwater Turtle Research Group in Wekiwa Springs Run to provide research experiences to undergraduate students and community scientists related to long-term turtle population monitoring that began in 1999.

- Funded the production of a film titled The Wekiva Wild and Scenic River System, A National Treasure now displayed on the Wild and Scenic River website. The film serves as a tool for promoting the Wekiva River System and raising awareness about the importance of conservation. A 5-minute film was created from this footage that highlights the ecological importance of the river and the impact of the Wild and Scenic River designation on the protection of the River System.

Non-governmental Organizations (NGO) Initiatives

- Led by the Friends of the Wekiva River (FOWR), dozens of volunteers have participated in more than 30 annual Audubon Christmas Bird Counts in the Wekiva River count circle.
- The FOWR provided information to the East Central Florida Regional Planning Council to produce an economic valuation of the river system, including estimates of the direct, indirect, and induced values.
- The FOWR served as stakeholders for both Basin Management Action Plans (BMAPs) covering the Wekiva basin (FDEP 2015, FDEP 2018). The FOWR objected to certain provisions of the BMAP for Wekiwa and Rock Springs and filed an administrative appeal to formally convey those objections.
- The FOWR, Florida Audubon, private landowners, and partner agencies documented impacts from sediments in the Little Wekiva River, met with numerous regulatory agencies and elected officials, and helped obtain funding for restoration due to erosion into the primary channel of this tributary to the Wekiva River. Although the Little Wekiva River is not in the Wild and Scenic River System, these sediments would have ultimately ended up in the Wekiva River.
- Don Philpott with the Wekiva Wilderness Trust published the Guide to the Wekiva River Basin State Parks (Philpott 2015).

State and Local Government Actions

- Two separate BMAPs were completed to address nutrient loads in the Wekiva River, Rock Springs Run, and Little Wekiva Canal; and for Wekiwa and Rock Springs.
- As a part of the BMAP process, FDEP created a system to track projects intended to reduce nutrient loads in the surface and ground waters of the River System.
- As a part of the BMAP process, septic systems were mapped across Priority Focus Areas within the springshed.
- FWC scientists conducted baseline surveys for native fish, including the state-Threatened bluenose shiner. FWC fisheries biologists are developing a Habitat Suitability Index for the bluenose shiner and recommend regularly assessing habitat conditions relative to the Index for bluenose shiner populations.
- Lake, Orange, and Seminole counties passed ordinances that, among other things, regulate the use and application of fertilizer containing nitrogen or phosphorus on property covered by lawn, turf, and landscape plants.
- The Orange County Environmental Protection Division conducted an educational campaign targeting residents of the Wekiwa and Rock Springs springsheds to inform residents about the fertilizer ordinance through direct mail and utility bill mailer inserts; door hangers; booths at community events; homeowner association meetings; public service announcements on TV and at movie theaters; fertilizer retailers; newspaper and magazine articles; billboards; and advertising in local outdoor areas, website articles, and social media.
- SJRWMD scientists conducted surveys of submerged aquatic vegetation along the lengths of the Wekiva River mainstem and Rock Springs Run.

6.0

Public Engagement and Recommendations for Digital Media

A multifaceted approach to public engagement was implemented as a part of this CRMP update. This outreach included an in-person workshop; a Zoom input meeting with the same content as the in-person workshop; an online survey that was posted on the website from September 1 to October 18, 2022; and a Pin-Drop app (a mapping exercise) that was also posted on the website during the same time frame as the survey. The information gathered during these efforts informed the public outreach approach in the CRMP Update. This multifaceted approach was used to maximize participation and to generally calibrate responses rather than to provide a statistically-valid survey.

The Public Engagement Summary (Appendix A) provides a general overview of the responses for all public engagement opportunities. Respondents affirmed that they were satisfied and enjoying resource-based recreation within the river system.

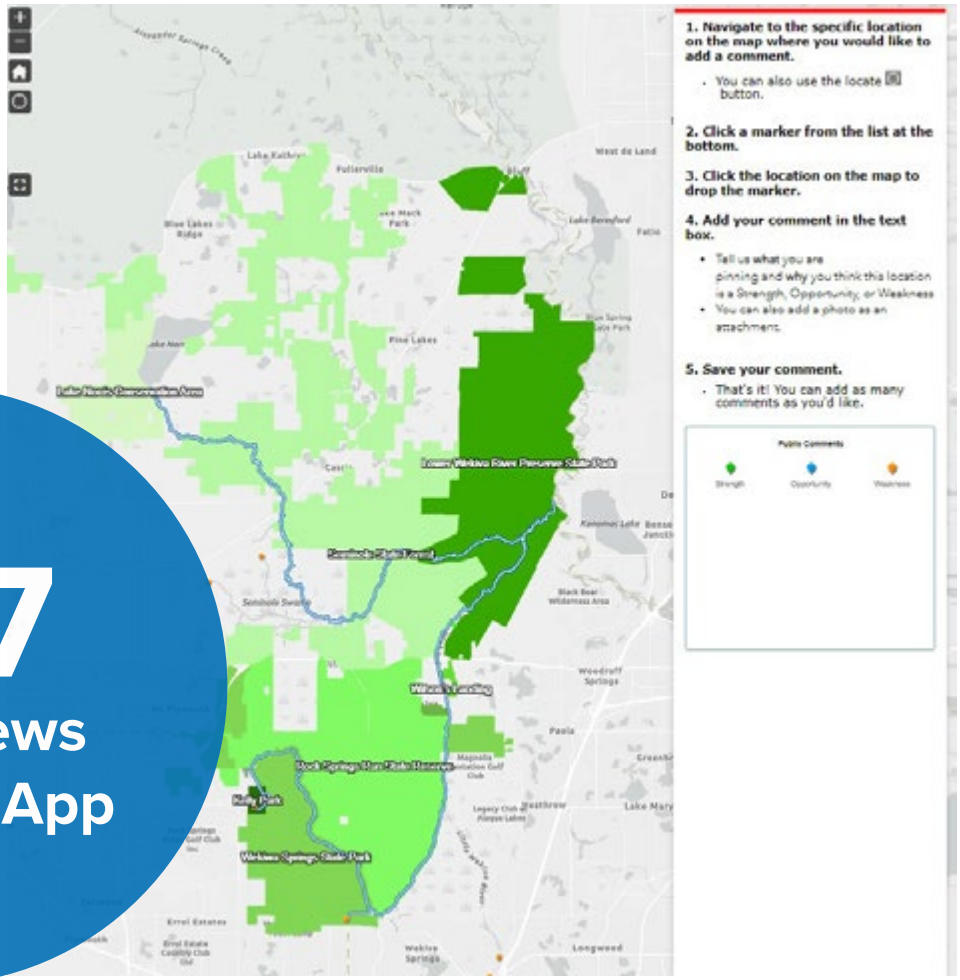
Appendix B provides a summary of recommendations related to the digital marketing strategy.

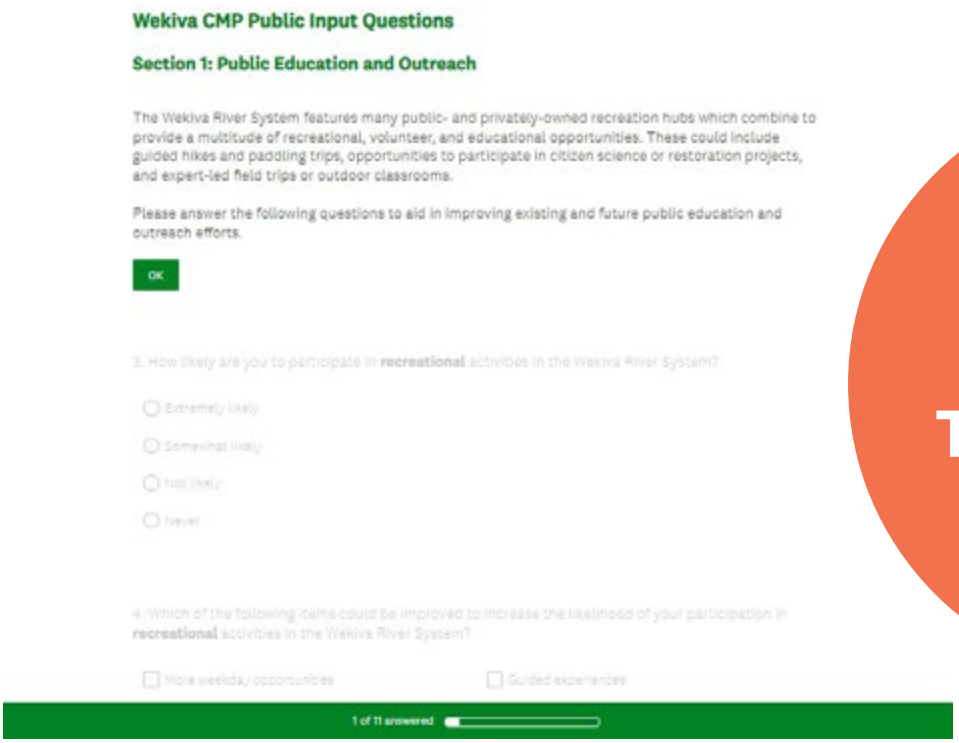
The goal of this summary is to improve internal and external communications for the Wekiva Wild and Scenic River System Management Committee, an issue that came up repeatedly in the public engagement exercises. The report provides the River Ambassador or others leading communication efforts with guidance regarding messages, content, brand, and output. The brand, messages, and content are based on digital marketing strategies and best practices; however, the output and ways to communicate were driven by the public engagement process and how respondents expressed their communication preferences.

Public Engagement and Outreach Summary ▶

116
Pin/Map Comments

217
Total Views Pin-Drop App





196
Total Surveys Completed

7.0

State of The Wekiva River System

Recognition of the value of the natural resources associated with the Wekiva River System began with the purchase of Wekiwa Springs State Park in 1969 and the designation of the Wekiva River Aquatic Preserve in 1975. For the last 50 years, a litany of rules, regulations, policies, and land acquisitions have been conferred upon the Wekiva River System so that it is sometimes referred to as "the most protected river system in the state." Vast areas of aquatic and wetland habitat and high aquifer recharge are in public ownership, and, as a result, almost 60,000 acres of habitat in the Wekiva to Ocala Greenway are protected in perpetuity. Additional state-owned conservation lands adjacent to the Greenway total more than 15,000 acres. Despite these protections, there are threats to natural and cultural resources from changes in water quality and quantity, encroachment by incompatible land uses, and potential impacts from heavy recreational use.

This Chapter describes the condition of the river system by highlighting its assets and identifying threats and impacts. Goals and Actions to alleviate the threats and impacts are referenced in **Chapter 8.0**

Scenic

Scenic values encompass the landscape within view of the river and existing recreation sites and facilities that are directly related to the river. Much of the river system provides an outstanding opportunity to see an unspoiled part of natural Florida. Other than the high use recreational areas around Wekiwa Springs Run and Rock Springs Run, the scenic resources are exceptional. The Wekiva River System serves as a national, statewide, and regional attraction for nature observation and education, nature photography, and scenery appreciation (NPS 1999).

Assets

- More than half of the River System flows through public conservation lands characterized by native aquatic and wetland vegetation.
- Clear waters flow from Wekiwa and Rock Springs down their spring runs.
- The river's Wild and Scenic segments provide predominantly unobstructed views of natural communities along the river.
- Additional potential disturbances to the scenic quality are protected by local and state regulations.

Threats and Impacts

Visual:

- Alteration of shoreline vegetation has occurred near residential dwellings.
- Physical structures, including boat launch facilities, docks, and decks interrupt the natural view of river system, particularly within Recreational segments.
- Even though the legacy trash has been removed, copious amounts of litter still enter the river system from roadway stormwater runoff and recreational users who don't secure their trash.

Wekiva Springs Run

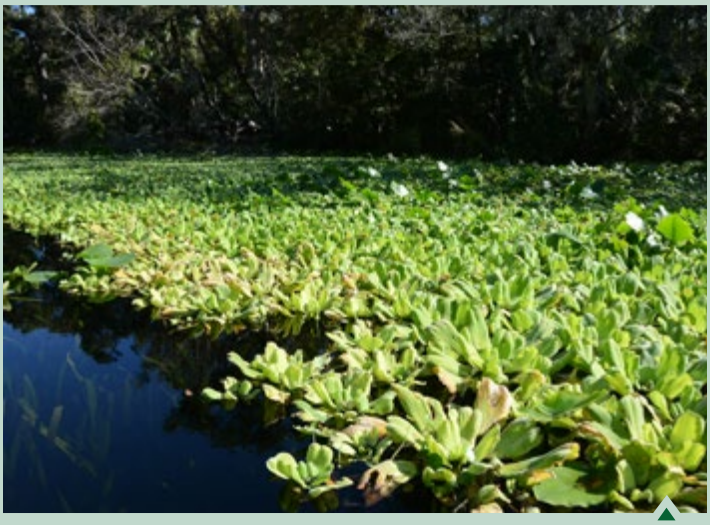
Trash left behind near Indian Mound Campsite

- Bank erosion and damage to vegetation occur at canoe launches and take-out sites.
- Invasive plants such as water hyacinth and wild taro spoil the views of native wetland plants along the waterway's edge.
- Excessive algae growth, and the loss of native submerged aquatic plants, effects the experience of river users, particularly in Wekiwa Springs Run.
- Herbicides applied to control exotic plants and to maintain navigability occasionally result in an unsightly dead zone of vegetation.

Visual and Auditory:

- Motorized boats and jet skis on the Wekiva River can be a conflict with the experience of canoeists and kayakers.
- Although the Wekiva Parkway bridge over the Wekiva River was painted with colors that camouflage the bridge to river users and has been elevated to reduce noise and visual distractions, it is incompatible with scenic values of the river system.
- Similarly, roadway bridges at SR 44, CR 44A, and Lake Norris Road obstruct natural views of the river surroundings.
- Crowds around recreation hubs can prevent quiet, clear views of natural resources along the river and spring runs.

Motorized boat on the Wekiva River System



Water Lettuce Impeding Navigation on Rock Springs Run

Conservation at the landscape scale allows restoration and management of extensive areas of longleaf pine sandhill habitat

Recreation

The Wekiva River, Wekiwa Springs Run, Rock Springs Run, and Black Water Creek are major nature-based recreational resources for central Florida. Recreation activities include canoeing/kayaking, fishing, motorized boat and personal watercraft use, picnicking, camping, tubing, swimming, snorkeling, wildlife watching, hiking, horseback riding, and hunting. The Wekiva River/Rock Springs Run Canoe Trail is designated as part of Florida's statewide system of greenways and trails, and portions of the Florida National Scenic Trail run through Wekiwa Springs State Park System and Seminole State Forest.

The diverse and extensive recreational resources across the Wekiva River System are fully described in Chapter 4.0 above. Concentrated activities within recreation hubs, and particularly around Wekiwa and Rock Springs Runs, draw hundreds of thousands of visitors each year.

Assets

- 12 recreation hubs throughout the River System provide access to the river and recreation opportunities including:
  - Canoeing/kayaking/paddle boarding/tubing
  - Motorized boating
  - Swimming, snorkeling, and diving
  - Hiking, biking, and horseback riding
  - Picnicking and camping
  - Fishing, hunting, and wildlife watching.
- The User Capacity Study (Exum 2020) found that most people surveyed were Very Satisfied with their experience on the river (69.1%), and only 13% of respondents said they felt crowded during their experience.
- A paddling guide is available for the River System with information on distances between access points; services available at each trailhead; GPS coordinates for river segments; locations of springs; and the names of river segments, campgrounds, springs, and access points.

Threats and Impacts

Impacts from recreational use:

- Erosion, which occurs at almost every area of high recreation use, causes sedimentation into the waterway.
- Noise disturbance impacts the recreation experience for some users and is known to negatively affect wildlife (Shannon et al. 2016).

Off-road cyclists at Wekiwa Springs State Park

Kayak Rental at Wekiwa Springs State Park

Kiosk with Paddle Guide of the Wekiva River System and Wildlife information at Wilsons Landing

- Vegetation alteration reduces habitat value, promotes the growth of exotic plants, and can lead to sedimentation.
- Vandalism and erosion of middens remains a threat due to lack of knowledge and enforcement.

Threats to the recreational experience:

- Limited rest stops, restroom facilities, picnicking and camp sites outside of the recreation hubs may prevent some users from experiencing the river.
- Increasing demand may diminish the user experience.
- Navigational impediments, particularly after major storms, frequently cause disruptions to paddling some sections of the river and may be costly to remedy.
- The lack of emergency access could complicate injuries from accidents or health emergencies on the river.
- Invasive plants such as water hyacinth and native plants such as water-lettuce can cause navigational impediments.

Recreationists at Wekiwa Springs State Park

Wildlife and Habitat

The 2012 CRMP included two general aspects of the Wildlife and Habitat ORV in the Wekiva River System. One of these aspects relates to aquatic and wetland habitats associated with the springs, runs, creeks, and the Wekiva River. The second component was the wildlife corridor encompassed by the Wekiva to Ocala Greenway, particularly related to its value to the Florida black bear. Each of these components of the Wildlife and Habitat ORV is referenced separately below.

Wetland and Aquatic Habitat

Background

Much of the wetland and aquatic habitat associated with the Wekiva River System is in good condition and protected in perpetuity by public ownership, conservation easement, or extensive regulations. However, there are threats to the quality of habitat related to shifts in historical wetland and aquatic vegetation and the concomitant effects on aquatic and wetland-dependent wildlife. These threats include:

- the potential collapse of the aquatic macrophyte community, particularly eelgrass (*Vallisneria americana*), from numerous causes, including shading by epiphytic algae
- shifts from macrophytes to algal mats and filamentous cyanobacteria
- comments from those with extensive experience on the river, including from members of the public during workshops and the pin drop exercise, reflect a buildup of organic material over historically sandy bottoms of spring runs, and the Wekiva River
- the proliferation of exotic plants and animals.

A summary of recent research and monitoring of the factors threatening the aquatic community is relevant and provided below.

Studies documenting the loss of aquatic macrophyte vegetation (particularly eelgrass) in Florida rivers and springs have caused concern about the potential for drastic ecological changes to aquatic habitat in the Wekiva River System (Holder 2022, Camp et al. 2014, Frazer et al. 2006). Submerged macrophytes are critical components of many aquatic systems, because they stabilize sediments and reduce turbidity, assimilate and store nutrients, sequester carbon, and provide refuge and foraging habitat for higher-level organisms (Guan 2020b). Although submerged aquatic vegetation has largely disappeared from Wekiwa Springs Run (SJRWMD unpublished data), Mattson et al. (2019) found

a persistence of healthy beds of eelgrass in the Wekiva River and Rock Springs Run.

An increase in the prevalence of algal mats and filamentous cyanobacterium has been documented in aquatic ecosystems worldwide, including Florida spring-run streams (Hudon et al. 2014). In many cases, this was associated with declines in abundance of submerged macrophytes. But other factors may be the cause of the decline of the aquatic macrophytes, including changes in light conditions, invasive herbivores, turtles, pathogens, and water quality issues (Holder 2022).

Epiphytic algae and macroalgae were sampled in 2015 for 14 spring-run streams including Wekiwa and Rock Springs Run and the Wekiva River (Mattson et al. 2021). Comparison of the data with historical data on algae from Florida spring-run streams indicated that the assemblage of species was similar to that existing approximately 70 years ago. Many of the filamentous algal taxa that can form extensive mats were present in Florida springs in the 1950s. Mattson et al. (2019) concluded that while mats of filamentous macroalgae have always been present in Florida springs and spring-run streams, they did not appear to be as extensive historically compared to what has been observed more recently.

With respect to the epiphytic load of periphyton on aquatic macrophytes, Guan (2020a) found that even relatively low loads reduced available light to levels below reported light requirements for a variety of species, including eelgrass. Currently, expansive beds of eelgrass persist in Rock Springs Run, Black Water Creek, and the Wekiva River even though, in many areas, they carry a heavy epiphytic periphyton load.

Mattson (2009) conducted a review of the literature and data from his prior research relating to benthic macroinvertebrate abundance and species richness to macroalgal proliferation in Florida springs. He concluded that the habitat provided by macroalgal mats may only be preferred by a few invertebrate groups. Camp et al. (2014) found that replacement of rooted macrophytes with filamentous macroalgae affected various trophic levels, from macroinvertebrates to small fish and the higher trophic levels that depend on them. Finally, Frazer and Mattson (2017) found that nuisance algae do not contribute substantially to the diet of key consumers, and consequently, it is likely that much of this production is exported to the surrounding terrestrial environment.

Parsley et al. (2020) studied trends in fisheries in spring runs of the St. Johns basin, including Rock Springs Run and the Wekiva River. Sampling in Rock Springs Run revealed a healthy mix of aquatic habitats and fish populations, and that it is one of the primary spring ecosystems for the imperiled bluenose shiner in the St. Johns basin. The fish population in the Wekiva River was among the most diverse and robust of all the systems sampled, in part because of its diversity of habitats. Although exotic fish species did not represent a significant portion of the species or biomass collected (likely due to the relative ineffectiveness of the sampling gear for these species), five species were present in the Wekiva River System. These included armored catfish (brown hoplo), blue tilapia, vermiculated sailfin catfish (aka plecos), walking catfish, and chanchitas. While these species do not appear to currently be a dominant component of the fishery in the Wekiva River System, they may congregate in the springs (sailfin catfish) or the spring runs (blue tilapia) seasonally.

In the spring of 2022, SJRWMD and FWC biologists worked with a private contractor to use a haul seine to assess the biomass of blue tilapia in Lake Winder, a basin more than 75 river-miles southeast of the confluence of the Wekiva and St. Johns rivers (unpublished data from the FWC: Lake Winder Experimental Tilapia Harvest study). Although this study is not immediately comparable to the fish population in the Wekiva River, exotic species totaled almost 83% of the biomass captured by the haul seine. Blue tilapia represented 58%, and vermiculated sailfin catfish represented 22% of the harvest. Again, these data are not transferable to the Wekiva River system, but they show the potential impact of exotic species on the ecology of the St. Johns River ecosystem, and further demonstrate the need to monitor the fish population and potential impacts to the aquatic habitat within the Wekiva River System.

- The FWC implements exotic plant control over most of the Wekiva River System. The 2022 Annual Work Plan projected the need to control 5 acres of hydrilla (*Hydrilla verticillata*) and 200 acres of floating exotic plants, particularly including common water-hyacinth. Other plants targeted for control included wild taro, green hygro, Peruvian primrosewillow, torpedograss (*Panicum repens*), elephantgrass, cattail (*Typha sp.*), and paragrass (*Urochloa mutica*). The native water-lettuce was also treated due to its impacts to navigability. An explanation of the need to target many of these exotic species, the herbicide specified for treatment, and a budget to treat the projected acreage of exotic species is provided in the work plan. Based on conversations with FWC invasive plant management biologists, the annual work plan has recently been implemented as prescribed.

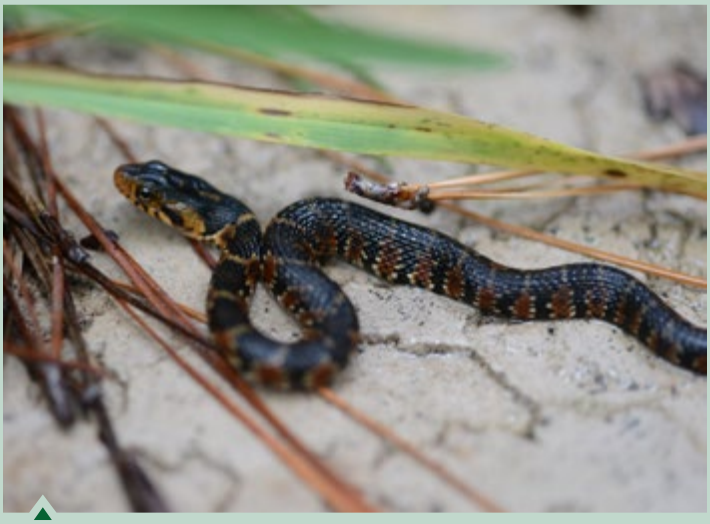
To summarize these studies, aquatic habitat in the Wekiva River System has been altered, and it is likely that algal mats and filamentous cyanobacteria have increased in comparison with historical abundance. Despite the collapse of eelgrass beds in the St. John's River and many of the spring runs that flow into it, healthy eelgrass beds persist in the Wekiva River, Black Water Creek, and Rock Springs Run. The epiphytic periphyton that persist on these plants may affect their productivity, but there is no indication of a systemwide collapse. A diverse assemblage of native fish is present in the Wekiva River System, in large part because of the quality and diversity of aquatic habitats. Though exotic fish do not currently appear to constitute a significant portion of the fish biomass, they may congregate in places where they are highly visible and be influenced by changes in aquatic habitat.

Assets

- Much of the aquatic and wetland habitat is in good condition and protected in perpetuity.
- A diverse assemblage of native fish exists in valuable aquatic habitat across the river system.
- Expansive beds of eelgrass occur in the Wekiva River, Rock Springs Run, and Black Water Creek.
- Extensive regulatory oversight is in place to sustain or improve conditions of wetland and aquatic habitat.
- Several listed species, including bluenose shiner, little blue heron, tri-colored heron, and to a lesser degree West Indian manatee, are relatively common in the Wekiva River System.

Threats and Impacts

- The native, aquatic macrophyte community, particularly eelgrass, has disappeared in other spring runs and the St. Johns River without a complete understanding of the causative factors that may also come to bear in the Wekiva River System.
- There is an increasing prevalence of algal mats and filamentous cyanobacteria, particularly in Wekiwa Springs Run.
- Though evidence is mostly anecdotal, organic material over sandy bottoms of spring runs, and the Wekiva River appears to have increased from historical levels.
- Invasive species of plants and animals are pervasive in the river system.



Florida Banded Water Snake in the Wekiva Basin

Dense Algae on Eelgrass

Protection of biological diversity includes consideration of plants and their pollinators

The Wekiva to Ocala Greenway

The wildlife corridor encompassed by natural lands between Wekiwa Springs State Park and the Ocala National Forest is an important ecological linkage for the Florida black bear, and its conservation would protect a diverse array of native species of plants and animals. Protection of this wildlife corridor, known as the Wekiva to Ocala Greenway, was a priority identified in the 2012 CRMP. The Wekiva to Ocala Greenway was designated as the #4 priority on the Critical Natural Land Projects list, as determined by the Acquisition and Restoration Council in December 2022. The Greenway was identified as a priority acquisition in 1995, and though approximately 75% of the corridor has been protected by acquisition or easement, there are still more than 20,000 acres of land to be acquired (**Figure 11**).

Assets

- Over 59,000 acres (almost 75%) of the Wekiva to Ocala Greenway is in permanent conservation.
- The Central Florida black bear population, which includes the Greenway, is estimated at 1,200 individuals - the largest in the state.
- The nearly complete Wekiva Parkway includes more than a mile of wildlife underpasses to allow movement of wildlife through the corridor.

Threats and Impacts

- In the last 5 years, there has been little progress toward purchasing the remaining 22,000+ acres in the Greenway.
- The expansion of development in Lake County and the city of Eustis adjacent to the northwestern portions of the Greenway threatens the viability of the corridor.

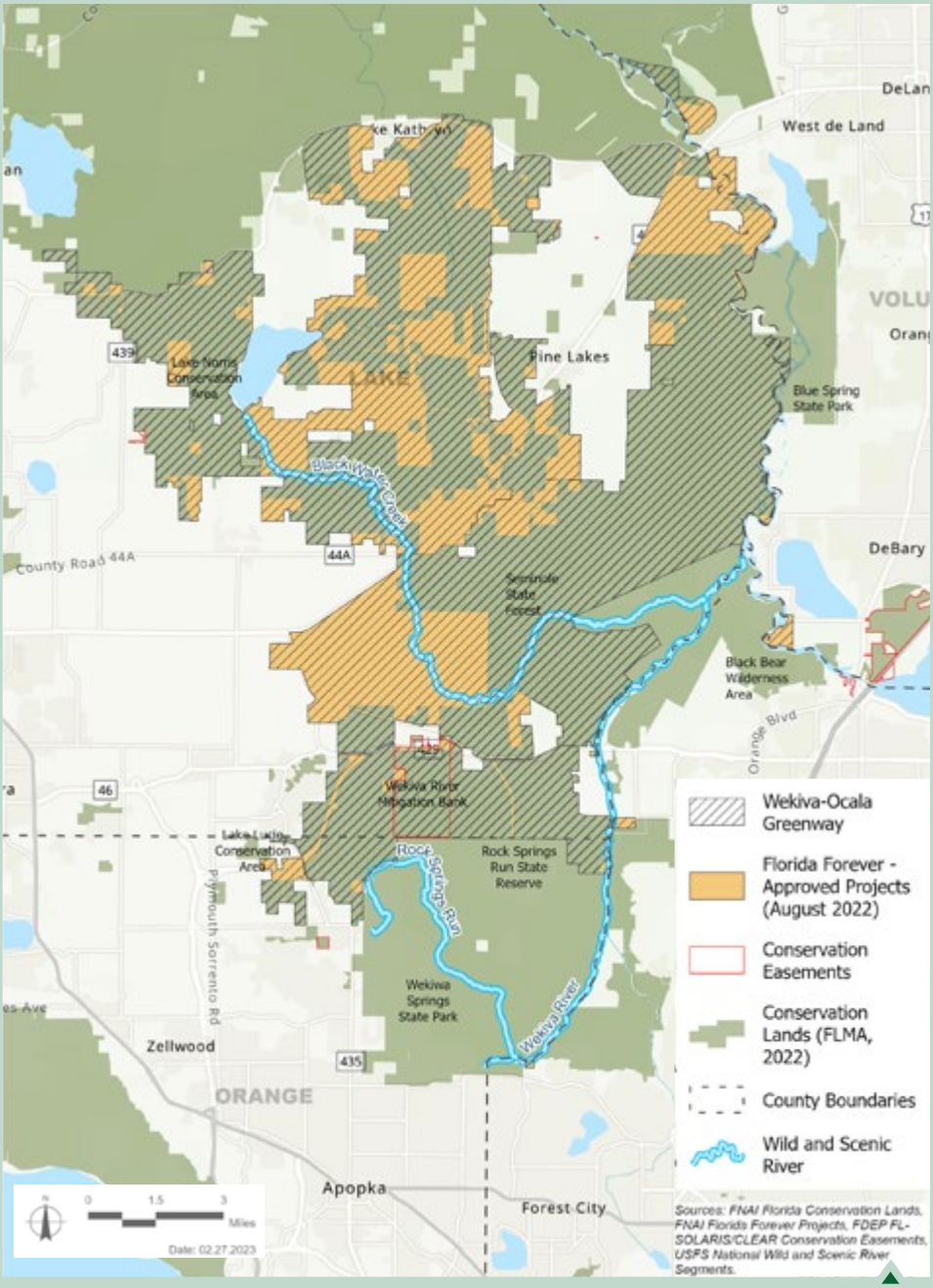


Figure 11. *Existing conservation lands and areas proposed for future acquisition in the Wekiva to Ocala Greenway*

Historic and Cultural

For millennia, the Wekiva basin has provided abundant natural resources for human occupation. Numerous previously documented historic and cultural resources have been catalogued in the Florida Master Site File maintained by the Florida Division of Historical Resources. Investigations on Seminole State Forest found two recorded historical structures and 20 archaeological sites (FDACS 2011). The Wekiva River Basin State Parks Unit Management Plan (FDEP 2017) provides the following summary of the archaeological record within the areas covered by the plan:

There are 78 archaeological sites recorded in the Florida Master Site File for the Wekiva River Basin State Parks. The sites consist of one prehistoric village site, four Indian mounds, seven lithic scatter sites, 30 shell middens identified from the early Archaic, Orange, St. John's I, St. John's II, and modern periods, and 25 recently identified cultural sites dating from the early 19th century through the 1960s. Twin Mounds Archaeological District is the National Register combination of two adjacent shell middens.

Only small portions of land in the Wekiva basin have been adequately surveyed for historic and cultural resources. Large gaps exist in the archaeological and historic record pertaining to the Native Americans who inhabited the area prior to European contact (Weisman 1993). Therefore, it is likely that other unrecorded historic and cultural sites are present.

Assets

- There is a history of investigations and a substantial literature base related to historic and cultural resources in the Wekiva River basin.
- Most of the area with highest potential for historic resources is in public ownership or protected by existing regulations.

Threats and Impacts

- Given the likely importance of the Wekiva River basin to native Americans, there is a void of data on the extent of historic and cultural resources.
- The public is unaware of the important historic resources in the Wekiva basin and may not take precautions to protect them.
- Vandalism, soil compaction, and bank erosion occurs in varying degrees on Shell Island and other shell middens along the Wekiva River.
- There is no local agency or institution with comprehensive oversight of the historic and cultural resources within the river system.

Wekiwa Springs State Park longleaf pine sandhills

Cinnamon fern in wet flatwoods of along Rock Sprigns Run

Relict Bridge over Black Water Creek

- Secluded sites with historic resources can be accessed with little or no knowledge of land managers or law enforcement, and thus are difficult to protect.

Water Quality and Quantity

The character of the water in the Wekiva River System ranges from the crystal-clear flows from the artesian springs and spring runs to the tannin-colored waters of the black water creeks. Water quality, which is affected by water quantity coming from springs and runoff from adjacent lands, is an outstandingly remarkable resource. It is an integral factor in the popularity of the springs and rivers as recreational resources and the health and integrity of the rivers' ecosystems (NPS 1999).

Water Quality

Background

A distinctive characteristic of the Wekiva River is that spring flow is a significant component of the total flow of the river. Therefore, the water quality of the freshwater springs that contribute to the Wekiva, particularly Wekiwa and Rock Springs, is important to the river's overall water quality. Wekiwa and Rock Springs are two of the 24 Outstanding Florida Springs identified by FDEP as impaired. They are identified as impaired because of a biological imbalance caused by excessive concentrations of nitrate (FDEP 2018). In 2008, Total Maximum Daily Loads (TMDL) for nitrate and phosphorus were developed as water quality restoration targets for Wekiwa Spring and Rock Springs. The TMDL established a monthly average nitrate target of 0.286 milligrams per liter (mg/L) of nitrate and 0.065 mg/L of total phosphorus (TP). As of June 2022, nitrate and phosphorus concentrations at both Wekiwa and Rock Springs were substantially above the established TMDL targets (**Figures 12–15**). Interestingly, water quality data sampled from the Wekiva River at SR 46 shows declining concentrations of nitrate below 1 mg/L, and consistent concentrations at or below 0.286 mg/L. These diminishing concentrations indicate an uptake of nitrogen by plants and/or denitrification as water from springs flows downstream in the Wekiva River.

Hydrologic Monitoring Station on the Wekiva River

Collecting Water Quality Samples from The Spring Vent in Wekiwa Springs

Bridge over Spring Run in Wekiva Falls RV Resort

Figure 12. *Nitrate concentrations in Rock Springs 2003–2022. (SJRWMD data provided by Rob Mattson.)*

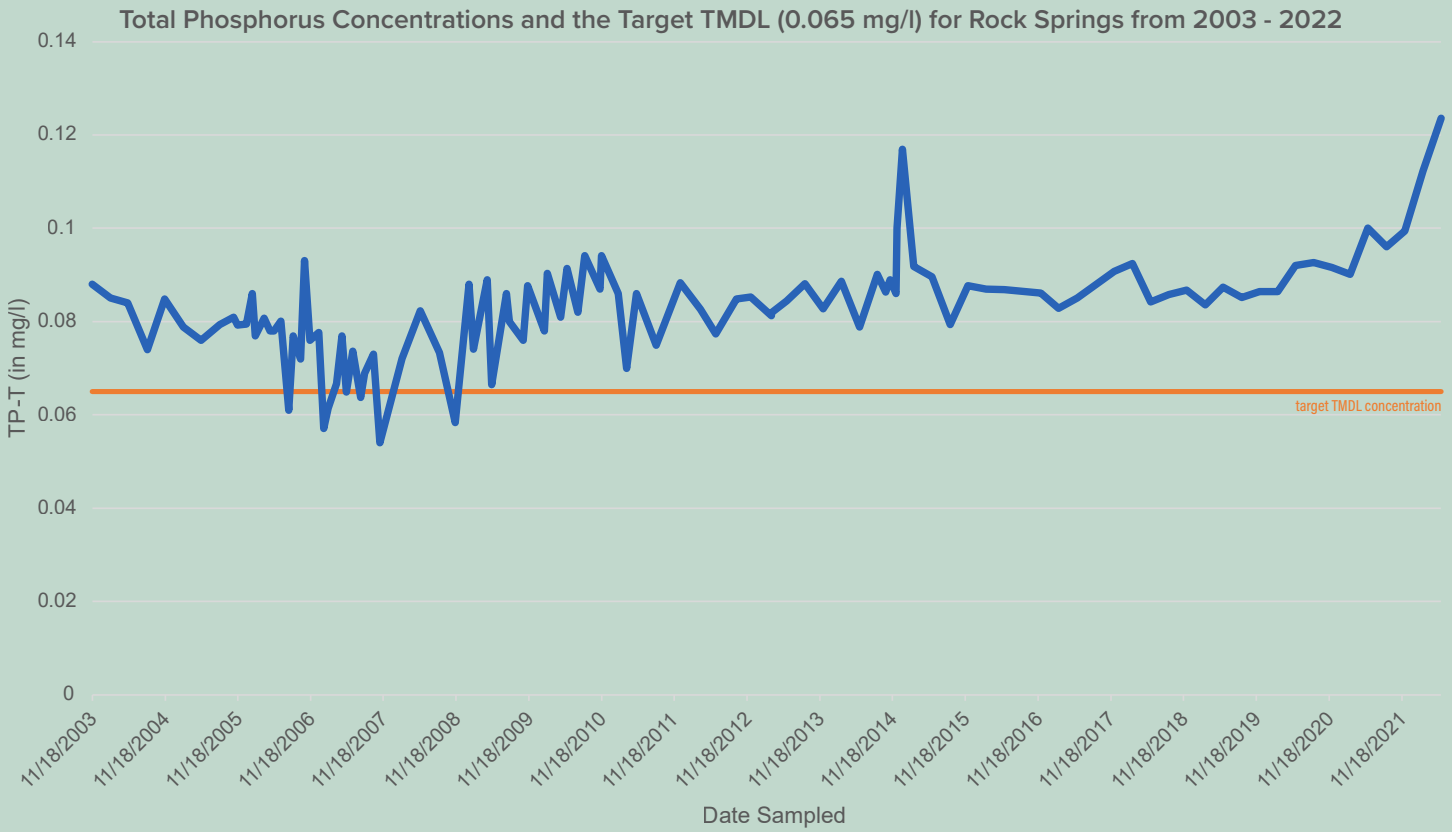


Figure 13. *Phosphorus concentrations in Rock Springs 2003–2022. (SJRWMD data provided by Rob Mattson.)*

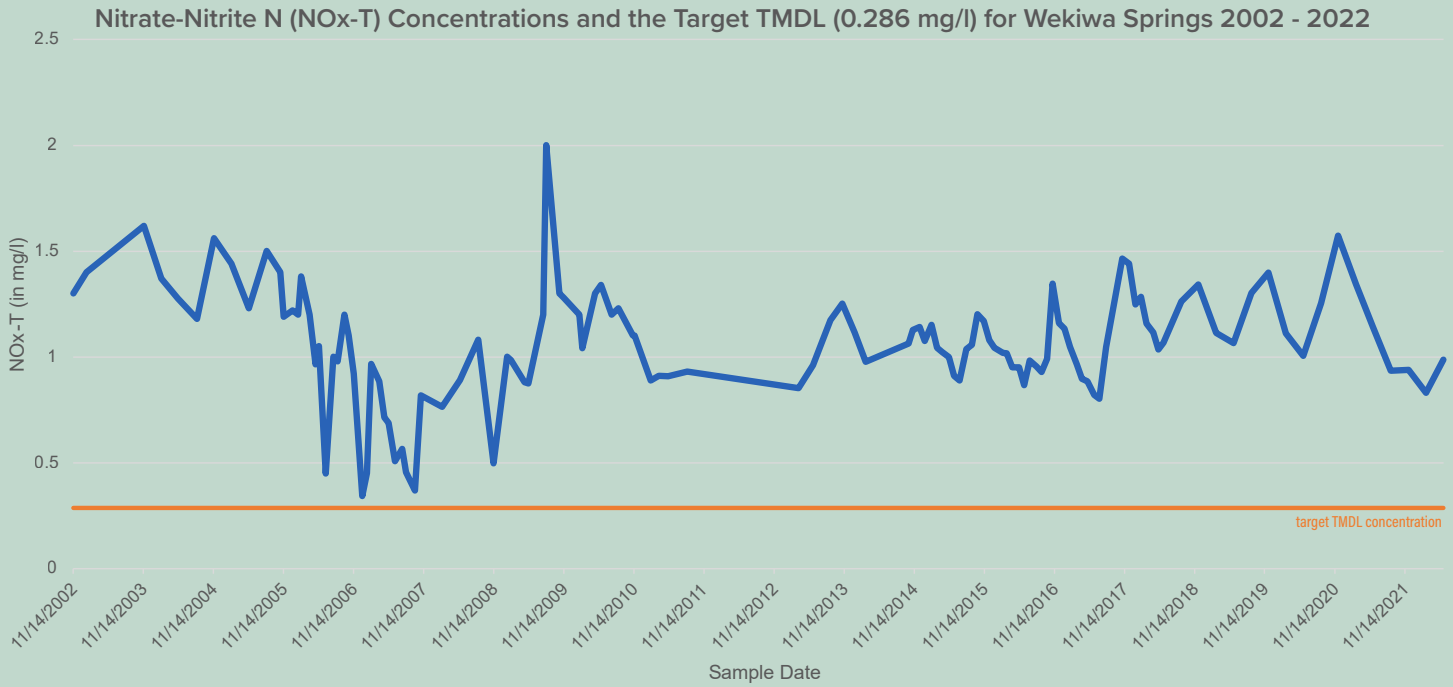


Figure 14. *Nitrate concentrations in Wekiwa Springs 2002–2022. (SJRWMD data provided by Rob Mattson.)*

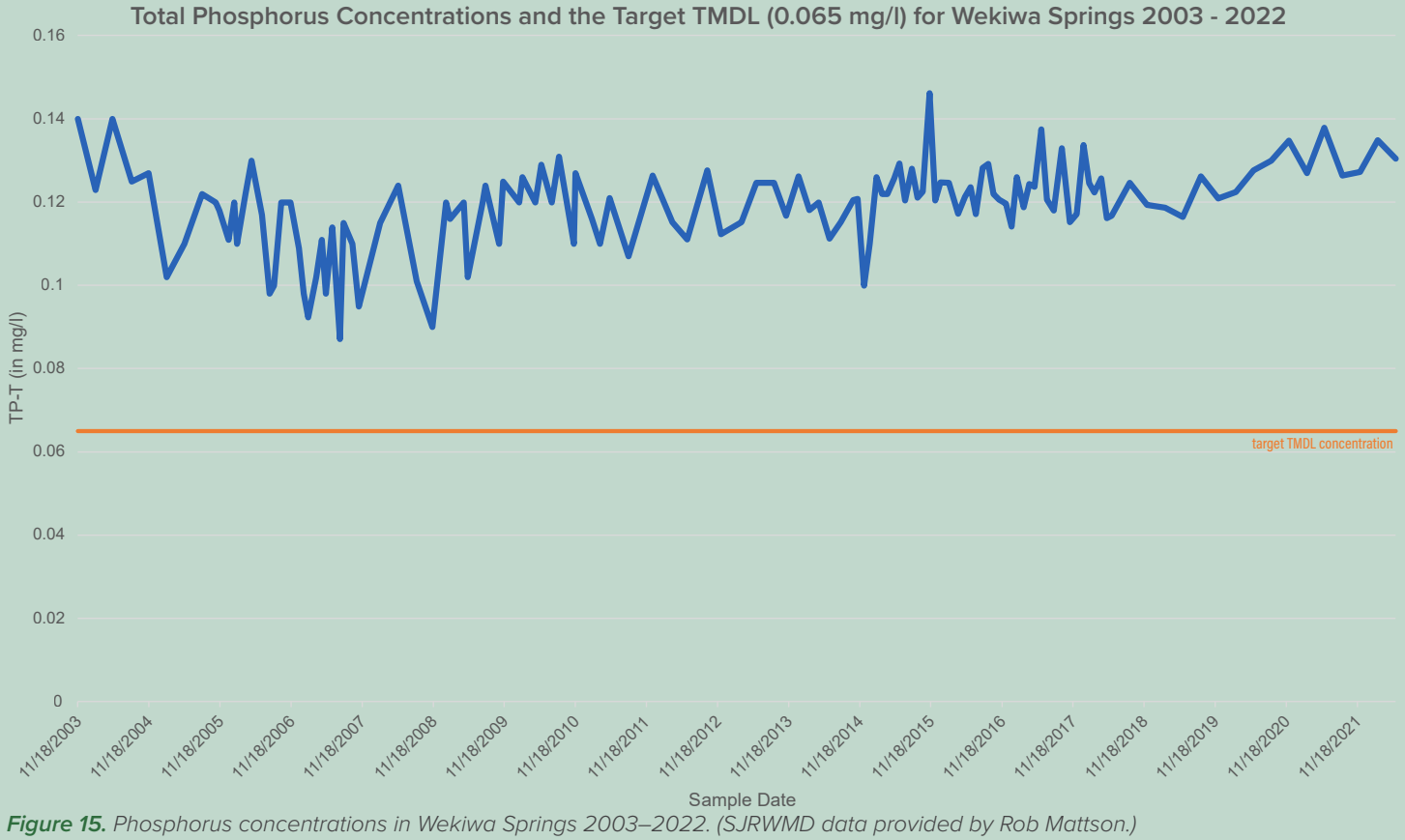


Figure 15. *Phosphorus concentrations in Wekiwa Springs 2003–2022. (SJRWMD data provided by Rob Mattson.)*

The Florida Springs and Aquifer Protection Act provides for the protection and restoration of Outstanding Florida Springs, which include 24 first-magnitude springs, six additional named springs, and their associated spring runs. Wekiwa and Rock Springs are two of the impaired second-magnitude Outstanding Florida Springs. Development of a comprehensive set of strategies to achieve required pollutant load reductions are required by the Florida Springs and Aquifer Protection Act. This is accomplished through the development of Basin Management Action Plans (BMAPs). Two BMAPs have been completed for the Wekiwa basin. The first BMAP covered the Wekiwa River, Rock Springs Run, and the Little Wekiva Canal (FDEP 2015), and the second included Wekiwa and Rock Springs (FDEP 2018). Administrative appeals of the Wekiwa and Rock Springs BMAP prolonged its execution until a final Administrative Judge's order in 2021.

Using the Nitrogen Source Inventory Loading Tool during the Wekiwa and Rock Springs BMAP preparation, FDEP concluded that Onsite Sewage Treatment and Disposal Systems (OSTDS) or septic systems represent 29% of the estimated nitrogen loading to groundwater within the springshed. Urban turfgrass fertilizer use represented 26%, and wastewater treatment facilities 16% of the total loading to groundwater.

The BMAP identified Priority Focus Areas (PFA) (Figure 16) where the aquifer is most vulnerable to potential contaminants in surface waters that have percolated through sandy soils in areas of high recharge, and where there are the most connections between groundwater and the springs. For context, OSTDS are also shown in

Figure 16. Certain activities are prohibited in the PFA, including most new domestic wastewater disposal facilities, new conventional septic systems on lots less than an acre, and new agricultural operations that do not implement best management practices.

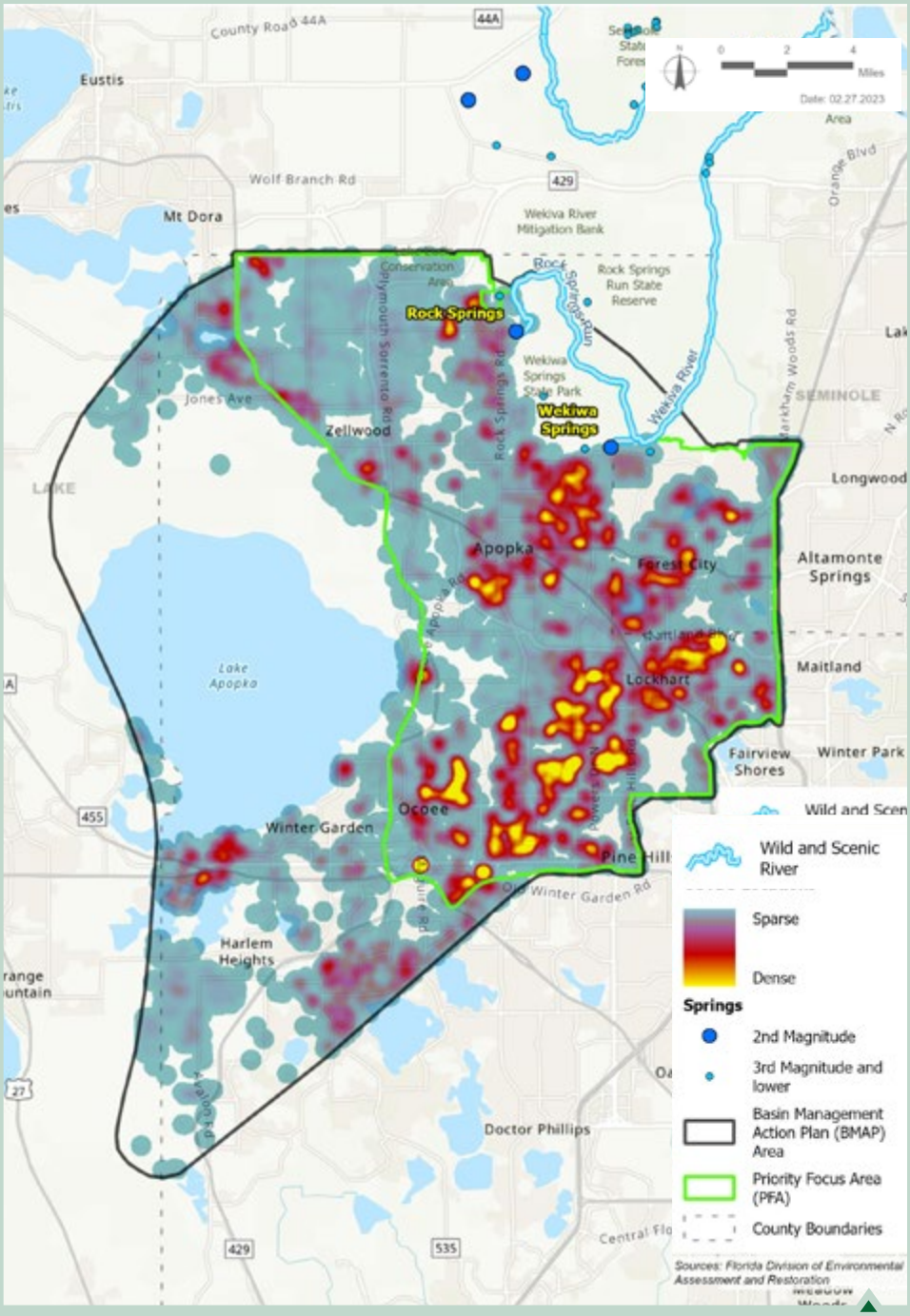


Figure 16. *Priority Focus Area and On-site Treatment and Disposal Systems identified in the Wekiwa and Rock Springs BMAP*

FDEP and local governments affected by the two BMAPs in the Wekiva basin have developed a comprehensive list of projects to achieve the load reductions anticipated in the BMAP (FDEP 2022). The status of those projects as of June 2022 is included as Appendices D and E. Projects are designed for nitrogen removal but are expected to achieve phosphorus reductions as well. Whether or not these projects achieve the desired results in the timeframes included in the Wekiwa and Rock Springs BMAP will require monitoring as more projects are implemented. Actions in the Wekiwa and Rock Springs BMAP are intended to achieve 80% of the load reductions at the spring vent within 10 years of adoption and 100% within 15 years.

In 2012 and 2013, the Center for Earth Jurisprudence provided detailed comments (Appendix C in Florida Springs Institute (2016)) during the preparation of the Wekiva River, Rock Springs Run, and Little Wekiva Canal BMAP. In their correspondence, they stated that FDEP substantially underestimated the amount of nitrates reaching the groundwater of the Wekiva springshed. Because of this underestimate, they contended that proposed nitrate load reductions in the BMAP represent less than 1% of the total load entering the system. Further, they stated that this reduction in nitrate influx wouldn't reduce nitrate concentrations in the springs that feed the river to achieve the targeted water quality goals in the BMAP. The FDEP and SJRWMD rebutted these assertions, and the nitrate loading estimates were not revised in the final BMAP (FDEP 2015).

In their publication Wekiva River and Springs Restoration Plan, prepared by the Florida Springs Institute (2016), they stated that FDEP did not fully consider their conclusions that treated wastewater disposal through Rapid Infiltration Basins in the Wekiva basin had an undesirably high load of nitrate-nitrogen. The Institute study also raised concerns about the use of reclaimed wastewater, particularly in the PFA, due to the potential for groundwater contamination from elevated nitrogen concentrations.

In 2017 and 2018 correspondence, the Friends of the Wekiva River (FOWR) provided comments on the draft Wekiwa and Rock Springs BMAP to Moira Homann, Basin Coordinator for FDEP's Division of Environmental Assessment and Restoration. In these letters, FOWR stated that the proposed remediation plan would not be sufficient to meet the TMDL for nitrogen in the springs within 20 years as mandated by the state. FDEP did not agree with the conclusions that the projected nitrogen reductions were inadequate, and the Wekiwa and Rock Springs BMAP was finalized in 2018.

Saltwater Intrusion

Mattson (2022) provided the data for **Figure 17** below, which shows increasing trends in conductivity in Wekiwa and Rock Springs from 1956 to 2022. These data reflect an increase in saline (saltwater) indicators consistent with what Copeland et al. documented in 2011. They concluded that increased saline indicators likely came from upconing of groundwater within the Floridan aquifer system due to drought, or lateral intrusion of saltwater from increased groundwater pumping. Increasing salinity can negatively affect freshwater ecology, but more importantly, these trends in Wekiwa and Rock Springs are likely indicators of a shrinking freshwater lens, and the consistent timeframe of the increase implicates a correlation with groundwater pumping. The effects of drought or the dynamic weather patterns associated with climate change may only exacerbate problems related to a depleted freshwater lens in the Florida aquifer system.

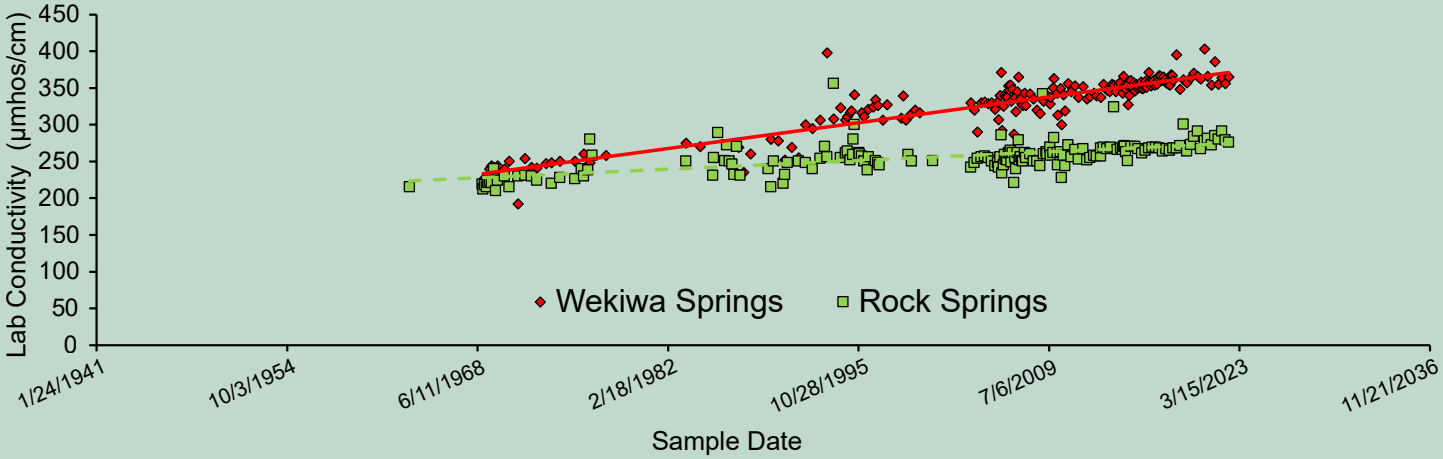


Figure 17. *Trends in conductivity in Wekiwa and Rock Springs 1956–2022. (SJRWMD data provided by Rob Mattson.)*

Rock Springs Run

Assets

- Nitrate loads do not appear to be increasing in springs, runs, and surface waters.
- Nitrate concentrations diminish downstream in the Wekiva River.

Threats and Impacts

- Degraded water quality from fertilizers and septic systems is an ongoing threat to the health of springs in the river system.
- There has been limited progress in improving existing septic systems or expanding municipal sewer in the PFAs.
- Saltwater intrusion is increasing due to a diminishing freshwater aquifer.
- Despite the prevalence of a multifaceted system of regulations and projects to reduce nutrients, nitrate loads remain four to five times above targets, and total phosphorus loads remain substantially above the established TMDL in Wekiwa and Rock Springs.

Water Quantity and River Flow

In 1992 the SJRWMD adopted Minimum Flows and Levels (MFLs) for the Wekiva River at SR 46, Black Water Creek at SR 44, and eight springs along the Wekiva and its tributaries (Messant, Miami, Palm, Rock, Sanlando, Seminole, Starbuck, and Wekiwa). These MFLs were intended to protect the water resources and ecology of the river system from significant harm caused by water withdrawals. Currently, the SJRWMD is working on an update to the 1992 MFLs and will provide a new assessment of targeted flows and the criteria used to assess the aquatic resources that depend upon a dynamic, but dependable flow.

The Florida Springs Institute (2016) and Intera (2007) concluded that discharge rates for both Rock and Wekiwa Springs has decreased from historical levels. The Florida Springs Institute (2016) cited additional evaluations that indicated flow declines at Starbuck and Palm Springs and concluded that the springs in the Wekiva River System were impaired by reduced average flows beyond the point of significant harm. One of the conclusions of the recent Central Florida Regional Water Supply Planning process was that the primary areas that appear to be more susceptible to the effects of groundwater withdrawals were the Wekiva Springs/River System (Central Florida Water Initiative 2020). The study also concluded that fresh groundwater resources could not meet future water demands or even currently permitted allocations without unacceptable impacts to water resources and natural systems.

Based on recent data from the SJRWMD, flow rates at Wekiwa and Rock Springs have been above targeted levels for the last 4 years, but this trend is inconsistent with flow rates from the prior 10 years (**Figures 18 and 19**) (see http://webapub.sjrwmd.com/agws10/hdsnew/map.html). Unfortunately, flow rates for Palm Springs fell below the targeted rate approximately 10 years ago and have not been above the MFL since (**Figure 20**). Since up to 90% of the flow of the Wekiva River can be attributed to spring flows during low water levels, reduced flow in springs will result in reduced flow in the river (Seong and Wester 2019). Concerns over the long-term flow rates for the Wekiva River and all three of these springs, plus others covered by the 1992 MFL, warrant a substantive review of the SJRWMD's upcoming report on new MFLs, along with an evaluation of the likely consequences to the aquatic resources of the Wekiva River System.

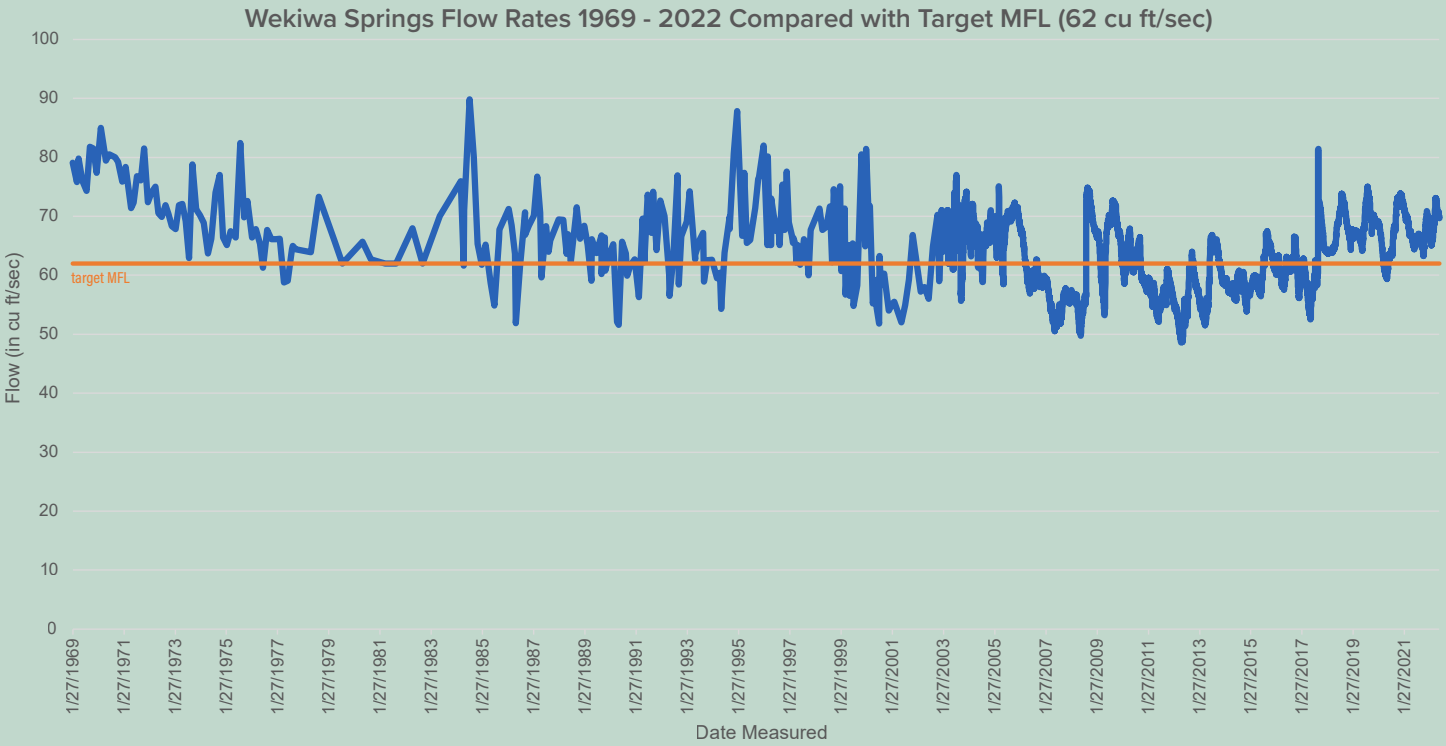


Figure 18. *Trends in flow rates at Wekiwa Springs 1969–2022. (SJRWMD discharge data http://webapub.sjrwmd.com/agws10/hdsnew/map.html.)*

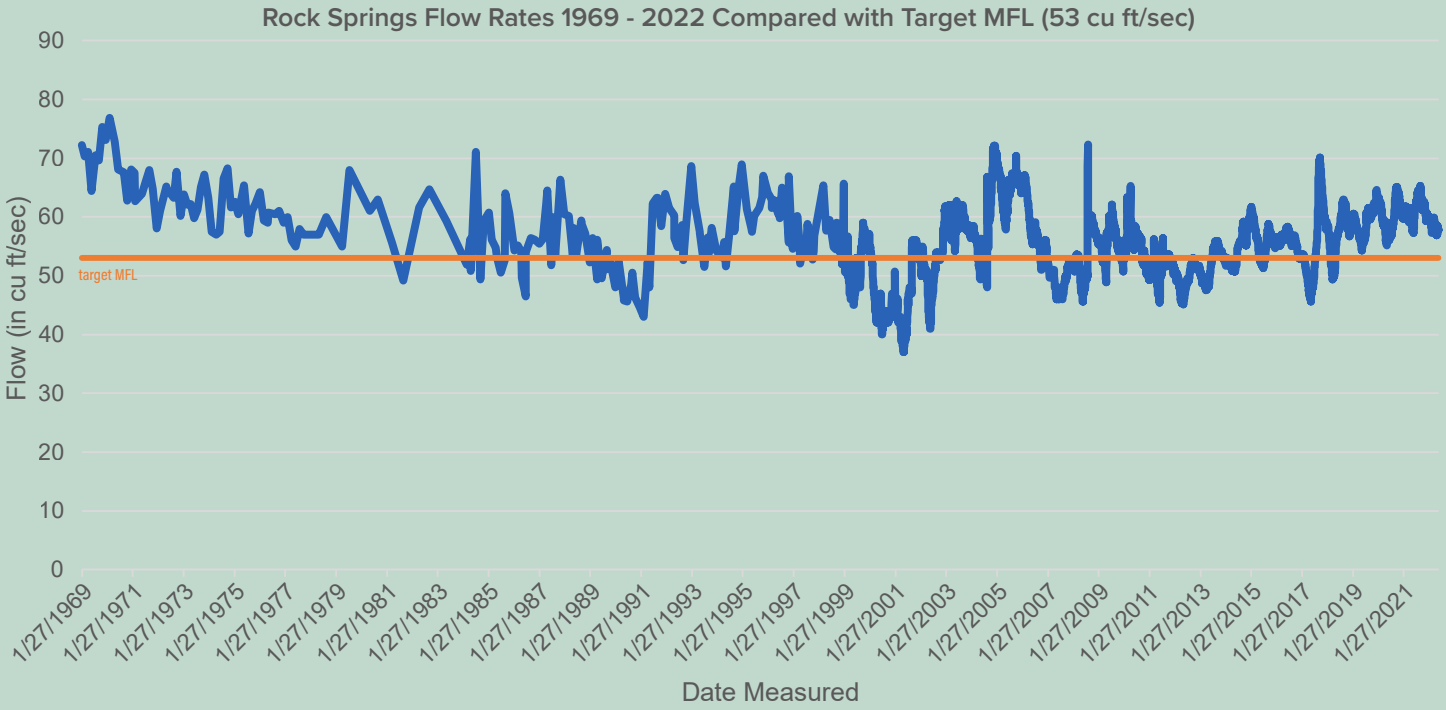


Figure 19 . *Trends in flow rates at Rock Springs 1969–2022. (SJRWMD discharge data http://webapub.sjrwmd.com/agws10/hdsnew/map.html)*

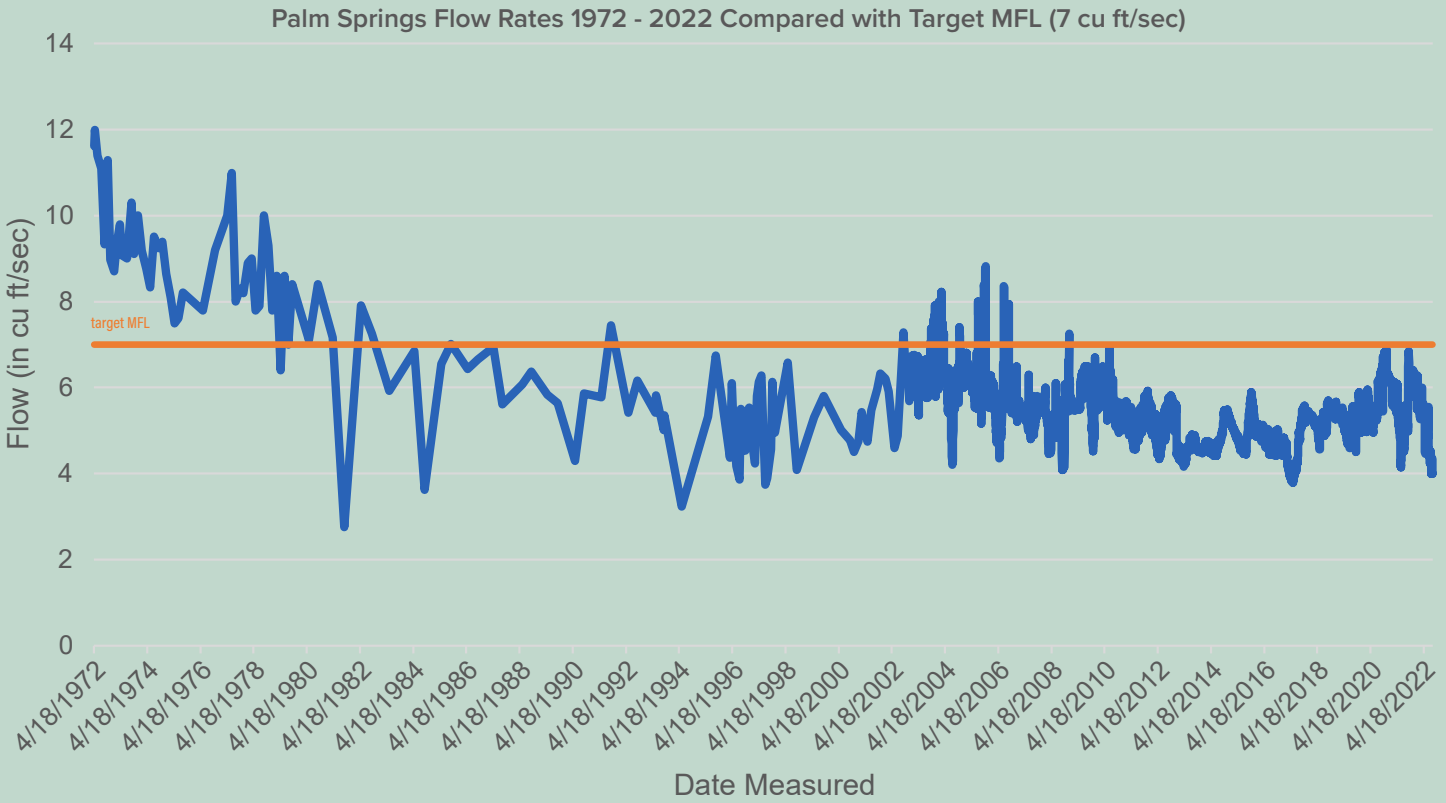


Figure 20. *Trends in flow rates at Palm Springs 1972–2022. (SJRWMD discharge data http://webapub.sjrwmd.com/agws10/hdsnew/map.html)*

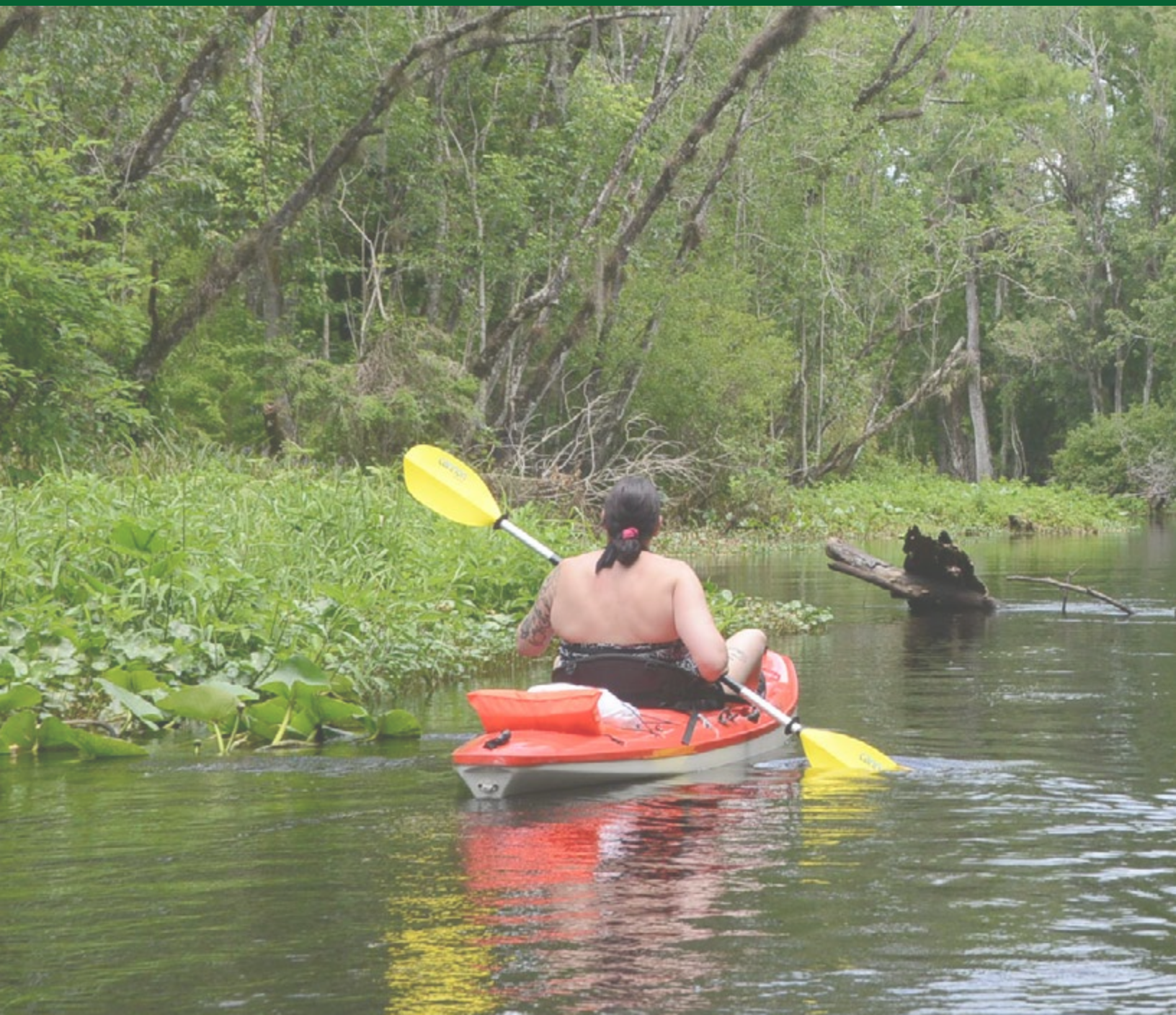
Assets

- Flow rates in Wekiwa and Rock Springs have been above targeted rates for the past 4 years.
- Standards for MFLs in the River System are being reevaluated to assure protection of aquatic resources.

Threats and Impacts

- Flow rates in Palm Springs have been consistently below targeted goals for the last 40 years.
- Since there are no MFLs or long-term monitoring data for the majority of the 31 springs in the Wekiva River System, it is unknown whether the troubling trends in flow rates for Palm Springs, or the recent improvements in flow for Wekiwa and Rock Springs, are more representative of current flow trends for the unmonitored springs.
- Data from the Florida Springs Institute (2016) and from the Central Florida Water Initiative (2021) indicate that existing CUPs, and projected groundwater pumping will negatively affect natural resources, particularly in the Wekiva basin.

Rock Springs Run at Kelly Park



8.0

Wekiva Wild and Scenic River System Management Committee Goals & Actions

Hundreds of Goals and Actions were identified in the 2012 CRMP. But, based on input from stakeholders, this list was unwieldy, redundant, and in many cases unrealistic. During stakeholder interviews at the beginning of this project, one of the primary objectives was to streamline these Goals and Actions and make them more pragmatic. During these interviews, those Goals and Actions that were already completed were identified, and others were deemed to be no longer relevant. These Actions were removed from the list in this CRMP Update. Goals and Actions that are routinely carried out by Wekiva Wild and Scenic River System partners as a part of their management plan requirements were also removed. The intention of this update to the CRMP was to include only those Goals and Actions that are more holistic in context or require collaboration between Wild and Scenic committee members, other governmental agencies, and private or nonprofit groups.

The entities responsible for executing the Actions identified in the 2012 CRMP were often unaware that they had the responsibility for its implementation, in part because other entities were also often identified as being responsible for many of the tasks. For this update, responsible entities are reduced to either one or two.

Successful completion of these Goals and Actions will require frequent review and involvement of groups that have not participated in Wild and Scenic committee meetings in the past. These include a broader range of NGOs, a subcommittee of public conservation landowners, and what will hopefully be a coalition of private recreation providers who operate in the Wekiva River basin.

Table 6 includes the streamlined list of Goals and Actions for each ORV, and the primary and secondary entities responsible for its execution. Responsible entities include the Wekiva Wild and Scenic River Management Committee, SJRWMD, FDEP Division of Recreation and Parks, FDEP Office of Resilience and Coastal Protection (Aquatic Preserve), FDEP Nonpoint Source Management Program (Florida Friendly Landscaping), Wekiva River Ambassador, East Central Florida Regional Planning Council, Rollins College, public conservation landowners and NGOs. Public conservation landowners are those agencies that own lands dedicated to natural resource management in the Wekiva basin, including local and state organizations. NGOs should include but are not limited to the Friends of the Wekiva River, the Save the Manatee Club, land trusts, Keep Seminole Beautiful, Florida Audubon, Seminole Audubon, and Orange Audubon. The private recreation group should include representatives from Wekiva Island, Kings Landing, Wekiva Falls Resort, Adventures in Florida, Venture Outdoors, and the Wekiwa Springs State Park concessionaire, and other entities that provide opportunities for resource-based recreation in the Wekiva River System.

Paddler on Black Water Creek

Lack of aquatic vegetation in areas of high recreation use at Kelly Park

Table 6. *Goals and Actions to sustain or improve Wekiva Wild and Scenic River System ORVs*

ORV, Goals and Actions	Primary Responsible Entity	Secondary Responsible Entity
Scenic		
Goal 1		
Maintain and enhance the wild and scenic character of the Wekiva River System by limiting visual and auditory impacts from human activity.		
Actions		
1. Obtain official prohibition of access by gasoline-powered motorized watercraft to Rock Springs Run and Black Water Creek, except for authorized service vessels.	W&S Comm	Private Rec Group
2. Ensure that concessionaires that rent motorized watercraft within the Wekiva River System (and the St. Johns River) alert their customers about limits on motorized boat access in these areas.	Private Rec Group	W&S Comm
3. Place signs at the mouths of Rock Springs Run, Wekiwa Springs Run and Black Water Creek alerting powerboat users to areas with restricted access.	FWC	W&S Comm
4. Use the Wild and Scenic social media network to organize volunteer groups to collect litter near the primary sources going into the River System.	River Ambassador	NGOs
5. Monitor proposed road and trail projects in the Wekiva River basin, to ensure that no new roads are constructed across the Wekiva River System, and any new trails are limited in scale to minimize visual intrusion.	NGOs	ECFRPC
6. Work with local governments to enforce regulations protecting the Riparian Habitat Protection Zone of surface waters in the Wekiva River System.	W&S Comm	NGOs
Recreation		
Goal 1		
Provide opportunities for recreation on the Wekiva River System that are compatible with the area's natural and cultural features and management objectives.		
Actions		
1. Convene an annual meeting of public and private recreation providers to collaborate on the needs of recreation users and the condition of natural resources in the vicinity of recreation hubs and in the River System.	W&S Comm	Private Rec Group
2. Maintain navigability in the segments of the Wekiva River System that are intended to be available for recreational use. (Currently, this does not include a section approximately 1 mile south of Lake Norris on Black Water Creek downstream to CR 44A).	W&S Comm	Public Conservation Landowners
3. Develop, and regularly update, a plan for emergency assistance of recreational users along the River System.	Public Conservation Landowners	FWC
4. If necessary to protect and secure public recreation areas, recommend public acquisition by local or state agencies of privately operated recreation sites to maintain long-term access for nature-based recreation.	W&S Comm	NGOs
5. If necessary to protect and secure public access, identify new sites for river access for public acquisition by local or state agencies.	W&S Comm	NGOs

ORV, Goals and Actions	Primary Responsible Entity	Secondary Responsible Entity
Recreation		
Goal 2		
Ensure that river recreation minimizes environmental impacts and user conflicts and is compatible with the preservation of natural and cultural qualities of a National Wild and Scenic River.		
Actions		
1. Every 2-3 years, comprehensively review the Indicators of Success identified in the User Capacity Study to ensure progress toward achieving the Desired Future Conditions.	W&S Comm	
2. Implement mitigative actions to alleviate issues in areas where there is no progress towards Desired Future Conditions from the 2020 User Capacity Study.	W&S Comm	
3. Using the outline provided in Chapter 9.0 of this CMP, create a practical monitoring plan to assess impacts from recreation activities.	W&S Comm	
4. During annual meetings with Recreation Providers, identify measures to ensure that recreation activities protect outstandingly remarkable values (ORVs), and that there is a unified message to recreation users about the Wekiva River System.	Private Rec Group	W&S Comm
5. Conduct User surveys approximately every 5 years to assess satisfaction with recreation experiences on the River System. Use the results of the survey to define management actions to alleviate problems or conflicts.	W&S Comm	
6. Annually meet with law enforcement officers from the Florida Fish and Wildlife Conservation Commission to discuss priorities for enforcement, and expectations for the regularity of patrols on the Wekiva River System.	W&S Comm	FWC
Wildlife and Habitat		
Goal 1		
Protect aquatic and aquatic-dependent organisms and their habitats in the Wekiva River System.		
Actions		
1. Based on projected historical conditions, map areas of healthy and degraded eelgrass beds within the Wekiva River System.	SJRWMD	FWC
2. If needed, establish a restoration program for eelgrass to reestablish optimal conditions, and monitor their condition over time.	FWC	SJRWMD
3. Create a Habitat Suitability Index model for the bluenose shiner and use that to inform management actions in the Wekiva River System.	FWC	FDEP Aquatic Preserve
4. Establish baseline populations and develop monitoring protocols for aquatic invertebrates, including but not limited to the Wekiwa Springs hydrobe, Wekiwa siltsnail, and Orlando cave crayfish.	FWC	FDEP Aquatic Preserve
5. Evaluate the extent and timing of use of the Wekiva River System by manatees and make management recommendations based on these data.	NGOs	FDEP Aquatic Preserve

ORV, Goals and Actions	Primary Responsible Entity	Secondary Responsible Entity
Goal 2		
Maintain habitat quality, landscape diversity, and ecosystem connectivity within the Wekiva to Ocala Greenway with an emphasis on the black bear as an umbrella species.		
Actions		
1. Assure that any proposed road projects under roadways that cross the Wekiva basin such as SR 44 and CR 42 include wildlife underpasses .	NGOs	FWC
2. Monitor proposed road projects and discourage construction activities that could impede movement of black bears and other wildlife.	NGOs	FWC
3. Work with the Lake County Commission to discourage the expansion of incompatible land uses in the Wekiva River Protection Area within the Wekiva to Ocala Greenway.	NGOs	W&S Comm
4. Identify private landowners that are willing to sell fee simple rights to their property or a conservation easement to aid in the acquisition of the remaining 22,000+ acres left to acquire in the Wekiva to Ocala Greenway.	NGOs	W&S Comm
5. Pursue programs at the federal, state, and local level for the purchase of conservation lands, including but not limited to a) encouraging annual state legislative funding for Florida Forever, b) the appropriation of special funding for key acquisitions and easements, c) the expansion of local land acquisition and easement programs, and d) partnerships with private conservation organizations.	NGOs	W&S Comm
Goal 3		
Reduce the impacts of exotic species on native species and habitats in the Wekiva River System.		
Actions		
1. Create a plan with a clear depiction of protocol, methods, funding sources, and entities responsible for the control of exotic plants in the river system, including hydrilla, water hyacinth, wild taro, para grass, and Chinese tallow.	FWC	FDEP Aquatic Preserve
2. Monitor for the occurrence of new exotic species of plants and implement control measures as needed.	FWC	Public Conservation Landowners
3. Monitor and, where feasible, control exotic fishes, including armored catfish (brown hoplo), blue tilapia, vermiculated sailfin catfish, walking catfish, and chanchitas in the Wekiva River System.	FWC	SJRWMD
4. Create a plan for monitoring and controlling, where feasible, exotic invertebrates within the Wekiva River System, including exotic apple snails.	FWC	FDEP Aquatic Preserve
Historical and Cultural		
Goal 1		
Identify, protect, and preserve historic and cultural resources from human-related and natural threats.		
Actions		
1. Identify and prioritize areas that have not been surveyed for historic and cultural resources.	W&S Comm	Rollins College

ORV, Goals and Actions	Primary Responsible Entity	Secondary Responsible Entity
2. Complete a comprehensive survey of the historic and cultural resources within the Wekiva River System.	W&S Comm	
3. Document each new site and file a record of them with the Florida Master Site File.	W&S Comm	
4. Create a position for a Cultural Resources Coordinator for the Wekiva area potentially through a partnership of multiple agencies.	Public Conservation Landowners	W&S Comm
5. Implement the Best Management Practices Guide to Protecting Archaeological Sites to stabilize and protect, at a minimum, high-priority sites.	Public Conservation Landowners	
6. Establish additional protections for Shell Island through discussions with Rollins College and FDHR.	Public Conservation Landowners	Rollins College
7. Review and implement appropriate recommendations from Gill's senior thesis related to assessing and protecting resources at Shell Island (Gill 2014).	Public Conservation Landowners	Rollins College
8. Conduct site-specific surveys for historic and cultural resources prior to activities that could destroy or disrupt the resource.	Public Conservation Landowners	
Goal 2		
Foster an understanding among the public of the significance of the historic and cultural resources of the Wekiva basin.		
Actions		
1. Create messages on the Wild and Scenic website about cultural resources, the people who left them in the Wekiva basin, and the methods needed to protect them.	River Ambassador	Rollins College
2. Create information for resource managers, private businesses, and concessionaires with clear language indicating that looting and vandalism of cultural resource sites is illegal and that enforcement actions will be taken.	River Ambassador	Rollins College
Water Quality and Quantity		
Goal 1		
Protect instream water quality of the Wekiva River System.		
Actions		
1. Engage with the SJRWMD and the FDEP to meet the objectives of the Basin Management Action Plans for Wekiwa Spring and Rock Springs (FDEP 2018) and for the Wekiva River, Rock Springs Run, and Little Wekiva Canal (FDEP 2015).	NGOs	
2. Request that representatives from the SJRWMD, FDEP, and local governments make presentations to the Wekiva Wild and Scenic River management committee regarding the status and success of projects intended to reduce nutrient loads into the surface waters of the Wekiva River System.	W&S Comm	NGOs
3. Request a status report from the SJRWMD on all MFLs within the Wekiva River basin.	W&S Comm	
4. Identify additional funding mechanisms at the federal, state, and local level for the acquisition of high-recharge areas and areas of aquifer vulnerability within the Wekiva River System.	NGOs	W&S Comm

ORV, Goals and Actions	Primary Responsible Entity	Secondary Responsible Entity
5. Using protocol defined in fertilizer ordinances of Orange, Lake, and Seminole counties, and through collaboration with the Florida Friendly Landscaping program, use the Wekiva Wild and Scenic River website and social media network to promote the reduction of turf grass area and to encourage landscaping that does not require the intense use of fertilizers.	River Ambassador	FDEP (Florida Friendly Landscaping)
6. Using the outline provided in Chapter 9.0 of this CMP, create a practical monitoring plan to systematically collect and assess water quality data in the River System.	W&S Comm	SJRWMD
7. Review proposed activities for potential risk of water quality degradation and Outstanding Florida Waters Violations.	NGOs	W&S Comm
Goal 2		
Protect flow regimes of the Wekiva River System.		
Actions		
1. Engage with the SJRWMD and the FDEP to ensure that the current and proposed revised Minimum Flows and Levels (MFLs) maintain the range of surface water fluctuations to sustain the ecology of the River System.	NGOs	W&S Comm
2. Determine if proposed modifications to the MFLs adequately protect the ORVs of the Wekiva River System.	NGOs	W&S Comm
3. If additional protection is needed, determine whether that can be best achieved by refinement of MFLs, by a water management district water reservation pursuant to Section 373.223(4) Florida Statutes, or by other processes.	W&S Comm	NGOs
4. Monitor the implementation of conservation measures identified in the Regional Water Supply Plan (CFWI 2020) to reduce consumption of groundwater in the Wekiva basin.	NGOs	W&S Comm
5. Use the Wekiva Wild and Scenic River website and social media network to promote opportunities for improving efficiency and water conservation, such as limiting turf grass, requiring Florida Friendly Landscaping, preserving non-irrigated open space, and using water-efficient fixtures/appliances.	River Ambassador	FDEP (Florida Friendly Landscaping)
6. Work with the SJRWMD to evaluate and, as appropriate, strengthen regulations and incentive programs to conserve water within the Wekiva basin and springshed, including but not limited to those addressing water allocation, water consumption, water billing rate structures, irrigation, and lawn or landscaping practices.	NGOs	SJRWMD
7. Work with local governments to evaluate and as appropriate strengthen regulations and incentive programs to conserve water within the Wekiva basin and springshed, including but not limited to those related to State Building Codes, plumbing codes, installation of irrigation systems, lawn and landscaping ordinances, and water billing rates.	NGOs	W&S Comm

ORV, Goals and Actions	Primary Responsible Entity	Secondary Responsible Entity
Public Education and Outreach		
Goal		
Using diverse in-person and virtual approaches, engage in a dynamic conversation with a broad and inclusive representation of the community about natural resource assets and threats, recreational and educational opportunities, and ways to get involved with the Wekiva Wild and Scenic River System.		
Actions		
1. Sustain active participation by the Management Committee with members representing organizations identified in the Wekiva Wild and Scenic River Act of 2000.	NPS	
2. Use the Wekiva Wild and Scenic River website and social media network to communicate with volunteers, recreational and environmental groups, and the interested public on issues relevant to the protection of natural resources and recreation experiences on the River System.	River Ambassador	W&S Comm
3. Host special events that encourage people to directly experience and learn about the Wekiva River System, such as the Wekiva River Festival.	W&S Comm	
4. Create flyers, displays, signage and other materials for distribution at recreation hubs and other strategic locations to convey information about recreational experiences and natural resource protection in the Wekiva River System.	W&S Comm	
5. Consider a docent program capable of producing volunteers to further educate the public and target audiences about the Wekiva River System and its values.	W&S Comm	
6. Participate in the annual St. Johns River Springs Workshop related to research on springs and strategies for springshed protection hosted by Stetson University and the Florida Fish and Wildlife Conservation Commission.	River Ambassador	FDEP Aquatic Preserve
7. Develop effective relationships with elected leaders, agency heads, and decision-makers through proactive communication about the Wekiva River System and its values, and secure the support needed to ensure their protection.	W&S Comm	NGOs

Sign at Black Water Creek

Eelgrass Bed on the Wekiva River System

Alligator on the Wekiva River System


FOOT TRAFFIC
PROHIBITED
BEYOND
THIS POINT

9.0

Partner Agency Regulatory Mandates and Management Plans

As mentioned previously, the Wekiva River System is sometimes described as “the most protected river system in the state.” For the last 50 years, a series of rules, regulations, and policies have been put in place to protect the river and adjacent lands. Conservation land acquisitions have assured the protection of more than 75,000 acres of lands surrounding the Wekiva basin, and most of these lands are included in detailed management plans implemented by state or local agencies. These publicly available plans specify actions to sustain or improve natural habitats, areas important to aquifer recharge, and the springs and spring runs that create most of the flow for the Wekiva River.

An excellent summary of the regulatory history of the Wekiva basin can be found in the Wekiva River and Springs Restoration Plan prepared by the Florida Springs Institute (2016). Below is a summary of some of the state regulations relevant to protection of resources in the Wekiva basin as well as a brief summary of some of the management plans implemented by state partner agencies that own land in the Wekiva basin. The statutory authority and purpose of relevant federal and state environmental regulations and policies are also provided in **Appendix F**.

Federal Agencies

National Park Service (NPS)

The National Park Service administers the National Wild and Scenic Rivers System in accordance with the Wild and Scenic Rivers Act (Public Law 90-42; 16 U.S.C. 1271 et seq.) www.rivers.gov/documents/wsr-act.pdf

Under the broad authority of the Act, the National Park Service conducts studies of the eligibility of rivers proposed for designation in the national system and coordinates with states in the development and implementation of management plans for rivers in the system. The National Park Service also reviews permits required by the U.S. Army Corps of Engineers under Section 404 of the Clean Waters Act of 1972 for potential environmental impacts on national wild and scenic rivers. Based on the authority of Section 7(a) of the National Wild and Scenic Rivers Act, no federal agency may assist by loan, grant, license or otherwise in the construction of any water resources project that would have a direct and adverse effect on any of the resource values of the designated segment of the river.

The NPS has a range of responsibilities for rivers depending on the administrative nature of the river. Certain rivers that flow wholly or partly within the boundaries of national park units or were designated as park units are administered solely by the NPS. Other rivers, like the Wekiva Wild and Scenic River System, are administered in partnership with state and local governments and/or non-governmental organizations. These are known as “Partnership Wild and Scenic Rivers” (PWSRs). A third type of WSR, designated by secretarial action at the request of state Governors, is administered by a state agency with limited technical assistance provided by NPS. These rivers are known as Section 2(a) (ii) WSRs, Additionally, NPS has responsibility for maintaining a list of rivers with potential for inclusion in the NWSRS. This list is known as the Nationwide Rivers Inventory (NRI).

The NPS oversees Partnership Wild and Scenic Rivers to protect the ORVs for which the rivers were designated. For the Wekiva Wild and Scenic River System, this is done through coordination with state and county agencies and community advocates. The NPS, through a cooperative agreement provides partnership funding for managing the Wekiva Wild and Scenic River System and all other partnership rivers and is responsible for reviewing all Federally-assisted water resources projects, pursuant to Section 7 of the Wild and Scenic Rivers Act. U.S.

Army Corps of Engineers (ACOE)

The ACOE is charged with regulating Waters of the United States. These waters include coastal and navigable inland waters, lakes, rivers, and streams; other intrastate lakes, rivers, and streams (including intermittent streams); and mudflats, sandflats, wetlands, sloughs, wet meadows, and certain impoundments. The ACOE maintains section 404 permitting authority for retained waters of Florida. In, 2020, FDEP began administering the "State 404 Program," assuming the federal dredge and fill permitting program under Section 404 of the federal Clean Water Act within certain waters.

U.S. Fish and Wildlife Service (US FWS)

The US FWS must be consulted if a Federally protected species may be impacted by an activity within its jurisdiction. US FWS staff prepare an independent Biological Opinion, and an activity may not be authorized unless it is determined that the project is not likely to jeopardize the continued existence of the species or result in the destruction of the habitat of the species.

State Agencies

Florida Department of Environmental Protection (FDEP)

FDEP has programs regulating drinking water facilities, wastewater discharges, landfills (solid waste), hazardous waste facilities, and operations creating air discharges. Dredging, filling, and/or construction activities in state-assumed waters or wetlands associated with private, single-family residences, wastewater facilities, or landfills also are regulated by the Department. In addition, FDEP sets water quality standards (found in Chapter 62-302, Florida Administrative Code) for different categories of surface waters in the state.

In 2020, Chapter 62-331, Florida Administrative Code (F.A.C.), was adopted, which transferred dredge and fill permitting under section 404 of the federal Clean Water Act to the state. Minor changes were also made to the Environmental Resource Permitting program in Chapter 62-330, F.A.C., to facilitate the transfer. The State 404 Program is responsible for overseeing permitting for single family residences; commercial developments; utility projects; environmental restoration and enhancement; linear transportation projects; governmental development; certain agricultural and silvicultural activities; and in-water work within assumed freshwater bodies such as boat ramps, living shorelines, and other shoreline stabilization.

In 2016, the Florida legislature identified 30 Outstanding Florida Springs, including Rock and Wekiwa, that require additional protection to ensure their conservation and restoration for future generations. Known as the Florida Springs and Aquifer Protection Act, it affords special status and protection to these historic springs (Section 373.801(3)(b), F.S.). Regarding water quantity, it directs the water management districts or FDEP to adopt a recovery or prevention strategy if a spring is below or is projected within 20 years to fall below the MFL for the spring.

Wekiva River Basin Unit Management Plan

The FDEP Florida Park Service's mission is to provide resource-based recreation while preserving, interpreting, and restoring natural and cultural resources. This

mission is implemented, in part, through the Wekiva River Basin Unit Management Plan. The plan is intended to meet the requirements of Sections 253.034 and 259.032, Florida Statutes, Chapter 18-2, Florida Administrative Code. This plan provides a basic statement of policy and general direction for the management of the Wekiva River Basin State Parks. It identifies the goals, objectives, and actions that guide park administration. It also defines measures that will be implemented to meet management objectives and provide balanced public use.

A number of imperiled species inhabit the 19 natural communities found within the Wekiva River Basin State Parks, and significant work has been done to protect known habitat, including prescribed fire and active exotic species removal. Several historic and cultural sites have been cataloged and protected, including an old cemetery and numerous middens found through the parks and along the river. This plan is updated at 10-year intervals and covers a total area of 41,043.55 acres between three contiguous properties located 20 miles north of Orlando, across Lake, Orange, Seminole, and Volusia Counties.

The 2017 plan consists of three components, including Resource Management, Land Use, and Implementation. These related sections provide objectives relating to:

- Administrative Support,
- Water Quality and Quantity,
- Natural Communities,
- Imperiled Species,
- Exotic and Invasive Species Control,
- Cultural Resources,
- Public Access and Recreation Opportunities, and
- Capital Facilities and Infrastructure.

For a complete list of the objectives related to these goals, see **Appendix G**.

Wekiva River Aquatic Preserve Management Plan

The mandate for developing aquatic preserve management plans is outlined in Section 18-20.013 and Subsection 18-18.013(2) of the Florida Administrative Code. The purpose of the plan is to incorporate relevant information about the sites into a cohesive management strategy, and to assure appropriate access to managed areas while protecting the long-term health of the aquatic system.

The 2014 Wekiva River Aquatic Preserve Management Plan provides guidelines for policies and management related to the Preserve and associated issues affecting the use and ecology of the system. The plan is updated at 10-year intervals and covers a total area of 5,669.7 acres, located in Lake, Orange, Seminole, and Volusia Counties. The Plan is broken into three components, including Basis for Management, Management Programs and Issues, and Additional Plans. These related sections provide objectives relating to:

- Water Quality
- Water Quantity
- Recreational Use
- Aquatic Debris

- Wildlife and Habitat
- Cultural and Historic Resources
- Hurricane and Emergency Preparedness

For a complete list of the actions related to these goals, see **Appendix H**.

FDAC Florida Forest Service/Seminole State Forest

The Florida Department of Agriculture and Consumer Services Florida Forest Service manages more than 30,000 acres of state land in east Lake County. Known as Seminole State Forest, these lands provide essential connectivity in the Wekiva basin, extending north of Rock Springs Run State Reserve to the Ocala National Forest. Although title to most of Seminole State Forest is held by the state of Florida, 3,549 acres surrounding Black Water Creek are owned by the St. Johns River Water Management District. Seminole State Forest is managed by the Florida Forest Service with the goal of protecting and maintaining the native biological diversity of the many ecosystems that comprise the state forest, while integrating public use of the resources. Multiple-use management promotes recreation, timber, protection of wildlife including designated species, environmental education, and other values that benefit Florida residents and visitors. Land management activities generally contribute to preserving the natural ecosystem around much of Black Water Creek.

Seminole State Forest (SSF) 10 Year Resource Management Plan

The SSF 10-Year Resource Management Plan is provided according to requirements of Sections 253.034, 259.032 and 373, Florida Statutes, and was prepared using guidelines outlined in Section 18-2.021 of the Florida Administrative Code. This plan covers more than 30,000 acres in eastern Lake County. The 2011 10 Year Resource Management Plan outlined management activities on SSF for the past 10 years. For a list of the actions related to management goals from the 2011 plan, see **Appendix I**.

At the time of the publication of this update to the CRMP, an update to the 10-year management plan for SSF is almost complete. Management strategies for SSF center on the multiple-use concept, as defined in sections 589.04(3) and 253.034(2)(a) Florida Statutes. Multiple-use management for SSF will be accomplished with the following strategies:

- Practice sustainable forest management for the efficient generation of revenue and in support of State Forest management objectives
- Provide for resource-based outdoor recreation opportunities for multiple interests
- Restore and manage healthy forests and native ecosystems ensuring the long-term viability of populations and species listed as endangered, threatened, or rare, and other components of biological diversity, including game and non-game wildlife, and plants
- Protect known archaeological, historical, and cultural resources
- Restore, maintain, and protect hydrological functions, related water resources, and the health of associated wetlands and aquatic communities
- Provide research and educational opportunities related to natural resource management.

St. Johns River Water Management District (SJRWMD)

The Wekiva basin is entirely within the jurisdictional boundaries of the SJRWMD, which oversees numerous activities to ensure the sustainable use and protection of water resources on both designated and undesignated segments. The SJRWMD has two primary regulatory programs, the Consumptive Use Permit (CUP) program and the Environmental Resource Permit (ERP) program, which are authorized by Part II and Part IV Chapter 373, F.S. The District is also authorized in Part I of Chapter 373 to establish minimum flows and levels (MFLs), implemented through the CUP and ERP program.

Part VII of Chapter 373 requires the water management districts to develop regional water supply plans to ensure that water demands are met, and water resources and related natural systems are sustained. The recently published regional supply plan for Orange, Osceola, Polk, Seminole, and southern Lake Counties complied with this mandate Central Florida Water Initiative (2020).

Wekiva River Buffer Conservation Area Land Management Plan

The Wekiva River Buffer Conservation Area Land Management Plan is administered by the SJRWMD and covers 3,142 acres in Seminole County, along the Wekiva and Little Wekiva Rivers. The 2012 Plan is intended to meet the requirements of Sections 259.032 and 259.105, Florida Statutes, Chapter 40C-9, Florida Administrative Code. The Plan provides guidelines for land management activities to be implemented for the next ten-year period.

The Wekiva River Buffer Conservation Area Land Management Plan includes goals for categories including:

- Water Resources
- Flora and Fauna
- Forest Management and Restoration
- Exotic Species
- Cultural Resource Protection
- Access
- Recreation
- Environmental Education
- Security
- Land Acquisition
- Cooperative Agreements, Leases, Easements, and Special Use Authorization

For a complete list of the actions related to these goals, see **APPENDIX J**.

Florida Fish and Wildlife Conservation Commission (FWC)

The FWC manages the state's fish and wildlife resources, including more than 575 species of terrestrial wildlife and 700 species of saltwater and freshwater fish. Among its functions, FWC issues licenses for hunting and fishing, administers permit programs for incidental take and relocation, regulates captive breeding and possession of wildlife, and performs law enforcement. FWC is also a cooperative manager, regulating hunting and fishing on Wildlife Management Areas on Seminole State Forest and Rock Springs Run State Reserve. The FWC Invasive Plant Management Section is the lead agency for aquatic plant management in Florida. In addition to control of exotic plants and maintaining navigation throughout the Wekiva River System, FWC biologists are engaged in various activities relating to wildlife and habitat conservation, including research, management, and education. FWC developed the Imperiled Species Management Plan to address the needs of state listed species that did not already have a management plan or specific program in place. These species also have Species Conservation Measures and Permitting Guidelines that clarify what is needed for conservation and permitting of these species.

Florida Department of Health (FDOH)

The FDOH was required by the Wekiva River Protection Act (Section 369.318, F.S.) to conduct a study of onsite treatment and disposal system (septic tank and drainfield system) standards needed to achieve nitrogen reductions protective of groundwater quality within the Wekiva Study Area (FDOH 2007). The FDOH was directed to consider a more stringent level of wastewater treatment to reduce the level of nitrates discharged from onsite treatment and disposal systems and implement a maintenance and inspection program, including upgrading existing systems and funding mechanisms. Currently, a transfer of the Onsite Sewage Program from the FDOH to FDEP is underway. The role of these agencies is important to providing research and industry standards for on-site treatment and disposal systems (septic systems) and reviewing water quality improvement from projects proposed to FDEP in association with the Basin Management Action Plans for the Wekiva River and Wekiwa and Rock Springs.

Local Agencies

Orange, Lake, and Seminole counties

Orange, Lake, and Seminole counties implement actions to improve water quality, manage resources on conservation lands dedicated to ecological restoration, and support resource-based recreation. Each has adopted language in their comprehensive plans and development regulations requiring enhanced protection of natural resources in the Wekiva basin, and implementing the policies established for the Wekiva River Protection Area and the Wekiva River Study Area. These policies are reflected in zoning criteria and land development regulations that affect natural resources in the Wekiva basin.

Orange, Lake, and Seminole counties also all own land in the Wekiva basin and allow public access for resource-based recreation. Orange County manages the heavily utilized Kelly Park and owns the property encompassing Rock Springs and the initial portions of Rock Springs Run. Orange and Lake Counties have developed management plans for each of their properties within the Wekiva River

System and are working to restore the historical natural communities. Seminole County manages natural resources and recreation on the Black Bear Wilderness Area, which is within the Wekiva to Ocala Greenway and lies adjacent to the St. Johns River.

Lake County Water Authority (LCWA)

The Lake County Water Authority (LCWA) was established as a special agency dedicated to projects and management actions that conserve and improve freshwater resources in Lake County, including streams, lakes, canals, and the fish and aquatic wildlife that rely on them. In 2022, the Florida Legislature approved, and the Governor signed, a bill that proposed the transfer of responsibilities and taxes generated from the LCWA to the Lake County Board of County Commissioners, which accepted the transfer. This changed the LCWA's status to a dependent special district, and the Lake County Board of Commissioners now has authority over the budget and millage rate of the LCWA. As a part of this transition, Lake County now has some responsibility for managing the Lake Norris Conservation Area.

Lake Norris Conservation Area Land Management Plan

The Lake Norris Conservation Area Land Management Plan was created by the SJRWMD in 2012. The plan is intended to meet the requirements of Sections 373.415, 259.032, and 259.105, Florida Statutes, Chapter 40C-9, Florida Administrative Code.

The plan provides guidelines for land management activities to be implemented at Lake Norris Conservation Area for the next 5-year period and covers a total area of 3,660 acres between three separate parcels of land. The Lake Norris Conservation Area is accessed from Lake Norris Road in Lake County, 7 miles northeast of Eustis and north of CR 44A.

The Lake Norris Plan includes overviews on the conservation area, as well as its natural and cultural resources. The plan also includes goals for categories including:

- Security
- Water Resource Protection
- Wetland Restoration
- Flora and Fauna
- Forest Management and Restoration
- Fire Management
- Exotic and Invasive Species
- Cultural Resources
- Access
- Recreation and Outreach
- Acquisition
- Cooperative Agreements, Leases, Easements, and Special Use Authorization
- Revenue Generation

For a complete list of the actions related to these goals, see **Appendix K**.

Altamonte Springs, Longwood, and Apopka

Altamonte Springs, Longwood, and Apopka are partner cities on the Wekiva River Wild and Scenic River System Management Committee. Though they do not own conservation lands in the Wekiva to Ocala Greenway, they are in the Wekiva River Study Area and each participates in strategies to improve water quality through participation in Basin Management Action Plan (BMAP) projects. Natural resource protection embodied in the Wekiva Parkway and Protection Act and the Wekiva River Protection Act is referenced in the comprehensive plans and land development codes of these cities. Like county governments, these cities implement land development regulations that affect natural resources in the Wekiva basin.

Non-Governmental Organizations (NGOs)

Several nonprofit organizations are involved with activities in the Wekiva River basin. Their efforts have been critical to achieving many of the accomplishments identified in this report, and they are targeted as entities responsible for implementing many of the Goals and Actions. The Audubon of Florida and the Friends of the Wekiva River were both designated as members of the Advisory Management Committee in the Wekiva Wild and Scenic River Act of 2000.

Founded in 1982, the Friends of the Wekiva River's mission is to protect, preserve, and restore the natural functions and beauty of the Wekiva River System. Members of the Friends of the Wekiva River work on issues that affect the Wekiva, ranging from pollution to smart growth, to the welfare of wildlife, including bears. Representatives of the Friends of the Wekiva River have served on the BMAP stakeholder group, commented on models for the MFL update, provided public comment on incompatible land uses proposed within the Wekiva River Protection Area, and led hikes and paddles into the Wekiva River System.

The Wekiva Wilderness Trust is the nonprofit Citizens Support Organization for the Wekiva Basin State Parks. Volunteers with the Trust maintain the Nature Center and Serenity Garden, help rangers remove exotic plants, and assist with river cleanups. Other NGOs such as the Seminole Audubon Society, Keep Seminole Beautiful, and The Nature Conservancy have been involved with various activities in the Wekiva River basin. These have included public comment on actions that could impact natural resources, river cleanups, assisting with events, and providing data on potential parcels to acquire in the Wekiva to Ocala Greenway.

10.0

Monitoring, Research, and Reporting

Scientific research, natural resource monitoring, and oversight of policy decisions are ongoing for issues relevant to the ORVs of the Wekiva River System. A summary of monitoring that should be conducted to assure protection of natural resources, sustain recreational experiences, and promote engagement with the public is provided below. The Goals and Actions identified in Chapter 8.0 identify the entities responsible for most of these monitoring activities, but a comprehensive annual monitoring plan should be derived from these key elements.

Scenic and Recreation

1. Every 2-3 years, comprehensively review the Indicators of Success identified in the 2020 User Capacity Study to ensure progress toward achieving the Desired Future Conditions.
2. Every year, tour the River System to assess the quality of scenic vistas, particularly in areas of private ownership.
3. Every year, tour the River System to assess impacts from recreation activities, including:
    a. Erosion and vegetation alteration at areas of high recreation use
    b. Litter deposition, particularly at concentrated sources around roadways and stormwater ponds
    c. Physical structures in the river
    d. Unauthorized structures on trees
    e. Noise disturbance and light pollution.
4. Conduct user surveys approximately every 5 years to assess satisfaction with recreation experiences on the river system.

Wildlife and Habitat: Wetland and Aquatic Habitat

1. Continue fish community monitoring, including assessing the state-Threatened bluenose shiner and the conditions of habitat relevant to its Habitat Suitability Index.
2. Conduct detailed mapping of aquatic vegetation to create a baseline of native aquatic vegetation. Afterward, monitor the health of these systems annually.
3. Assess the prevalence of exotic fish and aquatic invertebrates to determine whether they occupy a significant portion of the fish and invertebrate biomass in the Wekiva River System.
4. Assess areas of rampant algal growth, particularly filamentous algae, and its effects on aquatic ecosystems within the Wekiva River System.
5. Establish baseline populations and develop monitoring protocols for rare, unique, or endemic aquatic invertebrates, including but not limited to the Wekiwa Springs hydrobe, Wekiwa siltsnail, and Orlando cave crayfish.
6. Evaluate the extent and timing of use of the Wekiva River System by manatees and make management recommendations based on these data.
7. Document infestations of new exotic species of plants and institute control measures as needed.

Wildlife and Habitat: The Wekiva to Ocala Greenway

1. Track acquisitions and the purchase of conservation easements within the remaining 22,000+ acres yet to be acquired in the Wekiva to Ocala Greenway.
2. Monitor the expansion of incompatible land uses in the Wekiva River Protection Area within the Wekiva to Ocala Greenway.
3. Monitor proposed road and trail projects in the Wekiva River basin to ensure that no new roads are constructed across the Wekiva River System, and any new trails are limited in scale to minimize visual intrusion, promote wildlife underpasses, and discourage construction that could impede movement of black bears and other wildlife.

Historic and Cultural:

1. Monitor direct and indirect impacts to known historic and cultural resources.
2. Compile a comprehensive survey of the historic and cultural resources within the Wekiva River System.

Water Quality:

1. Water quality sampling has been conducted in the Wekiva basin for decades, and the local and state agencies responsible for it should continue to collect these data. Compile an annual summary of water quality data taken at Wekiwa and Rock Springs and at numerous locations along Black Water Creek, Rock Springs Run, Little Wekiva River, and the Wekiva River.
2. Assess proposed and completed projects and progress toward the defined goals for water quality improvement in the BMAPs for Wekiwa and Rock Springs and for the Wekiva River, Rock Springs Run, and Little Wekiva Canal.

Water Quantity:

1. Continue to collect flow data for the springs with established MFLs and at various locations along the Wekiva River. Annually review flow rates compared with target MFLs.
2. Assess progress on revisions to the MFLs that are being developed by the SJRWMD for the Wekiva River and select springs.
3. Assess the implementation of conservation measures identified in the Regional Water Supply Plan (CFWI 2020) to reduce consumption of groundwater in the Wekiva basin.

Public Outreach:

1. Monitor the effectiveness of social media programs through an assessment of website traffic, responses to emails, social media likes and shares, etc.

11.0

Literature Cited

Baker, B. G. 1988. Summary of General Legislation 1988. Joint Legislative Management Committee, Division of Legislative Library Services. B. Gene Baker, Director. http://library.law.fsu.edu/Digital-Collections/FLSumGenLeg/FlSumGenLeg1988.pdf

Camp, Dresser and McKee, Inc. 2006. Wekiva Parkway and Protection Act: Master Stormwater Plan Support (http://www.lake.wateratlas.usf.edu/upload/documents/WekivaParkway_ProtectionActMasterStormwaterPt1.pdf)

Camp E. V., C. L. Staudhammer, W. E. Pine III, J. C. Tetzlaff, and T. K. Frazer. 2014. Replacement of rooted macrophytes by filamentous macroalgae: Effects on small fishes and macroinvertebrates. Hydrobiologia 722:159–170.

Central Florida Water Initiative. 2020. Regional Supply Plan: A Comprehensive Plan for Orange, Osceola, Polk, Seminole and Southern Lake Counties. 139 pp.

Copeland, R., N. A. Doran, A. J. White, and S. B. Upchurch. 2011. Regional and statewide trends in Florida's spring and well groundwater quality (1991–2003). Florida Geological Survey. Bulletin No. 69. 417 pp.

Denton, C. The Wekiva River Basin: A Resource Revisited. The Friends of the Wekiva, Inc., 1992.

East Central Florida Regional Planning Council. 2021. The Economic Impact of the Wekiva River Area. 31 pp.

Environmental Protection Agency. 2016. What Climate Change Means for Florida. EPA 430-F-16-011. 2 pp. https://www.epa.gov/sites/default/files/2016-08/documents/climate-change-fl.pdf

Exum Associates, Inc. 2020. User Capacity Study for the Wekiva Wild and Scenic River: Executive Summary. 33 pp.

Florida Department of Agriculture and Consumer Services, Florida Forest Service. 2011. Ten-Year Resource Management Plan for the Seminole State Forest, Lake County, Florida. 67 pp.

Florida Department of Environmental Protection, Division of Environmental Assessment and Restoration. 2022. Statewide Annual Report. https://floridadep.gov/dear/water-quality-restoration/content/statewide-annual-report.

Florida Department of Environmental Protection, Division of Environmental Assessment and Restoration, Water Quality Restoration Program. 2018. Wekiwa Spring and Rock Springs Basin Management Action Plan. 172 pp. https://floridadep.gov/sites/default/files/Wekiwa%20and%20Rock%20Springs%20Final%202018.pdf

Florida Department of Environmental Protection, Division of Environmental Assessment and Restoration, Watershed Restoration Program. 2015. Basin Management Action Plan for the Implementation of Total Maximum Daily Loads for Nutrients by the Florida Department of Environmental Protection in the Middle St. Johns River Basin for Wekiva River, Rock Springs Run, and Little Wekiva Canal. 194 pp.

Florida Department of Environmental Protection, Division of Recreation and Parks. Wekiva River Basin State Parks Unit Management Plan. 2017. 211 pp. https://floridadep.gov/sites/default/files/WRBSP_ApprovedPlan_Website_0.pdf

Florida Department of Environmental Protection, Division of Water Resource Management, Bureau of Watershed

Management. 2008. TMDL Report: Nutrient TMDLs for the Wekiva River (WBIDs 2956, 2956A, and 2956C) and Rock Springs Run (WBID 2967). Xueqing Gao. 92 pp.

Florida Department of Environmental Protection, Florida Coastal Office. 2014. Wekiva River Aquatic Preserve Management Plan. 202 pp. http://publicfiles.dep.state.fl.us/CAMA/plans/aquatic/Wekiva-River-AP-Management-Plan.pdf

Florida Department of Health. 2007. Nitrogen Impact of Onsite Sewage Treatment and Disposal Systems in the Wekiva Study Area. Bureau of Onsite Sewage Programs, Division of Environmental Health. 26 pp.

Florida Department of Transportation. 2017. Wekiva Parkway Section 6 Fact Sheet (Lake & Seminole Counties). Financial Project ID: 238275-7. 2 pp.

Florida Springs Institute. Wekiva River and Springs Restoration Plan. Howard T. Odum Florida Springs Institute. 2016. 262 pp.

Francke, A. E. Jr. 1984. Early Days of Seminole County, Florida. https://www.seminole.wateratlas.usf.edu/upload/documents/317_earlydays.pdf

Frazer, T. K., and R. A. Mattson, 2017. Biology: Trophic Interactions. Section 9 of the Collaborative Research Initiative on Sustainability and Protection of Springs [CRISPS]. University of Florida report to the St. Johns River Water Management District, pp. 747–871.

Gill, C. M. 2014. Preserving Shell Island: A Plan for Cultural Resource Management and Site Stewardship. Rollins College Honors Program Theses. Paper 3. 100 pp.

Guan, J. C., A. Jacoby, and T. K. Frazer. 2020a. Light attenuation by periphyton on Vallisneria americana. Ecological Indicators: 116 (2020) 106498. 8 pp.

Guan, J. C., A. Jacoby, and T. K. Frazer. 2020b. In-situ assessment of the effects of periphyton on the growth of Vallisneria americana. Ecological Indicators 119 (2020) 106775. 9 pp.

Havens, K. E., J. Gaohua, J. R. Beaver, R. S. Fulton III, and C. E. Teacher. 2017. Dynamics of cyanobacteria blooms are linked to the hydrology of shallow Florida lakes and provide insight into possible impacts of climate change. Hydrobiologia (2019) 829:43–59.

Holder, J. 2022. Juniper Springs Run: Rapid Loss of Submerged Aquatic Vegetation. Presentation to the St. Johns River Springs Biology Working Group. Stetson Aquatic Center, DeLand, Florida.

Hudon, C., M. De Sève, and A. Cattaneo. 2014. Increasing occurrence of the benthic filamentous cyanobacterium Lyngbya wollei: A symptom of freshwater ecosystem degradation. Freshwater Science 33(2): 606-618.

Hupalo, R. B., C. P. Neubauer, L. W. Keenan, D. A. Clapp, and E. F. Lowe. 1994. Establishment of minimum flows and levels for the Wekiva River System. St. Johns River Water Management District, Palatka, Florida. 98 pp.

Intera. 2007. Statistical Modeling of Spring Discharge at Rock and Wekiva Springs in Orange County, Florida. Final Report to the St. Johns River Water Management District. 85 pp. http://static.sjrwmd.com/sjrwmd/secure/technicalreports/SP/SJ2007-SP12.pdf

Interagency Wild and Scenic Rivers Coordinating Council. 1999. The Wild & Scenic River Study Process. Technical Report of the Interagency Wild and Scenic Rivers Coordinating Council. 55 pp.

Lake County Water Atlas. Wekiva River Watershed. 2001. https://www.lake.wateratlas.usf.edu/watershed/?wbodyatlas=watershed&wshedid=5

MACTEC. 2010. Final Report: Wekiva River Basin Nitrate Sourcing Study. 72 pp.

Mattson, R. A. 2022. Florida Springs: A Personal Retrospective. Presentation to the St. Johns River Springs Biology Working Group. Stetson Aquatic Center, DeLand, Florida.

Mattson, R. A. 2009. Relationships Between Benthic Algae and Benthic Macroinvertebrate Communities In Florida Spring-Run Streams. SJRWMD Professional Paper SJ2009-PP1. 31 pp.

Mattson, R. A., D. L. Hall, M. L. Szafraniec, and M. Q. Guyette. 2021. Synoptic Biological Survey of 14 Spring-Run Streams in North and Central Florida: II. Submerged Aquatic Vegetation Communities - Algae. SJRWMD Technical Publication SJ2021-05. 126 pp.

Mattson, R. A., D. L. Hall, M. L. Szafraniec, and M. Q. Guyette. 2019. Synoptic Biological Survey of 14 Spring-Run Streams in North and Central Florida: I. Submerged Aquatic Vegetation Communities – Macrophytes. SJRWMD Technical Publication SJ2019-2. 111 pp.

McCorkle, J. L. Jr. 1992. Moving Perishables to Market: Southern Railroads and the Nineteenth-Century Origins of Southern Truck Farming. Agricultural History, Vol. 66, No. 1, pp. 42-62.

Milanich, J. T. 1994. Archaeology of Precolumbian Florida. University of Florida: Gainesville, FL. 476 pp.

Milanich, J. T., and C. H. Fairbanks. 1980. Florida Archaeology. Academic Press, Inc.: New York, NY. 290 pp.

Mulkey, S. 2007. Climate change and land use in Florida: Interdependencies and opportunities. A report prepared for the Century Commission for a Sustainable Florida. 43 pp.

National Park Service, Southeast Support Office. 1999. Wekiva River, Rock Spring Run, and Seminole Creek Wild and Scenic River Study. 206 pp.

National Park Service. 2011. Wekiva Wild and Scenic River System Environmental Assessment for the Comprehensive River Management Plan. 198 pp.

Orange County Water Atlas. Wekiva River Watershed. 2001. https://www.orange.wateratlas.usf.edu/watershed/?wshedid=12&wbodyatlas=watershed

Parsley, P., J. Holder, N. Trippel, T. Lange, and E. Lundy. 2020. Assessing Temporal and Spatial Trends in Fish Assemblages within Spring Runs of the St. Johns River Basin. Fish and Wildlife Foundation of Florida and Florida Fish and Wildlife Conservation Commission. 78 pp.

Phelan, S. 2010. Song of Wekiva: Florida's wild river and its democratic vista. https://scholarship.rollins.edu/cgi/viewcontent.cgi?article=1091&context=as_facpub. 361 pp.

Philpott, D. 2015. Guide to the Wekiva Basin State Parks. Don Philpott. 186 pp.

Scott, T. M. The Hawthorn Formation of northeastern Florida (FGS: Report of investigation 94). 1983. https://original-ufdc.uflib.ufl.edu/UF00001281/00001/11j. 90 pp.

Seminole County. 2020. Local Mitigation Strategy for Seminole County and its Municipalities. 80 pp. https://www.seminolecountyfl.gov/core/fileparse.php/3423/urlt/LMS-2020-2025-For-Public-Comment.pdf

Seong C-H, and A. E. Wester. 2019. Wekiva River hydrology and hydraulic modeling for minimum flow and level evaluations. St. Johns River Water Management District, Palatka, Florida. 103 pp.

Shannon, G., M. F. McKenna, L. M. Angeloni, K. R. Crooks, K. M. Fristrup, E. Brown, K. A. Warner, M. D. Nelson, C. White, J. Briggs, S. McFarland, and G. Wittemyer. 2016. A synthesis of two decades of research documenting the effects of noise on wildlife. Biol. Rev. (2016), 91, pp. 982–1005.

Shofner, J. H. 1982. History of Apopka and Northwest Orange County, Florida. Apopka Historical Society. 328 pp.

St. Johns River Water Management District. 2011. Lake Norris Conservation Area. 149 pp.

Tebeau, C. W., and W. Marina. 1999. A History of Florida. University of Miami Press. 586 pp.

USDA Soil Conservation Service. Soil Survey of Seminole County, Florida. 1990. 165 pp.

Weisman, B. R. 1993. An overview of the prehistory of the Wekiva River Basin. The Florida Anthropologist 46(1): 20-36.

Weisman, B. R., and C. Newman, C. 1993. An Archeological Assessment of the Wekiva River Buffers Property (Plantation Tract), Seminole County. Ms on file, Florida Department of Environmental Protection: Tallahassee, FL

Wekiva Coalition. 2002. A Blueprint for Action. 13 pp.

Wekiva River Basin Coordinating Committee. 2004. Recommendations for Enhanced Land Use Planning Strategies and Development Standards to Protect Water Resources of the Wekiva River Basin. 54 pp.

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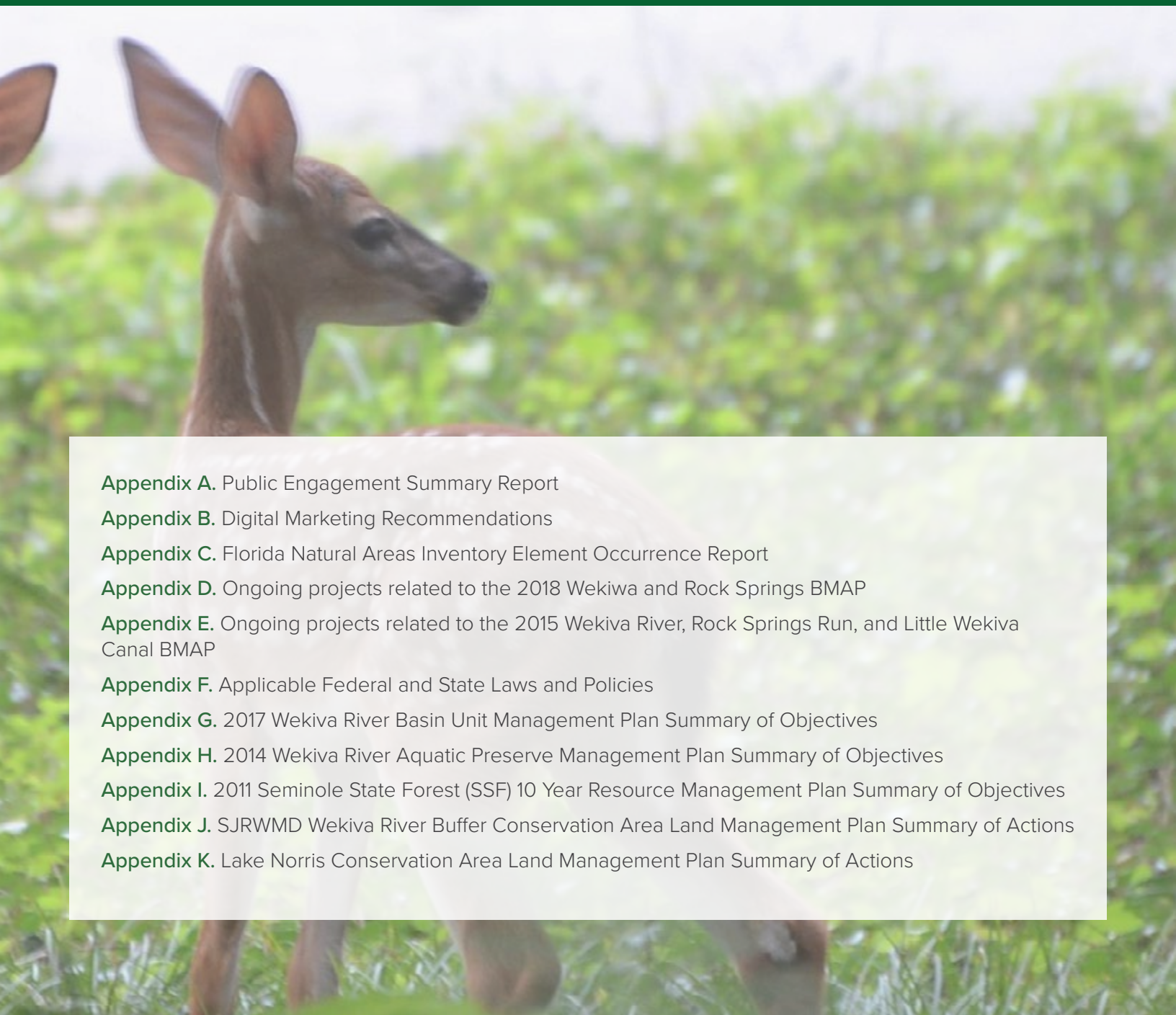
APPENDICES
(compiled in a separate document)



Appendix A. Public Engagement Summary Report

Appendix B. Digital Marketing Recommendations

Appendix C. Florida Natural Areas Inventory Element Occurrence Report

Appendix D. Ongoing projects related to the 2018 Wekiwa and Rock Springs BMAP

Appendix E. Ongoing projects related to the 2015 Wekiva River, Rock Springs Run, and Little Wekiva Canal BMAP

Appendix F. Applicable Federal and State Laws and Policies

Appendix G. 2017 Wekiva River Basin Unit Management Plan Summary of Objectives

Appendix H. 2014 Wekiva River Aquatic Preserve Management Plan Summary of Objectives

Appendix I. 2011 Seminole State Forest (SSF) 10 Year Resource Management Plan Summary of Objectives

Appendix J. SJRWMD Wekiva River Buffer Conservation Area Land Management Plan Summary of Actions

Appendix K. Lake Norris Conservation Area Land Management Plan Summary of Actions

Prepared by:

COMMUNITY SOLUTIONS GROUP

EXUM ASSOCIATES, INC.

NATIONAL WILD AND SCENIC RIVERS SYSTEM

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