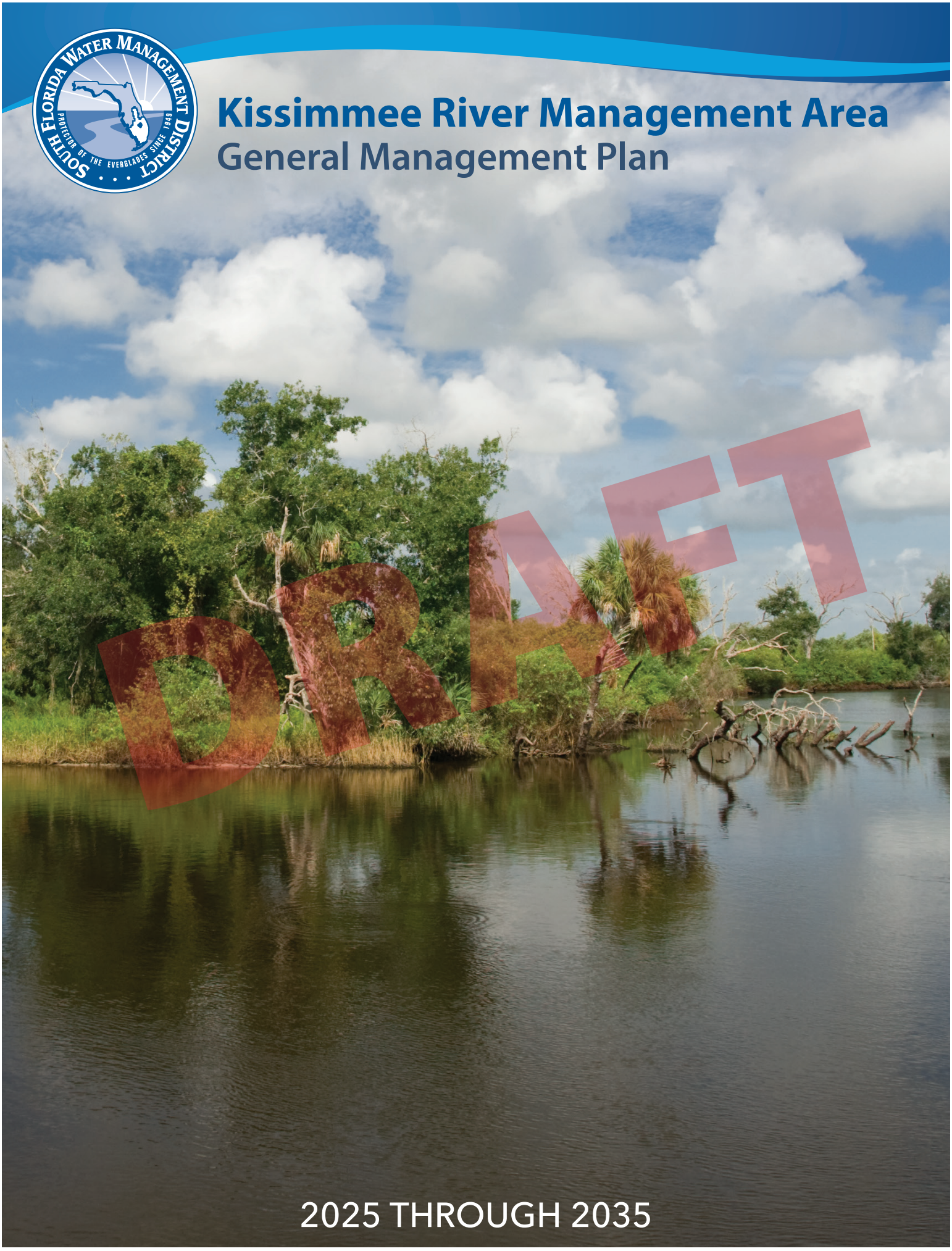
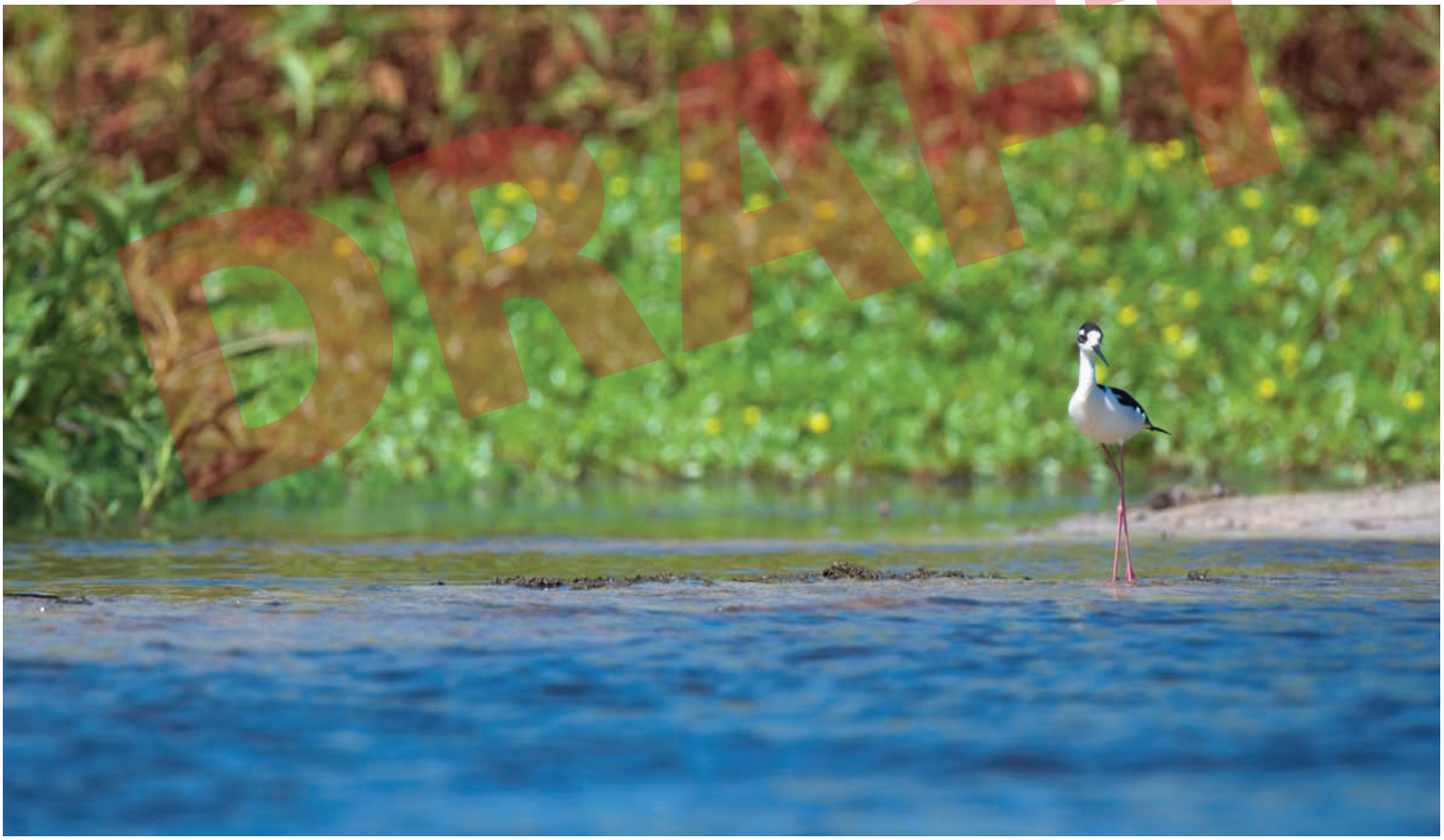
Kissimmee River Management Area
General Management Plan



2025 THROUGH 2035



Get the latest information from SFWMD

Learn more by signing up for the District's emails.
Visit SFWMD.gov and click on ***"Subscribe for Email Updates."***

Connect with us on Facebook, X, Instagram, LinkedIn and YouTube.

3301 Gun Club Road
West Palm Beach, FL 33406
SFWMD.gov

Kissimmee River Management Area General Management Plan

(2025 through 2035)

2026

Land Stewardship Section
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, Florida 33406

Table of Contents

Figures

Maps

Tables

Appendices

ABBREVIATIONS

CARL	Conservation and Recreation Lands
District	South Florida Water Management District
FDHR	Florida Division of Historical Resources
FE	Federally-designated Endangered
FFS	Florida Forest Service
FISC	Florida Invasive Species Council
FNAI	Florida Natural Areas Inventory
Ft	Feet
FT	Federally-designated Threatened
FT(S/A)	Federally-designated Threatened because of similarity of appearance
FXN	Federally-designated Threatened Nonessential Experimental Population
FY	Fiscal Year
FWC	Florida Fish and Wildlife Conservation Commission
HRS	Headwaters Revitalization Schedule
KRREP	Kissimmee River Restoration Evaluation Program
NAVD	North American Vertical Datum
NGVD	National Geodetic Vertical Datum
mi	Miles
mi^2	Square Miles
PSGHA	Public Small Game Hunting Area
SE	State-designated Endangered
ST	State-designated Threatened
TIITF	Board of Trustees of the Internal Improvement Trust Fund
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

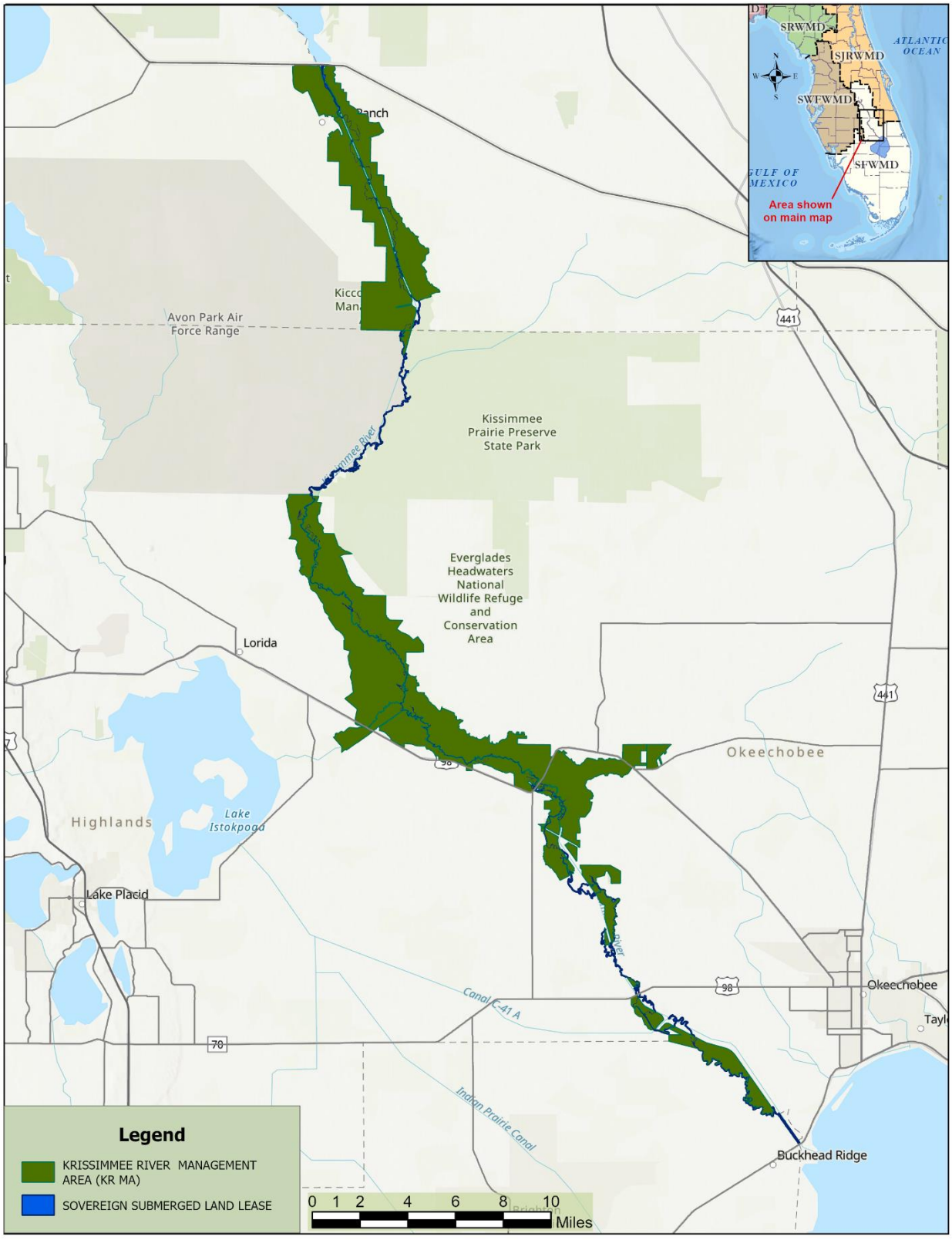
1. EXECUTIVE SUMMARY

The Florida Legislature established the Water Management Lands Trust Fund Section 373.59, Florida Statutes, in 1981, which allowed water management districts to acquire environmentally sensitive land for the purposes of water management, water supply and conservation and protection of water resources through the Save Our Rivers (SOR) program. The South Florida Water Management District (District) used these funds to acquire properties for the Kissimmee River Restoration Project. The District has acquired a total of 86,914 acres in fee and shared-fee title interests to date, which it manages in collaboration with the Florida Department of Environmental Protection (FDEP) Division of State Lands. Of this land, the District directly manages 40,577 acres of fee-owned land and 2,173 acres owned by the Trustees of the Internal Improvement Trust Fund (TIITF), as the Kissimmee River Management Area (KR MA).

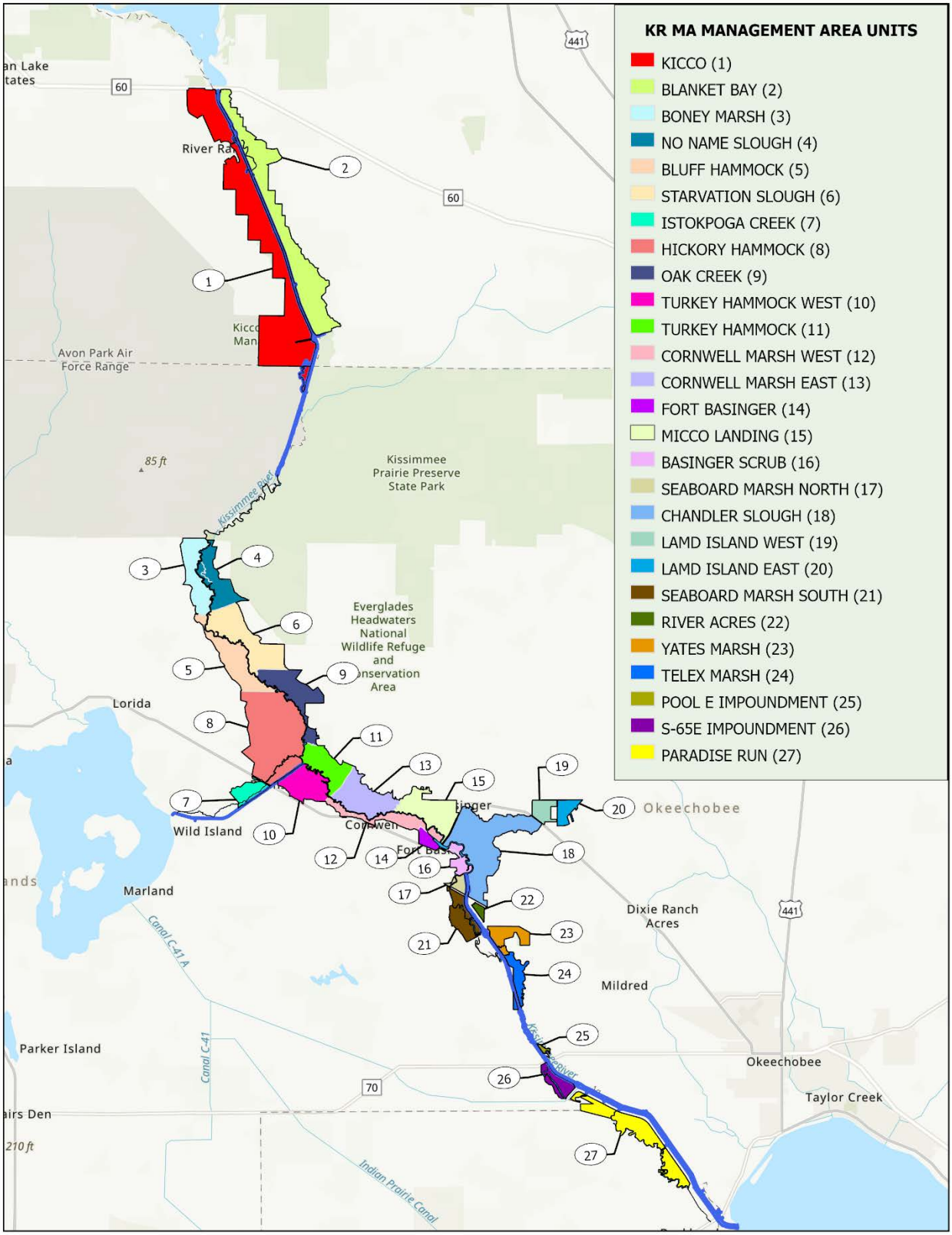
Pursuant to Section 373.1391, Florida Statutes, the District is responsible for managing lands acquired under the SOR program. This General Management Plan (GMP) guides the management of the KR MA through the 10-year period of 2025-2035 and was peer-reviewed by external professionals, as directed by Section 373.591, Florida Statutes, and approved by the District's Governing Board. Goals identified for the next ten years include managing natural communities and modified habitats to protect and enhance water, floral, and faunal resources; providing resource-based public use opportunities; maintaining area infrastructure; and providing security and resource protection.

2. INTRODUCTION

The KR MA, located in central Florida, spans from State Road 60 to approximately 1.8 miles north of State Road 78 (**Map 1**). It covers portions of Polk, Osceola, Highlands, Glades, and Okeechobee counties. The Management Area encompasses lands within the Kissimmee River's 100-year floodplain, featuring a vast wetland ecosystem, interspersed with oxbows and upland communities. Historically, the Kissimmee River floodplain has been used for agriculture, and both conservation and agriculture continue to be the primary land uses in the KR Management Area and its surroundings. The KR MA is divided into twenty-seven separate management units (**Table 1, Map 2**).



Map 1. KR MA location map.



Map 2. KR MA management units.

Table 1. Positions of KR MA Management Units Relative to the River Channel.

100-Year Floodplain Pools	West Side of the Channel	East Side of the Channel
Upper River (FKA Pool A)	KICCO (1)	Blanket Bay (2)
Middle River (Kissimmee River Restoration FKA Pools B-D)	Boney Marsh (3) Bluff Hammock (5) Istokpoga Creek (7) Hickory Hammock (8) Turkey Hammock West (10) Cornwell Marsh West (12) Fort Bassinger (14) Basinger Scrub (16) Seaboard Marsh North (17) Seaboard Marsh South (21)	No Name Slough (4) Starvation Slough (6) Oak Creek (9) Turkey Hammock (11) Cornwell Marsh East (13) Micco Landing (15) Chandler Slough (18) Lamb Island West (19) Lamb Island East (20) River Acres (22)
Lower River (FKA Pool E)	S-65E Impoundment (26) Paradise Run (27)	Yates Marsh (23) Telex Marsh (24) Pool E Impoundment (25)

KICCO Unit (7,669 acres) and Blanket Bay Unit (4,793 acres) are located in Polk and Osceola counties, respectively. The KICCO Unit derives its name from the Kissimmee Island Cattle Company, which previously operated a small company town on this site. The Blanket Bay Unit is partly owned by the Board of Trustees of the Internal Improvement Trust Fund (TIITF) and managed by the District as part of the KR MA. These units were among the earliest acquisitions for the Kissimmee River Restoration Project. Although they were outside the backfilling project for the Kissimmee River Restoration, their acquisition was necessary due to the upstream effects resulting from the increased flows from the Kissimmee River Chain of Lakes just upstream of these units. These units were enhanced while the Kissimmee River Restoration Project was still in its initial testing stages. Improvements made in these areas included lowering levees to reestablish natural water flow and provide flood relief for the Kissimmee Chain of Lakes.

Boney Marsh (1,1415 acres), No Name Slough (1,284 acres), Bluff Hammock (1,626 acres), Starvation Slough (2,331 acres), Hickory Hammock (4,585 acres), Oak Creek (1,627 acres), Turkey Hammock West (1,273 acres), Turkey Hammock (1,250 acres), Cornwell Marsh West (980 acres), Cornwell Marsh East (1,696 acres), Fort Basinger (271 acres), Micco Landing (1,641 acres), Seaboard Marsh North (227 acres), Basinger Scrub (426), Chandler Slough (3,556 acres), Lamb Island West (456 acres), and Lamb Island East (422 acres), and Seaboard Marsh South (878 acres), make up most of the middle pools, which have been the primary focus of the Kissimmee River Restoration Project. These units are located in Highlands and Okeechobee counties and consist mostly of floodplain marshes that were drained for cattle operations. The ecological functions and hydrology of the units were restored alongside the restoration of the historic river

channel that historically fed them. The restoration efforts resulted in the removal of the C-38 Canal middle pools, removal of the spoil piles that blocked the sheet flow into these units, the restoration of the oxbow lakes that had been severed by the C-38 Canal, and the reestablishment of most of the original course of the Kissimmee River.

The benefits of restoration for the natural ecosystem are evident in the western portion of the No Name Slough Unit, where a prairie system has emerged along No Name Slough after the C-38 canal was backfilled. The western edges of the Oak Creek Unit feature hammock systems with a vast array of magnificent old-growth oaks. The Fort Basinger Unit extends outside the floodplain and the restoration project. Historically, it housed a one-room school where Edna Pearce-Lockett taught in her youth; the building was moved to the Pearce-Lockett estate in 2005. This unit has been restored to a mesic flatwood community and serves as a receptor site for relocated gopher tortoises. The Cornwell Marsh West Unit is located within the floodplain of the Kissimmee River and has been heavily disturbed. Previously, the upland areas in this unit were utilized for residential development, which included several houses that were demolished as part of the Kissimmee River Restoration Project. Some infrastructure, mainly roads, is still present in parts of the unit that remain disturbed. The Cornwell Marsh West Unit now hosts the Riverwoods Field Laboratory, which offers laboratory facilities for research and education while also supporting the monitoring program for the Kissimmee River. The Seaboard Marsh North Unit is mainly comprised of marshlands bordered by a cypress-dominated forested floodplain wetland. Within the Seaboard Marsh North unit is a hardwood community that lies outside the Kissimmee River floodplain. This area was acquired due to its archaeological significance. The Chandler Slough Unit lies within the Kissimmee River floodplain and primarily comprises restored floodplain marshes, forested wetlands, and cypress systems. As part of the Kissimmee River Restoration, a large ditch that bisected the Chandler Slough Unit was backfilled. The Lamb Island units, which are contiguous with the Chandler Slough Unit, lie outside the Kissimmee River floodplain but are part of the same interconnected slough system. Prior to acquisition by the District, the Lamb Island property was the site of a commercial dairy operation. Following the acquisition, the site was converted to a cattle operation to reduce nutrient loading into the Okeechobee Basin. The Seaboard Marsh South Unit stretches into Highlands and Okeechobee counties and comprises a mixture of marshes, cypress, and hardwood systems.

River Acres (118 acres), Yates Marsh (656 acres), Telex Marsh (545 acres), Pool E Impoundment (49 acres), S-65E Impoundment (525 acres), and Paradise Run (1,889 acres) units are located downstream of the Kissimmee River Restoration Project, south of the S-65D locks. In this segment, the C-38 Canal was not filled during restoration; however, remnants of the original river channel, which had been isolated by the canal, were reopened to restore connectivity to the historic flow path. Notably, the Telex Marsh Unit features some of the most scenic and undisturbed sections of the old river channel. The Telex Unit is located in Highlands County and consists of a hardwood system. The River Acres Unit is located within the River Acres platted subdivision in Okeechobee County. It was acquired as part of the Kissimmee River floodplain acquisition effort due to its position within the floodplain. It continues to function as a water quality detention area, helping to reduce nutrient loading by treating runoff from the surrounding subdivision. The site is densely vegetated with native and invasive shrub species. The Yates Unit is primarily improved pasture; however, the eastern portion supports a mix of natural communities. The land in Pool E is composed of wet prairie, while the S-65E Impoundment East and West, and Paradise Run units mainly consist of marshlands, which were necessary for flood control during the development of

the pool system. Paradise Run is partially located outside the Kissimmee River floodplain and is fairly drained. It is bordered by the remnant C-38 canal to the east and the old meandering river channel to the west.

2.1. Acquisition Purpose and Significance of the Area

The KR MA encompasses the lands that were necessary to effectively carry out one of the largest river restoration initiatives globally, the Kissimmee River Restoration Project. Since its inception, the restoration of the Kissimmee River has been a central focus of the District's core mission. The restoration program began with the 1976 legislature (Chapter 76-113, Florida Statutes), which led to the Kissimmee River Restoration Project, authorized by Congress in the 1992 Water Resources Development Act to reclaim the over-drained wetlands along the river floodplain. This Act allowed the District and the U.S. Army Corps of Engineers (USACE) to enter into a cost-sharing cooperative agreement in 1994 for land acquisition for the project. This led to the acquisition of lands within the river floodplain, which were crucial for increasing seasonal water storage capacity to provide year-round flow for the Kissimmee River. To date, the District has acquired 86,914 acres in fee simple and shared title interest and 26,535 acres in flowage and conservation easements across Polk, Osceola, Highlands, Glades, and Okeechobee counties. The District also has a lease for the sovereign submerged lands below the ordinary high water around the river.

Acquiring these lands contributed to flood control, natural system restoration, water quality improvement, and water supply in the Kissimmee River Basin. The properties acquired within the Kissimmee River floodplain made it feasible to reconstruct the river to its historic form in the restored sections, reversing decades of biodiversity decline while maintaining the current level of flood protection in the Kissimmee River Basin. Nearly 100,000 acres have been acquired because of its importance, ensuring the river floodplain's long-term conservation.

2.2. Legal Requirements of Management

The KR MA properties were purchased with funds from the SOR land acquisition program to protect lands that have important water resource values through acquisition, restoration, and management for environmental benefits. SOR was one of several programs funded through the 1981 Water Management Lands Trust Fund legislation (§373.59, Florida Statutes) using documentary stamp tax revenue. The SOR program was eventually replaced by the 1999 Florida Forever Act, which consolidated the legislative directives of SOR and Preservation 2000, a program enacted in 1990 to provide additional funding for land acquisition. Lands acquired with funds from the trust are required to satisfy the requirements outlined in Sections 373.139, Florida Statutes.

Section 373.1391, Florida Statutes, requires the District to balance resource conservation and public recreational use. This legislation reinforces the Water Management Lands Trust Fund requirements by directing the District to utilize lands titled to the District for public recreation purposes to the extent possible while considering the environmental sensitivity and suitability of those lands for recreation. Management activities on the leased area are consistent with the requirements for State Lands as set forth in §259.032, Florida Statutes.

Public use on District lands is also governed by Chapter 40E-7, Florida Administrative Code (§40E-7.511-539), which allows the District to establish regulations governing public access to District lands and use of said lands for appropriate nature-based recreation and allied purposes whenever possible and not in conflict with other District objectives. As the steward, the Land Stewardship Section is responsible for protecting, enhancing, restoring, and preserving District lands for the beneficial use and enjoyment of existing and future generations.

To support the statutory directives in Section 373.1391, the District has partnered with the Florida Fish and Wildlife Commission (FWC) to establish certain District properties as Wildlife Management Areas (WMA), Wildlife and Environmental Areas (WEA), Public Small Game Hunting Areas (PSGHA), or Miscellaneous Areas through their authority under Chapter 379, Florida Statutes. This partnership allows the FWC to promulgate rules under Chapter 68, Florida Administrative Code, in coordination with the District, to regulate public use on these properties.

The determination of compatible public uses on District lands is based on the following criteria:

- Consistency with the acquisition purposes, including protecting natural ecosystems.
- Restrictions by easements, leases, reservations, adjacent land ownership, or conditions of the purchase agreement.
- Existing infrastructure and facilities, including fences, gates, signage, access, trails, campsites, etc.
- Available funding.
- Limitations on use resulting from endangered species and sensitive natural or archeological resources.
- Public health, safety, and welfare.

Management activities on sovereign submerged land leases are also subject to the requirements for State Lands as set forth in Section 259.032, Florida Statutes.

2.3. General Management Plan Development

General Management Plans (GMPs) for the District are developed for selected areas established as management areas to guide management over a 10-year period. When the plans are updated, staff review the previous plan, identify accomplishments made on prior goals and objectives, and develop new goals and objectives for the coming ten years. These updated goals and objectives are based on District priorities, previous public input through meetings of the Recreation Forum and other venues, and current best management practices. This process is also designed to meet State requirements for management plans (§259.032, Florida Statutes) on areas leased from the State of Florida. The draft plan is provided to the management review team specified in Section 373.591, Florida Statutes, and comments from this multi-agency and stakeholder management review team on the draft and past management are included in the updated plan.

Common resource management and public use activities implemented by the District in management areas include:

- Prescribed fire to mimic the natural fire frequency in the fire-dependent habitats.
- Vegetation management, such as shredding and/or mowing to control invasive woody shrubs and eliminate hazardous fire fuels.
- Wildlife management, including surveys and habitat management.
- Nuisance and invasive vegetation control.
- Monitoring the health of the natural communities and the impact of management practices on them.
- Hydrologic restoration of wetlands to establish optimal flows and hydroperiods.
- Providing public use facilities that support hunting, boating, hiking, fishing, birding, canoeing, camping, nature appreciation, geocaching, and biking.
- Utilizing volunteers and user group organizations to support the public use program.
- Providing security and hunting opportunities through partnership with FWC.
- Providing educational programs through partnerships with external educational organizations.
- Leveraging staff time through contracts with the private sector when appropriate.

This GMP serves as the basic statement of management intent and consolidates relevant information about the KR MA to guide management actions for the 2025 to 2035 period. This includes land management goals and objectives, past and present land uses, resource data, restoration and management needs, public use programs, and administrative duties.

3. MANAGEMENT AREA GOALS AND OBJECTIVES

Management of Wildlife and Habitats

Goal 1: Manage natural communities and modified habitats to protect and enhance floral and faunal resources

Objectives:

- Continue to utilize prescribed fire to maintain all fire-dependent management units within their appropriate fire return intervals.
- Continue using mechanical vegetation treatment to control woody vegetation encroachment into wet prairies and seasonal wetlands, and to reduce dense pockets of vegetation.
- Enhance the mesic flatwoods community in the Fort Basinger Unit through mechanical and fire treatments.
- Continue to minimize hazardous fuel along firelines to reduce spot-over potential.

- Continue to utilize prescribed grazing as a management tool in areas compatible with acquisition purposes and management objectives.

Goal 2: Maintain, improve, or restore listed species populations and habitats.

Objectives:

- Enhance vegetation communities to increase habitat use by threatened and endangered species.
- Increase herbaceous cover in pine and prairie communities to improve foraging habitats.
- Manage the gopher tortoise recipient site in the Fort Basinger management unit according to the Long-term Gopher Tortoise Management Plan.
- Conduct periodic surveys of vegetation and tortoise burrows to monitor the gopher tortoise recipient site.
- Identify suitable habitats in other units to support potential gopher tortoise range expansion.
- Collaborate with state and federal partners to identify and manage black rail habitats, promoting their use by these federally threatened birds.
- Identify priority habitats and funding to conduct additional floral and faunal surveys.

Nuisance and Invasive Species Management

Goal 3: Manage invasive species to minimize their negative impacts on natural communities.

Objectives:

- Continue to control nuisance and invasive species to maintain the management units in maintenance condition (Condition Class 1) and systematically improve remaining areas.
- Continue to target invasive species infestations in identified areas as they become priorities to achieve maintenance levels.
- Collaborate with the Vegetation Management Section to develop strategies for reducing the spread of invasive grass and Carolina willow.
- Implement Early Detection Rapid Response (EDRR) treatments as needed.
- Seek additional funding through the FWC Upland Invasive Plant Management Program to expand invasive species treatment within the management area.
- Enhance wild hog population control measures.

Hydrological Management

Goal 4: Protect and enhance the hydrological and ecological functions of wetland communities

Objectives:

- Assess shifts in wetland hydrology and identify improvements to support optimal sheetflow in KR MA.
- Work with the Northern Everglades and Estuaries Protection Program to identify cooperative opportunities to make substantive improvements to degraded wetlands within the Kissimmee River Management Area.

Public access and Recreational opportunities

Goal 5: Provide nature-based public use opportunities

Objectives:

- Continue to provide compatible public use opportunities such as hunting, camping, airboating, canoeing, kayaking, fishing, equestrian use, and wildlife viewing.
- Continue to identify potential locations for new shelters and campsites in coordination with volunteers and user groups.
- Provide resource protection through partnerships with local and state law enforcement.
- Continue to implement the public use program through coordination with FWC, local partners, adjacent landowners, and recreation user groups.
- Continue to participate in the District's Public Recreational Forum to support stakeholder engagement.
- Continue to coordinate with the Florida Trail Association on the Florida National Scenic Trail throughout KR MA.
- Provide interpretive and educational information using brochures, signage, and kiosks at public use amenities such as airboat shelters.

Operation and Maintenance of Capital Facilities and Infrastructure

Goal 6: Maintain and improve facilities and infrastructure

Objectives:

- Continue to maintain the firelines and service roads within the management area.
- Maintain public-use facilities and infrastructure such as signs, primitive camping areas, boat ramps, and structures through a coordinated effort involving District staff, volunteers, and private contractors.
- Maintain and secure the Management Area boundary using signage, fences, and fireline maintenance.

- Ensure all facilities and infrastructure assets are accurately identified, mapped, and maintained within the geospatial data system.
- Develop comprehensive asset management and capital improvement plans for all infrastructure and facility assets to support proactive and strategic management.
- Secure needed funds to implement facilities and infrastructure maintenance and replacement plans.

Cultural Resource Management

Goal 7: Protect existing cultural resources

Objectives:

- Ensure all known sites are recorded in the Florida Division of Historical Resources Master Site file.
- Continue to monitor, protect, and preserve all known/identified sites.
- Coordinate with the Florida Division of Historical Resources (FDHR) to assess the need to conduct additional cultural resource surveys.
- Ensure at least one member of staff has attended the FDHR cultural resource training program.

4. AREA HISTORY

Historically, the Kissimmee River consisted of over 103 miles of meandering channels, oxbows, and natural, discontinuous sandbanks within a floodplain that varied from one to two miles in width (Figure 1). This floodplain, which is approximately 56 miles long, slopes gradually southward from Lake Kissimmee to Lake Okeechobee.

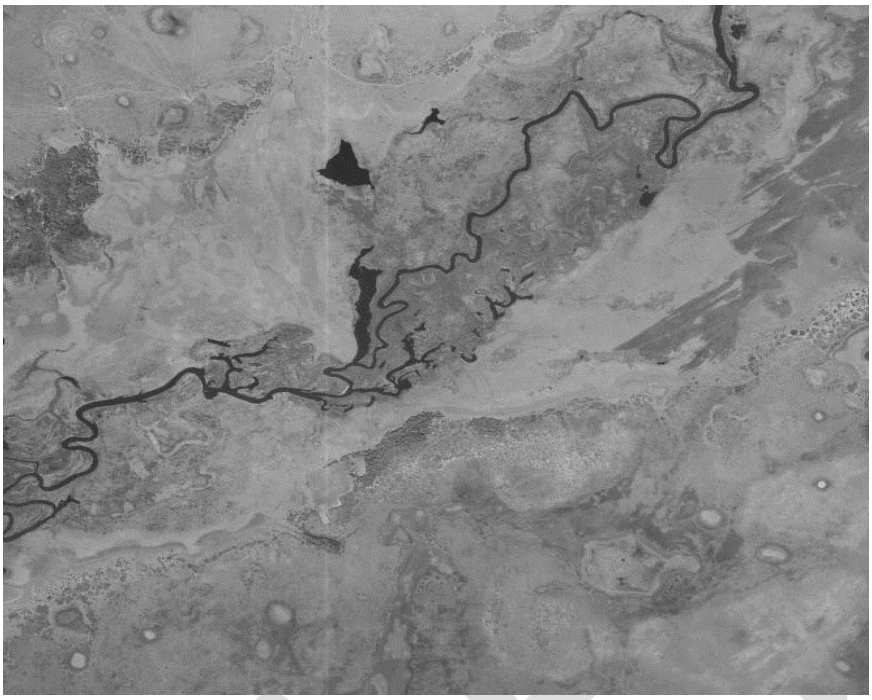


Figure 1. Aerial Image of the Kissimmee River Pre-Channelization.

During the Spanish colonial period, the Spanish king granted the Duke of Alagon over 12 million acres of land, which included most of central Florida west of the St. Johns River and north of Lake Okeechobee. The Duke received the grant in 1818 after assuring the king that he would collaborate with various private enterprises to settle and develop the land for agricultural production. However, the Duke sold the land to Richard S. Hackley, a Virginian, who later leased some of it to a private corporation in 1836. The treaty that ceded Florida to the United States included a declaration voiding the land grant. However, before the treaty was executed, the Spanish king had agreed to become a constitutional monarch rather than an absolute monarch. This meant that he was limited in his powers and could not seize private property without compensating the owner and having the action ratified by the Spanish Costas. As a result, the grant and transfer were disputed by the Territory, then the State of Florida, and after years of contestation, the U.S. Supreme Court ruled in 1853 (John Doe v. Braden - Braden was the founder of Bradenton) that the grant and transfer were invalid. The Court ruled it would be inconsistent with the principles and policies of the government to take ownership of Florida while one individual possessed and owned so much land. With the title cleared by the U.S. Supreme Court and ownership by the Federal Government confirmed, the land could pass unchallenged to the State as part of the Swamp and Overflowed Lands Act passed by Congress in 1850. Ironically, the state later transferred most of the Alagon/Hackley lands to Hamilton Disston, a wealthy businessman from Pennsylvania, in 1881 for the same purpose for which the land had been granted to the Duke of Alagon.

Prior to channelization, the Kissimmee River seasonally overflowed its banks, flooding its broad floodplain (**Figure 2**) (SFWMD, 2006). Most of the floodplain would remain inundated throughout the year, except during drought conditions (Toth et al., 1998). During significant floods, like the hurricane of 1878, the Kissimmee River floodplain resembled a vast lake, extending several miles across the basin. The flooding conditions in the Kissimmee River basin resulted from the accumulation of runoff on the basin's flatlands and the subsequent rise in lake

levels due to inadequate drainage capacity. Hurricane-force winds over the Florida peninsula created problems with tide generation on the larger lakes, which added to the local flooding.

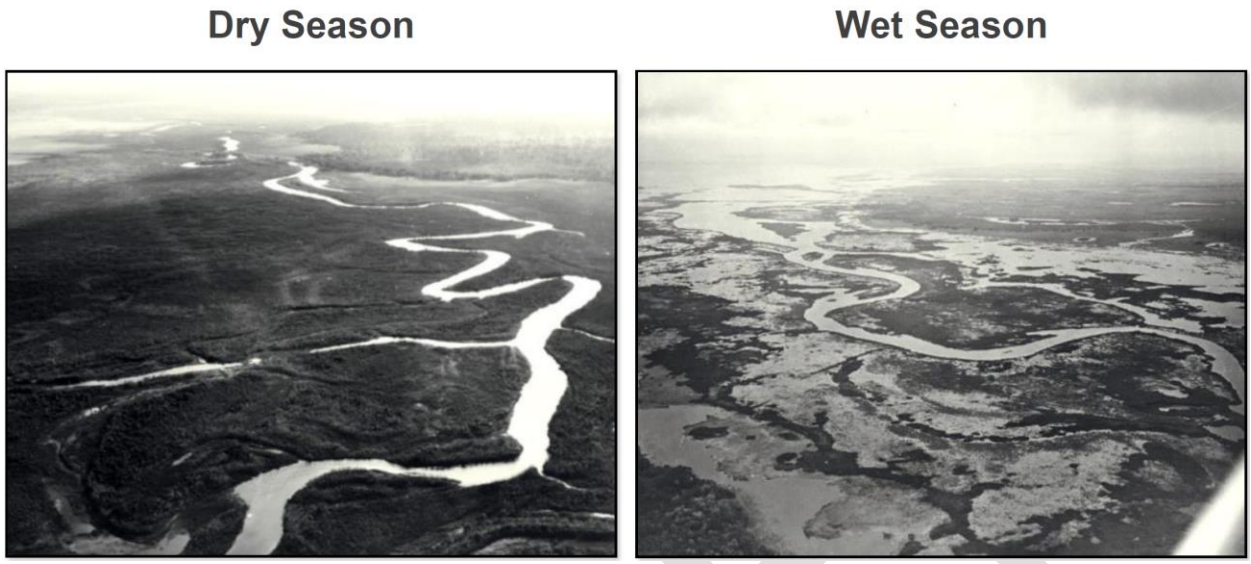


Figure 2. Seasonal water level trends in the Kissimmee River Basin.

Before the 1840s, settlement was sparse in the Kissimmee Basin. English-speaking settlers began to move to the area after the Seminoles were pushed south of Lake Okeechobee during the 1840s and 1850s. Land use in the basin primarily involved farming and cattle ranching. Steamboats served as the main mode of transportation for passengers and commerce. Kissimmee became a hub for steamboat travel along the Kissimmee River to South Florida and the Gulf Coast (Robinson, 2003). Initially, the steamboat route from Kissimmee to Fort Basinger was limited to steamers with a two-foot draft and was restricted by water levels. Periods of drought in the winter and spring would close the water route for several months, halting commerce and travel. Local politicians began lobbying Congress for improvements to the river system to accommodate larger steamers with a deeper draft year-round. As a result, Congress directed the USACE to study and open a steamer line from Kissimmee to Florida's southwest coast.

The Swamp and Overflowed Lands Act of 1850 encouraged development by transferring federal lands to the State to use as currency to finance drainage and levee projects. This led to the drainage of large tracts of land and opened the area to more homesteaders and development by the 1880s. Transportation and commerce also increased following the acquisition of four million acres of land by Hamilton Disston in 1881. Disston began a drainage project to connect the upper Kissimmee basin lakes and began dredging and clearing a navigable route from the Gulf of Mexico to Lake Okeechobee. Between 1881 and 1884, the Southport Canal was dredged to connect Lake Tohopekaliga and Lake Cypress. The St. Cloud Canal was also dredged to connect Lake Tohopekaliga and East Lake Tohopekaliga. By 1885, the Kissimmee River was navigable by 75-foot steamers from Fort Myers to Kissimmee (Bousquin et al., 2005). These excavations eliminated the meandering river channel, and the spoil deposited along the shorelines destroyed approximately 6,200 acres of floodplain wetland habitat. Newly drained and filled lands along the canals became suitable for ranching and farming. In 1902, Congress authorized additional

alterations to complete the 3-foot deep and 30-foot-wide river channel between the city of Kissimmee and Fort Basinger, as well as between Lake Istokpoga and the Kissimmee River.

The establishment of the Everglades Drainage District by the State of Florida in 1907 and the enactment of the General Drainage Act in 1913 contributed to the rapid development in central and south Florida and set the stage for extensive flooding in the Kissimmee River basin. A series of hurricanes followed in 1926 and 1928, producing extensive rainfall and flooding that resulted in significant losses of life and property (USACE, 1991). As a result of the prolonged flooding within the basin, Congress authorized a modification to the Kissimmee navigation project to include a flood control component. More settlements rapidly followed World War II. Later, over half a million acres were flooded again by a series of hurricanes in 1947. The prolonged flooding prompted a public outcry for federal assistance to reduce flood damage to property in the basin.

Figure 3. *Historical photo of 1940s flooding that led* to the C&SF Project.

Figure 4. Historic 1948 Flood Event in Kissimmee, Florida.

Consequently, Congress authorized the USACE to initiate construction of the Central and Southern Florida Project in 1948, which led to engineering changes to deepen, straighten, and widen the waterway. The Kissimmee River portion of the project was then authorized in 1954, allowing the channelization and installation of control structures in the upper portion (Upper Basin) and lower portion (Lower Basin) of the Kissimmee River. Between 1962 and 1971, the 103-mile meandering river was channelized by cutting and dredging a 56-mile-long, 30-foot-deep, and 300-foot-wide canal (C-38 canal). Inflow from the Kissimmee Chain of Lakes became regulated by six water control structures, creating a series of impounded reservoirs, designated as Pools A-E, along the C-38 canal upstream of each structure.

While the project achieved flood protection, it also caused severe damage to the biological communities of the river and floodplain ecosystem. The floodplain at the lower end of each pool continued to be inundated, while the upper pools dried up. The fluctuations in water levels that occurred prior to channelization were eliminated. The channelization of the river destroyed much of the floodplain-dependent ecosystem that nurtured the threatened and endangered species. While the channelization was ongoing, a drastic decline in bird, fish, and other wetland-dependent species was reported in a U.S. Geological Survey. These impacts on the river's natural resources elicited another public outcry, which led to the grassroots efforts to restore the Kissimmee River. The grassroots efforts prompted the 1971 Governor's Conference on Water Management in South Florida, which later resulted in the Florida legislature enacting the 1976 Kissimmee River Restoration Act. Following the passing of this Act, the U.S. Congress later authorized the Water Resources Development Act of 1992, which authorized the Kissimmee River Restoration Project to restore the river's ecosystem. After extensive planning, construction for the Kissimmee River Restoration Project began in 1999, with backfilling 8 miles of the C-38 canal.

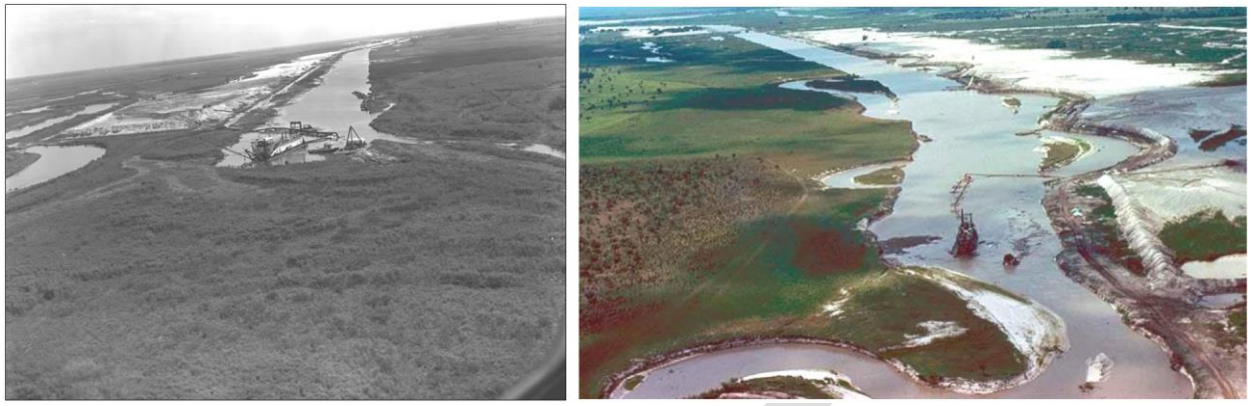


Figure 5. Kissimmee River channelization, Circa 1962–1971.

The Kissimmee River Restoration Project was a joint partnership between the District and the USACE. The project was initially designed to restore over 40 square miles of river and floodplain ecosystem, including 43 miles of meandering river channel and 27,000 acres of wetlands. The restoration involved reestablishing inflows from the Kissimmee Chain of Lakes to achieve flow velocities and volumes similar to those that existed prior to channelization. The construction of the Kissimmee River Restoration project involved backfilling approximately 22 miles of the C-38 Canal, reconnecting the original river channel across the backfilled sections, restoring portions of the river channel that were destroyed during the construction of the C-38 Canal, and removing the S-65B and S-65C water control structures along with their associated tieback levees.

In July 2021, the District and the USACE held a ribbon-cutting ceremony to celebrate the completion of the Kissimmee River Restoration Project.

A more in-depth historical overview of the region can be found in **Appendix A**.

5. RESOURCE DESCRIPTION AND ASSESSMENT

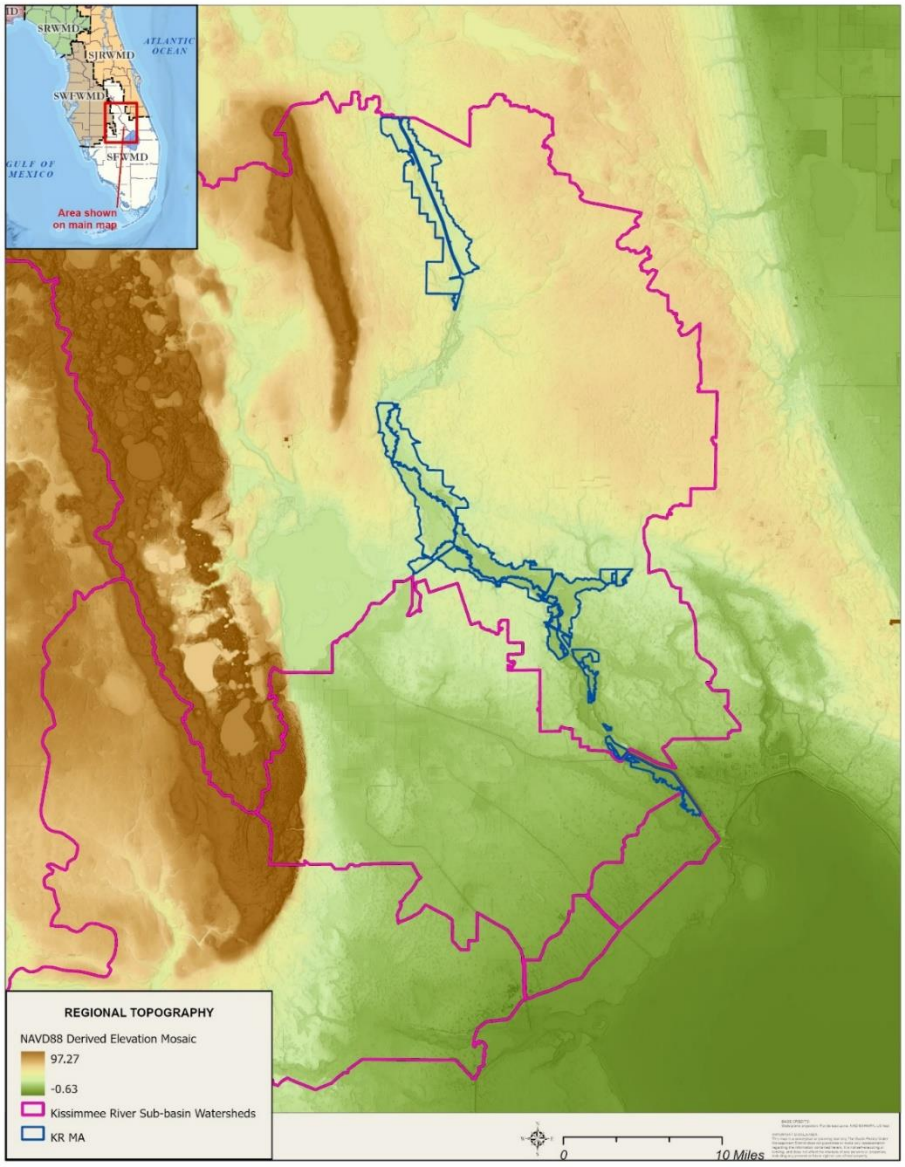
5.1 Infrastructure

The District maintains 118 miles of firelines and 20 miles of service roads through activities such as mowing, tilling, culvert replacement, and road improvements. The District also maintains the perimeter fences annually and conducts periodic repairs or replacements as needed. The District also maintains 23 primitive campsites, four being multi-use camping facilities, one of which is equipped with ADA-accessible features. In addition, there are five pavilions, five boat ramps for both motorized and non-motorized vessels, three airboat launches, two canoe and paddle launches, and 122 miles of recreational trails, all maintained with the assistance of dedicated volunteer groups.

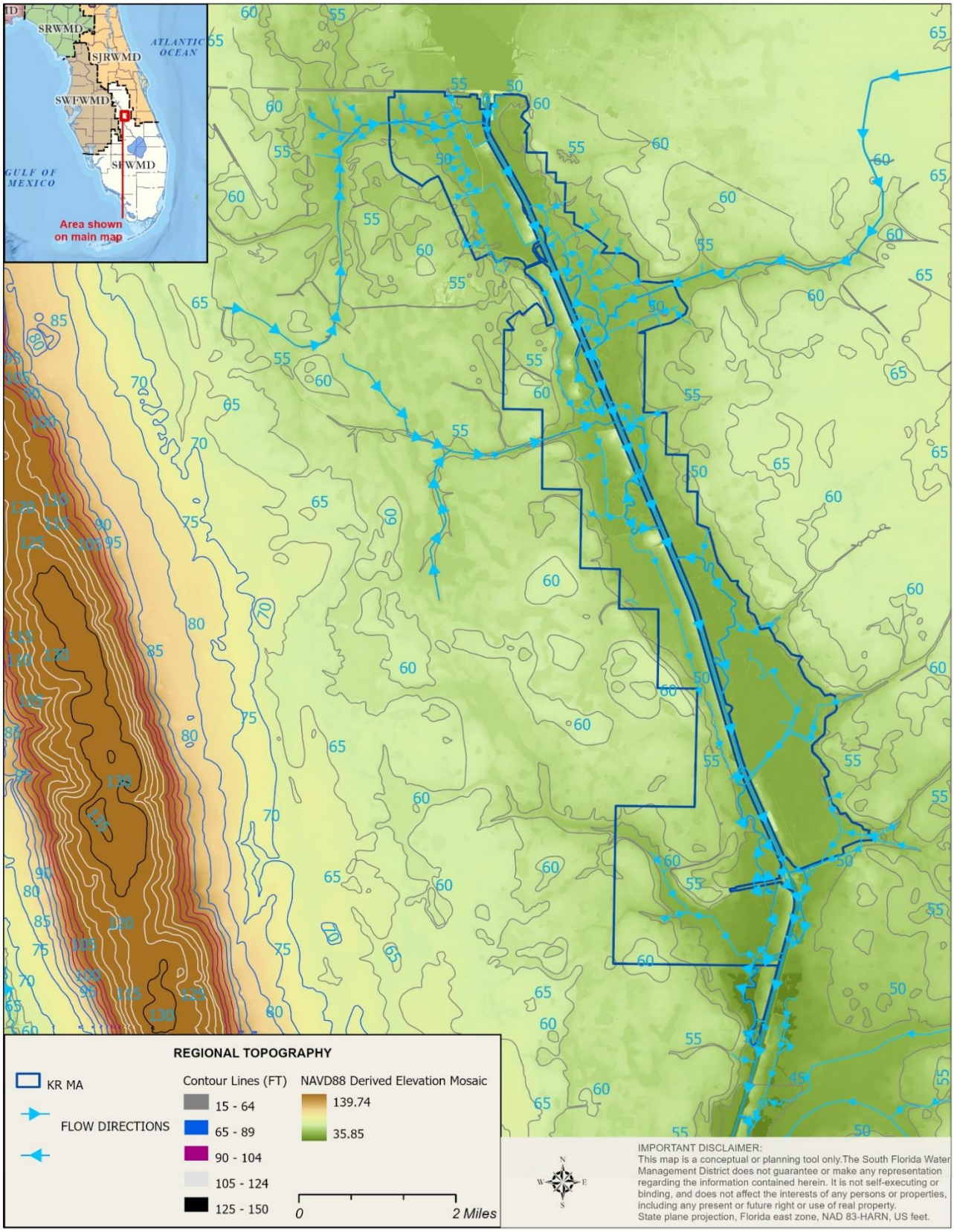
5.2 Physiograph

Topography

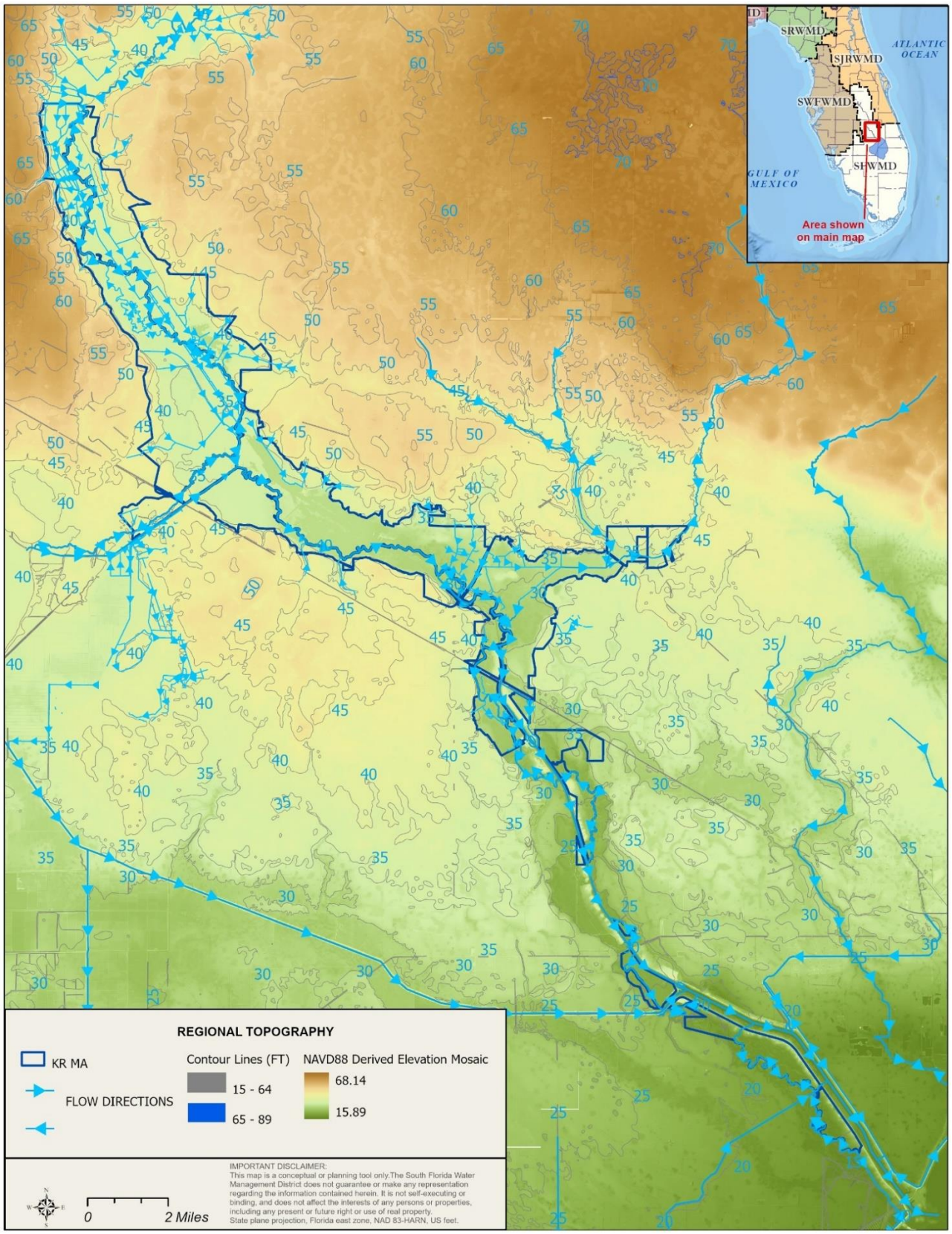
The natural topography in the Kissimmee River Basin (**Maps 3-5**) generally slopes southward toward the low-lying areas and eventually to the Kissimmee River, which originates at the southern end of Lake Kissimmee. Although it is relatively flat, the Kissimmee River basin exhibits greater topographic relief than areas south of Lake Okeechobee. Elevations within the Kissimmee River Basin range from 15 feet to 150 feet above mean sea level (MSL), with the higher elevations concentrated along the western ridges. In the KR MA, elevations range from 50 to 65 feet above MSL in the north, and gradually slope southwards, starting at an elevation of about 51 feet at Lake Kissimmee and reaching about 15 feet near Lake Okeechobee.



Map 3. Regional topography.



Map 4. KR MA (North) regional elevations.



Map 5. KR MA (South) regional elevations.

Geology

The Kissimmee River basin is situated within the Coastal Lowlands of the Coastal Plain physiographic province, extending into the eastern boundary of the Central Highlands physiographic province of the eastern United States. The Coastal Lowlands physiography includes several geomorphic features, including the Atlantic Coastal Ridge, Big Cypress Spur, Big Cypress Swamp, Caloosahatchee Valley, De Soto Plain, Eastern Valley, Everglades, Gulf Coastal Lowlands, Immokalee Rise, Mangrove and Coastal Glades, Osceola Plain, Sandy Flatlands, and the Southwestern Slope. The eastern boundary of the Central Highlands physiographic province encompasses Lake Wales Ridge and Intraridge Valley. The Kissimmee River basin falls within the Lake Wales Ridge, Osceola Plain, and Okeechobee Plain physiographic regions. The KR MA predominantly lies in the Okeechobee Plain (**Map 6**).

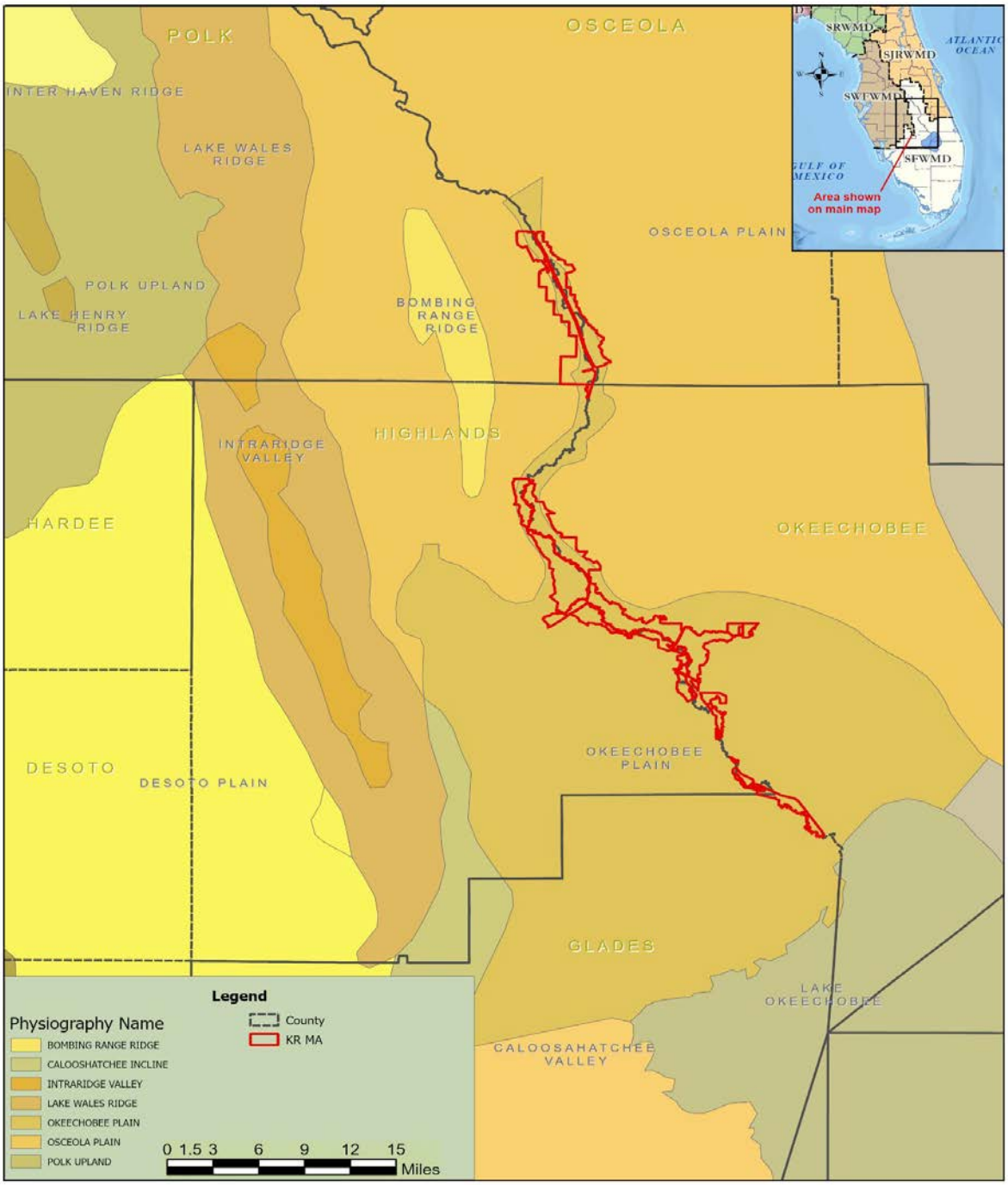
The Osceola Plain has little relief, with the average elevations ranging from about 50 to 75 feet above MSL and generally slopes southward to a low elevation of 40 feet in Okeechobee County. The highest elevation of the Osceola Plain occurs in the northwest corner, where it rises to 90 to 95 feet above MSL. The remainder of the Osceola Plain occurs between 60 and 70 feet above MSL. The Eastern Valley borders it to the east, and the Central Highlands physiography, which includes Lake Wales Ridge, Polk Uplands west, Mount Dora, and Orlando ridges, borders it to the north and the west. Drainage is mainly towards the Kissimmee River basin. A small ridge separates the Osceola Plain from the Okeechobee Plain.

The Lake Wales Ridge is a long, narrow ridge likely developed from a relict beach ridge during periods when the sea level was higher. It has the most prominent topographic feature of the Florida Peninsula, with elevations exceeding 100 feet above MSL. Surface waters east of the ridge flow into the Kissimmee River.

The Okeechobee Plain starts as a narrow, elongated stretch between the Osceola Plain physiographic region and expands southward. It is characterized by gently sloping, poorly drained sands and organic deposits. Elevations range from elevation 15 feet above MSL at Lake Okeechobee to 40 feet elevation in the north from the toe of the scarp that separates it from the Osceola Plain.

The Kissimmee River drainage basin has a complex groundwater system that includes three major hydrogeologic units: the surficial aquifer system, the intermediate confining unit, and the Floridan aquifer system. The surficial aquifer system is primarily recharged by rainfall. The thickness of the surficial aquifer varies considerably and ranges from about 10 to 150 feet below MSL within most of the Kissimmee River drainage basin. In Polk County along the Lake Wales Ridge, the thickness of the surficial aquifer system reaches almost 300 feet. It consists of fine to medium quartz sand, silt, and sandy clay. The intermediate confining unit is roughly 200 feet thick within the basin, but it ranges 50 to 600 feet below MSL in parts of Okeechobee and Highlands counties. It consists of an interbedded sequence of sands, calcareous silts and clays, shell, and phosphatic sand from the Peace River formation and the Arcadia formation, and dolomite. The Floridan aquifer system is subdivided into the Upper and the Lower Floridan aquifer, which are separated by a semi-confining unit. It consists of highly permeable carbonate rocks, primarily limestone and dolomite. The thickness of the Upper Floridan aquifer ranges from 100 to 1,000 feet

below MSL, and the Lower Floridan aquifer ranges from 1,000 to 1,600 feet below MSL. The Upper and Lower Floridan aquifers are composed of two production zones separated by low-permeability confining units. In the northern portion of the Kissimmee River drainage basin, the Upper Floridan aquifer is recharged primarily by direct downward leakance (e.g., through sinkholes) from the surficial aquifer system and, where present, through the intermediate confining unit. (SFWMD, 2020).



Map 6. KR Major geomorphic features.

Climate

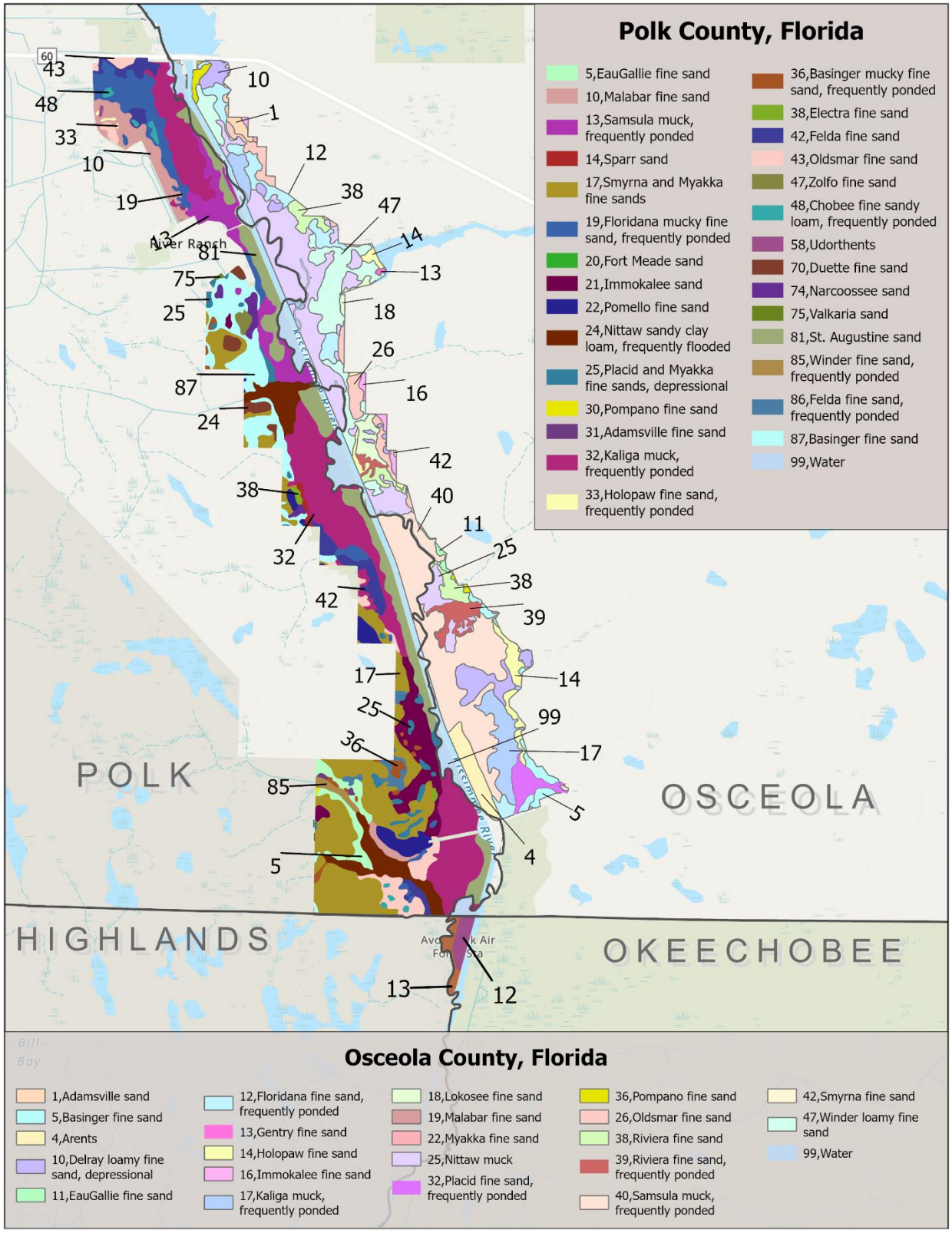
The Kissimmee River Basin experiences a humid subtropical climate characterized by wet and dry seasons of nearly equal length. The average yearly rainfall is 48 inches in the Upper Kissimmee Basin and 45 to 50 inches in the Lower Kissimmee River Basin. Most precipitation occurs during a distinct wet season, which lasts from June to October. El Niño effects during the dry season can lead to above-average precipitation from November to January.

Soils

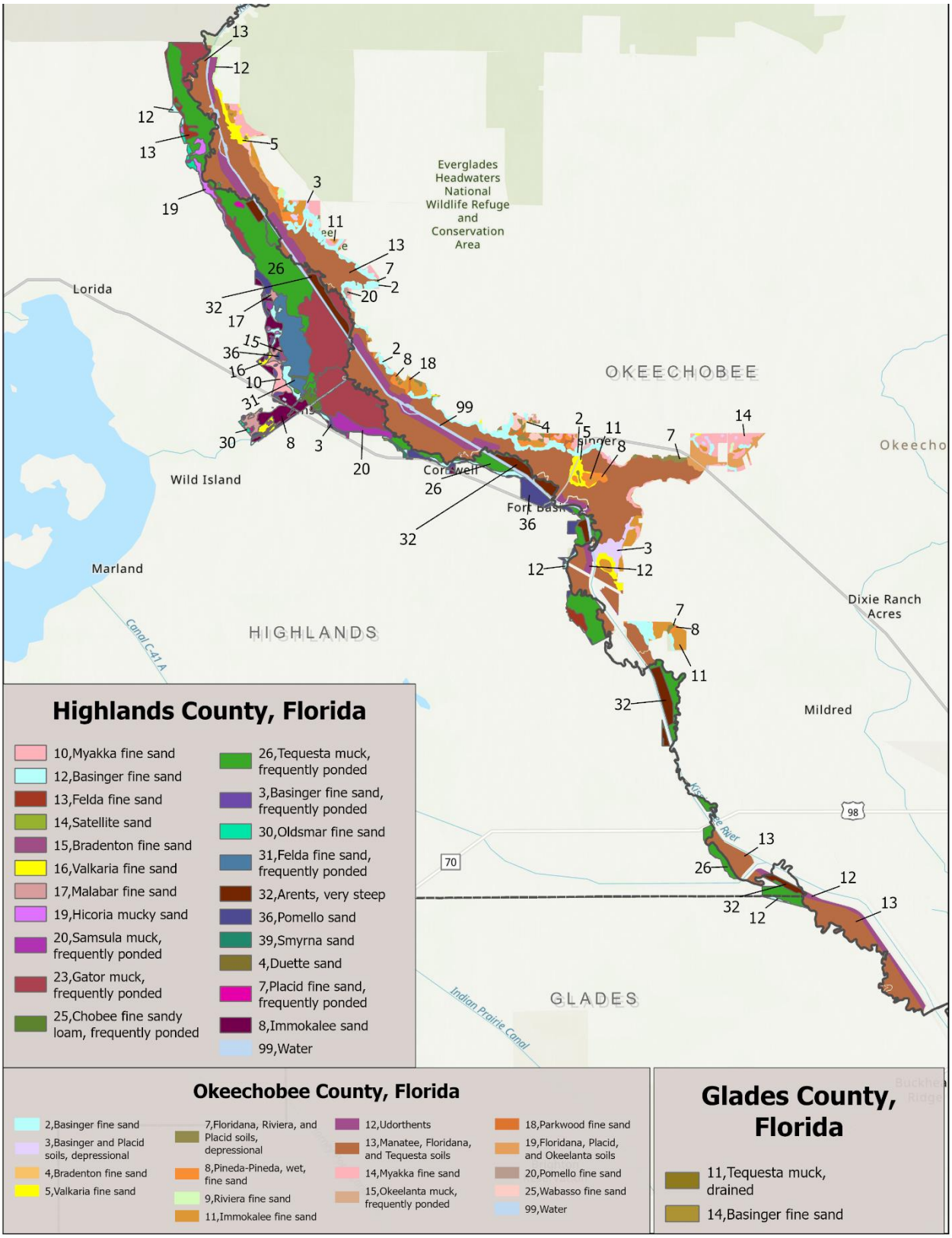
A soil map encompassing the KR MA (**Maps 7-8**) was compiled using Polk and Osceola County soil survey data from the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS).

The sandy soils in the Kissimmee drainage basin primarily originate from marine-deposited silica sands. In Okeechobee County, the main soil compositions in the KR MA are the Manatee Floridana Tequesta complex, and Udorthents soils and Myakka fine sand. In Highlands County, the predominant soil compositions are Tequesta muck, Gator muck, and Arents soils. In Polk County, the primary soil compositions are Kaliga muck, along with the Smyrna and Myakka fine sand complex. In Osceola County, the major soil compositions are Samsula muck and Nittaw muck. In Osceola County, the major soil compositions consist of Samsula muck and Nittaw muck. Other soil compositions throughout the KR MA include Basinger fine sand, Immokalee fine sand, Malabar fine sand, Felda fine sand, St. Augustine sand, Pineda-Pineda, Winder loamy fine sand, Chobee fine sandy loam, Pompano fine sand, Valkaria fine sand, Nittaw sandy clay loam, Floridana mucky fine sand, Delray loamy fine sand, Oldsmar fine sand, Hicoria mucky sand, Holopaw fine sand, Riviera fine sand, Pomello sand, EauGallie fine sand, Parkwood fine sand, Placid fine sand, Lokosee fine sand, Narcoossee sand, Zolfo fine sand, Sparr sand, Satellite sand, Electra fine, Okeelanta muck, Gentry fine sand, Duette fine sand, Bradenton fine sand, Wabasso fine sand, Adamsville fine sand, sand, and Fort Meade sand. In some areas, a hardpan layer lies one to two feet beneath the surface and is linked to perched wetlands. Information about soils is updated by NRCS periodically and available through the NRCS Web Soil Survey.

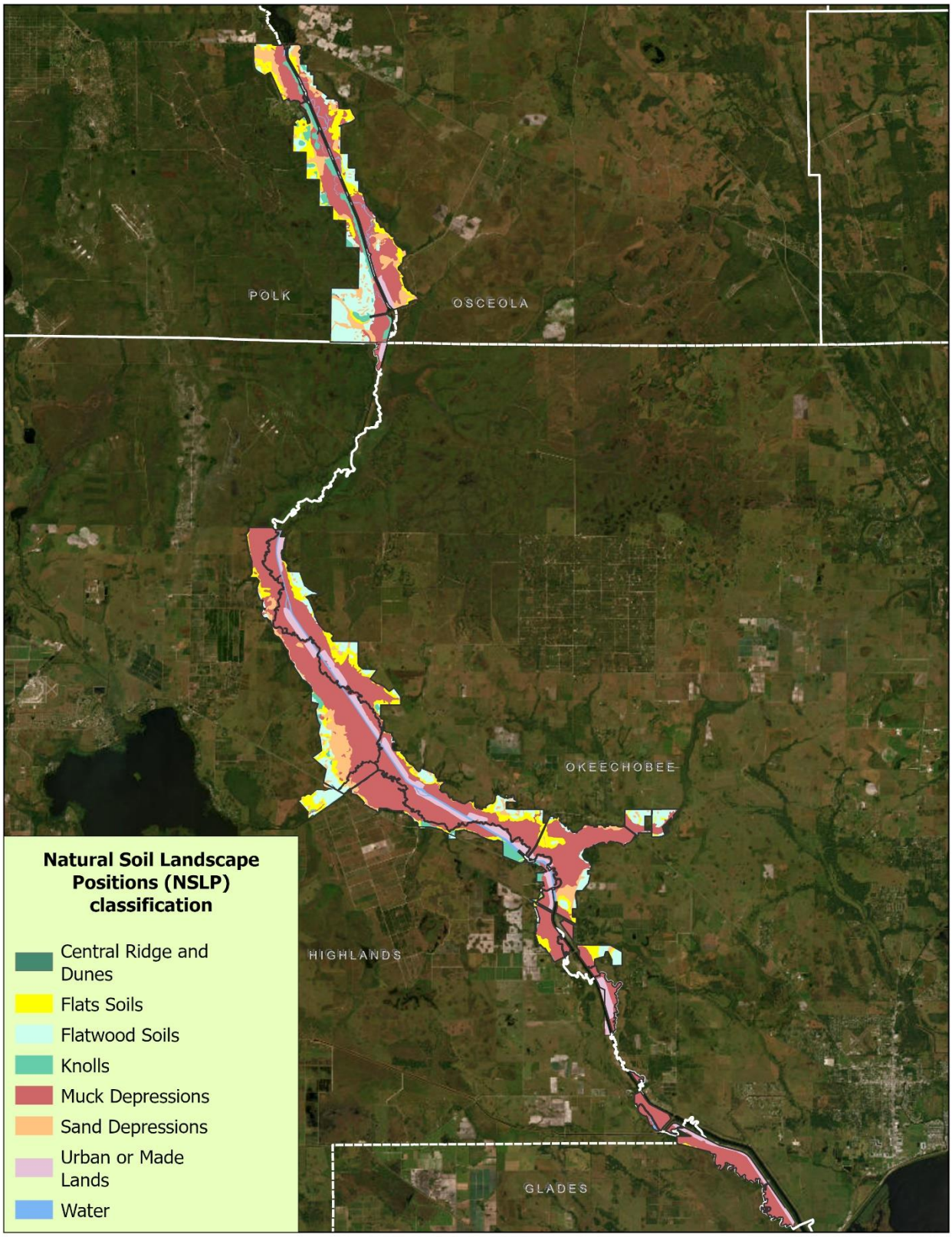
Weathering, erosion, climatic conditions, vegetation effects, and topographical locations of resident soils have resulted in numerous differences in soil characteristics. The Natural Soil Landscape Positions (NSLP) classification system groups South Florida soils into 12 categories based on hydrology and soil morphology that reflect the area's local relative topography, hydrology, and vegetation (Zahina et al. 2001). The soils within the KR MA are classified into seven distinct soil categories: flats soils, flatwood soils, knolls, muck depressions, sand depressions, Central Ridge and Dunes, and urban/made lands (**Map 9**). The soil classification database provides a complete description of soil classification, vegetation associations, and map and data files of NSLP (Zahina et al., 2001).



Map 7. KR MA (North) NRCS soil classifications.



Map 8. KR MA (South) NRCS soil classifications.



Map 9. KR MA NSLP soil classifications.

Soil Contamination and Excavation Sites

Water and soil samples were collected from the KR MA property as part of the environmental assessments for the Kissimmee River Restoration Project to identify potential contaminants. The assessments revealed several areas within the KR MA property with contaminated soil. These on-site contaminants, linked to previous cattle operations, were primarily associated with cattle dipping vats and cattle spray pens. Analysis of the samples indicated that the concentrations of contaminants of concern in the groundwater did not exceed the acceptable levels established by the Florida Groundwater Guidance, meaning that no corrective action or restrictions on the use of the site were necessary. However, elevated levels of contaminants were found in the soil, specifically arsenic contamination in Pool A (KICCO Unit) and Pool C. Additionally, Pool C showed contamination from dichlorodiphenyltrichloroethane (DDT) and related pollutants. As a result, the contaminated soils in these areas were excavated and replaced with clean soil. This remediation was essential for the Restricted I site use-level category designation, which allows for recreational use of the property. Furthermore, the installation of groundwater wells near the former sites of the dipping vats has been restricted. FDEP has confirmed that no further action is required following the cleanup. Given the property's agricultural history, there may be additional cattle dipping vats present. If any new vats are identified, the necessary cleanup will be coordinated with the FDEP.

Hydrology

The KR MA is located within the Lower Kissimmee Drainage Basin, which feeds the Kissimmee-Okeechobee-Everglades system. Its hydrology is closely linked to the Kissimmee River Restoration and the Headwaters Revitalization Schedule (HRS) that manages water discharge into Lake Okeechobee.

The Kissimmee River Drainage Basin is the largest watershed discharging surface water into Lake Okeechobee. Hydrologically, the Kissimmee River Drainage Basin and Lake Okeechobee Drainage Basin downstream function as a single cohesive watershed. The Kissimmee Drainage Basin is divided into two parts: the Upper Basin, covering 1,633 square miles and including Lake Kissimmee, along with the east and west chain of lakes in Orange and Osceola Counties, and the Lower Basin, which covers 758 square miles and includes the tributary watersheds of the Kissimmee River between the outlet in Lake Kissimmee and Lake Okeechobee (USACE, 1991). Furthermore, the basin is subdivided into several sub-basin watersheds. The KR MA falls within five of the sub-basins of the Lower Basin: S-65A, Kissimmee River, S-68E, L-59E, and L-48 **(Map 10**).

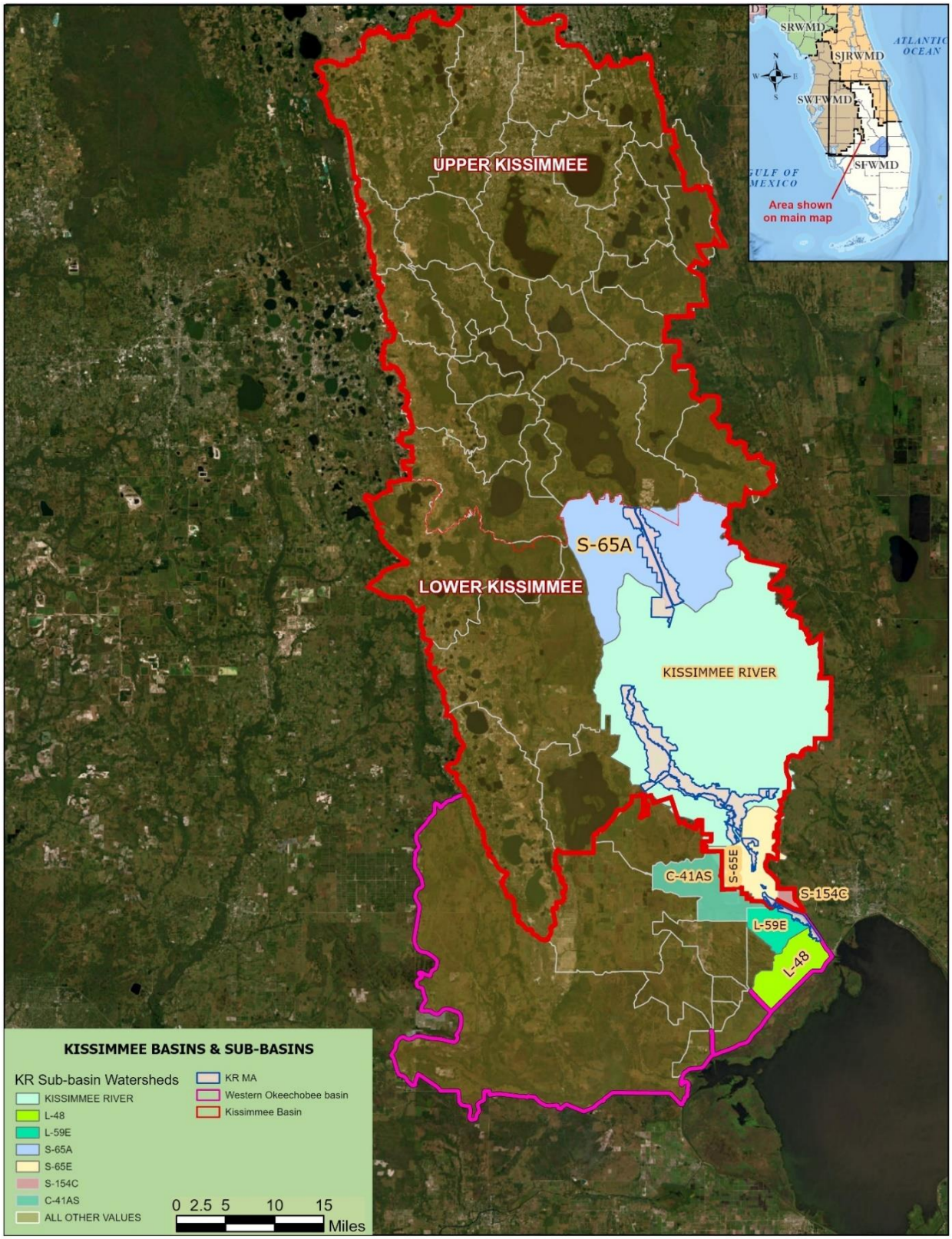
The Kissimmee River primarily drains agricultural lands, crops, and a natural slough system. Historically, the lakes within the Upper Basin were interconnected by streams and sloughs, and the hydrology was cyclical in response to periods of high and low rainfall. During wet seasons, the Chain of Lakes would overflow, creating expansive, marshy connections between the lakes. Flows through the Upper Basin originated near Alligator Lake, flowing northward through the East Chain of Lakes to Lake Hart, and then southward through East Lake Tohopekaliga, Lake Tohopekaliga (Lake Toho), Lake Cypress, Lake Hatchineha, and Lake Kissimmee. The Chain of Lakes had limited outfall capacity via the meandering natural Kissimmee River, functioning as natural

reservoirs that temporarily stored water during the wet season and released it throughout the rest of the year. The Kissimmee River basin was characterized by upland and floodplain retention with slow runoff. Under these conditions, the river flowed gradually, with average velocities usually below two feet per second. Hydrologic data from 1934 to 1960 indicate that overbank flooding occurred 35 to 50% of the time.

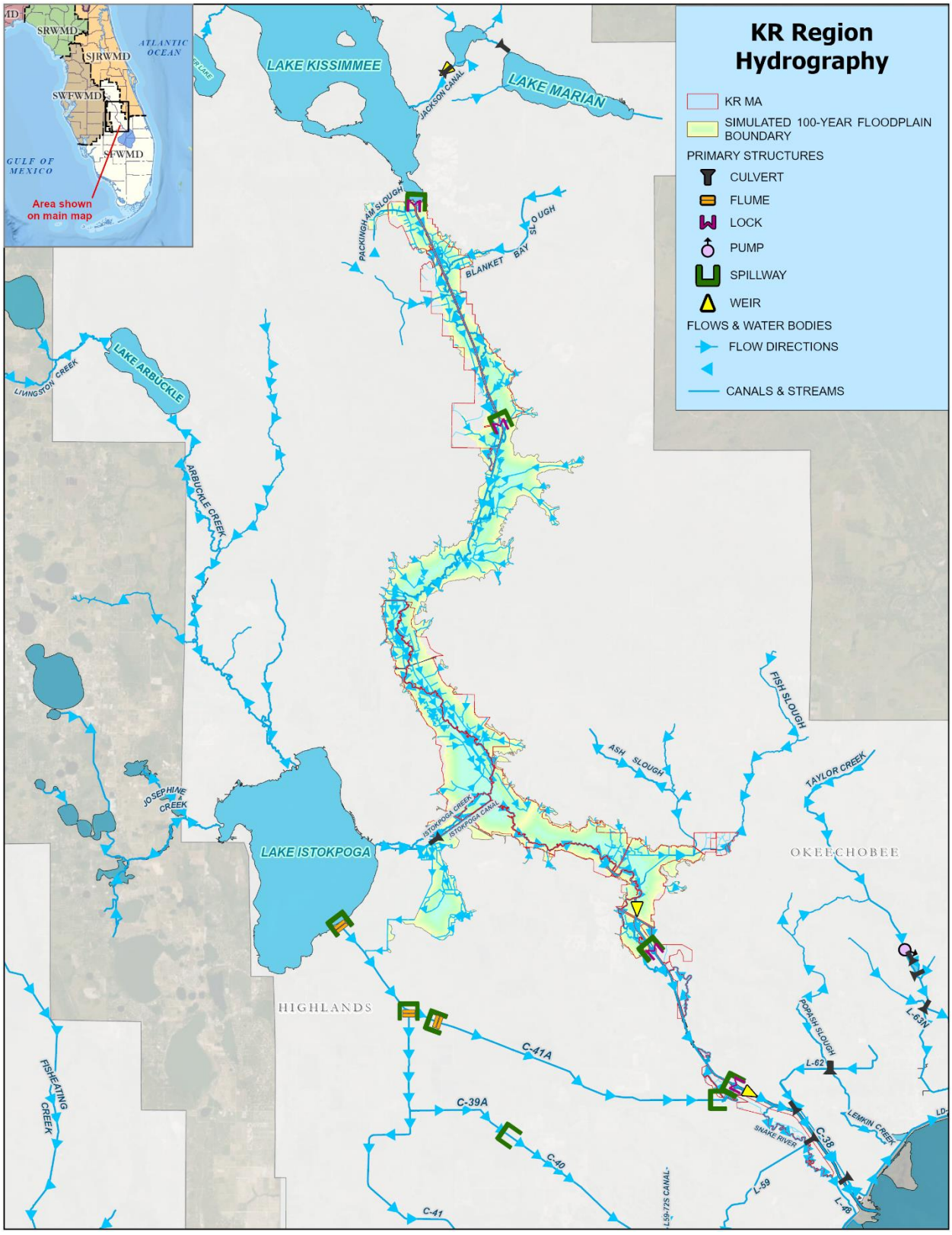
Between 1964 and 1970, several control structures were constructed as part of the Central and South Florida Flood Control Project to manage water levels and outflows in the Upper Basin. This project established a system for regulating water levels in the Upper Basin with a schedule designed to reduce flooding risks. Equipped with multiple gates, these structures can be opened or closed according to a stage regulation schedule that defines the necessary seasonal and monthly limits for the intended flood protection. The primary outfall structure, S-65, located at the southern end of Lake Kissimmee, regulates the outflow of the Upper Basin watershed. Recently, the regulation schedule for the Upper Basin was modified as part of the Headwaters Revitalization Project, which will be implemented in several phases. The new schedule, HRS, will gradually increase seasonal water storage in Lake Kissimmee, Lake Cypress, and Lake Hatchineha over the coming years. Once fully implemented, this schedule will allow lake water levels to rise 1.5 ft higher than the current S-65 schedule permits and will enhance the water storage capacity in Lakes Kissimmee, Hatchineha, Cypress, and Tiger by approximately 100,000 acre-feet.

In the Lower Basin, the main source of surface water is the inflow from the S-65 Structure, along with contributions from rainfall, floodplain wetlands, and other storage areas. This water flows into the Lower Basin via the C-38 Canal, subsequently moving into the restored portions of the Kissimmee River and continuing southward to Lake Okeechobee (**Map 11**).

The Lower Basin has experienced a substantial shift in land use over the past 70+ years. Between 1958 and 1972, there was a rapid transformation of natural lands into improved pastures. This shift in land use negatively affected the hydrology of the lower basin because the expansion of agricultural land required the construction of extensive tertiary ditch systems, which ultimately drained the basin. It was estimated that the drainage density in the lower basin increased from approximately 1.59 mi/mi². under historic drainage conditions to about 4.43 mi/mi^2. after the introduction of artificial drainage. Historically, the Kissimmee River Basin featured vast areas of poorly drained and perched wetlands, attributable to hardpan found one to two feet beneath the surface. The increase in land use and the subsequent need for flood protection in the basin have drained these wetlands using surface drainage systems and by breaking up the original hardpan. These formerly perched wetlands, along with the floodplain marshes, were interconnected with ditches to quickly drain the surface runoff. The extensive ditching and accelerated drainage on agricultural lands led to the straightening and channelization of the drainage systems.



Map 10. Kissimmee River Basin watersheds and sub-watersheds.



Map 11. Kissimmee River Basin Regional hydrography.

After the channelization of the river, five control structures (S-65A, S-65B, S-65C, S-65D, and S-65E) were used to regulate water levels in the Lower Basin, creating impoundments Pools A through E. This regulated flow altered the natural flow and stages of the Kissimmee River, resulting in significantly lower water levels in the northern reach and notably higher levels in the southern reach, which had a significant impact on the marshes in the northern reach. Water levels of around 10 to 12 feet decreased to roughly 3 to 4 feet at each location along the river. From 1970 to 1980, the water levels in Pool B remained below the average floodplain elevation, estimated at 43 feet NGVD (National Geodetic Vertical Datum). In contrast, Pool D experienced floodplain stages that exceeded the average ground elevation of 28.5 feet NGVD roughly 70 percent of the time. The reduced storage upstream and accelerated water movement downstream led to a change in hydrology in the Lower Basin, shifting the characteristics from upland and floodplain retention with slow runoff to upland and floodplain drainage with rapid runoff.

The Kissimmee River Restoration Project dismantled Structures S-65B and S-65C, eliminating these impoundments. Additionally, Structures S-65, S-65A, S-65D, and S-65E were modified to enhance the management of flow and water levels in the Kissimmee River and its floodplain. After the restoration was completed in 2021, approximately 69% of the project's length consisted of segments of the natural river channel, which were reconnected to restore historical flow after being severed by the excavation of the C-38 Canal. Another 27% of the project's length consisted of reconstructed river channels that were destroyed during the C-38 Canal's excavation. The remaining 4% included connector channels crossing the backfilled C-38 Canal, which helps prevent erosion. By reestablishing flow in the Kissimmee River channel through the backfill of the C-38 Canal, water levels can now fluctuate with variable flows, leading to periods of floodplain inundation and recession. For example, three floodplain inundation events recorded in 2024 resulted in flows exceeding the bankfull discharge into the river floodplain. Nonetheless, because of the significantly altered hydroperiod, simply backfilling is unlikely to restore adequate flow to the marshes in the Lower Basin because the downstream structure, S-65D, cannot maintain floodplain water levels without considerable inflow from the Upper Basin, which supplies the majority of the water volume. Therefore, to achieve consistent floodplain inundation that simulates conditions before channelization, it was crucial to adjust the discharge release schedule from S-65 to better reflect the natural flow conditions vital for wetland restoration.

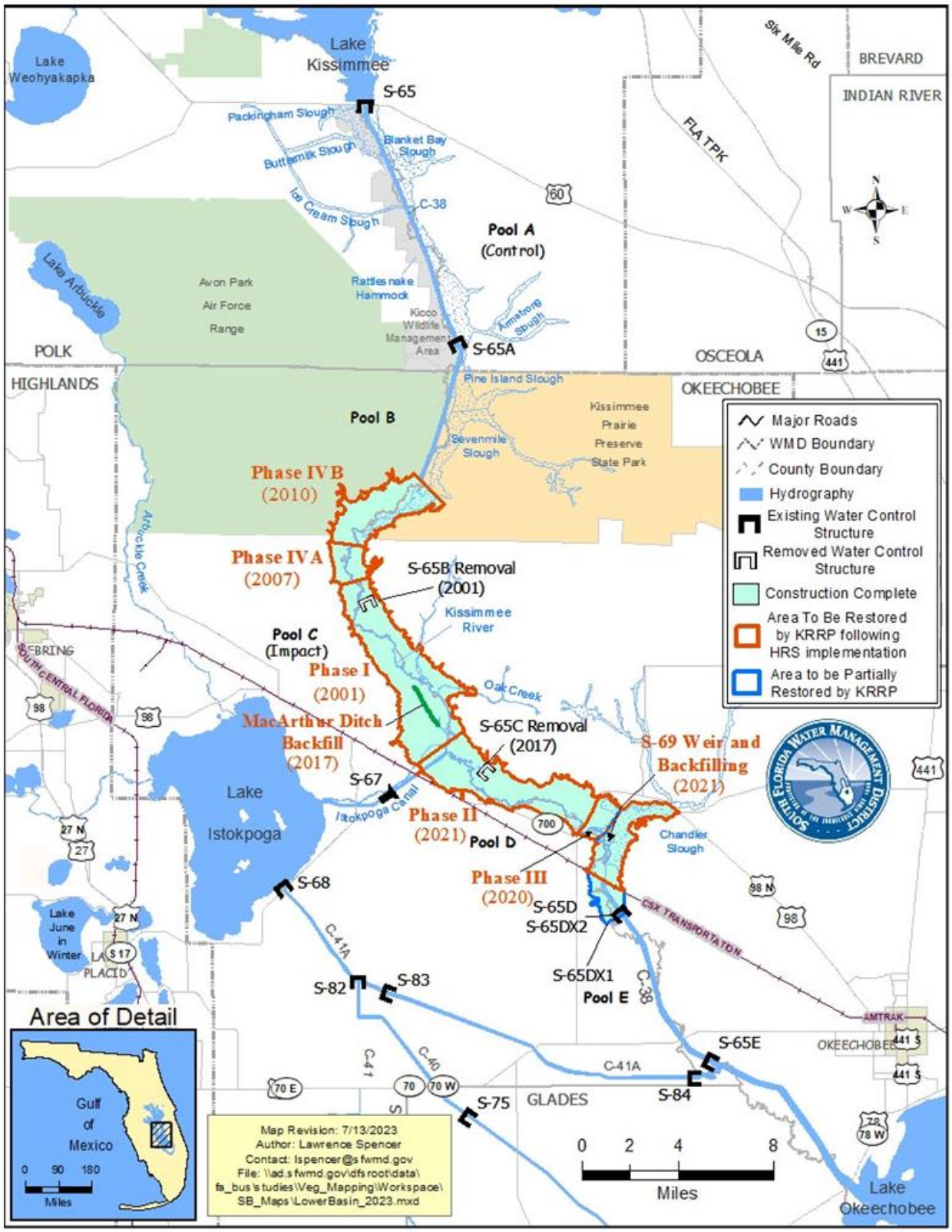


Figure 6. *O*verview of key *f*eatures and *c*onstruction *p*hases *of the* Kissimmee *River Restoration.*

5.3 Vegetation

The protection and preservation of native plant communities within the KR MA are central to the Land Stewardship Section's core mission. Twelve distinct natural community types exist within the KR MA (**Maps 12-13; Figure 7**). These communities are classified according to the Florida Natural Areas Inventory (FNAI) Classification System (FNAI, 2010) and the Florida Land Cover Classification System (Kawula & Redner, 2018), which are used by the District to group and describe natural community types consistently across management areas. These classification systems provide a consistent framework for describing and managing ecological communities across District lands. The communities are actively managed through prescribed fire, invasive species control, and mechanical treatments to maintain ecological integrity and resilience. Adaptive management strategies are applied based on each community's response to land management practices, allowing for the restoration of degraded habitats, the promotion of native plant diversity, and the prevention of invasive species encroachment. Collectively, these efforts support the long-term conservation of the region's botanical diversity, including state- and federally listed plant species.

The KR MA is predominantly characterized by extensive floodplain marshes, which provide critical habitat for a diverse array of flora and fauna, contributing significantly to the region's ecological integrity. Detailed descriptions of both natural communities and altered landcover types are provided in Appendix B, and Appendix C lists the species that utilize these habitats.

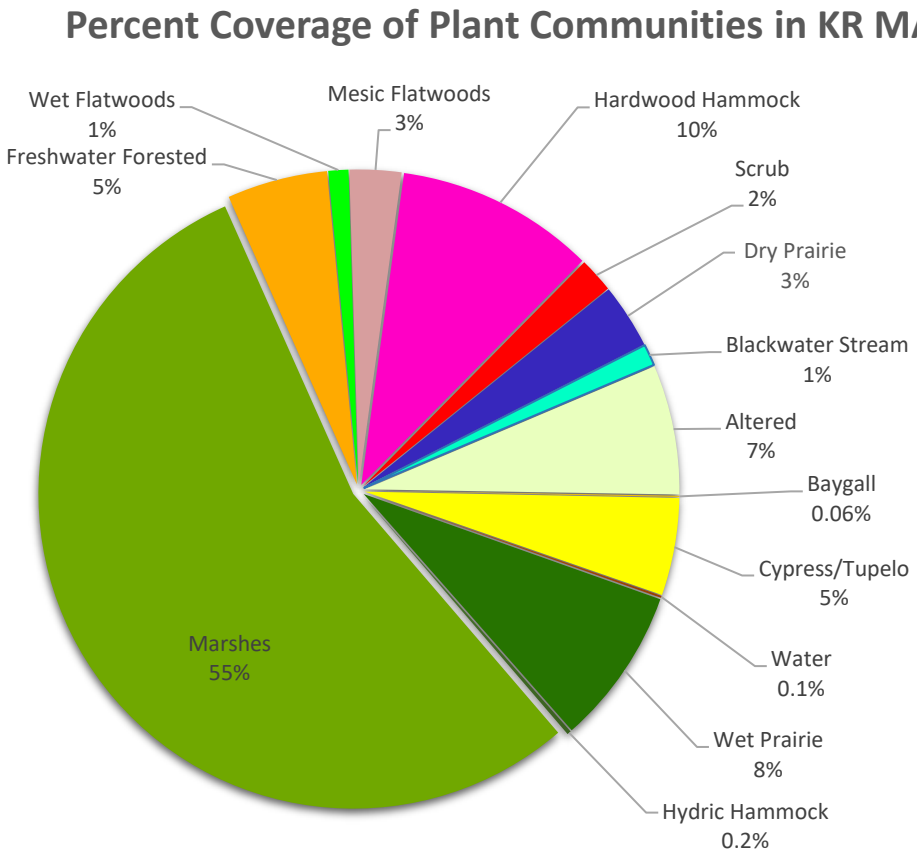
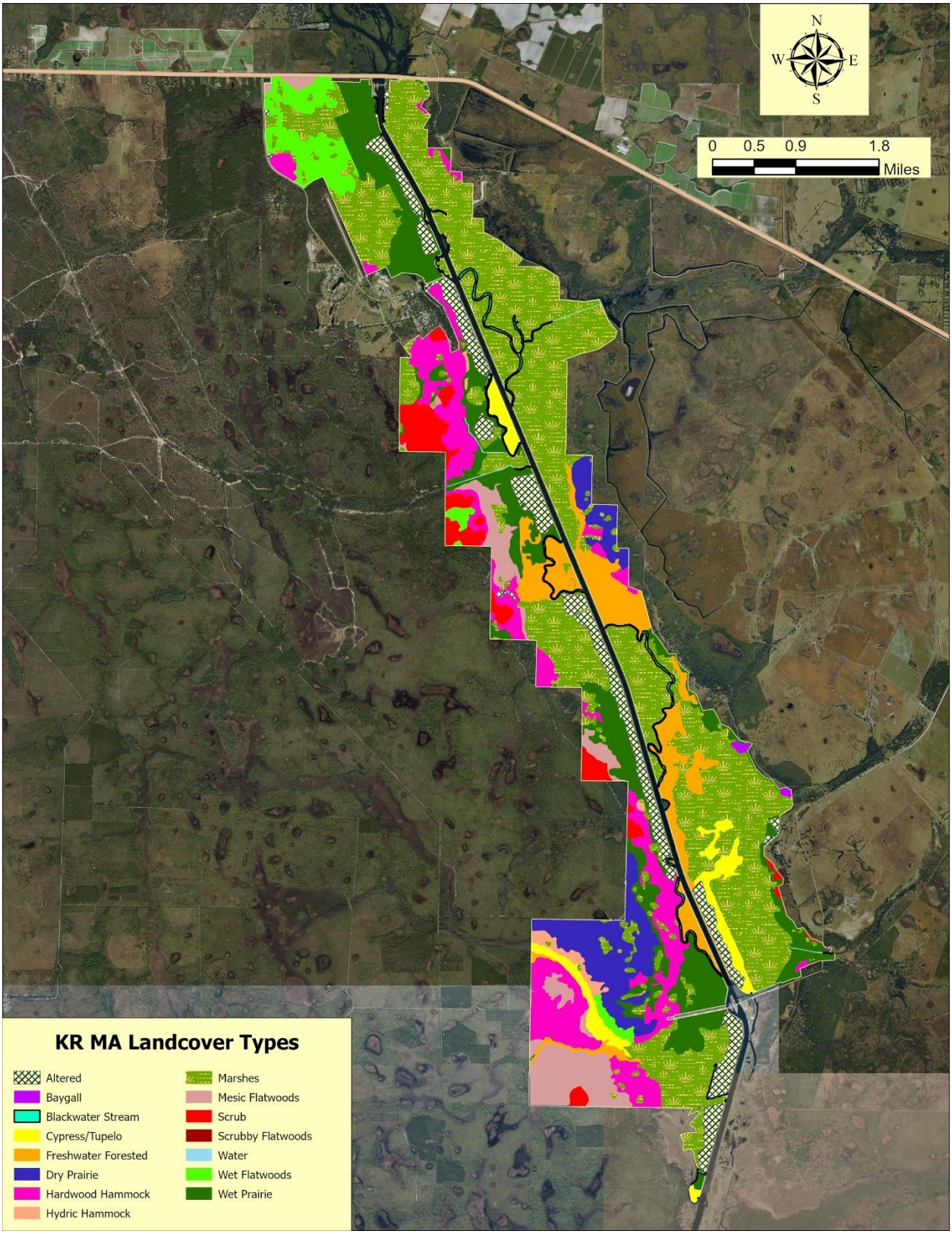
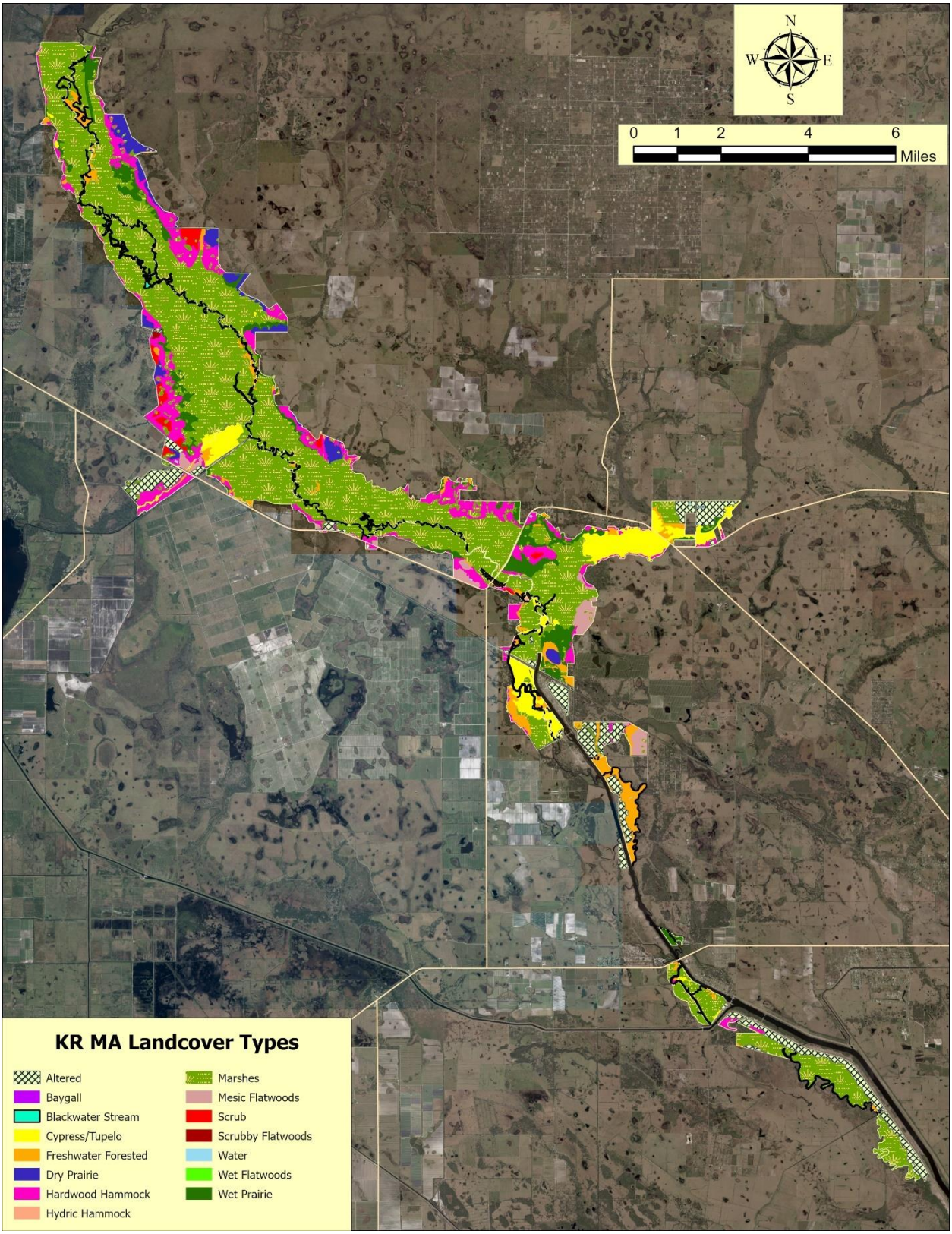


Figure 7. Plant community classifications within KR MA.



Map 12. Distribution of Natural Communities and Altered Landcover in KR MA (North).



Map 13. Distribution of Natural Communities and Altered Landcover in KR MA (South).

Listed Species

Listed species include those plants and animals identified as rare, threatened, or endangered by the U.S. Fish and Wildlife Service (FWS), FWC, and the Florida Department of Agriculture and Consumer Services. The Kissimmee River and its floodplain provide for several federal and state-listed endangered or threatened plant and animal species. **Table x** provides a list of these plant species identified within the management area.

Table 2. Listed plant species associated with the KR MA and current status.[a]

Common Name	Scientific Name	Status
Bulbous wild pine; Northern needleleaf	Tillandsia balbisiana	ST
Cardinal airplant; Stiff-leaved wild pine	Tillandsia fasciculata	SE
Giant orchid	Orthochilus ecristatus	ST
Giant wild pine	Tillandsia utriculata	SE
Giantspiral ladiestresses	Spiranthes longilabris	ST
Lowland loosestrife	*Lythrum flagellare*	SE
Yellow butterwort	Pinguicula lutea	ST

a. Key to abbreviations: Species listed by the State of Florida as State-designated Threatened (ST) & State-designated Endangered (SE).

Nuisance and Invasive Plant Species

South Florida's subtropical climate provides an excellent growth environment for the rapid spread of nuisance and invasive plants that can cause extensive alterations to the natural ecosystems. Nuisance and invasive plant infestations can result in partial or total displacement of native plants, loss of wildlife habitat, and the degradation of public use areas. Environmental changes caused by extensive hydroperiod alterations have been a major factor in the nuisance and invasive plant colonization within the KR MA. Without proper land management, nuisance and invasive plant expansion will continue to displace our native plants, reduce wildlife utilization, and degrade public use areas. The District is committed to reducing the proliferation of invasive species to protect its management areas' ecological values (SFWMD, 2020).

5.4 Wildlife

The Kissimmee River and its floodplains are home to a rich variety of fish and aquatic life, including unique species of fish. The abundance of fish in the area attracts many birds, some of which migrate seasonally from various continents. The river floodplain has historically been an important habitat for wading birds, waterfowl, amphibians, and reptiles during winter and breeding seasons, serving as a crucial refuge for wildlife. Many endangered bird species rely on the shallow wetlands in the basin for feeding and nesting. The wading bird populations in the Kissimmee River basin steadily declined throughout the 1800s and 1900s due to factors such as commercial plume hunting, destruction of marsh habitats, changes in hydrology, and increased competition from other species. Since the restoration, populations of wading birds and waterfowl have gradually increased, with the restored portions of the river now averaging numbers that exceed the goals established for these restoration efforts.

The diverse plant communities and wetland systems within the KR MA provide critical habitat for a wide range of wildlife, including birds, amphibians, reptiles, mammals, and fish. These habitats support essential life functions such as foraging, nesting, breeding, and sheltering. Wetlands, in particular, serve as vital nursery areas for fish species native to the Kissimmee River and contribute to the overall productivity of the ecosystem. Wildlife management in the KR MA is centered on preserving and enhancing these habitats to benefit both common and imperiled species. The District maintains and improves habitat quality across the landscape through integrated land management practices. These strategies are designed to support the needs of species known to occur within the KR MA or the surrounding region, including numerous state- and federally listed species. Conservation efforts are adaptively managed to ensure they remain effective in promoting the recovery and long-term sustainability of native wildlife populations.

Several surveys have been conducted to create a species inventory of the animals observed in the KR MA, including birds, mammals, reptiles, and amphibians. In addition to the species documented during these surveys, some have expanded from nearby populations, while many migratory species may be transient within the management area during annual migrations. Other species may visit the management area when foraging away from their nearby roosting or breeding sites. As new species are observed, the species list is updated to reflect these observations and their protected status. The latest update can be found in **Appendix C**.

Rare, Threatened and Endangered Listed Species

The KR MA supports a variety of federally protected wildlife species. Several federally listed wildlife species have been observed in the management area, including four (4) listed as endangered, four (4) as threatened, and one (1) as threatened due to similarity of appearance. The area also supports seven (7) species designated as state threatened. Additionally, several other listed species that are known to utilize the Kissimmee River floodplain and nearby preserves may be foraging on the property, although they have not yet been confirmed within the KR MA. A list of these species is included in **Table 3.**

Table 3. Listed wildlife species utilizing the KR MA and current status.[a]

	Common Name	Scientific Name	Status
		Birds	
CONFIRMED	Burrowing Owl	*Athene cunicularia floridana*	ST
	Crested caracara	*Caracara plancus*	FT
	Everglades Snail Kite	*Rostrhamus sociabilis plumbeus*	FE
	Florida Grasshopper Sparrow	*Ammodramus savannarum floridanus*	FE
	Florida Scrub Jay	*Aphelocoma coerulescens*	FT
	Little blue heron	*Egretta caerulea*	ST
	Red-cockaded Woodpecker	*Picoides borealis*	FT

	Roseate Spoonbill	*Platalea ajaja*	ST
	Southeastern American Kestrel	*Falco sparverius paulus*	ST
	Tricolored heron	*Egretta tricolor*	ST
	Wood stork	*Mycteria americana*	FT

Table 3 (Continued). Listed wildlife species utilizing the KR MA and current status.[a]

	Common Name	Scientific Name	Status
		Herpetofauna	
	American Alligator	*Alligator mississippiensis*	FT(S/A)
	Eastern Indigo snake	*Drymarchon corais couperi*	FT
	Florida Pine Snake	*Pituophis melanoleucus mugitus*	ST
	Gopher Tortoise	*Gorpherus polyphemus*	ST
		Mammals	
	Florida Bonneted bat	*Eumops floridanus*	FE
	Florida Panther	Felis concolor caryi	FE
UNCONFIRMED		Birds	
	Eastern Black Rail	*Laterallus jamaicensis jamaicensis*	FT
	Whooping crane	*Grus americana*	FXN
		Herps	
	Bluetailed Mole Skink	*Plestiodon egregius lividus*	FT
	Sand skink	*Neoseps reynoldsi*	FE
	Short-tailed Snake	*Lampropeltis extenuate*	ST
		Mammals	
	Florida Manatee	*Trichechus manatus latirostris*	FT

a. Key to abbreviations: Species listed by the State of Florida as Federally-designated Endangered (FE), Federally-designated Threatened (FT), Federally-designated Threatened because of similarity of appearance [FT(S/A)], FXN Federally-designated Threatened Nonessential Experimental Population.

5.5 Cultural Resources

Twenty-one prehistoric archaeological sites identified in the KR MA are registered in the Florida Master Site File due to their significance. These sites include various features, such as prehistoric campsites, middens, mounds, and historic earthworks. Of the twenty sites, eleven have been evaluated for eligibility for the National Register of Historic Places (NRHP), and six of these have been deemed eligible. Additionally, other significant sites have also been identified in the surrounding area.

Specific site locations and detailed descriptions of the cultural resources within the KR MA are excluded from this plan due to the sensitive nature of this information. The District is dedicated to preserving the integrity of cultural resource sites within the management area. The management

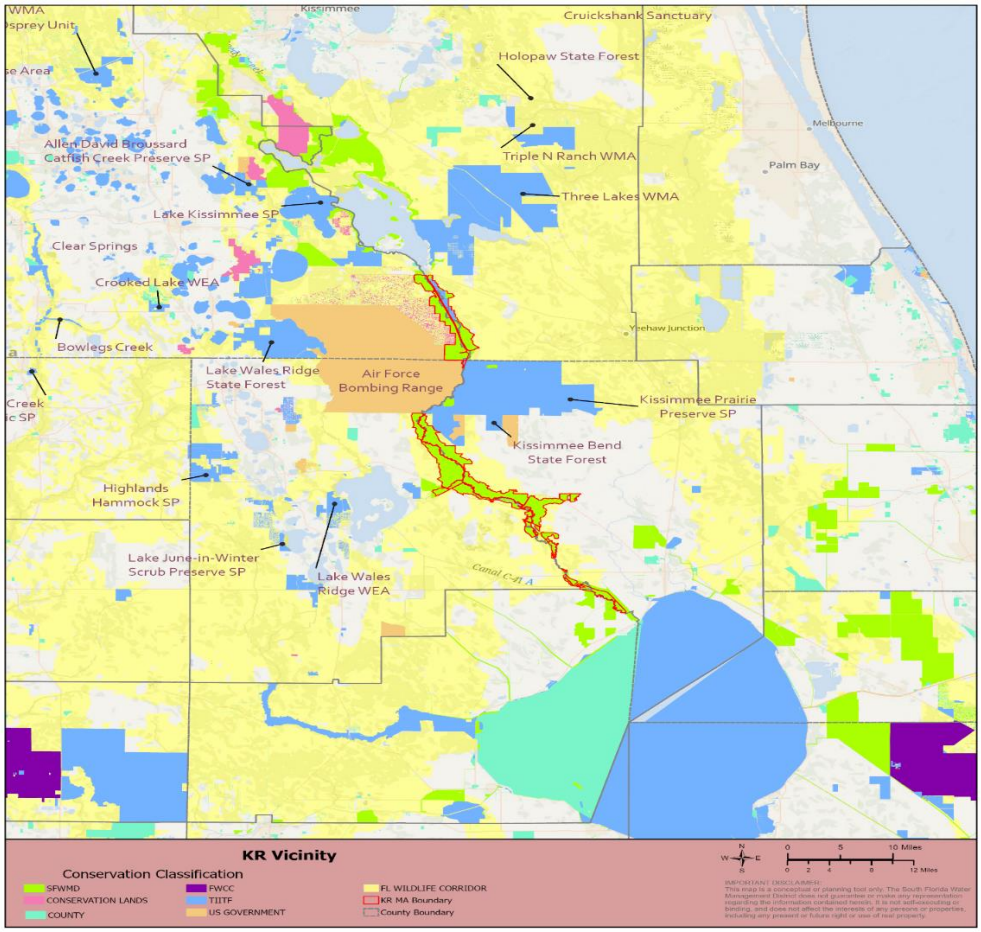
goal for cultural resources within the KR MA is to preserve the sites and artifacts that represent Florida's cultural periods. Land managers focus primarily on monitoring and prohibiting ground-disturbing activities in and around these archaeological sites. Vegetation management and prescribed burning activities are carefully conducted to reduce the impact on these resources.

5.6 Mitigation

The FWC has designated the Fort Basinger Unit as a long-term recipient site for gopher tortoises to satisfy the regulatory mitigation obligations associated with relocating this species. The District acquired a permit (FWC Permit #GTLR-17-00003A) to move gopher tortoises from various District project locations to the Fort Basinger Unit, which has been accepting relocated tortoises since 2017.

5.7 Potential Additions

The District acquires land through donations, mitigation, and purchase. Acquiring land within the Kissimmee River watershed helps achieve the environmental benefits of the Kissimmee River Restoration Project. The District and external partners have acquired almost 100,000 acres within the Kissimmee River basin to date. Land acquisition for the Kissimmee River Restoration Project through the SOR program is nearly complete, with approximately 1,263 acres remaining. While most lands within the Kissimmee River Restoration footprint are held in the public interest or easement, some private inholdings are within the Florida Forever acquisition boundary (**Map 14**). Acquiring these parcels, along with fee simple acquisition of abutting easements through a willing seller program, would enhance the continuity of conservation lands and the configuration of management area boundaries.



Map 14. Conservation Lands in the Vicinity of the KR MA.

6. PUBLIC USE

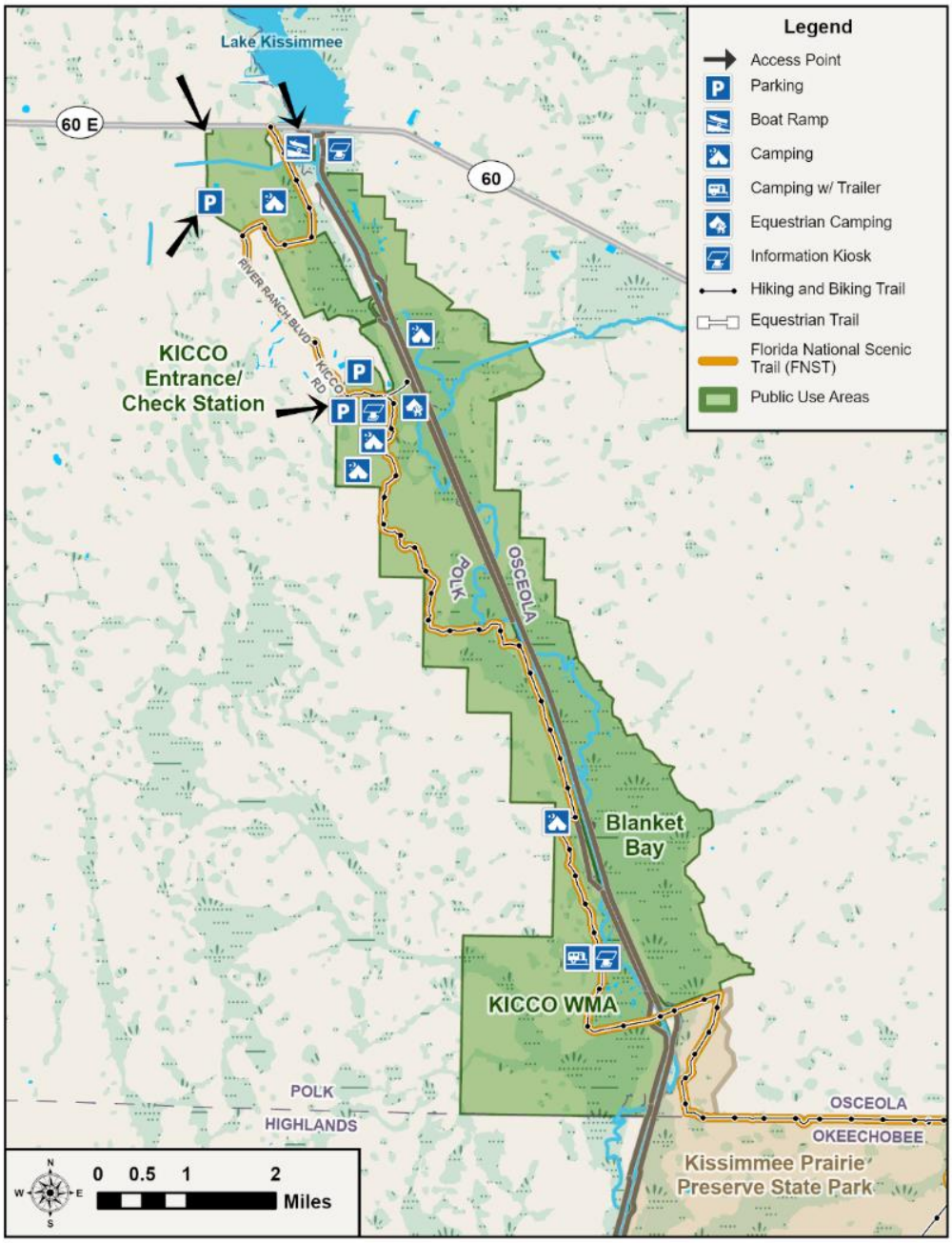
The KR MA is intersected by State Road 60, State Road 70, and US Highway 98. Access to the management area is mainly through public and private boat and airboat ramps, although some management units are accessible by road. This includes the KICCO Unit, which is accessible from SR 60. The Hickory Hammock, Micco Landing, Fort Basinger, Cornwell Marsh West, Turkey Hammock West, and the Chandler Slough units can be accessed via US Highway 98. Paradise Run is accessible from SR 78.

The District encourages public use of management areas for appropriate natural resource-based activities. District lands are generally available for public use, except in instances where the public use would be incompatible with the purposes for which these lands were acquired, there is no legal public access, or where construction activities prohibit public entry. Public input into the management of these areas is solicited at the District's quarterly Recreational Forum Meetings. In coordination with partnering agencies, adjustments to public use opportunities are made on an ongoing basis through the Recreational Forum Meetings and rulemaking, if necessary. This plan describes the scope of public use opportunities available or planned as of the date of the management plan. Compatible recreational activities on District lands typically include hiking, biking, hunting, fishing, frogging, horseback riding, canoeing, geocaching, boating, primitive

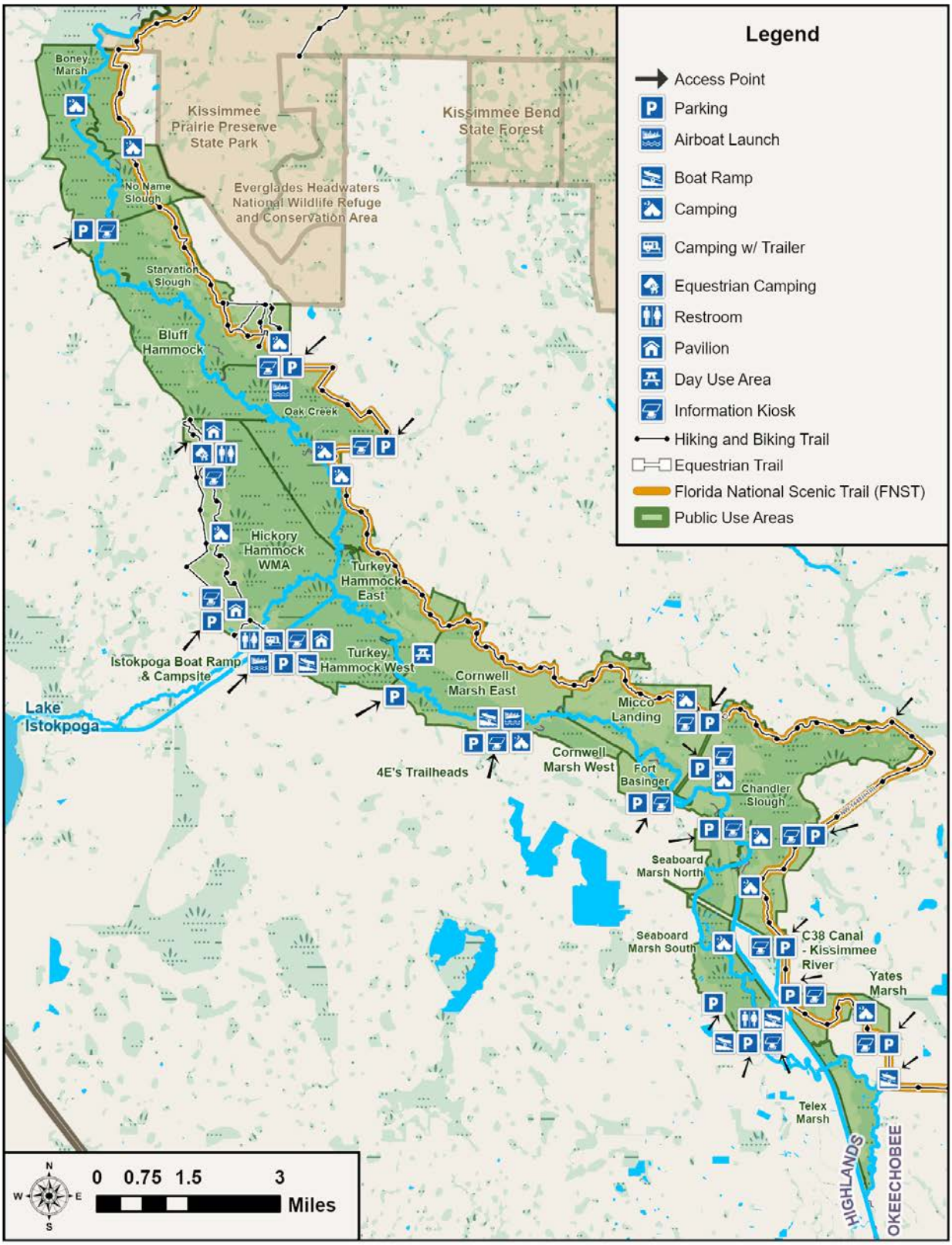
camping, environmental education, wildlife viewing, nature photography, natural history study, and flora and fauna identification. These activities are designed to maximize the diversity and variety of recreational options available while ensuring the necessary resource protection measures are in place. This approach helps to maintain conservation values and ensures long-term benefits for the public.

Most of the KR MA property is designated as a Public Use Area (PUA) to provide the public with recreational access. The KICCO and Hickory Hammock units are also designated by FWC as Wildlife Management Areas (WMAs). Popular recreational opportunities offered in the KR MA include boating, airboating, canoeing, kayaking, fishing, picnicking, hiking, biking, horseback riding, camping, hunting, stargazing, wildlife viewing, and nature photography. The campgrounds and recreational trails are popular attractions in the KR MA. The public has access to over 57 miles of hiking and biking trails, along with 23 miles of equestrian trails. Additionally, nearly 42 miles of the Florida National Scenic Trail are located within the KR MA, linking the KR MA management units with nearby parks, including the Kissimmee River Prairie State Park and Three Lakes Wildlife Management Area. Some service roads are accessible to the public with a valid permit. The District offers a Special Use License that allows the public to participate in various recreational activities, including equestrian camping and camping with an RV or Trailer in the KR MA, free of charge. There are designated sites for camping throughout the management area. Primitive camping spots also exist at various locations along the river. Furthermore, the restored Kissimmee River was designated as an official state Blueway in 2024, providing outstanding paddling opportunities along the waterway. The Kissimmee River Blueway extends over 76 miles, from the Lake Kissimmee lock (S-65) to C. Scott Driver Park near Lake Okeechobee. The Fort Basinger Unit, specifically designated for stargazing, offers a unique opportunity for astronomy enthusiasts. The recreational amenities on the KR MA are illustrated in **Maps x-x.** Additional details, including the locations of recreational points of entry and special use licenses, are available on the District's recreational guide and website, as well as the websites of the Florida Trail Association, the Florida Paddling Trails Association, and the Office of Greenways and Trails.

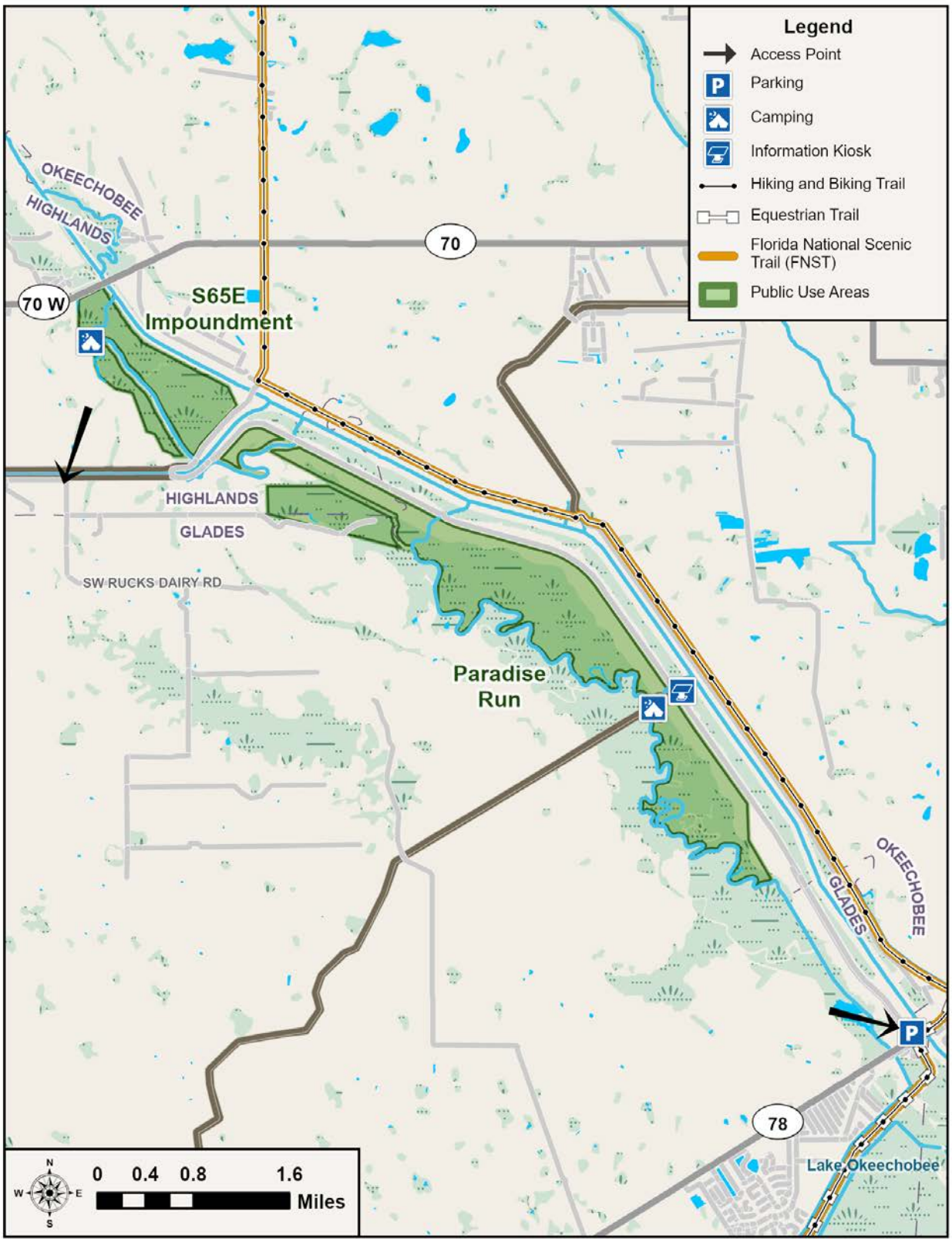
The District partners with FWC to manage game species and public hunting opportunities on District lands designated as WMAs, WEAs, PSGHAs, and PUAs. These designations allow FWC to utilize biologists and law enforcement staff to assist in the management of wildlife on District lands and enforce wildlife and public use rules for resource protection purposes. These designations also allow the FWC to establish hunting seasons and promulgate laws regulating public activities in these areas. A hunting brochure (Appendix x) outlining the regulations for hunting and additional information is available online.



Map 15. KR MA public use amenities (North).



Map 16. KR MA public use amenities (Middle)



Map 17. KR MA public use amenities (South).

Environmental Education

The District promotes educational partnerships with volunteers and various organizations aimed at enhancing visitor knowledge and appreciation of natural areas and cultural resources. These partnerships can include, but are not limited to, youth camps and research studies. Since 1995, the Kissimmee River has functioned as a living laboratory through the collaboration between the District and the Riverwoods Field Laboratory (Riverwoods), a research center managed by Florida Atlantic University's Center for Environmental Studies (CES). Riverwoods supports extensive research and educational activities focused on the restoration of the Kissimmee River, attracting scientists, students, and technicians from around the globe. Interpretive kiosks are also set up throughout the KR MA to educate the public about the crucial role of water management in sustaining resource viability and productivity.

Resource Protection

The District uses law enforcement surveillance to protect natural and cultural resources, safeguard the public, and deter vandalism, dumping, poaching, and other unlawful activities on its lands. As part of the cooperative land management agreement with FWC, the Commission administers hunts for various game species on the KR MA and has the authority to enforce regulations concerning wildlife resources, aquatic life, and public use within the area.

During hunting seasons, FWC maintains a consistent presence in the KR MA. The protection of resources on the KR MA is further enhanced by establishing and maintaining posted property boundaries, fences, and the regular presence of staff in the area. The KR MA has limited access points, which contribute to the protection of its natural resources and District assets. Additionally, the KR MA upland boundaries have been fenced where necessary, and the perimeter is marked with visible signage in areas where entry is likely.

In addition to this primary level of security, the District has implemented an "enhanced patrol" program to increase law enforcement presence on District lands as needed. This program is designed to increase law enforcement presence on District lands when necessary and allocates funding for additional patrols to conduct targeted operations to address specific law enforcement needs.

Lease Administration

The District authorizes reservations, leases, or similar agreements on District lands or interest in land when such use is compatible with the purpose of the acquisition and the long-term use of the land. Historic property uses, such as agriculture, are allowed to continue on selected properties on an interim basis until the land is needed for construction or restoration.

The District administers both revenue-generating cattle leases and non-revenue apiary leases on the KR MA. Cattle grazing is employed as an interim tool to control the growth of improved pasture grasses and suppress woody vegetation. These leased areas are actively managed by the District to conserve natural resources, provide public access, and control nuisance and invasive plant species. Lessees are responsible for maintaining fences and associated infrastructure for

cattle leases, ensuring site security, implementing applicable best management practices (BMPs), securing all necessary permits and approvals, maintaining required insurance coverage, and fulfilling obligations related to taxes, property assessments, and lease payments.

7. NATURAL RESOURCE MANAGEMENT

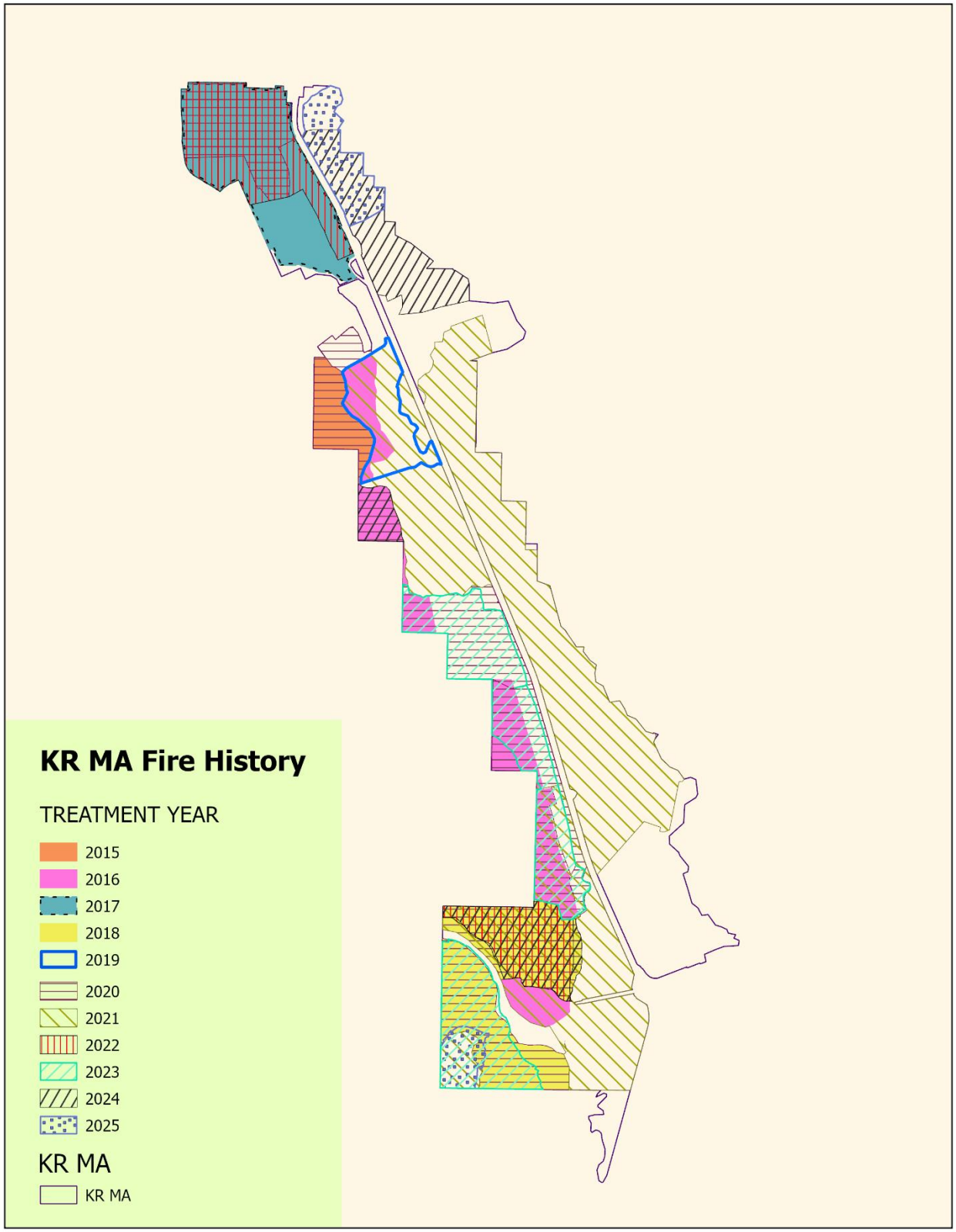
To keep native plant communities healthy and productive, District land managers take appropriate actions to compensate for the loss of natural processes. Several land management practices are utilized to preserve the ecological health and function of the management areas. These practices include prescribed burning fire-dependent plant communities with fire return intervals that mimic natural fire regimes; controlling invasive vegetation through the selective use of herbicides and biological control agents; restoring the physical structure of plant communities and biological diversity through mechanical vegetation management, including mowing, chopping and shredding; and implementing hydrologic restoration activities where the natural hydrology has been altered through ditches, canals, and other surface water drainage features.

7.1 Fire

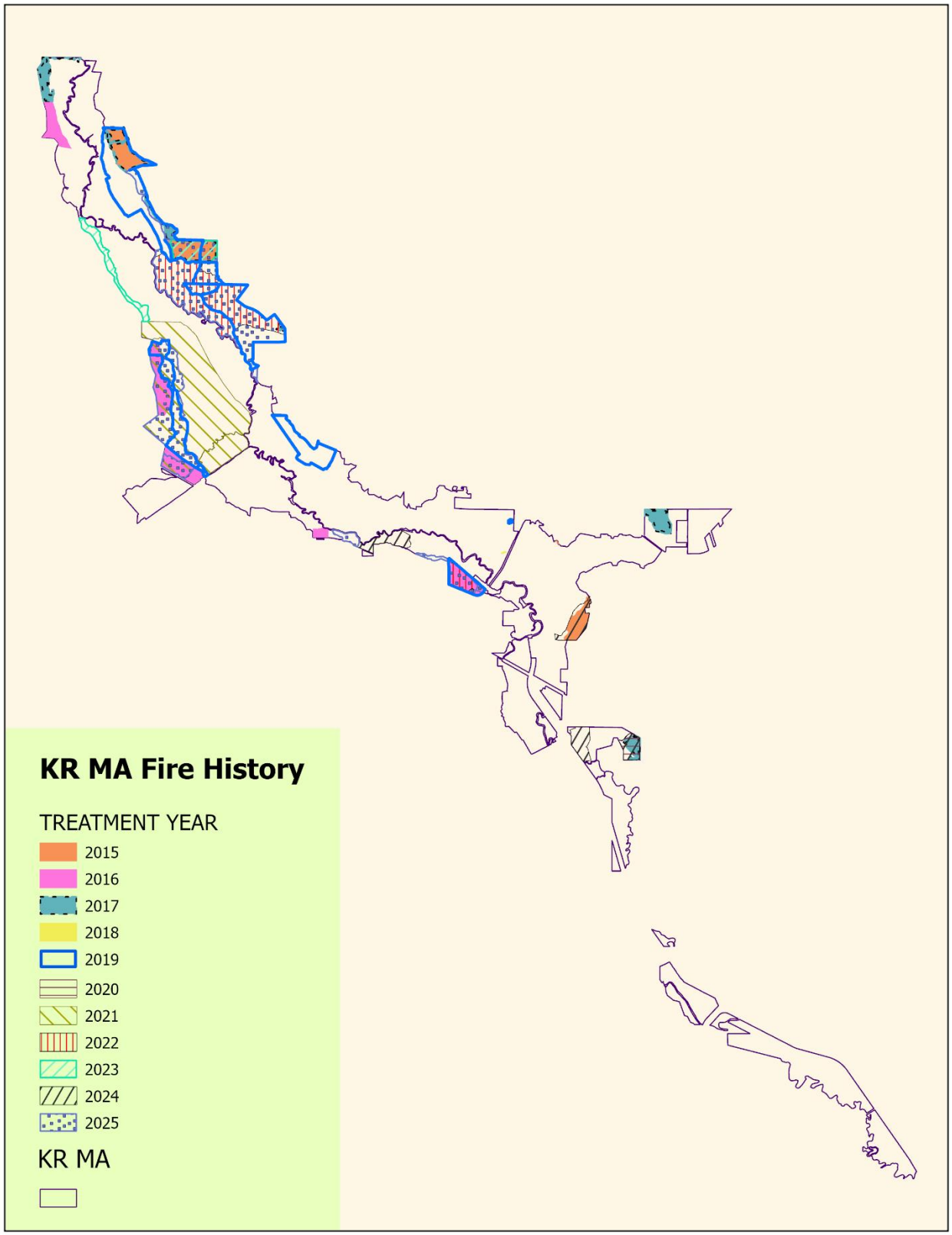
Fire has shaped the distribution of plants in Florida's ecosystems. Historically, wildfires reduced fuel loads in natural communities. Due to habitat fragmentation and human suppression efforts, these fires no longer occur with historical frequency or extent, resulting in alteration to the natural community structure and function in fire-dependent communities. Most plant communities in Florida are adapted to periodic fires and rely on them to maintain their vegetative characteristics and biodiversity. Land Managers use prescribed burning to reduce hazardous buildup of vegetative fuel load, maintain plant species diversity, enhance wildlife habitat, and encourage restoration of native plant communities. Land Stewardship recognizes the importance of fire as a management tool and has integrated prescribed fire into its land management strategy.

Fire History

The KICCO property was frequently burned by the previous landowner, but there is little fire history available for the rest of the KR MA property prior to District acquisition. Native Americans commonly used fire as a tool to clear and encourage the growth of plants for later harvest. Based on the common grazing practices on the property, native ranges were likely burned to improve the forage. Early settlers probably used fire on the property to clear farmlands and rejuvenate the grasses to produce forage for grazing animals. Similarly, wildfires originating from lightning likely played a critical role in maintaining grass communities and fire fuels on the property. Other areas of the property experienced fire exclusion, as evidenced by heavy fuel loads in these areas at the time of acquisition. The District adopted a rigorous prescribed fire program for the Kissimmee River region in the early 1990s. Since the program's initial implementation, a burn rotation has been established for the fire-dependent communities, restoring the natural fire regime for the management area **(Maps 18-19).**



Map 18. KR MA (North) Fire History.



Map 19. KR MA (South) Fire History.

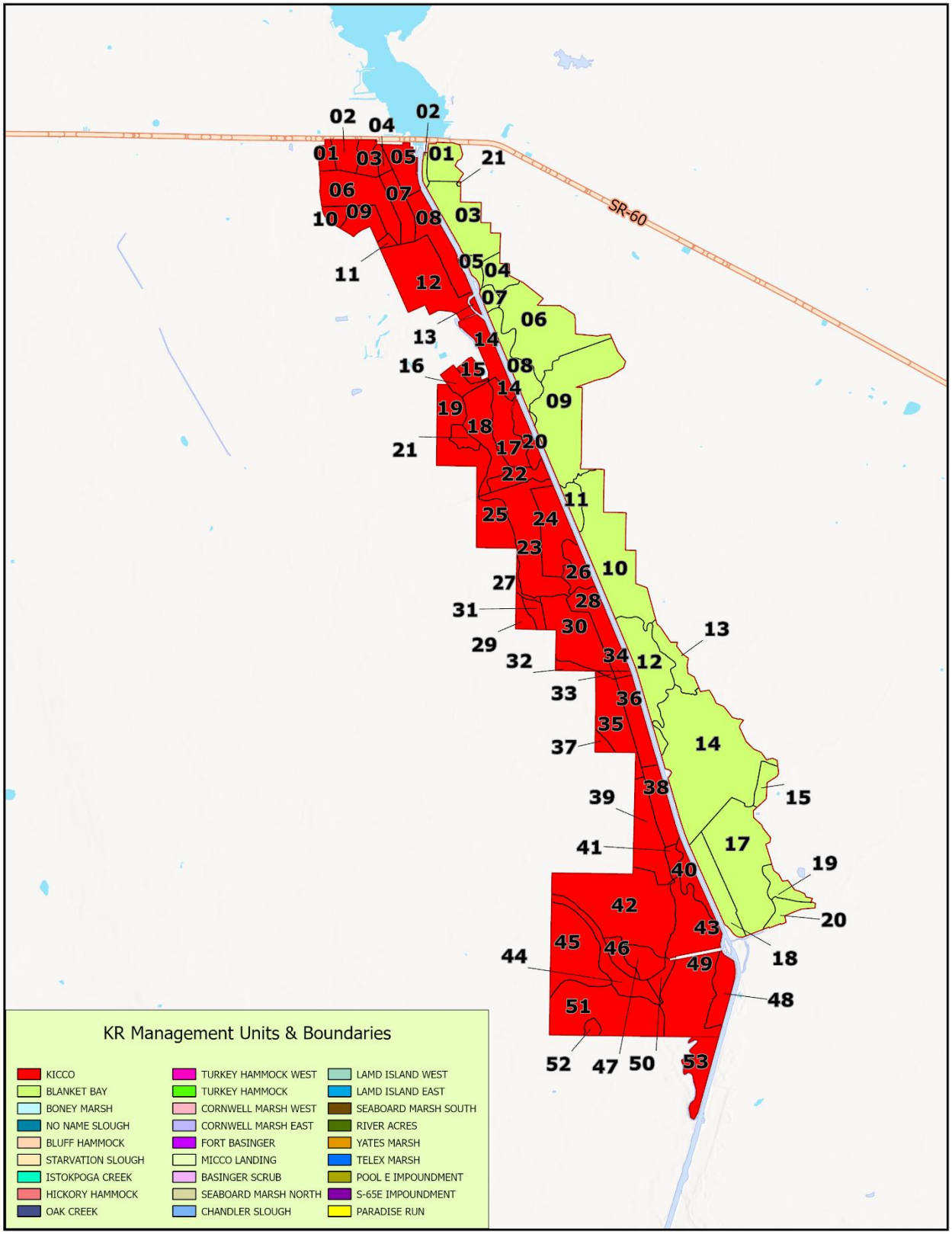
Prescribed Fire Planning

The fire management program for the KR MA includes wildfire prevention, detection and suppression, and prescribed burning. Prescribed burn standards and procedures are outlined in the Land Stewardship's Wildlands Fire Manual, which also serves as a centralized resource for information on fire management on District lands. The manual outlines the procedures that must be followed to ensure compliance with statutory requirements in Section 590 Florida Statutes (2018) and Rules 5I-2 and Chapter 62.256, Florida Administrative Code.

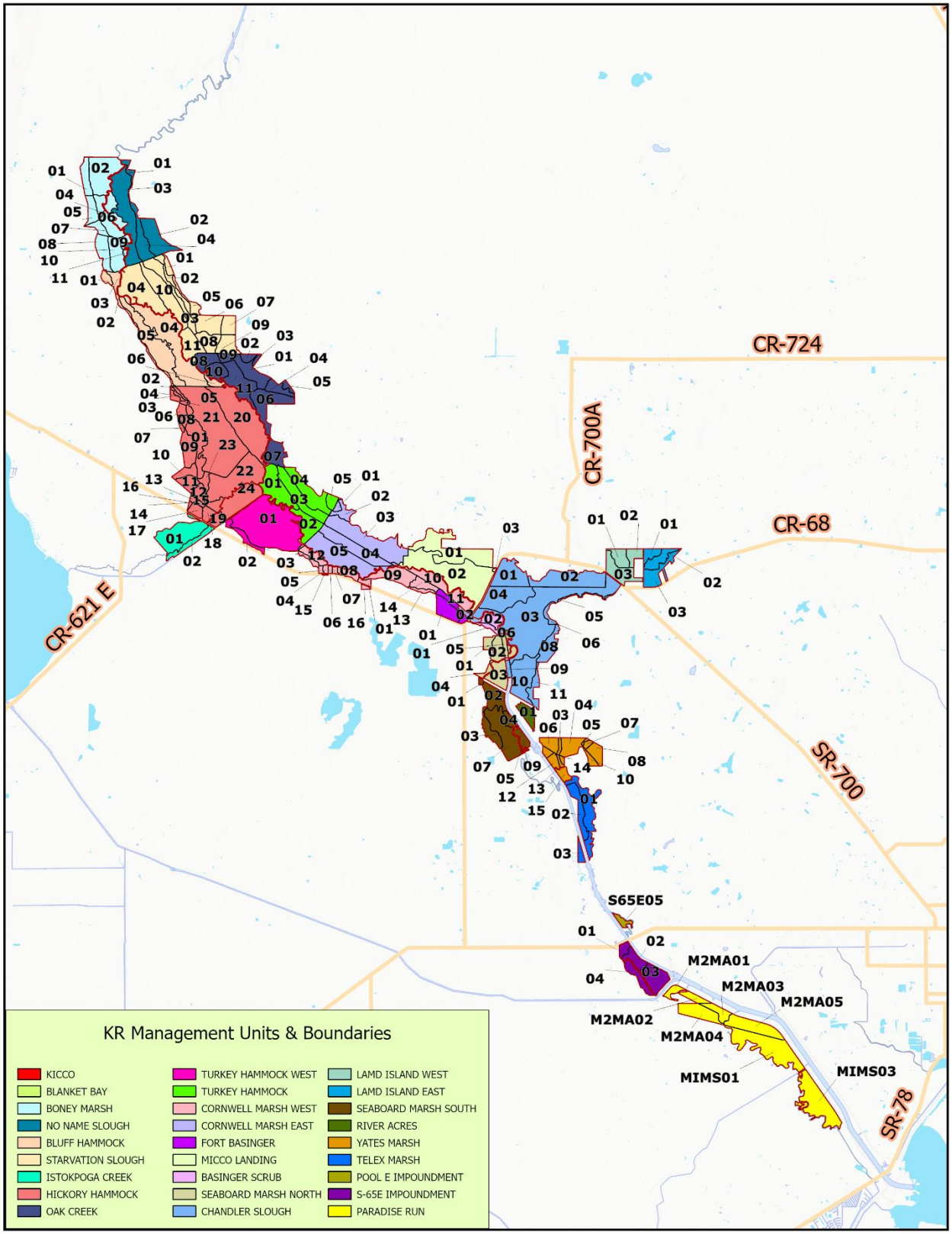
KR MA is divided into management units for the application of prescribed fire **(Maps 20-21)**. Existing roads and trails, disked firelines, and, where possible, natural firebreaks such as wetlands and ecotones determine the boundaries of these units. Challenges for a robust fire program include smoke management requirements, zigzagging firebreaks around the management units that follow elevation contours around private property, limited accessibility for fireline preparation, and limited resources. Despite the added difficulties of prescribed burning in the area, fuel loads need to be maintained at low levels to protect the KR MA from destructive wildfires.

Prescribed fire is applied with different management objectives based on plant community needs, wildlife utilization, and specific species requirements. Prescriptions for these burns identify the environmental conditions, return frequency, and ignition techniques to provide for mosaic burns that do not remove all vegetation while redefining the boundaries of embedded plant communities that are not fire-dependent, such as hammocks or swamps. A healthy fauna in South Florida is integrally tied to fire return intervals, seasonality, and intensities. Frequent fire tends to favor understory vegetation that provides essential forage and mobility for wildlife. Although high-intensity winter burns give the appearance of removing more fuels from the landscape, spring and summer burns achieve a more effective reduction of fuel and are preferred from a wildlife management and ecological perspective. Spring growing season burns provide a mosaic effect, allowing for the retention of cover and foraging opportunities for wildlife that winter burns may temporarily eliminate. Late spring and summer burns help to control the spread of hardwoods. Because prolonged dry periods make it increasingly difficult to implement safe and successful spring burns, land managers utilize less intensive summer burns to achieve management goals. Summer burns reduce the likelihood of spot fires and escapes because of the amount of green vegetation and high relative humidity. Burning in late summer and early fall also helps replicate historical fire patterns that occurred in many habitats during occasional lightning strikes. Although spring and summer burns can cause isolated instances of mortality to wildlife and their nests, these species will readily re-nest (i.e., quail, Turkey, etc.), and the summer burns produce ideal brood habitat for fledged young.

Prescribed fire is one of the management tools relied upon by the Kissimmee River Restoration Project to achieve its long-term goals of restoring the marsh and wet prairie vegetation structure that existed before channelization. Ideally, these burns occur in late spring and early summer to more effectively reduce shrub biomass. However, the use of prescribed fire in marsh and wet prairie communities depends on how quickly water levels recede. With the implementation of HRS, more hydrologic changes are expected, which could affect the effectiveness of prescribed fire as a management tool in these marsh and wet prairie communities. For instance, the longer hydroperiod will limit the fire's ability to spread through these areas.



Map 20. KR MA fire management units (North).



Map 21. KR MA (South) fire management units.

Additionally, meeting the prescribed fire goals and objectives for each fire-maintained community is largely dependent on weather conditions, personnel, and statewide emergency situations such as wildfires, hurricanes, and other natural disaster responses. Ideally, burn crews would consist of 6-8 or more individuals. While the District Land Stewardship employees successfully conduct most prescribed burns, some prescribed burns require outside assistance to ensure they are conducted in a safe and effective manner. KR MA receives assistance from FWC, Archbold Ecosystem Management Team, different divisions of the District and regions of Land Stewardship, and trained volunteers.

Wildfire Suppression

Wildfires ignited by lightning are a common occurrence throughout Florida. The Florida Forest Service (FFS) is responsible for preventing, detecting, and suppressing wildfires in Florida (§590.01, Florida Statutes). Maintaining fire-dependent habitats with frequent prescribed burns is the main way the District limits the negative impacts of wildfires and increases the ability of the FFS to respond successfully to wildfire events. When a wildfire is detected, the land manager immediately notifies FFS while the Land Stewardship staff responds and, if appropriate, begins fire suppression efforts. Upon arrival, FFS takes command of the fire while the District continues to provide logistical and situational support as needed.

The FFS District office in Orlando is responsible for responding to wildfire incidents in the Blanket Bay Unit. The FFS District office in Lakeland is responsible for KICCO. The FFS District office in Okeechobee is responsible for units south of the Kissimmee River Prairie State Park.

7.2 Control of Nuisance and Invasive Plant Species

The District's vegetation management program utilizes an Integrated Pest Management strategy to maintain nuisance and invasive plant populations at the lowest feasible level. Integrated Pest Management is an ecosystem-based strategy that focuses on the long-term prevention of pests or their damage through the combination of management techniques, including prescribed fire, herbicide application, mechanical treatment, biological control, and physical removal. The selection of control measures is dependent upon species type, environmental factors, and the natural communities impacted.

Invasive plant control funding represents the largest item in the Land Stewardship Program's annual budget. Land managers have developed specific management area treatment strategies that optimize invasive plant control efforts. Although Category I and II species on the Florida Invasive Species Council (FISC) list threaten the function and ecological stability of natural communities, achieving maintenance on all species identified on these lists is currently not feasible with existing budgetary resources. The primary goal of the Land Stewardship's invasive plant management program is to control the spread of 30 priority invasive species (**Table 5**), in addition to area-specific priority species based on early detection/rapid response and locally significant impacts or potential for impacts.

Table 4. Land Stewardship Section invasive species control priority species.

Scientific Name	Common Name	FISC Category
Abrus precatorius	Rosary Pea	I
Acacia auriculiformis	Earleaf Acacia	I
Albizia julibrissin	Mimosa, Silk Tree	I
Albizia lebbeck	Woman's Tongue	I
Ardisia crenata	Coral Ardisia, Scratchthroat	I
Ardisia elliptica	Shoebutton Ardisia	I
Bischofia javanica	Bishopwood	I
Casuarina cunninghamiana	River Sheoak, Australian-Pine	I
Casuarina equisetifolia	Australian-Pine, Beach Sheoak	I
Casuarina glauca	Suckering Australian-Pine, Gray Sheoak	I
Colocasia esculenta	Wild Taro	I
Cupaniopsis anacardioides	Carrotwood	I
Dioscorea alata	Winged Yam	I
Dioscorea bulbifera	*Air potato*	*I*
Imperata cylindrica	*Cogon Grass*	*I*
Leucaena leucocephala	*Lead Tree*	*II*
Lygodium japonicum	*Japanese Climbing Fern*	*I*
Lygodium microphyllum	*Old World Climbing Fern*	*I*
Melaleuca quinquenervia	*Melaleuca, Paper Bark*	*I*
Mikania micrantha	*Mile-A-Minute Vine*	*II*
Mimosa pigra	*Catclaw Mimosa*	*I*
Rhodomyrtus tomentosa	*Downy Rose-Myrtle*	*I*
Schefflera actinophylla	*Schefflera, Australian Umbrella Tree; Octopus Tree*	*I*
Schinus terebinthifolia	*Brazilian Pepper*	*I*
Senna pendula var. glabrata	*Christmas Senna Climbing Cassia, Christmas Cassia*	*I*
Solanum diphyllum	*Twoleaf Nightshade*	*II*
Solanum tampicense	*Wetland Nightshade, Aquatic Soda Apple*	*I*
Solanum viarum	*Tropical Soda Apple*	*I*
Syzygium cumini	*Jambolan-Plum, Java Plum*	*I*
Triadica sebifera	*Popcorn Tree, Chinese Tallow Tree*	*I*

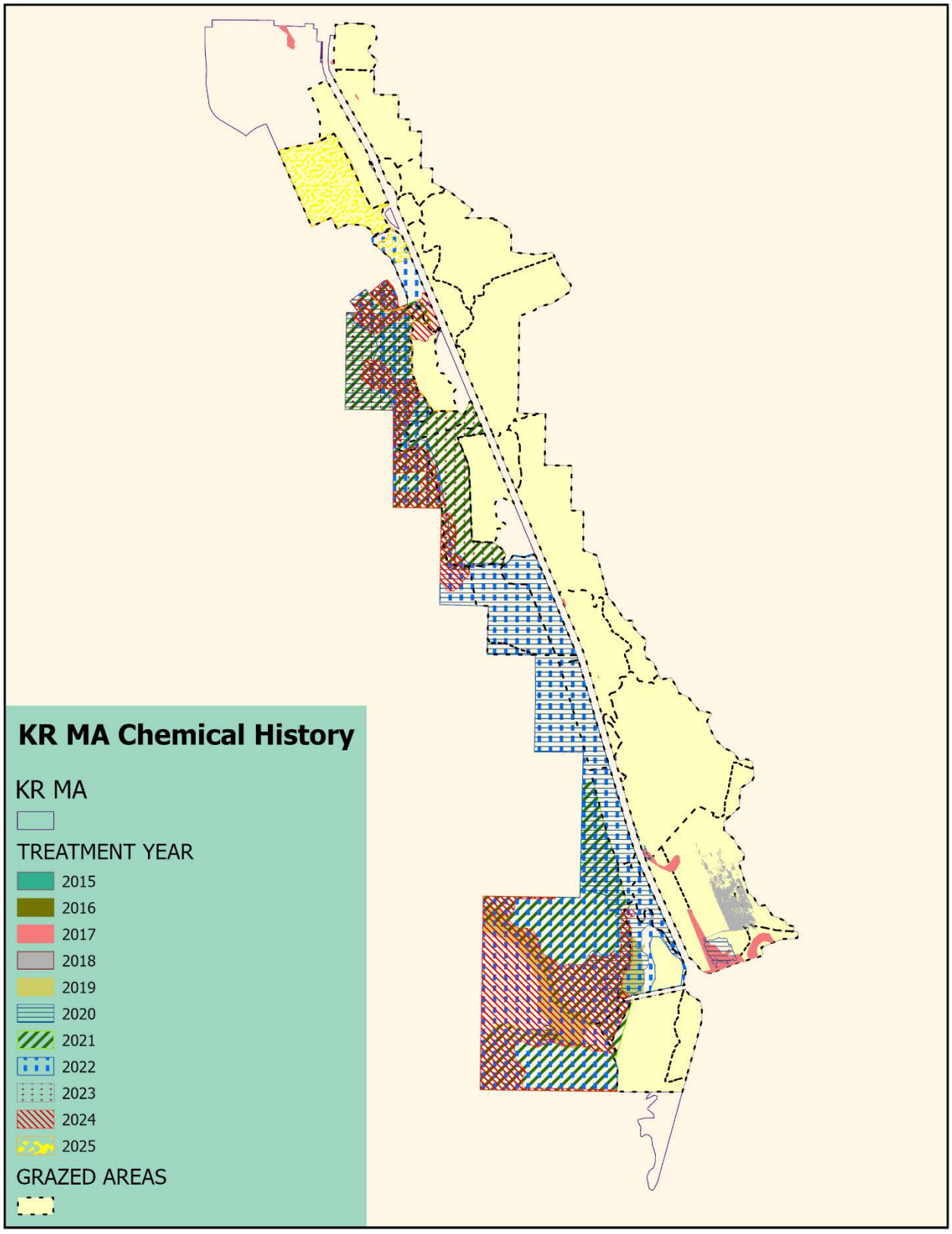
Presently, the main species being targeted for treatment on the KR MA include Brazilian pepper (*Schinus terebinthifolius*), climbing fern (*Lygodium spp*.), Tropical soda apple (*Solanum viarum)*, cogon grass (*Imperata cylindrica)*, Chinese tallow (*Triadica sebifera*), Chinaberry tree (*Melia azedarach*), air potato (*Dioscorea bulbifera)*, rose natalgrass (*Melinis repens*), and tropical

nutrush (*Scleria microcarpa)*. Additionally, species found in isolated pockets, including melaleuca *(Melaleuca quinquenervia)*, rosary pea (Abrus precatorius), Napiergass *(Cenchrus purpureus)*, Indian rosewood *(Dalbergia sissoo)*, Castorbean *(Ricinus communis)*, and Aquatic soda apple (*Solanum tampicense),* are systematically targeted when observed. **Maps 22 and 23** identify the treatment history for the nuisance and invasive species within the KR MA over the last decade.

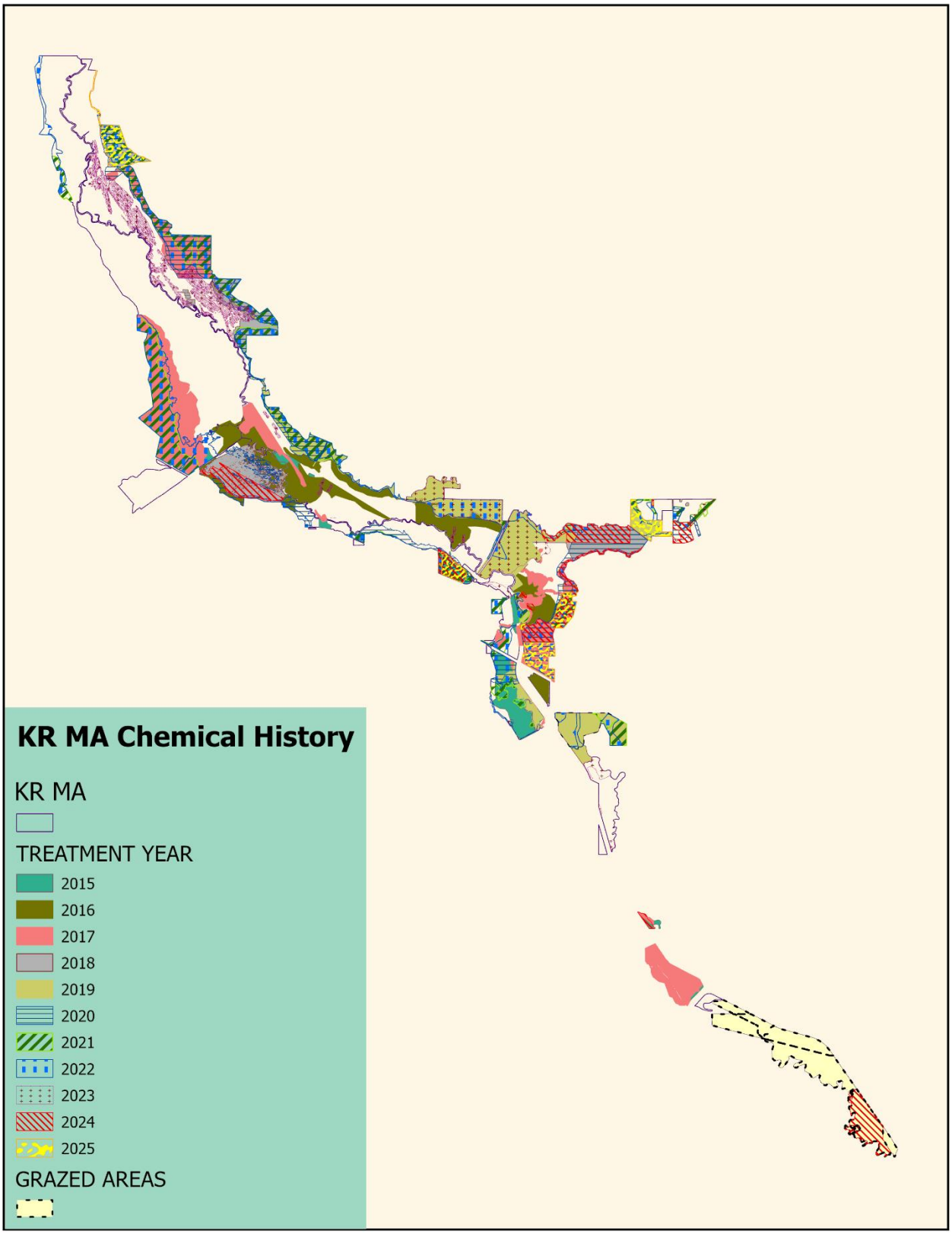
Several other problematic nuisance and invasive species are affecting the river and the KR MA. These include West Indian marsh grass (*Hymenachne amplexicaulis*), Cuban bulrush (*Cyperus blepharoleptos*), hydrilla (*Hydrilla verticillata*), water hyacinth (*Pontederia crassipes*), water lettuce (*Pistia stratiotes*), torpedo grass (*Panicum repens*), limpo grass (*Hemarthria altissima*), paragrass (*Urochloa mutica*), and primrose (*Ludwigia spp*.). While effective control strategies have not yet been established for all these species, broader efforts are underway to manage the spread of invasive and nuisance aquatic plants within the river and its floodplain. Particularly, efforts to control these nuisance grasses are primarily focused on supporting the Kissimmee River Restoration Project and target grasses within the project's construction footprint. These efforts are implemented in high-quality habitats and where treatment results can be most effective. Additionally, the floodplain is treated for emergent and submersed aquatic plants such as Cuban bulrush, water hyacinth, and water lettuce. These treatments are being undertaken through a multi-agency collaboration between FWC and the District's Vegetation Management Section. The Vegetation Management Section is also collaborating with researchers to develop effective strategies for more sustainable and efficient control of invasive grasses in the river and floodplain.

Nuisance and invasive species treatment is primarily conducted by herbicide applicators contracted through the District's Vegetation Management Section. Supplemental efforts by District staff are also conducted on small or sporadically distributed infestations. Treatment areas are scheduled based on the severity of nuisance and invasive plant infestation, time since the last treatment, property access, groundwater conditions, avian nesting seasons, and public use. All treatments follow best management practices for herbicides and use the best available science. Treatment dates, locations, and species treated are recorded in a GIS database. Herbicide use is recorded in the District's nuisance and invasive plant control database.

Land managers also collaborate with the United States Department of Agriculture (USDA) – Agricultural Research Service (ARS) to introduce biological control agents on District lands, helping to reduce the proliferation of invasive pest plants. Federally approved biological control agents that have been introduced or have migrated onto District lands include the melaleuca weevil (*Oxyops vitiosa*), water hyacinth planthopper (*Megamelus scutellaris*), water hyacinth weevils (*Neochetina spp.*), the Brazilian pepper thrips (*Pseudophilothrips ichini*), the Old World climbing fern white lygodium moth (*Austromusotima camptozonale*), brown lygodium moth (*Neomusotima conspurcatalis*), and eriophyid mite (*Floracarus perrepae*). The brown lygodium moth and eriophyid mites were released near Chandler Slough and other areas in the management area to target the region's Old World climbing ferns in the region. The air potato leaf beetles (*Lilioceris ch*eni and *Lilioceris egena*) have also been introduced to the river floodplain, including the Fort Basinger and Basinger Scrub units.



Map 22, KR MA (North) invasive treatment history.



Map 23. KA MA (South) invasive treatment history.

7.3 Mechanical Vegetation Control

Prescribed fire is the preferred method for managing vegetation in fire-maintained habitats in South Florida due to its cost-effectiveness and environmental benefits. In areas where prescribed fire cannot be used, such as in urban interface zones, or when other constraints prohibit the use of prescribed fire, mechanical vegetation control offers an alternative way to reduce vegetation coverage and fuel loads. Mechanical vegetation control can reduce woody plant growth and increase plant species diversity through the use of mowing, chopping, and shredding. Selective forest thinning may also be used to improve the natural environmental characteristics of certain habitats.

In the KR MA, mechanical treatments are primarily used prior to burning to reduce fuel height along the boundaries of management units and minimize the risk of escape. Since low-intensity fires result in patchy burns, mechanical treatments are also used to re-structure fuels that build up in fire shadows where prescribed burns do not achieve the desired results. Weedy native vegetation such as bladderpod (*Sesbania vesicaria*), dogfennel (*Eupatorium capillifolium*), and blackberry (*Rubus pensilvanicus*) are also treated mechanically when necessary to improve aesthetics and promote species diversity, especially in grazed areas or where these species become dominant. Additionally, when shrubby vegetation, such as wax myrtle (*Morella cerifera*), saltbush (*Bacharris halimifolia*), willow (*Salix and Ludwigia spp.*), and cabbage palm (*Sabal palmetto*) encroaches upon marsh and prairie communities, it can be controlled through mechanical means to reestablish the herbaceous-dominated characteristics and maintain the open grassland community.

Timber Management

Harvesting timber is another form of mechanical vegetation control. If the District determines that the ecological needs of an area require the timber stand to be thinned, a harvest may be designed for that purpose. However, many listed species depend upon mature pine trees for their survival, so often it is the smaller trees that are targeted. These trees tend not to have the marketability of larger trees, resulting in limited opportunities for a commercial harvest. Historically, areas with high tree density within the KR MA have been commercially harvested. While there are currently no marketable pine stands within the management areas, future harvests may be considered in flatwoods communities in management units such as KICCO, Hickory Hammock, Cornwell Marsh, Chandler Slough, and Fort Basinger Units. When timber assessments indicate that thinning is necessary to meet habitat management objectives, a timber harvest may be planned accordingly. All timber harvests conducted on District lands will adhere to the FFS's silvicultural Best Management Practices (BMPs) and maintain a natural stand density of 30 to 35 square feet of basal area per acre.

Grazing

The District uses cattle grazing to manage nuisance and invasive pasture grasses. This tool is most effective as an interim management tool for managing vegetation on project lands before the water resource project goes into construction. Some management lands include former ranchlands that have a mixture of native range and improved pasture. Cattle grazing is allowed on these

properties to minimize the need for physical manipulation and manage the vegetation coverage until funding is secured to restore the native community. The Kissimmee River Valley has been grazed for centuries since the early Spaniards stocked the Florida Peninsula with cattle. Currently, the District administers eight low-density grazing leases covering approximately 13,931acres of the KR MA.

7.4 Wildlife Management

Wildlife management on the KR MA relies on active habitat management that addresses the needs of all species present. The Land Stewardship program accomplishes this by implementing management strategies that benefit multiple species and habitats while addressing the specific needs of individual species. These strategies include:

- Conducting land management activities that maintain and enhance native wildlife habitats, including prescribed fire and nuisance and invasive plant control;
- Conducting specific management activities that support protected species;
- Following management guidelines for listed species protection as determined by the South Florida Multi-Species Recovery Plan, Volume 1 (U.S. Fish and Wildlife Service (USFWS) 1999), as well as the Florida's Imperiled Species Management Plan (FWC 2016); and
- Maintaining lists of confirmed and potential wildlife species.

The primary focus is on restoring and maintaining the natural processes that shape the structure of the natural communities within the management area. By implementing integrated management strategies to restore natural functions such as fire rotation, the species composition in the vegetation communities has improved significantly. This improvement has increased foraging and nesting habitats in the area. For example, there has been an expansion of snail kite nesting efforts within the management area, red-cockaded woodpecker nesting in KICCO, and suitable foraging grounds to support gopher tortoise relocation in the Fort Basinger Unit.

Snail kites

Snail kites have successfully nested in the Kissimmee River Chain of Lakes for many years, but nesting activities in the Kissimmee River Restoration Project area only began after the kites returned in 2014. Since 2016, successful nesting has been intermittently recorded within the KR Management Area, with dozens of nests documented in Buff Hammock, the Cornell Marsh units, and more recently, the Chandler Slough Unit. However, while there have been active nests, many have not resulted in successful fledging. This lack of success has primarily been attributed to insufficient water depth and predation. Nevertheless, the wetland communities in the KR MA offer abundant foraging habitat for the snail kite population along the river. Snail kites are often seen foraging in the floodplain, frequently in large groups. Their consistent use of the floodplain and increase in nest activities within the management area indicate that this area can effectively support the snail kite population in the basin. To improve nesting success within the management area, it is essential to have more consistent flooding of the floodplain and to gradually increase the river's discharge. However, these conditions must be sustained long enough for eggs to hatch and young kites to fledge. Management efforts will continue to focus on improving the wetland communities to benefit snail kites and various other wildlife species.

Red-cockaded woodpecker (RCW)

The Avon Park Air Force Range, which borders the KICCO Unit, is home to a well-established colony of RCWs. Suitable habitats for RCWs are found along the southern and western boundaries of the KICCO Unit. Habitat management efforts within the unit have created environments that support RCW roosting and nesting. As a result, the RCW population from the Avon Park Air Force Range has begun to expand into the flatwoods located on the southern boundary of the KICCO Unit. With the continued maturation of the pine trees in the area, it is expected that more RCWs will move into this managed habitat. Prescribed burns will continue to be conducted at optimal intervals in the KICCO Unit to maintain the open structure preferred by the Red-cockaded Woodpecker and other species.

Gopher tortoise

The KR MA contains upland communities that provide suitable habitats for gopher tortoises. These include mesic flatwoods, dry prairies, upland ridges formed by remnants of the C-38 canal, and open disturbed areas. Over 50% of the upland communities in the Basinger Unit are managed for gopher tortoise. It is regularly surveyed, inspected, and managed to keep the habitat quality adequate to sustain the gopher tortoise population on the property. Management efforts in this unit focus on promoting desirable herbaceous species. Ongoing management will continue to support a healthy understory of herbaceous species in this area and other identified locations, including but not limited to prescribed burning and mechanical treatments to enhance and preserve the groundcover.

Florida Grasshopper Sparrow

The Florida grasshopper sparrow is the only species that is endemic to dry prairies. Two of the three remaining subpopulations on public land are located in the adjacent Kissimmee Prairie Preserve State Park and Avon Park Air Force Range. These subpopulations have been declining for nearly two decades. While the exact reasons for this decline are unclear, it may be attributed to various factors, including disease, genetic instability, predation, and habitat loss. The dry prairies in the management area provide foraging habitat for the endangered grasshopper sparrow, and the wet prairie community can provide suitable breeding habitats if the grasshopper sparrow becomes more widely established within Avon Park Air Force Range or if the subpopulation in the Kissimmee Prairie Preserve State Park expands. Ongoing management efforts, including the reduction of shrubs in the wet prairie, will continue to enhance prairie communities to support the species that utilize them and facilitate potential expansion into the management area.

Nuisance and Invasive Animal Species

Invasive wildlife species harm native wildlife and can negatively impact native vegetation or seriously interfere with management objectives. Some of the species of concern are Nile monitor (*Varanus niloticus*), purple swamphen (*Porphyrio porphyrio*), feral hog (*Sus scrofa*), pythons (*Python spp.),* tegu (*Salvator merianae*), and spiny iguana (*Ctenosaura similis*). The District coordinates with FWC to reduce the invasive species populations through trapping and public hunts, where hunting is allowed. The results of population control efforts are monitored by periodic site evaluations.

Feral hogs are the main invasive species currently managed on the KR MA. Feral hogs have significant impacts on natural communities and land management operations. Their disruption of soil and vegetation through rooting alters natural communities and can be especially damaging in sensitive habitats that are slow to recover. Land management objectives are affected when rooting disturbance disrupts prescribed burns by limiting the horizontal spread of fire. Areas of disturbed soil can also be more susceptible to nuisance and invasive plant invasion. Rooting can also impact hiking trails, reptile populations, and ground-nesting birds. Land managers mainly control hog populations through the year-round public hunting program. Since 2005, the District has also utilized no-cost hog control agents to remove feral hog from management areas whenever necessary. In addition to these primary control measures utilized to manage the hog population within the KR MA, hog control agents are periodically dispatched to Blanket Bay, Lamb Island, Yates Marsh, and Paradise Run units outside of the hunting season. Furthermore, the District has partnered with the USDA Animal and Plant Health Inspection Service, Wildlife Services (APHIS Wildlife Services) to integrate the Feral Swine Damage Management Aerial Operations Program into its invasive species management strategy to enhance the effectiveness of the District's Feral Hog Damage Management Program. This program operates in compliance with FAA regulations, NEPA guidelines, and applicable state permits, using aircraft to map and safely target overpopulations of feral hogs on District-managed lands, including the Istokpoga Creek Unit and the Land Island East and West management units.

The Island Apple snail (*Pomacea maculata*) is known to occur in the KR MA but is not being targeted for geographic containment. The native apple snail, Florida apple snail (*Pomacea paludosa*), populations have drastically declined within the Kissimmee River restoration project area. The island apple snail is a highly fecund, fast-growing species that has likely become a permanent part of the Kissimmee River floodplain. Historically, the Florida apple snail has been the main prey for the federally endangered snail kite. This decline in native snails has caused snail kites to forage almost entirely on the non-native apple snail within the Kissimmee River Restoration Project area. Since the island apple snail plays a crucial role as the main food source for the endangered snail kite in the region, it is likely to persist on the floodplain without specific management efforts to support snail kite populations.

The ambrosia beetle (*Xyleborus glabratus*) is a wood-boring beetle native to Asia that infects trees with Laurel Wilt disease, caused by the fungus *Raffaelea lauricola*. This deadly fungal disease affects trees in the *Lauraceae* family, such as red bay (*Persea borbonia*) and swamp bay (*Persea palustris*). Discovered in Florida in 2010, the fungus has since spread across the state through various native and nonnative ambrosia beetles and has been found in every county. Currently, neither the ambrosia beetles nor the Laurel Wilt fungus is targeted for geographic containment due to the lack of effective control methods for the pest or the disease in natural areas.

Other invasive wildlife sightings in the region, such as the Green Iguana (Iguana iguana), Cuban Treefrog (Osteopilus septentrionalis), and Black Spiny-tailed Iguana, are not currently being targeted for geographic containment. Management of these species is limited due to factors like a lack of effective control tools, insufficient resources, and limited risk assessment data.

7.5. Hydrologic and Habitat Restoration

The District regularly partners with various agencies and non-profit organizations to implement a wide range of ecological restoration projects that improve wildlife habitats. Land managers often build upon initial restoration efforts, especially hydrologic enhancement projects, to maximize their benefits. Over the past decade, the District has successfully completed construction of the Kissimmee River Restoration.

Kissimmee River Restoration Project

The KR MA benefits from one of the world's largest river restoration projects. In July 2021, the District and USACE celebrated the Kissimmee River Restoration Project's completion. The river floodplain's physical shape was reconstructed in four phases, as shown in **Figure 8**. This milestone marked the successful backfilling of 22 miles of the C-38 canal between Lakes Kissimmee and Okeechobee and the restoration of the flow to 24 miles of the meandering Kissimmee River. Since completing the first phase of the Kissimmee River Restoration Project, the wetland communities that were once disappearing within the KR MA have been preserved and their vegetation has steadily improved. The restoration of these natural communities results from a combination of land management practices used on the KR MA, the restoration of the historic river channel, and drainage improvements in the Kissimmee River Basin.

Continuous monitoring shows a positive trend in the expansion of wetland communities as a result of the restoration efforts. However, the vegetation composition present before channelization has not fully recovered. The monitoring findings reveal an increasing trend in shrub vegetation and facultative plants within historically herbaceous communities. Notably, the spread of shrub species such as wax myrtle, saltbush, Carolina willow, and primrose willow in the marsh and wet prairie communities. These findings underscore the need for further manipulation of vegetation structures in the KR MA to restore the herbaceous vegetation structure in these areas following HRS implementation.

The Kissimmee River Restoration Project seeks to restore the vegetation structure of marsh and wet prairie communities that existed on the floodplain before channelization. To achieve this long-term goal, the project has concentrated on modifying the hydrology and land managers' prescribed fire practices but also supports other management tools as needed to meet its restoration objectives. Mechanical treatments will likely be an essential tool in reducing shrub coverage and restoring the herbaceous vegetation structure that existed before channelization. Using mechanical treatments can be particularly effective for wet prairie communities, where research indicates a substantial seed bank presence for the most common species. However, this approach is likely to be less feasible for long-hydroperiod and deep areas marshes. The duration of flooding and water level fluctuations across the floodplain will determine whether mechanical treatments are practical and effective in reducing shrub coverage in these marsh communities, as long periods of inundation will significantly restrict the use of mechanical equipment and may also hinder the natural recruitment of marsh vegetation seedlings after treatment.

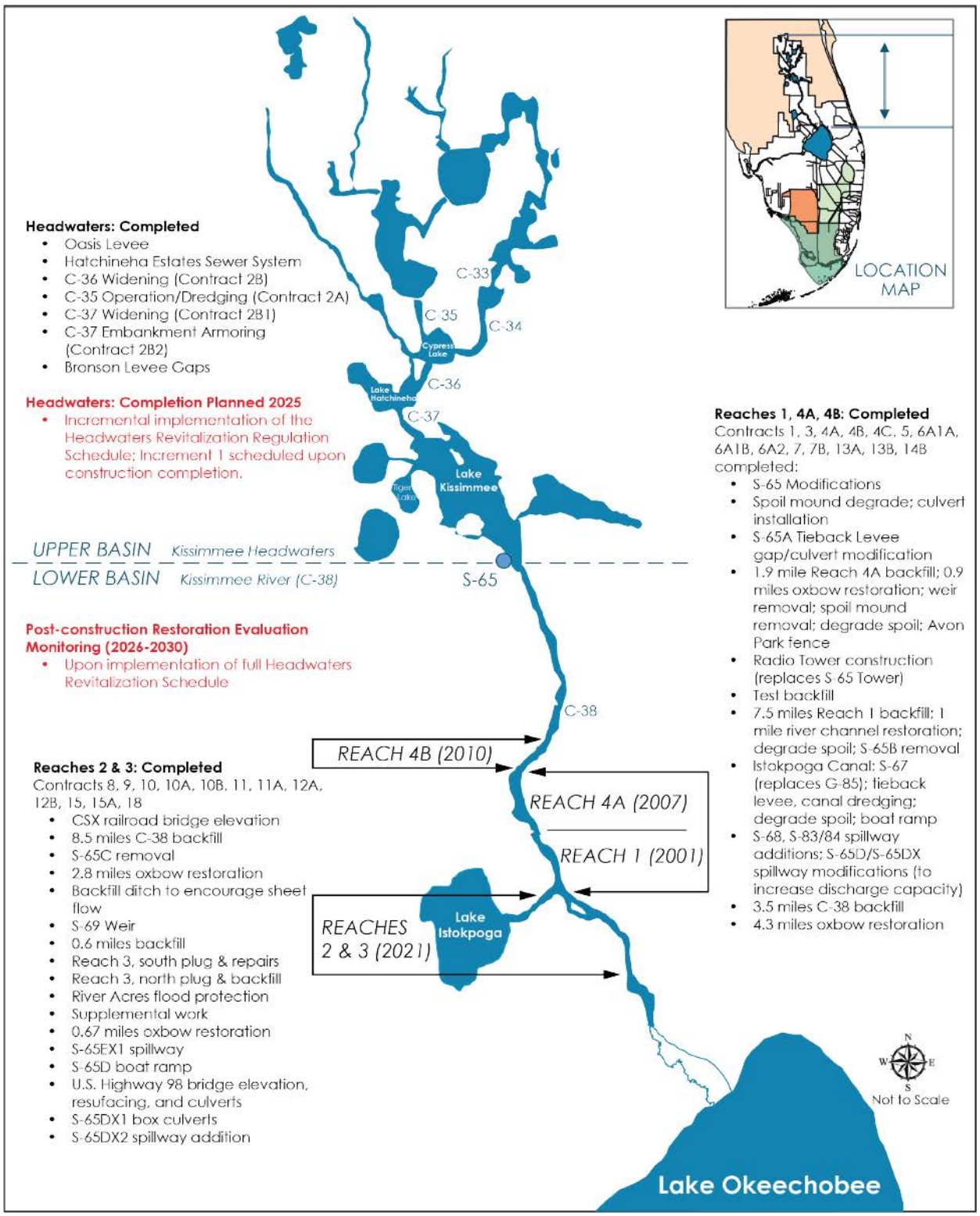


Figure 8. Completed construction marking the completion of the Kissimmee River Restoration.

Over the next decade, land managers for KR MA will continue to expand on the Kissimmee River Restoration efforts along with prescribed fire and vegetation management progress. Land management evaluation of the KR MA will also continue to identify additional vegetation improvement or internal drainage improvement needs, such as installing culverts, ditch plugs, or leveling existing spoil piles, if necessary to support wildlife habitat within the KR MA. Restoration plans will be prioritized based on site needs and funding availability.

Along with the efforts of the Kissimmee River Restoration Project, the KR MA land managers plan to use mechanical shredding combined with prescribed fire to reduce the shrub coverage in specific marsh communities within the Blanket Bay Unit. This method will also be implemented in wet prairie areas and other suitable marsh communities throughout the KR MA, where a need has been identified. Additionally, after the HRS is implemented, land managers plan to identify other upland areas suitable for gopher tortoises and develop a habitat restoration plan to support their expansion in the KR MA.

Lamb Island East

In 2004, the District initiated the Lamb Island Tributary Stormwater Project as part of the Lake Okeechobee Protection Plan. This project rehabilitated the former dairy ranch to help reduce phosphorus discharges into Lake Okeechobee. The design involved collecting stormwater runoff from two key areas: a high-intensity area (HIA) with elevated phosphorus levels and the surrounding unimproved pasture, by creating four cells with surface water containment berms. Approximately 16 acres of wetland were created to retain runoff from the pasture, helping to lower the phosphorus levels before the water was discharged. Alum was also utilized to bind and inactivate soluble phosphorus in residual dairy waste within the small onsite ponds, with two of these ponds and the perimeter ditches subsequently backfilled. The constructed wetland was graded to an elevation of approximately 36.25 feet NGVD. Surface water from Lamb Island West now discharges through two 36-inch diameter culverts with risers. One riser discharges the wetland water at 37.75 feet NGVD, while the southwestern discharge point is set at 39 feet NGVD. Additionally, the risers from the overflow culverts in the cells can be maintained at a maximum elevation of 43 feet NGVD. Although the hydrology of the unit has been modified by this manmade system, the project will ultimately restore the area to a wetland system. As a result, wetland vegetation is expected to gradually replace pasture grasses, thereby enhancing the biological uptake of phosphorus as the area remains inundated for extended durations. During this plan period, the Land Stewardship Section plans to continue improving the physical structure of the plant communities through vegetation management. The overall goal of the HIA swale retention area and the outer pasture area was to reduce phosphorus discharge from the site by increasing the time for phosphorus removal through biological and physical processes by limiting the discharge. After the project was completed, follow-up monitoring indicated that over 99% of phosphorus was retained. Over the past decade, management efforts have focused on maintaining system performance, including managing the outer pasture area through harvesting and grazing, enhancing natural communities by controlling invasive species and nuisances, and reducing discharges from the management unit.

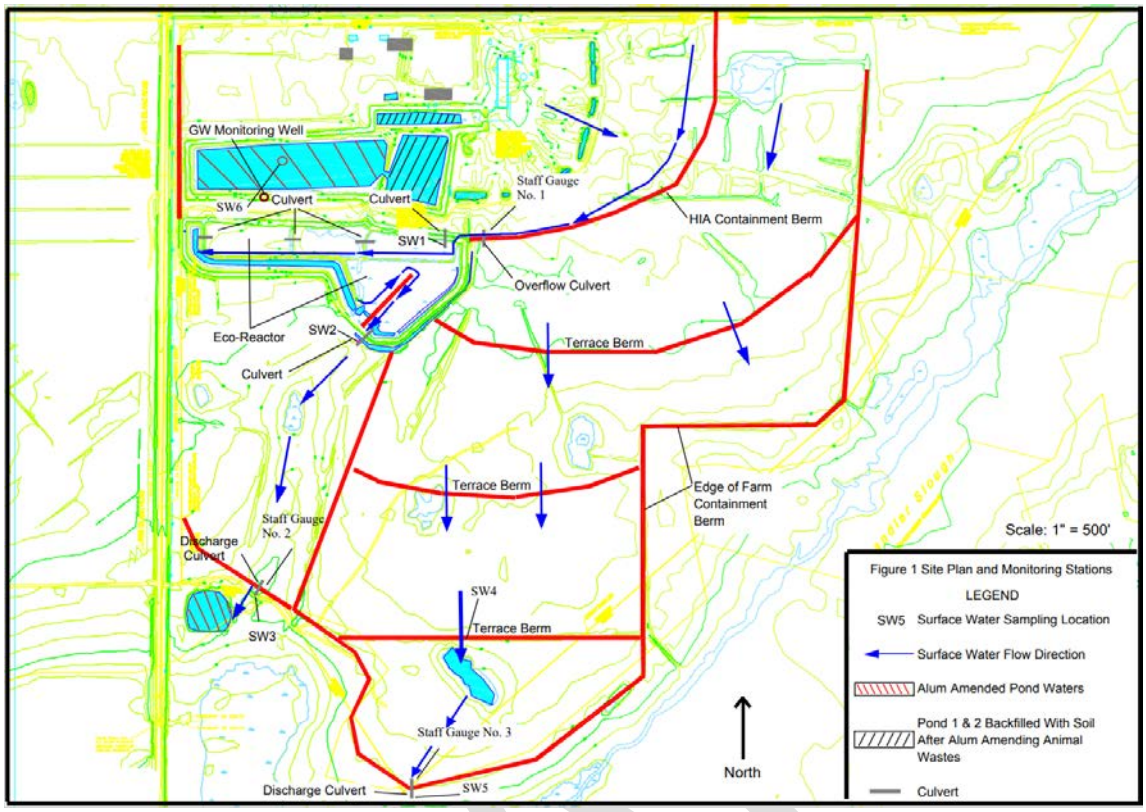


Figure 9. Overview Map of the Lamb Island East Stormwater Project Site.

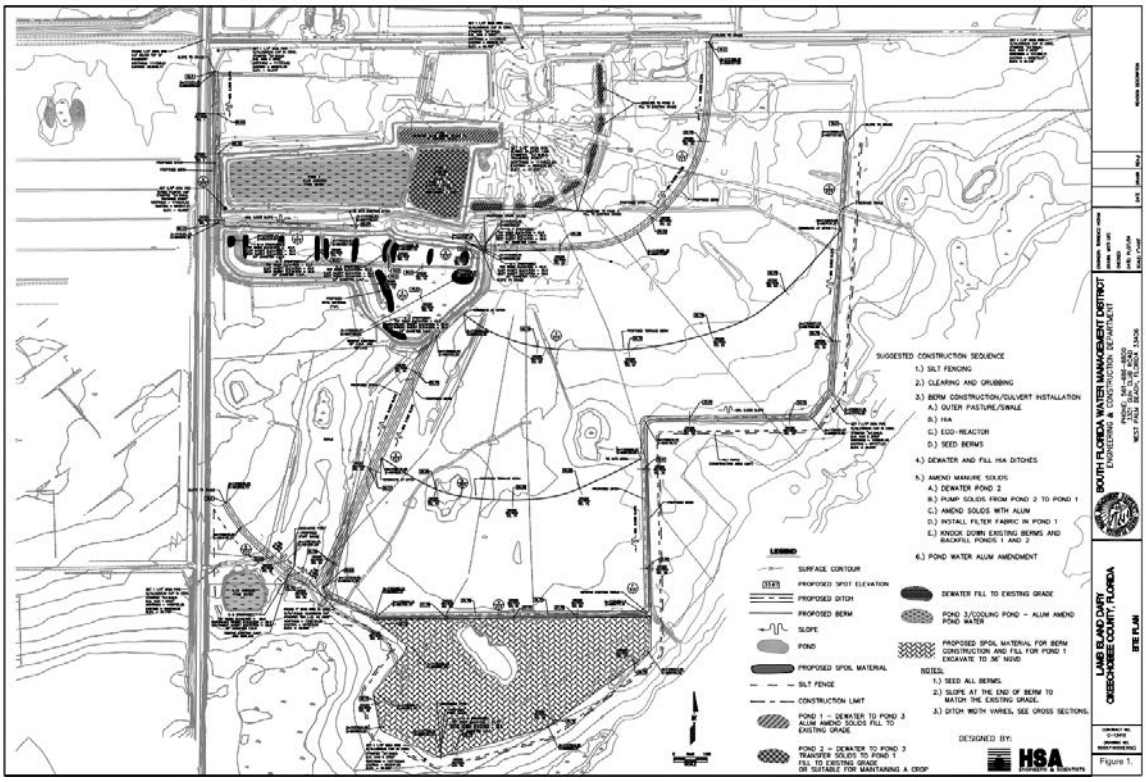


Figure 10. Project Site Plan for Lamb Island East.

Yates Marsh

To support natural vegetation recruitment within the KR MA, supplemental restoration efforts have been implemented as funding allows. In addition to previous efforts to enhance the dry prairie communities in the Starvation Slough Unit, approximately 25 acres of a riparian corridor connected to the natural slough in the Yates Marsh Unit are being restored to enhance water quality and wildlife habitat. This restoration plan includes the installation of a cattle exclusion fence along the corridor and the implementation of a multi-phase planting strategy, with planting zones designed based on the natural topography. The plantings include cypress trees, grasses, wetland and upland shrubs, as well as hardwood trees. To date, approximately 18 acres have been enhanced. During this plan period, the Land Stewardship Section plans to complete the remaining restoration activities and continue improving the physical structure of the plant communities through targeted vegetation management.

7.6. Research and Monitoring

KR MA Condition Class

The primary objective of the Land Stewardship Section's monitoring activities is to assess and document the effects of land management actions, such as the application of fire and herbicides. Land Stewardship managers evaluate habitat conditions and vegetation structures to identify gradual, desirable, or undesirable changes associated with invasive species, prescribed burns, and other factors such as hydrological shifts. During land management activities and routine site assessments, these land managers monitor the natural communities in the KR MA for invasive species. They assess burn units before and after prescribed burns to observe the vegetation's response to fire, thereby enhancing their understanding of how variables such as weather, fuel accumulation, seasonal changes, and water levels interact to influence the targeted vegetation structures. Monitoring observations are documented using condition class assessment tools developed by the District. In addition to the monitoring assessments conducted by the Land Stewardship staff, monitoring studies for the Kissimmee River and its floodplain are conducted by the District and other partnering agencies as part of the Kissimmee River Restoration Evaluation Program (KRREP). The KRREP gathers monitoring data and conducts research, providing valuable information to support the KR MA's land management goals. Consequently, KR MA land managers rely on KRREP monitoring data to make ecologically sound decisions about their land management practices.

Fire Condition Class

The District developed a GIS-based program called “physical condition class” to monitor the status of plant communities based on the time since a physical treatment occurred. Although physical treatments can be mechanical or through cattle grazing, the main tool used by the District is fire due to the natural benefits fire provides. The District uses the physical condition class to prioritize and plan the application of prescribed fire on individual management units.

Management units are delineated by prescribed fire boundaries and the condition of each unit is classified based on fire history and the desired fire-return frequency using FNAI

recommendations for the primary fire-dependent communities in each unit (**Map 24**). Most plant communities in South Florida require fire every 4 years or less to remain healthy and productive, so this is the default return frequency assigned to each management unit. If a management unit has been burned within the identified return interval, that unit is identified as being in condition class 1. If the most recent fire in a management unit exceeded the identified return frequency but less than twice this interval, that unit is identified as being in condition class 2. Condition class 3 includes those units having had fire more than two intervals ago but less than three, and condition class 4 are those fire-dependent units that have not experienced fire for more than three of the recommended return intervals or more than 12 years for most of the fire-dependent units in the management area. Fire-excluded habitats, where fire is generally confined to the periphery, are identified as not actively maintained by fire. This process is depicted in **Figure 11**.

Although the default fire-return frequency in the condition class is based on the prevailing plant communities, management units may contain a mosaic of habitats adapted to more variable return frequency than reflected in the fire condition class. Most fire-dependent communities in the KR MA burn units are burned at a fire-return frequency of 2 to 4 years. The edges of marsh communities in the KR MA often burn along with the surrounding fire-dependent communities, but when water levels in the floodplain drop below the surface, fire can effectively spread through the marshes. Cypress domes and other swamp communities are burned with the surrounding fire-dependent communities when the soil is still saturated. These wetland communities have a fire rotation of 4 to 8 years and fire typically only reaches the edges. Baygall species are fire-intolerant and the humid conditions typically inhibit fire except for prolonged drought periods. In the KR MA, the baygall communities are burned with the adjacent fire-dependent areas, but fire usually only affects the edges.

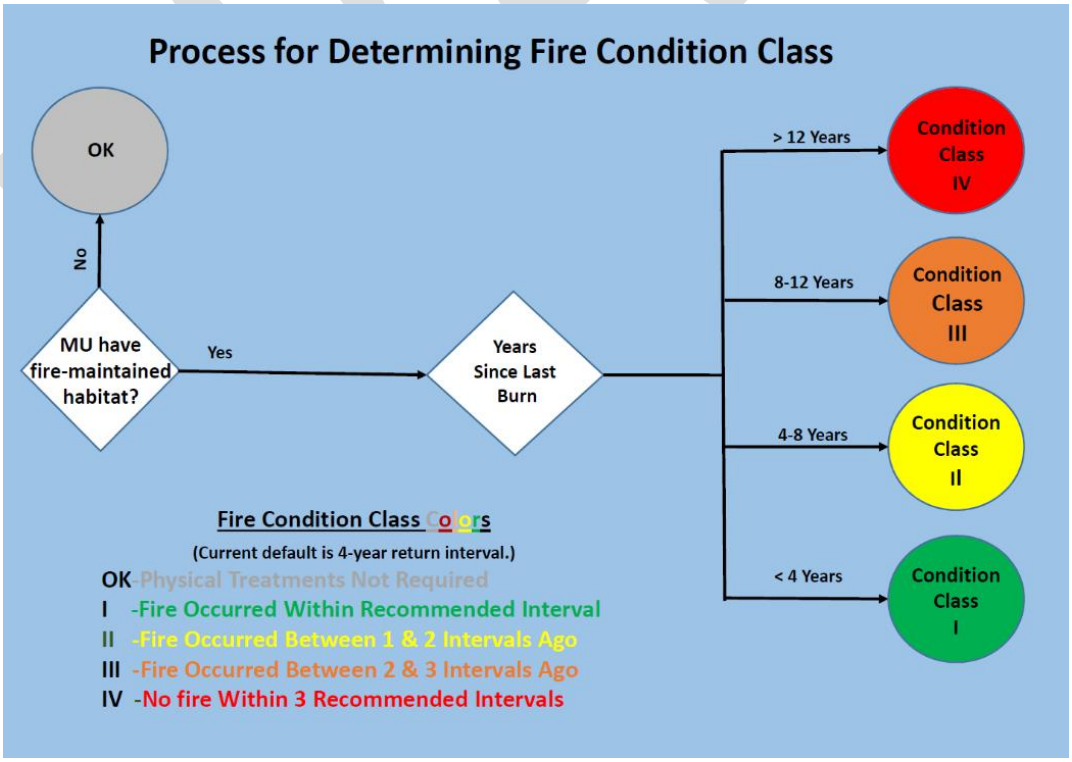
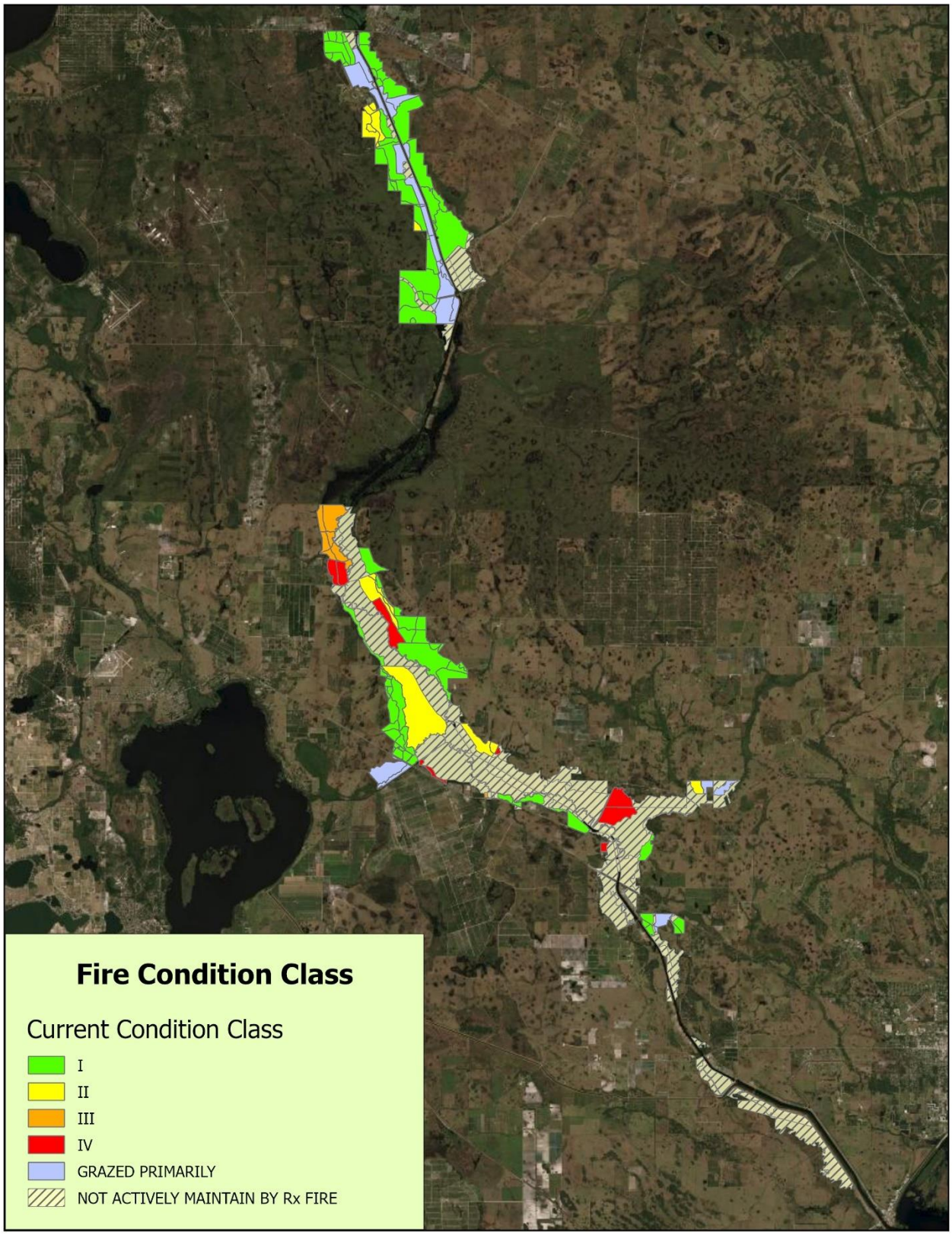


Figure 11. Flowchart illustrating the process for determining fire condition class.



Map 24. KR MA fire condition class.

Nuisance and Invasive Plant Condition Class

The District developed a GIS-based program called "invasive plant condition class" to monitor the status of plant communities based on the population status of prominent nuisance and invasive plant species. The District uses the invasive plant condition class to develop a strategy for treating the KR MA. The strategy prioritizes periodic treatments in management units once maintenance is achieved to keep the unit in maintenance status for specific species, expanding efforts to other areas or species only when available resources are sufficient to achieve and retain maintenance status.

The prevalence of invasive plants within management units is estimated and assigned a condition class value (**Map 25**). Each management unit is given an invasive plant condition class based on the maturity of the population of the primarily targeted species (**Figures 12-13**). Annual work plans are developed to minimize the ecological impacts of these invasive species in a cost-effective manner while minimizing the use of herbicides where practical.

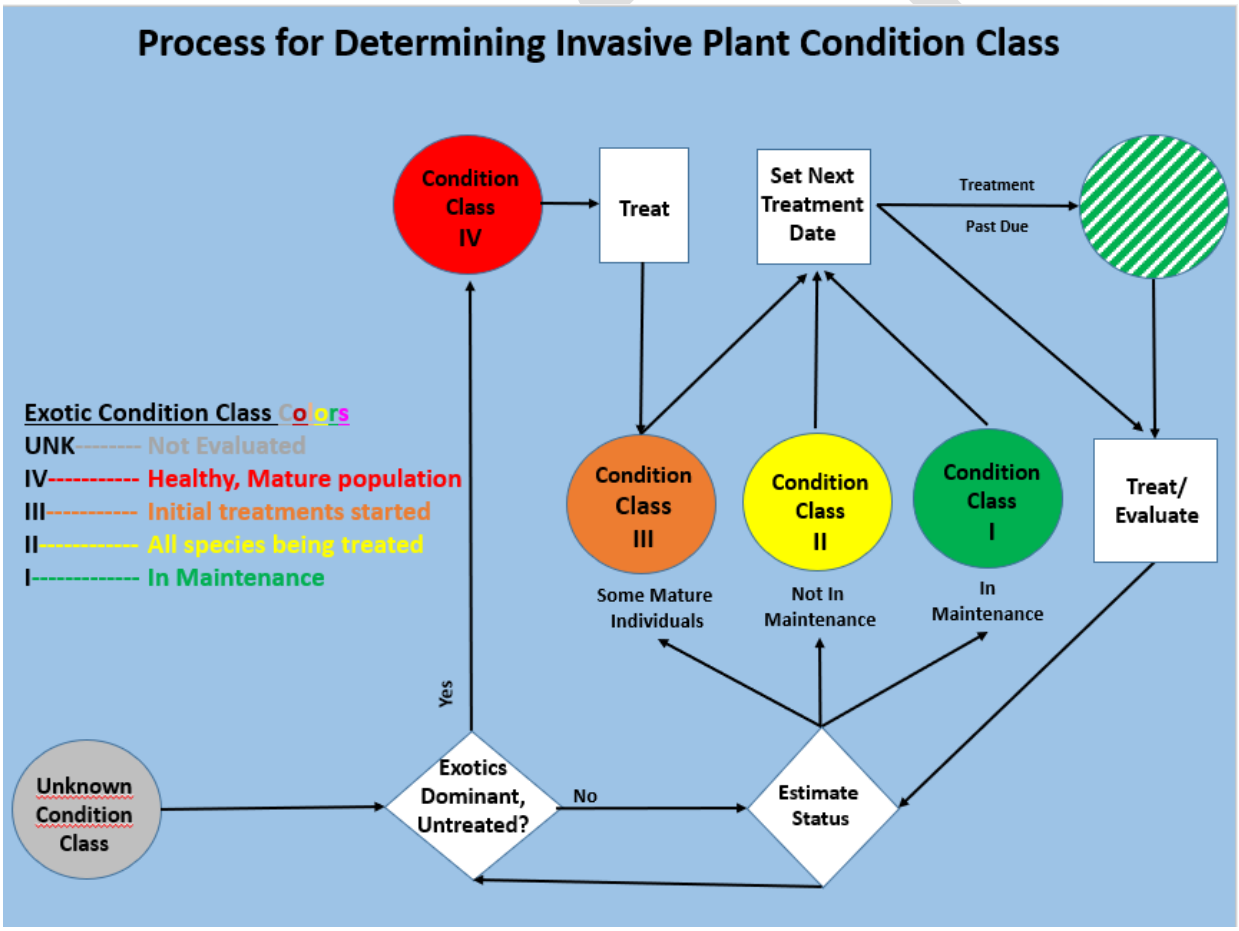
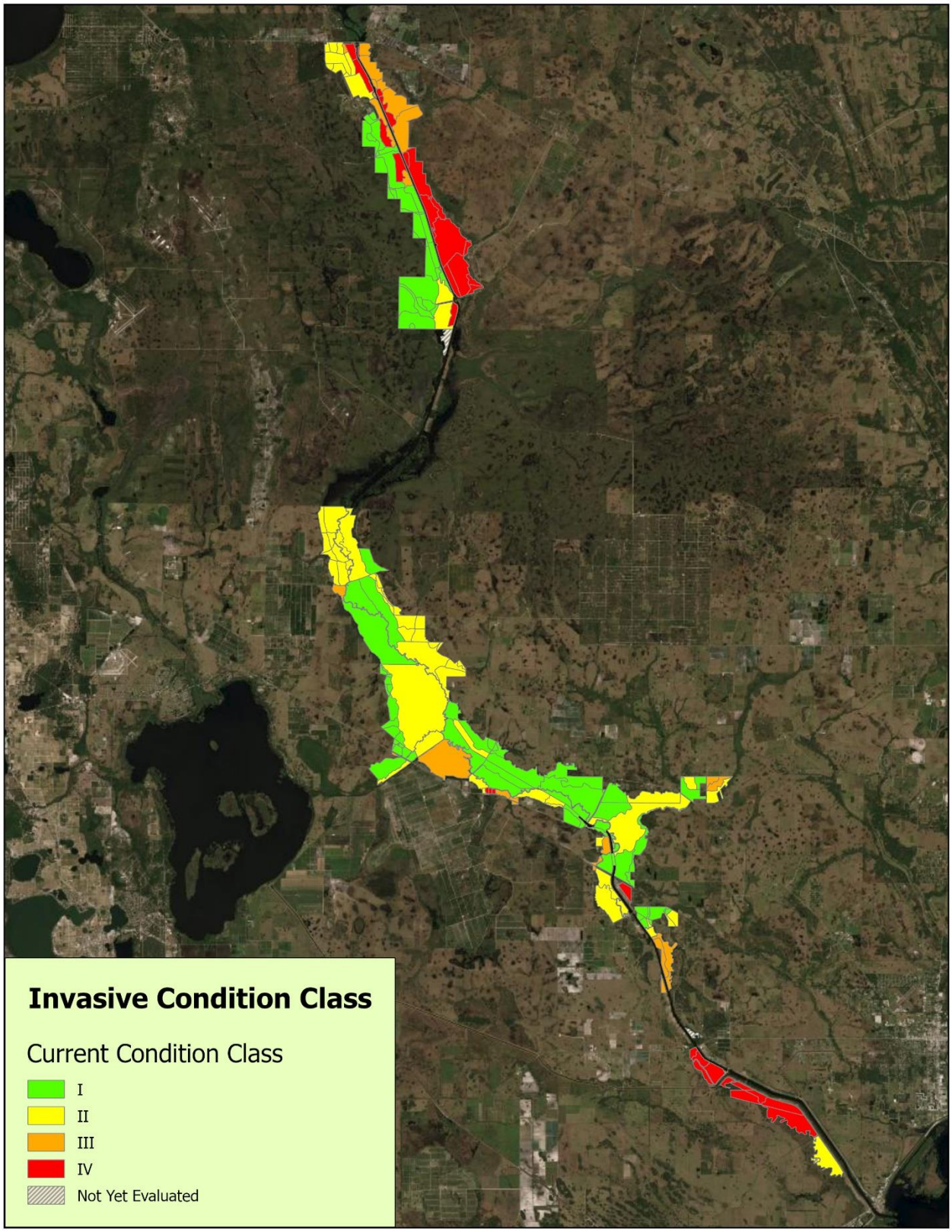


Figure 12. Flowchart illustrating the process for determining invasive plant condition class.

- **Woody vegetation (Melaleuca-Earleaf Acacia-Chinese Tallow-Brazilian Pepper-Ardisia-Senna-Downy Rose Myrtle-Carrotwood-Silk Tree-Mimosa Pigra-Schefflera-Java Plum-Lead Tree-Woman's Tongue)**
  - IV--Tall, dense, mature, many throughout landscape
  - III--Most mature dead, some regrowth/sprouting/isolated misses, many seedlings/suckers
  - II—All or nearly all mature dead, little regrowth, some seedlings
  - I----Occasional seedings or young plants
- **Vines (Lygodium-Air Potato-Winged Yam-Rosary Pea-Mile-A-Minute Vine)**
  - IV---Heavy blanket covering trees/bushes, dense, some throughout area
  - III---Most trellises dead, lots of sprouting/young plants, some clean areas
  - II----Trellises < 10' high, young plants tending towards "hot spots"
  - I-----Limited trellising, mostly young plants in isolated "hot spots"
- **Cogon Grass-Taro**
  - IV—Solid, Dense, Mature Stands
  - III---Main portion mostly dead, regrowth along edges and some internally
  - II----Outlying regrowth and isolated clumps
  - I-----Occasional dispersed clumps of fresh growth
- **Tropical Soda Apple**
  - IV---Thick & tall
  - III---Most dead in main concentrations, frequent outliers
  - II----Widely separated plants
  - I-----Occasional seedling plants

Figure 13. Example of invasive characteristics of target species used to assign condition class.



Map 25. KR MA invasive treatment condition class.

Gopher Tortoise Habitat Monitoring

A long-term monitoring program has been established for the gopher tortoise recipient site at the Fort Basinger Unit. The monitoring program includes the installation and periodic surveying of sixteen permanent vegetation transects to assess habitat conditions and vegetation management efforts. Additionally, gopher tortoise burrow surveys are conducted along these transects during the monitoring period. The monitoring reports, which compile data from the vegetation stations and burrow surveys, are used to inform and guide land management practices across the site.

Kissimmee River Restoration Studies and Monitoring Evaluations

The District has an environmental monitoring program that supports various restoration projects, including the Everglades, Kissimmee River, Lake Okeechobee, Big Cypress Basin, and the water conservation and stormwater treatment areas. This program routinely monitors surface water, fish, and sediment and analyzes them for nutrients, pesticides, trace metals, and ultra-trace mercury. The District has also partnered with Florida Atlantic University's Center for Environmental Studies since 1995 to manage the Riverwoods Field Lab, which serves as a research and education center, providing support staff for the scientific evaluation program for the Kissimmee River. Additionally, the District partners periodically with the University of Florida and provides funding for research aimed at understanding new invasive pest characteristics and developing better control strategies for more effective management.

The natural resources in the Kissimmee River Basin have been extensively studied for decades. Before the restoration, the District conducted bathymetric surveys and collected five years of monitoring data from permanent photo-monitoring plots to establish baseline conditions, which serve as a reference for post-restoration comparisons. The District and its partners have continued to systematically monitor the response to restoration efforts through the Kissimmee River Restoration Evaluation Program (KRREP). Research, ecological surveys, and monitoring studies conducted through KRREP evaluate river restoration and document the ecosystem's status, including hydrology, dissolved oxygen, floodplain geomorphology, vegetation, fish, wading birds, and waterfowl abundance. The District annually publishes the results from the KRREP long-term monitoring and other research in the South Florida Environmental Report (SFER). Multiple scientific studies on the Kissimmee River Restoration projects are also well-documented in peer-reviewed journals. Here is a brief overview of some surveys and monitoring studies that assist in guiding management practices in the KR MA. Additional details on methods, results, and other studies are available in SFER at https://www.sfwmd.gov.

Geomorphology

Channel planform analyses have been conducted since 2001 to quantify changes in the geomorphology of the Kissimmee River channel. The analysis combines planform and channel profile evaluations to measure shifts in the channel's centerline. By comparing a series of regularly collected aerial images with reference data gathered between 1943 and 1958, the study assesses whether the processes that create and maintain the natural river channel and its migration rate have been reestablished through restoration. This assessment offers valuable insights for land managers regarding the stability of the river channel and floodplain within the restored system.

Habitat monitoring: Community Classification and Treatment Efficacy

Several ecological monitoring studies have been conducted to establish baseline conditions in the Kissimmee River Floodplain, both before and after channelization. These studies used various techniques, including photointerpretation of aerial photographs, color infrared remote sensing, and ground-truth field sampling to develop vegetation maps. A vegetation classification system has also been developed for the KRREP to analyze plant associations using species cover data and habitat information. This vegetation classification system utilizes aerial imagery comparison and field observations to categorize habitats at the community level. The KRREP vegetation classification system plays a vital role in monitoring changes in plant communities, including the invasion of invasive species and the expansion of shrub vegetation within the floodplain. The District utilizes this data for vegetation mapping and for identifying plant communities across the river, floodplain, and surrounding uplands.

Following the full implementation of the HRS, additional vegetation monitoring will assess the effectiveness of herbicide treatments on invasive grasses within the Kissimmee River floodplain. Systematic experimental trials are currently being conducted to develop optimal control strategies and improve the efficacy of these treatments. Validating these strategies and identifying effective herbicides for managing West Indian marsh grass and other invasive grasses will help land managers address concerns regarding the potential spread of invasive grasses, which may result from the hydrological changes expected with the implementation of the HRS.

Wading Bird and Waterfowl

Monthly aerial surveys of the floodplain are conducted during the dry season to estimate the abundance of foraging wading birds and waterfowl in the Kissimmee River, both in the restored and unrestored sections. The data collected from these surveys is compared to baseline data collected prior to the restoration to evaluate the success of the restoration efforts on avian communities. Additionally, wading bird colonies within the restoration area around the Kissimmee River Basin are monitored and compared with historical records.

Snail Kites

The University of Florida also conducts systematic annual monitoring of statewide snail kite nesting efforts, distribution, and population size. These nest and roost surveys begin in January, with identified nests being revisited roughly every three weeks until they are no longer active. The results from these annual bird abundance and nesting surveys are documented through KRREP to inform water management decisions.

Fisheries, Invertebrates, and Herpetofauna Surveys

Since 2014, fish populations in the river channel have been sampled annually using electrofishing methods to assess abundance and biomass. This ongoing monitoring has helped evaluate how fish respond to restoration efforts, water management, and dissolved oxygen levels in the Kissimmee River. Frequently sampled species include bluegill sunfish (*Lepomis*

macrochirus), largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), redear sunfish (*Lepomis microlophus*), redbreast sunfish (*Lepomis auritus*), spotted sunfish (*Lepomis punctatus*), and warmouth (*Lepomis gulosus*). In addition, herpetofauna and invertebrate populations are sampled through herpetofaunal drift fence surveys and anuran call surveys to assess prey availability for birds in the Kissimmee River.

Other Passive Studies

Apple Snail:

A Visual Encounter Survey of apple snails was conducted monthly for more than two years along 24 fixed 50-meter transects within the restoration project area to observe egg masses of both native and non-native apple snails. Additionally, monthly throw trap samples were collected nearby to count live apple snails of both species.

Prescribed Fire:

In 2019, a monitoring study was conducted to assess the effects of prescribed fire on vegetation in the river floodplain. The District established permanent photo-monitoring points and vegetation plots within the burn units to document conditions after the burn. Observations of these ground photo-monitoring points and plots were made at 3-, 6-, 12-, and 24-month intervals following the burn. Long-term monitoring and evaluation of ongoing prescribed fire efforts will continue through photointerpretation of aerial imagery.

Carolina willow:

Experimental trials were conducted in Pool B and C to assess the effectiveness and non-target effects of three herbicide treatments aimed at controlling the spread of the native shrub Carolina willow in the Kissimmee River floodplain. Vegetation data were collected at 1-, 6-, and 12-month intervals following treatment. Ongoing research efforts are focused on developing best management practices to reduce Carolina willow coverage and minimize impacts on non-target species.

8. ADMINISTRATION

Administration of District lands is directed through the Land Stewardship Section within the Land Resources Bureau. Policy decisions, planning and budgeting, procurement of personnel and equipment, contract administration, and program development issues are administrative tasks coordinated through the Land Stewardship Section. Input is provided by regional land managers located over the 16-county area. Regional land managers handle regular administrative duties from their field locations to ensure quick response to local concerns and management issues. Administrative activities for KR MA will be handled through the District's field office at the Okeechobee Field Station and the District's headquarters in West Palm Beach.

8.1. Planning and Budgeting

Planning is a major component of the Land Stewardship Section and is critical to maintaining proper program focus, direction, and coordination with other agencies. This document forms the framework for prioritizing and creating targeted plans for the activities to be conducted within the appropriated budget for the next 10 years.

The principal sources of funding for land management operations on the KR MA include lease revenue, ad valorem tax revenue, and special grants. Overall funding availability determines management activities. Budget distribution among the District's five land management regions is based on a programmatic prioritization of management activities. Operational funds are distributed to accomplish the management objectives of each management area most effectively. The continued operation and maintenance of the KR MA includes costs to cover staffing, ongoing land management expenses, and capital refurbishment/replacement of aging infrastructure. Current conditions and anticipated serviceability determine capital infrastructure needs. Priorities for capital refurbishment/replacement are made on a District-wide basis. Utilities and operational expenses include supplies, electric service, business travel, and safety equipment. Public use costs include maintenance costs for public use facilities. Base-level funding needs may increase in the future in response to increasing operational expenses, including fuel costs, contracted nuisance and invasive plant control needs, equipment and infrastructure repairs, and increasing public expectations. Specific projects on which to spend these funds are prioritized annually to address each management goal. The Fiscal Year 2025 (FY2025; October 1, 2024 – September 30, 2025) budget for the KR MA and projected expenditures through FY2030 are outlined in **Table 7**.

Table 5. KR MA FY 2025 budget and proposed expenditures through FY 2030.

Management Activities	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030
Resource Management						
Mechanical Vegetation Mgmt.	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000
Chemical Vegetation Mgmt.	$137,447	$137,447	$137,447	$137,447	$137,447	$137,447
Prescribed Burning/Site Prep	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
Solid Waste/Debris Removal	$65,850	$27,434	$27,434	$27,434	$27,434	$27,434
Habitat Restoration						
Law Enforcement/ Enhanced Patrol	$23,400	$23,400	$23,400	$23,400	$23,400	$23,400
Capital Improvements						
Facilities & infrastructure improvements	$231,376	$80,000	$160,000	$400,000		

Fencing/Signage	$64,603

Table 7 (Continued). KR MA FY 2025 budget and proposed expenditures through FY 2030.

Management Activities	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030
Rec. Facilities Maint.	$75,762	$61,387	$61,387	$61,387	$61,387	$61,387
Support & Administration						
Infrastructure Maint.						
Prescribed Burn PPE	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
Contingent Staffing						
Vehicle Replacement						
Vehicle Fuel & Maint.						
Equipment Replacement						
Equipment Fuel & Maint.	$17,000	$17,000	$17,000	$17,000	$17,000	$17,000
Small Tools & Equipment	$2,800	$1,000	$1,000	$1,000	$1,000	$1,000
Total *	$662,818	$208,247	$208,247	$208,247	$208,247	$208,247

The FY 2025 invasive plant control strategy for the KR MA (**Figure 14**) identifies how nuisance and invasive plant control funding was distributed to achieve the control of nuisance and invasive plants based on current and expected future nuisance and invasive plant condition classes for each management unit. Through this process, efforts are directed toward maintaining nuisance and invasive plant infestations at the most cost-effective levels while minimizing negative impacts on natural communities. This strategy also minimizes the use of herbicides by keeping populations of nuisance and invasive plants at low levels in areas of maintenance.

Similarly, strategies prioritizing equipment and infrastructure replacement (including fencing, public use facilities, administrative structures, and hydrologic components), areas for prescribed fire, and public use needs are also updated annually. These strategies and budgets are developed in concert with District-wide operational priorities and budgetary cycles and prioritized across all areas managed by the Land Stewardship Section.

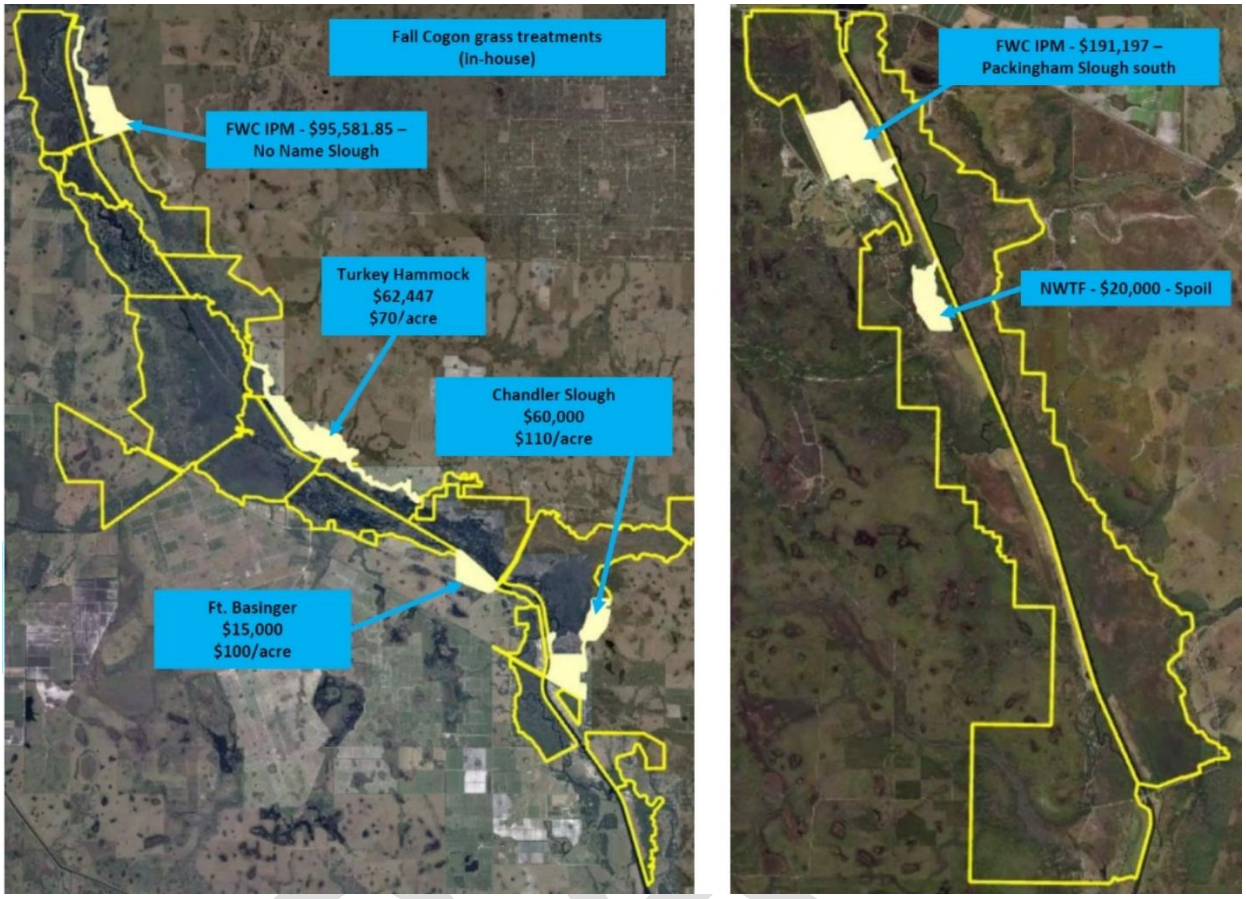


Figure 14. KR MA FY25 invasive plant treatment plan.

8.2. Personnel and Equipment

The Land Stewardship Section is separated into five geographic regions. Each region is assigned a Science Supervisor (Land Manager), one to three Land Management Technicians, and, based on the need in some areas, a Land Management Assistant, Scientist III, and/or Scientist IV position. A Section Leader provides direct oversight and supervision for the land managers. Additional leadership and assistance come from the Land Stewardship Section Administrator, Land Stewardship Senior Scientist, Wildlife and Public Use Section, Vegetation Management Section, and other support personnel from the District's headquarters in West Palm Beach and the Field Stations. Management of the KR MA property is the primary responsibility of the Okeechobee/Kissimmee Region's Science Supervisor, ~~one Land Management Technician~~, one Senior Land Management Assistant, and one Scientist III.

Staff have access to tools, supplies, four-wheel drive vehicles, fire suppression trucks, all-terrain vehicles, swamp buggies, airboats, and other heavy equipment. This equipment is maintained through the Okeechobee Field Station. Equipment from the other regions, as well as leased equipment, are also available if needed.

8.2. Volunteers

Section 373.1391, Florida Statutes, encourages the District to use volunteers for land stewardship and other services. The District recognizes the merits of volunteerism and welcomes participation in activities appropriate for public involvement. The Land Stewardship Section offers a variety of volunteer opportunities for individuals and groups. These opportunities include creating and maintaining public use trails, maintaining public use facilities and amenities, leading field interpretations and guided tours, organizing cleanups of trails and waterways, conducting invasive plant sweeps, and assisting with District-sponsored public events such as Earth Day and Public Lands Day.

In Fiscal Year 2024, District Lands benefited from 17,036 volunteer hours, which is valued at $538,508 based on Florida's average volunteer service rate of $31.61 per hour. The volunteer efforts are supported by dedicated individuals and organizations, including the KR MA Camp hosts, the Kissimmee River Valley Sportsman Association, Lake Okeechobee Airboat Association, the Florida Paddling Trail Association, and the Florida Trail Association. These groups assist in maintaining campsites, the Istokpoga Canal Boat Ramp Area, airboat shelters, hiking trails, and in organizing trash cleanups and posting signage. Additional cleanup efforts along the Kissimmee River involved removing old fence lines and other airboat navigation hazards, and removing deteriorating boardwalk along the FL National Scenic Trail.

8.3. Contractual Management

Effective operation and management of District properties require the services and cooperation of private organizations, other governmental agencies, and volunteers. Contractual management is established through a management agreement jointly executed by the District and the contracting entity, which outlines the responsibilities of each party. In addition to the contractual services for the KR MA, the District has established agreements to facilitate efficient management and protection of its resources, including the following:

Research and Education Agreement

The District contracts with Florida Atlantic University’s Center for Environmental Studies to provide field support for District restoration evaluation studies.

Enhanced Patrol Agreement

The District contracts with local law enforcement to provide enhanced patrol services throughout the District. Currently, the District has a contract with Highlands County for enhanced law enforcement support at the Hickory Hammock Equestrian Center and the Istokpoga Canal Boat Ramp Area. The District’s resource protection coordinator schedules patrols with input from the Management Area’s land manager and FWC.

FWC Agreement

The District has a cooperative agreement with FWC to regulate public use for managing and protecting wildlife and aquatic life on specific District lands. (Multi-Site agreement No.

4600000961). This agreement funds operational expenses for overseeing and regulating public use activities at the KICCO and Hickory Hammock WMAs and the Kissimmee River Public Use Areas.

USDA Agreement

The District has an agreement with USDA authorizing APHIS Wildlife Services to conduct aerial operations to manage feral hog populations on selected District-managed properties.

Lease Agreement

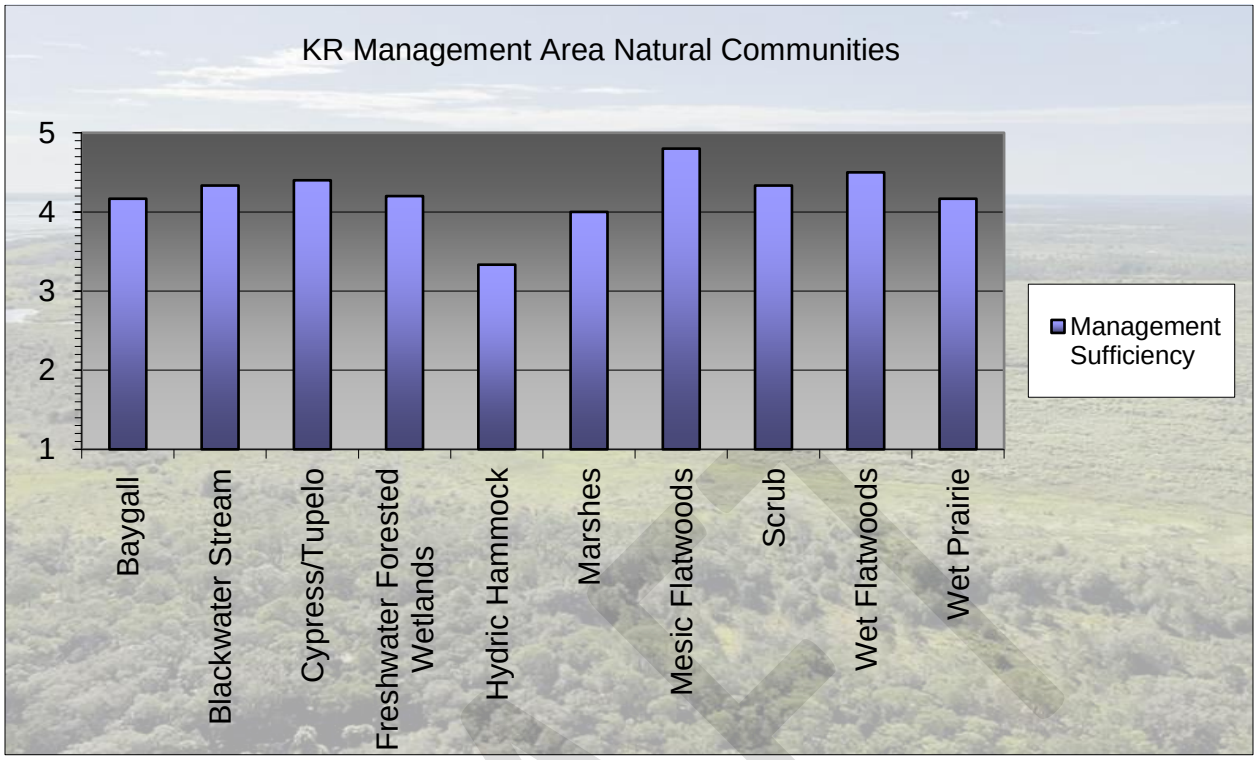
A 50-year lease with the Trustees of the Internal Improvement Trust Fund conveying the management responsibility for sovereign submerged lands within the Kissimmee River to the district (Contract LS040808, Lease No. 4099). Additionally, the District and the Department have entered into a lease agreement that conveys the management of properties within the KR MA that were purchased by TIITF. The Division of State Lands can perform a management review of the leased premises every five years. The Division of State Lands also receives notification of all public notices relating to the development of the site.

9. MANAGEMENT REVIEW

On November 5-6, 2025, a land management review was conducted to update the 2014-2024 KR MA GMP. The review team consisted of representatives from the Department of Environmental Protection, Fish and Wildlife Conservation Commission, Okeechobee County Board of County Commissioners, South Florida Water Management District, a private land manager representing adjacent landowners, and a member of a nonprofit representing a conservation organization (as per §373.591, Florida Statutes). The management assessment reviewed both management actions in the field and the written GMP to ensure they were consistent with acquisition intent and program objectives.

Over the two-day review, the team provided overall positive feedback on land management practices, particularly in the areas of ecosystem restoration, resource protection, and public use opportunities. These comments highlighted the dedication and performance of the land management staff. However, the team also identified areas where management resources were insufficient. There was consensus that additional staffing and increased funding are necessary to fully achieve the management goals for the KR MA. In particular, members emphasized the need for expanded funding for invasive plant control efforts. The team also assessed how thoroughly these topics were addressed in the management plan. Based on their assessment, revisions were incorporated into the final plan, resulting in an improved manuscript.

The review team ranked management actions taken, resource allocation, and the proposed goals and objectives on a scale of “1” (poorest) to “5” (best). An average score of less than “3” was considered insufficient management. A determination that the management area is not being managed according to the management plan would require the District to provide an explanation and/or propose corrective actions. The categories ranked included Biological Resources, Cultural Resources, Resource Management, Public Use, and Staffing/Funding Budget. The average score for each evaluation criterion is identified in **Figure 15**. The Management Plan and Field Review received an overall above-average rating; however, one category scored below a "3." Specifically, the team found the funding allocated for staffing and resource management to be insufficient. As a result, the land managers will identify specific unmet needs to request additional resources and funding to address any deficiencies.



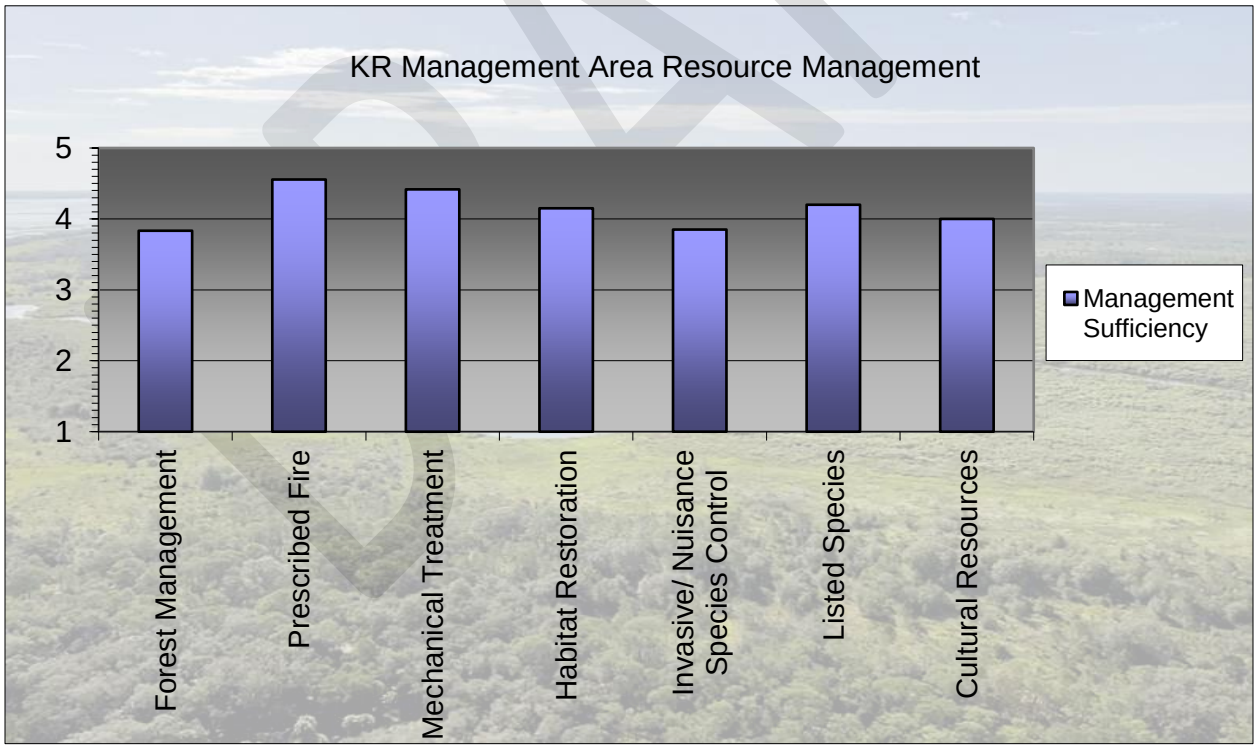


Figure 15. 2025 Land Management Review Results.

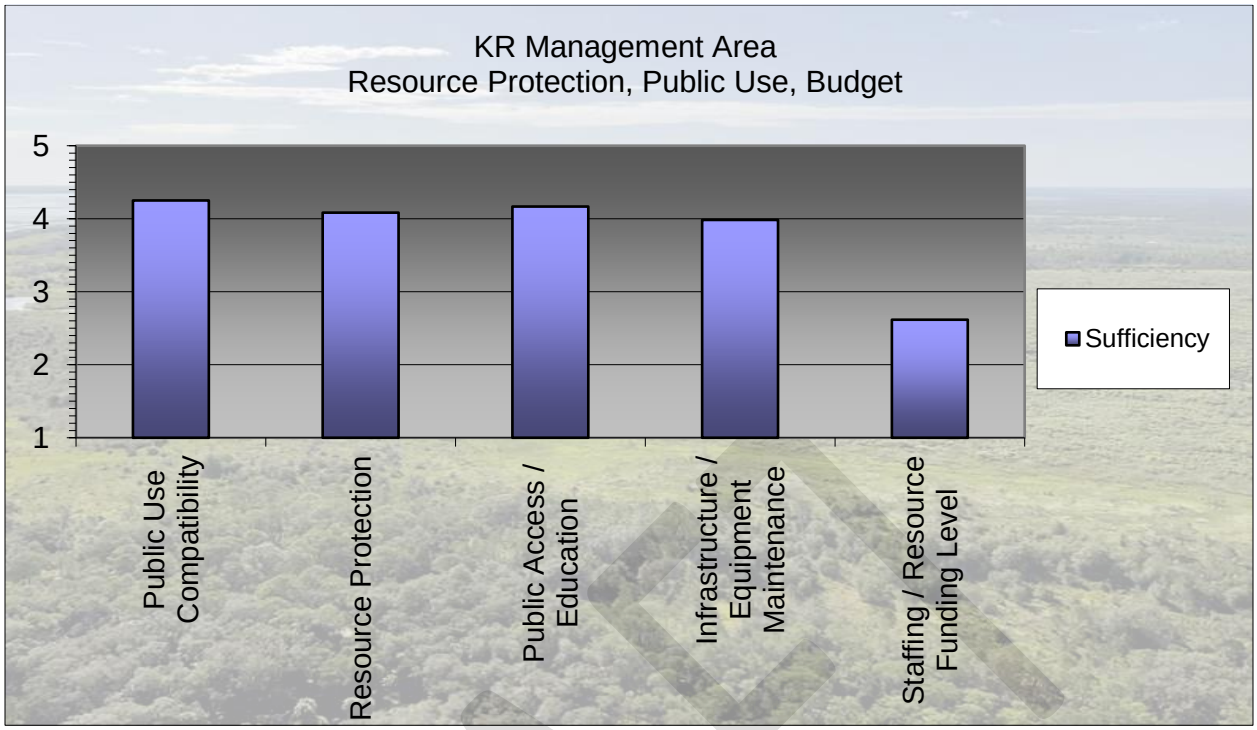


Figure 15 Continued. 2025 Land Management Review Results.

REFERENCES

Bousquin, S. G., Colee, J. 2014. *Interim Responses of Littoral River Channel Vegetation to Reestablished Flow after Phase I of the Kissimmee River Restoration Project.* Restoration Ecology. 22. 397-408.

Bousquin, S. G., Anderson, D. H.,Williams, G. E., Colangelo, D. J. 2005. *Establishing a Baseline: Pre-Restoration Studies of the Channelized Kissimmee River, Technical Publication ERA #432*. South Florida Water Management District. West Palm Beach, FL. Available at https://www.sfwmd.gov/sites/default/files/documents/krr_voli_baseline_studies.pdf

Florida Department of Agriculture and Consumer Services. 2003. *Notes on Florida's Endangered and Threatened Plants.* Division of Plant Industry. Gainesville, FL.

Florida Fish And Wildlife Conservation Commission 2021. Fish, Wildlife, And Habitat Plan: Kissimmee Chain Of Lakes. Tallahassee, FL. Available at https://myfwc.com/conservation/management-plans/lake/kissimmee/

Florida Fish and Wildlife Conservation Commission. 2019. Florida's Wildlife Legacy Initiative: Florida's State Wildlife Action Plan. Tallahassee, Florida.

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

Florida Natural Areas Inventory. 2010. Guide to the Natural Communities of Florida. Tallahassee, Florida.

Florida Invasive Species Council. 2023. *List of Invasive Species, Electronic version, 2023*. Available online at https://www.floridainvasives.org/plant-list/

Guardo, M. 1992. *An atlas of the upper Kissimmee surface water management basins*. South Florida Water Management District. West Palm Beach, FL.

Koebel, J.W, Bousquin, S. G., Anderson, D. H., Cheek, M. D., Carroll, C., Chen, H., Hanlon, C., Spencer, L. Anderson, B.C., Beck, T., & Brunell, A. 2021. Kissimmee River Restoration and Other Kissimmee Basin Initiatives. South Florida Environmental Report – Volume I. South Florida Water Management District, West Palm Beach, FL. Available online at https://apps.sfwmd.gov/sfwmd/SFER/2021_sfer_final/v1/chapters/v1_ch9.pdf

Koebel, J.W., Bousquin, S. G., Colee, J. 2014. *Interim Responses of Benthic and Snag-Dwelling Macroinvertebrates to Reestablished Flow and Habitat Structure in the Kissimmee River, Florida, U.S.A.* Restoration Ecology. 22. 409-417.

Koebel, J.W., Bousquin, S. G. 2014. *The Kissimmee River Restoration Project and Evaluation Program, Florida, U.S.A.* Restoration Ecology. 22. 345-352.

Koebel, J.W., Jr. (1995), *An Historical Perspective on the Kissimmee River Restoration Project*. Restoration Ecology, 3: 149-159. https://doi.org/10.1111/j.1526-100X.1995.tb00167.x

Spencer, L. J., Bousquin, S. G. 2014. *Interim Responses of Floodplain Wetland Vegetation to Phase I of the Kissimmee River Restoration Project: Comparisons of Vegetation Maps from Five Periods in the River's History.* Restoration Ecology. 22. 397-408.

Mossa, J., A. Gellis, C. Hupp, J.L. Pearman, U. Garfield, E. Schenk, J. Rasmussen, J. Valdes, & P. Habermehl. 2009. Geomorphic Monitoring of the Kissimmee River Restoration: 2006-2009. Department of Geography, University of Florida, Gainesville, FL. Available online at https://www.sfwmd.gov/sites/default/files/documents/geomorph_monitoring_krr_2006_2009.pdf

Robison, J., Osceola County Historical Society. 2003. Kissimmee: Gateway to the Kissimmee River Valley. Arcadia Publishing SC.

Schiner, G. R. 1993. *Geohydrology of Osceola County, Florida*. U.S. Geological Survey Water-Resources Investigations Report 92-4076. Tallahassee, FL.

South Florida Water Management District. 2022. *Physical Features and Water Resources of the South Florida Water Management District.* South Florida Water Management District, West Palm Beach, FL.

South Florida Water Management District. 2020. *Strategic Plan, 2021–2026*. South Florida Water Management District, West Palm Beach, FL.

South Florida Water Management District. 2020. *Technical Document to Support Water Reservations for the Kissimmee River and Chain of Lakes.* South Florida Water Management District, West Palm Beach, FL. Available online at https://www.sfwmd.gov/sites/default/files/documents/KRWR_Final_Tech_Doc.pdf

South Florida Water Management District. 2007. *Kissimmee River Restoration Evaluation Program Vegetation Classification System Guidebook.* South Florida Water Management District, West Palm Beach, FL.

South Florida Water Management District. 2006. *Executive Summary - Kissimmee River Restoration Studies*. South Florida Water Management District, West Palm Beach, FL. Available online at https://www.sfwmd.gov/sites/default/files/documents/krr_exec_summary.pdf

Spechler. R. M., Kroening S. E. 2007. *Hydrology of Polk County, Florida*. Geological Survey Scientific Investigations Report 2006-5320. Reston, VA.

Toth, L. A., Melvin, S. L., Arrington, D. A., & Chamberlain, J. 1998. *Hydrologic Manipulations of the Channelized Kissimmee River*. BioScience, *48*(9), 757–764. https://doi.org/10.2307/1313338

USDA Natural Resources Conservation ServiceWeb Soil Survey. 2022. *Custom Soil Resource Report for Osceola County, Florida, and Polk County, Florida.* Available at https://www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/soils/getting-started-with-web-soil-survey

USDA Natural Resources Conservation Service. 2003. *Soil Survey of Okeechobee County, Florida*. Washington, D.C.

USDA Natural Resources Conservation Service. 2000. *Soil Survey of Glades County, Florida*. Washington, D.C.

USDA Natural Resources Conservation Service. 1989. *Soil Survey of Highlands County, Florida*. Washington, D.C.

USDA Natural Resources Conservation Service. 1999. *Soil Survey of Polk County, Florida*. Washington, D.C.

USDA Natural Resources Conservation Service. 1979. *Soil Survey of Osceola County, Florida*. Washington, D.C.

U.S. Army Corps of Engineers. 2021. *Kissimmee River Restoration Project Facts & Information*. Jacksonville, FL.

U.S. Army Corps of Engineers. 1996. *Central and Southern Florida Project, Kissimmee River Headwaters Revitalization Project: Integrated Project Modification Report and Supplement to the Final Environmental Impact Statement.* US Army Corps Of Engineers, Jacksonville, FL.

U.S. Army Corps of Engineers. 1991. *Central and Southern Florida Project, Environmental Restoration of the Kissimmee River, Florida: Final Integrated Feasibility Report and Environmental Impact Statement*. US Army Corps of Engineers, Jacksonville, FL. Available at https://www.sfwmd.gov/document/csf-final-integrated-feasibility-report-and-environmental-impact-statement-environmental

U.S. Fish and Wildlife Service. 2020. *Cooperative Land Cover v3.4 Raster - State Classes - in Florida.* Florida Fish and Wildlife Conservation Commission-Fish and Wildlife Research Institute. Tallahassee, FL.

U.S. Fish and Wildlife Service. (1999). *South Florida multi-species recovery plan: a species plan, an ecosystem approach.* Atlanta, GA: Region 4.

U.S. Fish and Wildlife Service. 1998. *Multi-Species Recovery Plan for the Threatened and Endangered Species of South Florida, Volume 1: The Species. Technical/Agency Draft.* U.S. Fish and Wildlife. Service. Publications Unit, Shepherdstown, West Virginia.

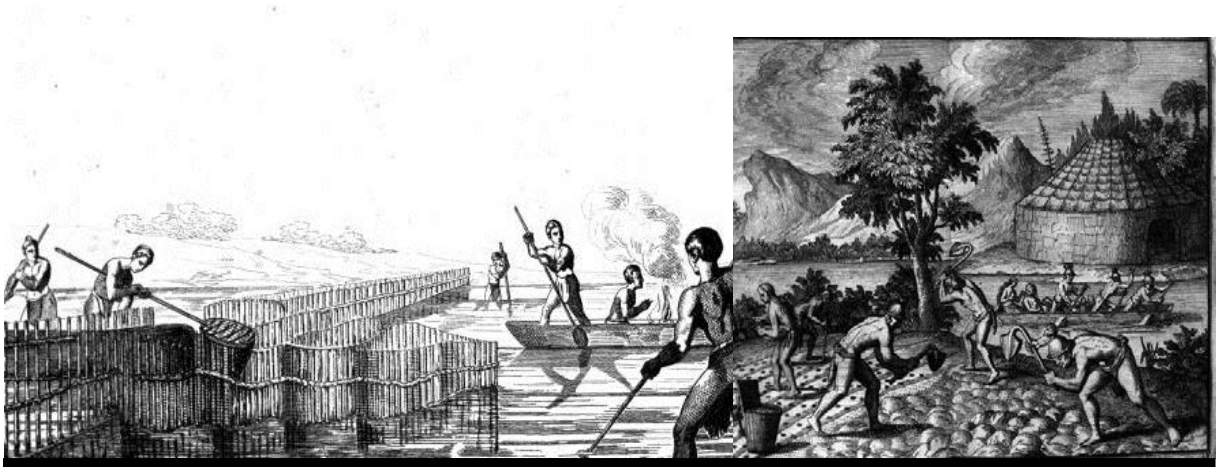
Wade, D., J. Ewel, and R. Hofstetter. 1980. *Fire in South Florida Ecosystems*. Gen. Tech. Rep. SE-17. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station.

White, W. A. 1970. *The Geomorphology of the Florida Peninsula*. FL. Department of Natural Resources Geological Bulletin No. 51. Designers Press, Tallahassee, FL. Available at https://ufdc.ufl.edu/UF00000149/00001

Appendix A.
Kissimmee River Area History

Historic Overview

The documentation of Native American presence in Florida, as recorded through archaeological and documentary research, dates back to approximately 3000 B.C. Scattered early habitation sites still exist today. During the Spanish colonial period, the region was considered wilderness and was rarely visited. The Spaniards did not map or survey the area during their 300-year rule over Florida, likely due to the difficult terrain. The nearest Franciscan mission during this time was likely La Concepcion de Atoyquime or San Joseph de Jororo, both located just north of present-day Orlando from 1685 to 1697. These frontier outposts had several missionaries killed by the local population and were ultimately abandoned.



Florida Indians as observed by early French settlers trapping fish - left, and tilling and sowing fields - right

The first description of what was likely Lake Kissimmee dates back to 1564, when two Spanish shipwreck survivors were brought to Fort Caroline, a French fort on the Atlantic coast near present-day St. Augustine. The French had heard rumors that two Europeans were living with two nearby chiefs described as Indian kings, Mathiaca and Onachaquara. One of the Spaniards told the French Captain at the fort about his journey while serving as a messenger from the Calusa King, Calos, at Estero Bay to his close ally, King Oathaqua of the Ais, who lived at Cape Canaveral (Cañaveral was a Spanish term for a marsh or reedbed). About halfway through the journey, they came across a large lake, 15 miles from one end to the other, called Sarrope.

The island was home to a population that was one of the most fierce and warlike in Florida. The inhabitants of Sarrope were skilled in cultivating a wide variety of crops, particularly coontie

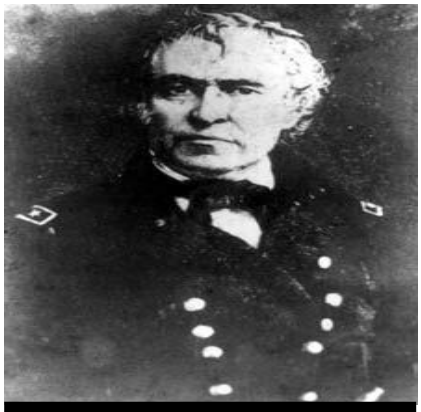
root, which they traded and used to make high-quality bread. The Spaniards noted that they had become quite wealthy from trading these crops. Their sphere of influence extended 15 miles from the Lake. The Spaniard also recounted a story that demonstrated the strength and confidence of the island population. According to the Spaniard, the inhabitants of the island were so confident in their strength that they angered both the Ais and the Calusa without fear of retribution. King Oathaqua had attempted to secure an alliance with the Calusa by arranging a marriage between his daughter and Calos. However, the bride and her entire retinue of maiden attendants were seized by the Sarrope inhabitants on their way to the Calusa and were forced to remain on the island, where they were required to marry the local men instead.

Figure 1. Early maps of Lake Kissimmee (then called Sarrope), 1591 – left, and 1703- right.

The Kissimmee River Basin region was home to several Native American tribes, including the Jororo, Mayaimi, and Seminole. The name Kissimmee originates from the language of the Jororo people and translates to “long water.” The Kissimmee River Basin would have fallen within the Jororo territory. The Jororo were hunter-gatherers who also tended small plots of maize and a few other vegetables. The area likely served as a stronghold for the early Native American culture until the Creek raids in the early to mid-1700s. Although it is not entirely clear how much the Creek raids impacted this specific area, as most accounts are from northern Florida tribes and coastal areas, it is evident that these raids marked the beginning of a significant decline in the tribes that were indigenous to Florida. In 1708, a man named Thomas Nairne from Carolina led 30 Yamasee warriors on a raid through central Florida to enslave Native American Indians. According to the notes from his journey, the village on Brahma Island was called "Cacema," which eventually gave rise to the name "Kissimmee" (**Figure 2**). Eventually, the Jororo and most of the nearby tribes migrated to St. Augustine, seeking protection, and came to be known as the Costas or Spanish Indians.

Figure 2. A 1780 map showing the Indian villages of Cacema, Dest, and Suliga near Lake Toho.

During the British colonial period that began in 1763, the region experienced immigration from the Creek and Yamasee tribes. Throughout the Second Spanish Period, the surviving Costas from the interior worked for Spanish fishing villages and rounded up native-range cattle, driving them to the coast for transportation to other Spanish colonies.



Colonel Zachary Taylor

The Kissimmee River Basin region remained practically unknown to most Floridians until the Second Seminole War. In 1837, the military began making detailed surveys of the area and established a system of frontier forts intended to keep the Seminoles south of Lake Okeechobee. Fort Gardner, also known as Fort Gardiner, named after a lieutenant who was one of the last to die in the Dade battle of the First Seminole War, was an important outpost on the Kissimmee River Chain of Lakes between Lake Hatchineha and Lake Kissimmee. It was from this fort that Colonel Zachary Taylor (the future President) and 600 soldiers marched out in 1837 to engage in the largest battle of the war, north of Lake Okeechobee, on Christmas Day.

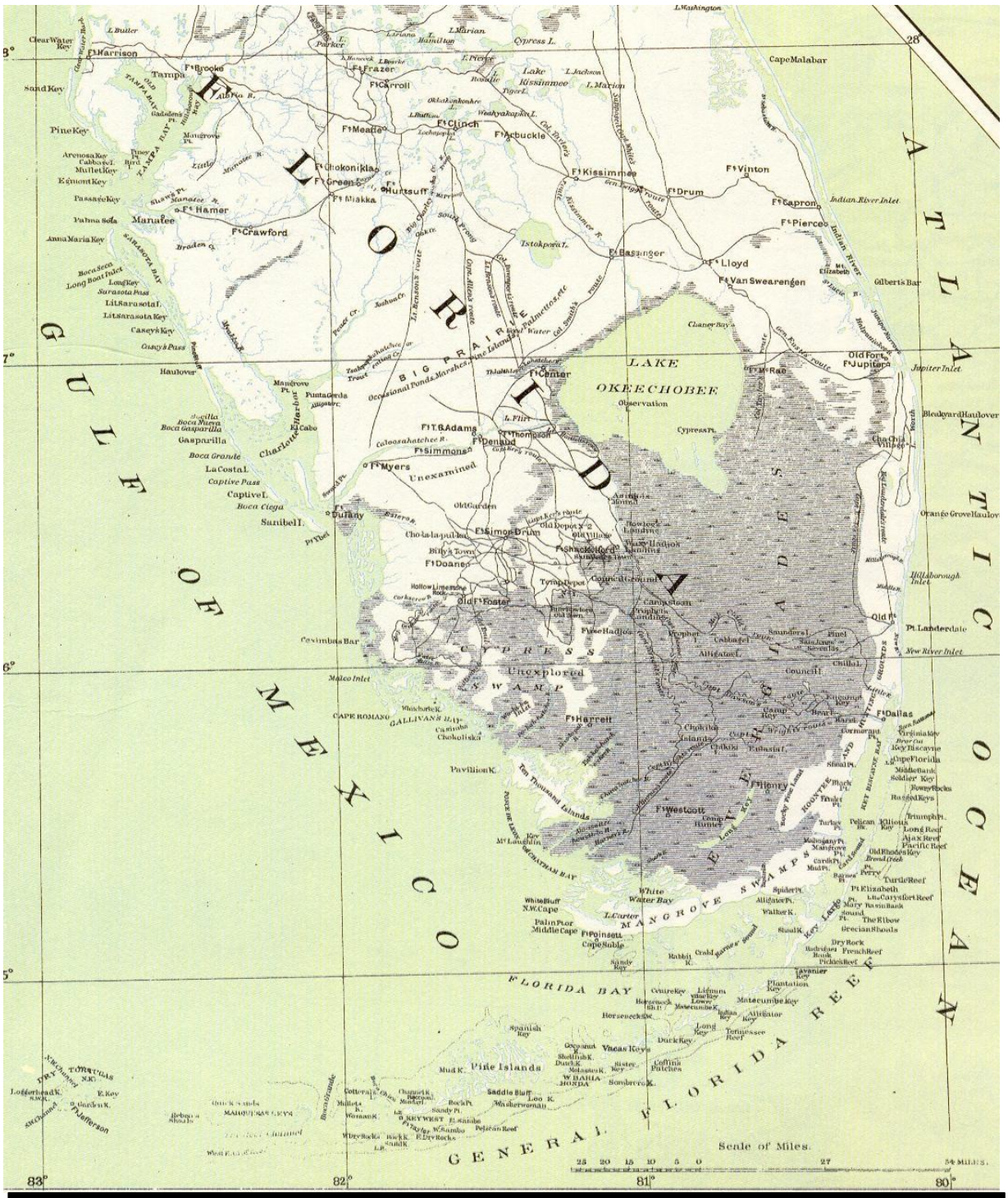


Figure 3. A reproduction of the 1856 Military Map of the Interior of Florida, showing the array of frontier forts and trails that were established in the Seminole Wars.

The Duke of Alagon Land Grant

In 1818, just before the end of the Second Spanish period, the Spanish king granted over 12 million acres to the Duke of Alagon. This was the largest land grant in Florida, and it included the Kissimmee basin and most of the rest of central Florida west of the St. John's River and north of Lake Okeechobee. The land was granted to the Duke because he had assured the king that if he had possession of it, he would work with various private enterprises to ensure that the land was settled and improved for agricultural production. However, the Duke promptly sold the land to Richard S. Hackley, of Virginia, who, in turn, leased some of it to a private corporation in 1836.

The treaty that ceded Florida to the United States included a written declaration that declared a land grant void. However, before the treaty was executed, the Spanish king had just agreed to become a constitutional monarch instead of an absolute monarch. Hence, he was limited in his powers and could not take private property without compensating the owner and then, having the action ratified by the Costas. As a result, the grant and transfer were disputed by the Territory, then the State of Florida. After years of being contested, the U.S. Supreme Court decided in 1853 (John Doe v. Braden - Braden was the founder of Bradenton) that the grant and transfer were not valid. The court asserted that the treaty was considered the supreme law of the land unless it violated the U.S. Constitution, not the Constitution of Spain, and assumed that the King had the necessary power to annul the grant. Since the transfer to Hackley occurred before the final ratification of the treaty in February 1821, it became a political decision rather than a judicial one. The treaty assumed the King had the necessary power to annul the grant, so the U.S. was not obliged to recognize the validity of the land grant.

The Court stated that taking ownership of Florida while so much land was in possession and ownership by a single individual would be "altogether inconsistent with the principles and policy upon which this government is founded." With the title being cleared by the U.S. Supreme Court and ownership by the Federal Government confirmed, the land could pass unchallenged to the State as part of the Swamp and Overflowed Lands Act passed by Congress in 1850. Ironically, the State later transferred nearly all the Alagon/Hackley lands to Hamilton Disston - a single individual - in 1881 for the same purpose that the king had granted the land to the Duke of Alagon: improving the land for agricultural production and encouraging settlement. This made Disston the largest individual landowner in the United States.

Table 1 highlights key historical dates pertinent to the Kissimmee region's history and provides a chronology for the Kissimmee River channelization and restoration projects.

Table 1. Overview of the region's history and chronology of the Kissimmee River Restoration Project.

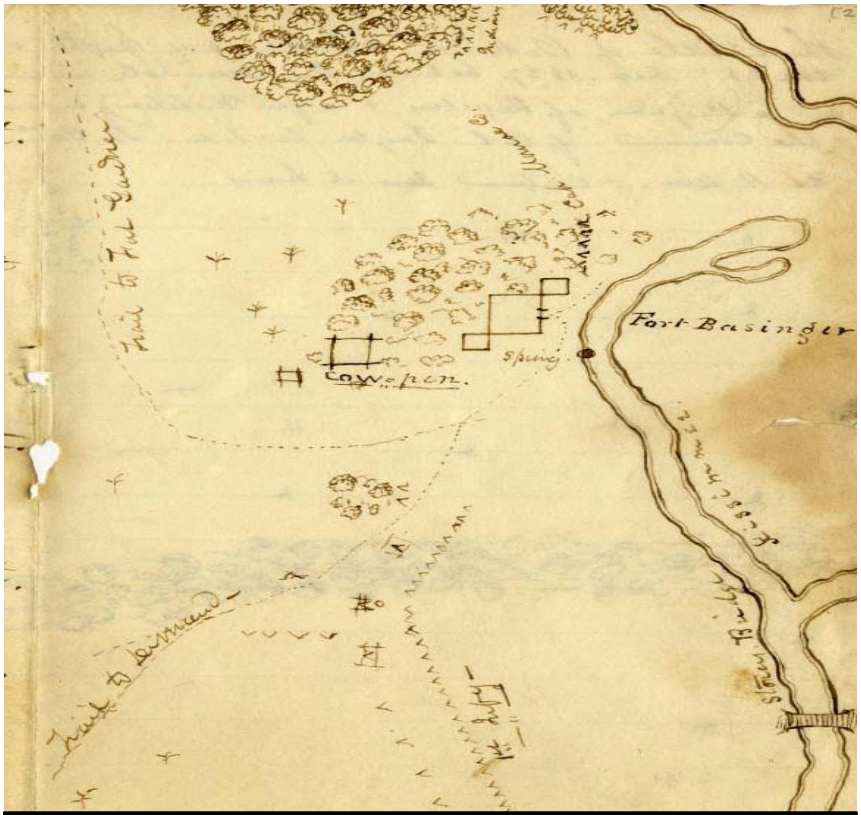
Chronology	Activity	Results and Impacts on KR Floodplain
1837	Fort Basinger constructed.	Trails constructed between forts spaced approx. 20 miles apart allowed settlement of the area when the Armed Occupation Act was passed in 1842.
1850	U. S. Congress passed the Swamp and Overflowed Land Act.	Allowed the state legislatures to transfer the ownership of swamp and overflowed lands to private entities to reclaim the land through drainage and levee projects.
1858	Third Seminole War ended.	Forced the Seminoles to relocate south of Lake Okeechobee, opening Kissimmee basin to settlement.
1881-1884	Hamilton Disston's Atlantic and Gulf Coast Canal and Okeechobee Land Company complete canals and dredging projects throughout the region. Navigable waterway established between Fort Myers and St. Cloud. Started clearing operation to keep the river navigable.	Water levels in the Upper Basin dropped; the River straightened for steamboat traffic; Vegetation communities along the navigable channel destroyed.
1890s	Kissimmee Island Cattle Company (KICCO) acquired land south and west of Lake Kissimmee to use the native range for cattle ranching.	Increased cattle grazing in the floodplain.
1915	Ditches dredged throughout the west of the river to establish KICCO's company town, resulting in the untenable situation of having a settlement and large operation in the 100-year floodplain.	Drained wetlands in the 100-year floodplain.
1926-1947	Major hurricanes strike in the Kissimmee River Valley. Subsequent "Crying Cow" report demanded better flood protection for agricultural lands in the Kissimmee River Valley after a 100-year flood event.	The flood events revitalized the floodplain and surrounding wetlands.
1948	Congress authorizes the Central and Southern Florida Project for Flood Control and Protection.	Set the stage for massive drainage and flood control projects.
1954	The Kissimmee River channelization is authorized by Congress.	

Table 1 Continued. Overview of the region's history and **c**hronology of the Kissimmee River Restoration Project.

1954-1960	Planning and design completed for the Kissimmee River flood control project.	
1962-1971	Channelization of the Kissimmee River.	Transformed the river floodplain ecosystem into a series of impoundments. Drained most of the floodplain.
1971-1974	Environmental impacts from the channelization are recognized by the Central and South Florida Flood Control District, and planning efforts to restore the River begin.	
1974	The State purchased 1718 acres within Blanket Bay; granted a flowage easement to SFWMD.	State acquisition kept Blanket Bay from being developed.
1978	1st Feasibility Study for the restoration conducted.	
1983-1985	KICCO in Pool A acquired by the SFWMD. Demonstration project initiated in 1984.	Removal of the existing development from the floodplain. Initiation of the restoration.
1990	2nd Feasibility Study for the restoration conducted.	
1992	Kissimmee River Restoration Project authorized by Congress.	The first 1000 feet of backfilling was completed in Pool B.
1994	Test filled project conducted.	
1997	Construction begins on Pool A restoration projects. Spoil piles on the south side of Blanket Bay removed; tie-back levees at S-65A constructed.	Increased flows to the Kissimmee River. Increased water storage of Pool A wetlands.
1999-2001	Phase I of the restoration project. Removed the S-65B structure and backfilled of the C-38 in Pool C.	Emergent and shoreline vegetation has reappeared and is thriving. Waterfowl returned. Water quality improved. Wildlife populations increased.
2017-2021	Backfilling of Reach 2. Dredged new channels; Backfilled 6.5 miles of the C-38 Canal; Removed S-65C structure. Construction of the S-69 weir.	The S-69 weir serves as the endpoint for the C-38 Canal backfill, maximizing the area of wetlands to be rehydrated in the floodplain. The weir dissipates the energy of flows as they transition from the floodplain to the remnant C-38 channel.
	Completion of the Kissimmee River Restoration Project.	Completion of the project facilitates the implementation of the Headwaters Revitalization Schedule (HRS).

Settlements in the Kissimmee River Basin

Before the 1840s, human habitation was sparse in the Kissimmee Basin. English-speaking settlers began moving to the area during the 1840s and 1850s, primarily cattlemen and homesteaders who lived mainly off the land and maintained their own small vegetable plots. The government would routinely grant 160-acre tracts to single men or heads of households through successive acts of Congress, such as the Armed Occupation Act of 1842. This act granted 160 acres to settlers who submitted a permit to the regional land office to build and live in a house on the land and cultivate at least 5 acres for a minimum of 5 years. The 160-acre parcels had to be located no closer than 2 miles from an existing military outpost. The trails connecting the military outposts were roughly 20 miles apart, which facilitated settlement in the region after the Armed Occupation Act was enacted in 1842. Fort Gardner, Fort Kissimmee, and Fort Basinger, located along the Kissimmee River basin (**Figure 3**), were among the outposts that experienced a surge in settlers. Most settlers were veterans of the Second Seminole War who had become familiar with the best parcels of land during their routine patrols. These early settlements were sparse, as only 1,250 homesteads were awarded under the Armed Occupation Act south of Palatka, FL. The Seminole Settlements included a small lake in Polk County, lying nearly midway between Lake Pierce and Lake Rosalie, towards the headwaters of the Kissimmee River. With the limited number of homesteads, the Brighton Seminoles were still largely free to roam the countryside and establish hunting and trading camps, including along Shingle Creek on the west shore of Lake Kissimmee.



1838 sketch of Fort Bassinger along the west side of the Kissimmee River from Capt. Backus's Diary.

In 1850, the U.S. Congress passed the Swamp and Overflowed Lands Act, which granted states federally owned wetlands to develop internal improvements. Florida received ownership of approximately 20 million acres, including the lands surrounding the Kissimmee River and the Everglades. Swamp land would become the currency of the State and be traded and sold to encourage the settlement and development of South Florida. The Swamp and Overflowed Lands Act of 1850 incentivized the draining of large tracts of land, which opened the area to more homesteaders and development.

During the last two years of the Civil War, many of the Seminole War veterans/homesteaders in the Kissimmee region had been serving in armies in the northern states of the Confederacy but were called home to form a special cavalry battalion to help protect and drive cattle from the interior of the peninsula to Georgia. The land was under the command of Captain Francis A. Hendry, from whom Hendry County is named.

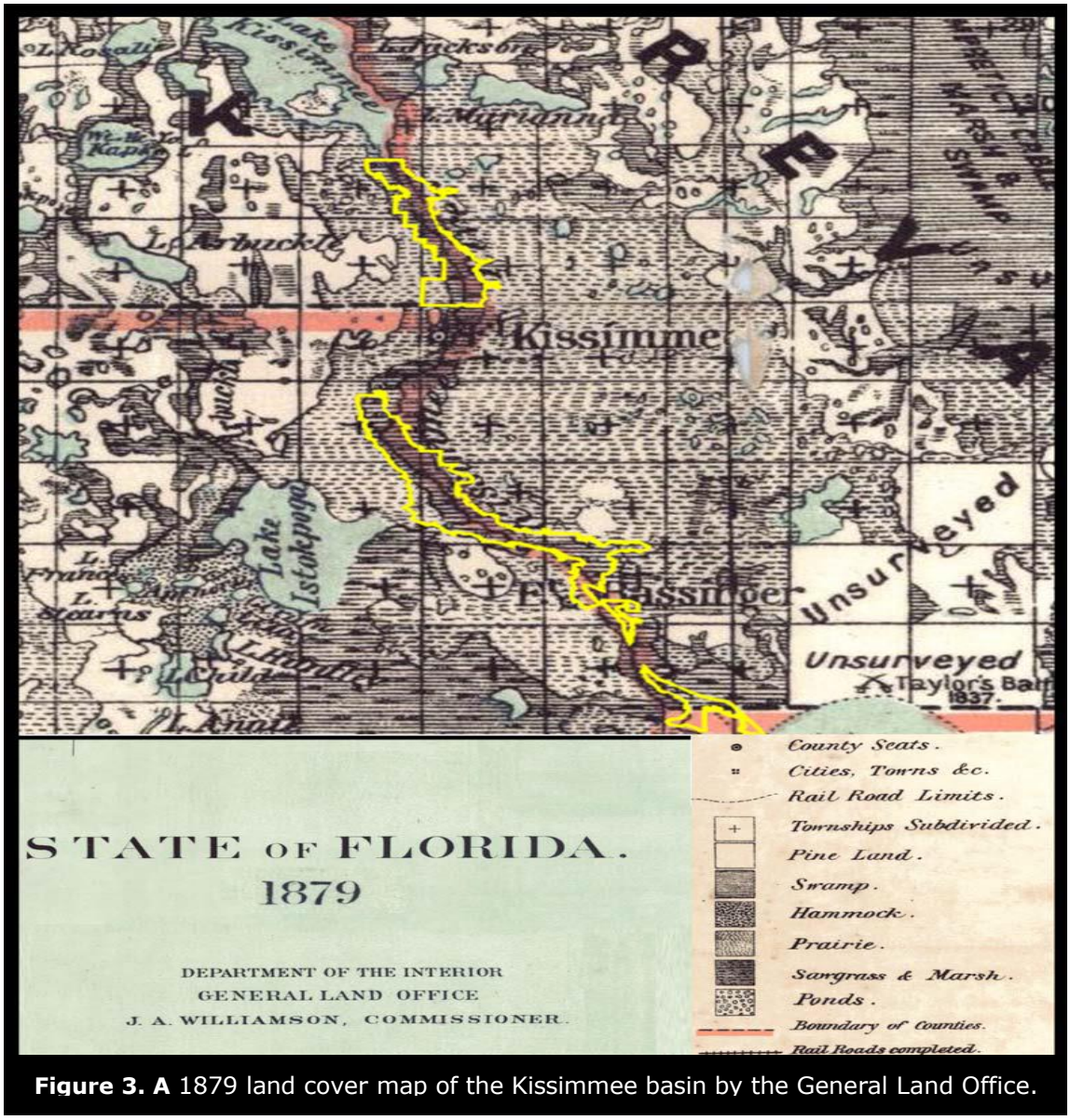
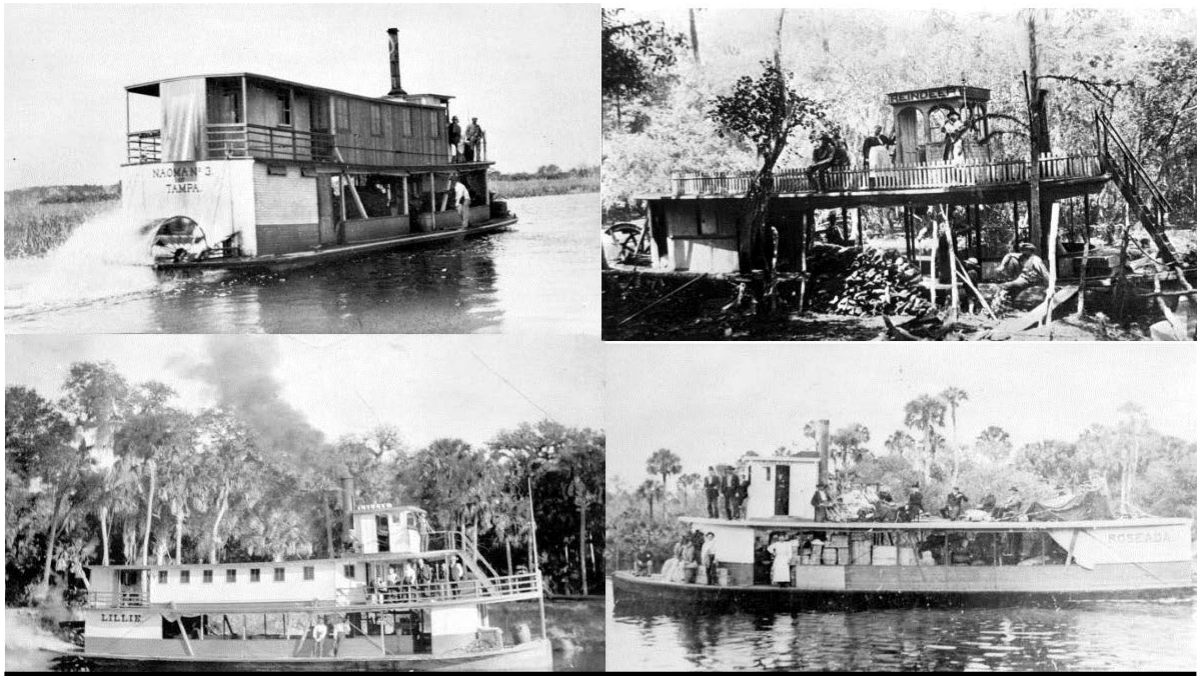


Figure 3. A 1879 land cover map of the Kissimmee basin by the General Land Office.

Navigation and Transportation

Steamboats served as the main mode of transportation for passengers and commerce in the region. More settlers began migrating to the area as regular service on several 50-foot steamers started traveling the Kissimmee Chain of Lakes and the Kissimmee River. At the time, steamboats were limited by the condition of the area. Steamers with a two-foot draft, referred to as workhorses of the river, were the only vessels that could be accommodated by the natural river system, and then only during the wet season. These workhorses of the river included the Mary Bell (sunk in 1884), the Lillie, the Tallulah (which ran aground near Ft. Gardner but was later raised, refurbished, and renamed the Reindeer), the Naoma, and the Roseada. The steamers' route ran from Kissimmee to Fort Basinger on a regular basis, as often as water levels permitted.

These steamers were the primary means of transportation for passengers and commerce. The river system was known to be extremely long and torturous, sometimes taking three miles to cover by the river, a distance that was only a quarter mile in a straight line. Every three to four years, dry periods in the winter and spring would close the water route for six to eight months, leaving the settlers to fend for themselves and subsist on their small garden plots, hunting, fishing, and whatever meager provisions they could obtain through small boats and horseback. Commerce came to a complete halt during dry conditions, and entire citrus and winter vegetable crops were left to rot in the fields. Local politicians began to lobby Congress for improvements to the river system to accommodate larger steamers with a deeper draft year-round. Congress then directed the USACE to investigate the possibility of expanding the steamer line from Kissimmee to Florida's southwest coast.



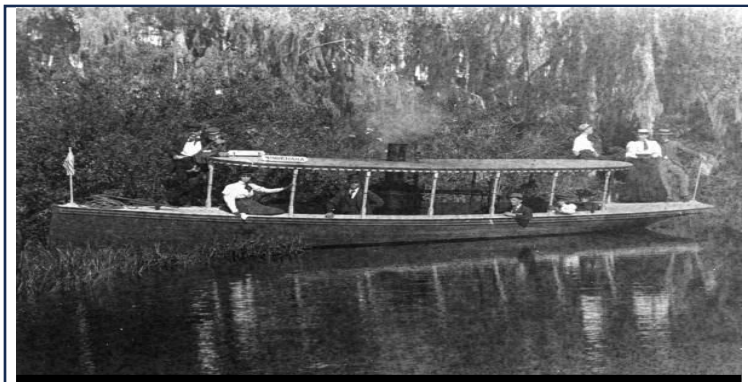
The 50-foot sternwheel steamers of the Kissimmee River system, clockwise from upper left: the Naoma, the Talullah, the Roseada, and the Lillie.

The USACE completed its feasibility survey in 1882, which provided a cost estimate for dredging shoals, removing snags and overhanging limbs, and creating a series of cutoff canals to shorten the trip and accommodate larger steamboats. At the same time, a businessman from Philadelphia, Hamilton Disston, started making these types of improvements to the river under a contract with the State.

Meanwhile, efforts to establish a railroad system in the region had been ongoing for over a decade. The cattle trade between South Florida and Cuba in 1870 reignited local enthusiasm for building a railroad line in Tampa on the Gulf Coast. However, the expansion of the South Florida Railroad, which connected Sanford to Orlando, was not completed until December 1880. Later, in March 1882, the South Florida Railroad extended its tracks to Kissimmee. The line from Kissimmee to Tampa eventually opened in 1884. Although the first improved roads didn't reach the Kissimmee areas until the 1930s, railroads and roadways gradually replaced the Kissimmee River system as the primary means of transportation.

Tourism

The towns of Orlando and Kissimmee were thriving during the 1880s. The Town of Kissimmee became the main port for steamboats navigating the Kissimmee River from Lake Tohopekaliga to Okeechobee. The land around the chain of lakes had been essentially depopulated since the first part of the Second Seminole War in the mid-1830s, and as a result, supported a large game and fish population. The town of Kissimmee was the end of the line for many southbound tourists; a frontier town perched on the edge of a vast wilderness. Adventure books and articles in Harper's Magazine and Field & Stream introduced the Kissimmee River basin to tourists and sportsmen from the Northern U.S. and Europe. These adventure seekers stayed at the Tropical Hotel, which was right off the main pier on Lake Toho. A stay at Tropical costs $3.50. Little steam launches could be rented for $10 to $15 per day, a sailboat from $3 to $6 per day, and a guide for $1 or more per day. An out-of-state hunting license cost $25 and had no restrictions on the type or quantity of game that could be hunted; everything from panthers to bears to manatees was permitted to be hunted with the license.



A steam launch, by 1890 there were 50 of them operating out of Kissimmee for "wilderness excursions."

Returning to the Tropical Hotel in Kissimmee following a bountiful fishing expedition in the Kissimmee Chain of Lakes.

An illustration of a Kissimmee Chain of Lakes outing appearing in Harper's Magazine in 1884.

Hunting cabins were established on the eastern shore of Lake Kissimmee. Largemouth bass were reported to be so plentiful that it was often taken for granted that finding dinner would not be a problem. The hunt guides would dangle a hook behind their boats and receive a strike every few minutes as they traveled downstream. Tourists that came for the hunting were said to have rarely gone home empty-handed. The Seminoles camped on the west shore were only too happy to trade trophy horns and hides to returning tourists who had come up short. Brahma Island (then called Bremer Island) was a popular hunting destination, as was the Gardner Marsh area between Lake Kissimmee and Lake Hatchineha.

Later, the opening of Disney World and other tourist attractions in the early 1970s greatly boosted the area's economic growth. As a result, both tourism and residential development in the region increased significantly by the late 1970s.

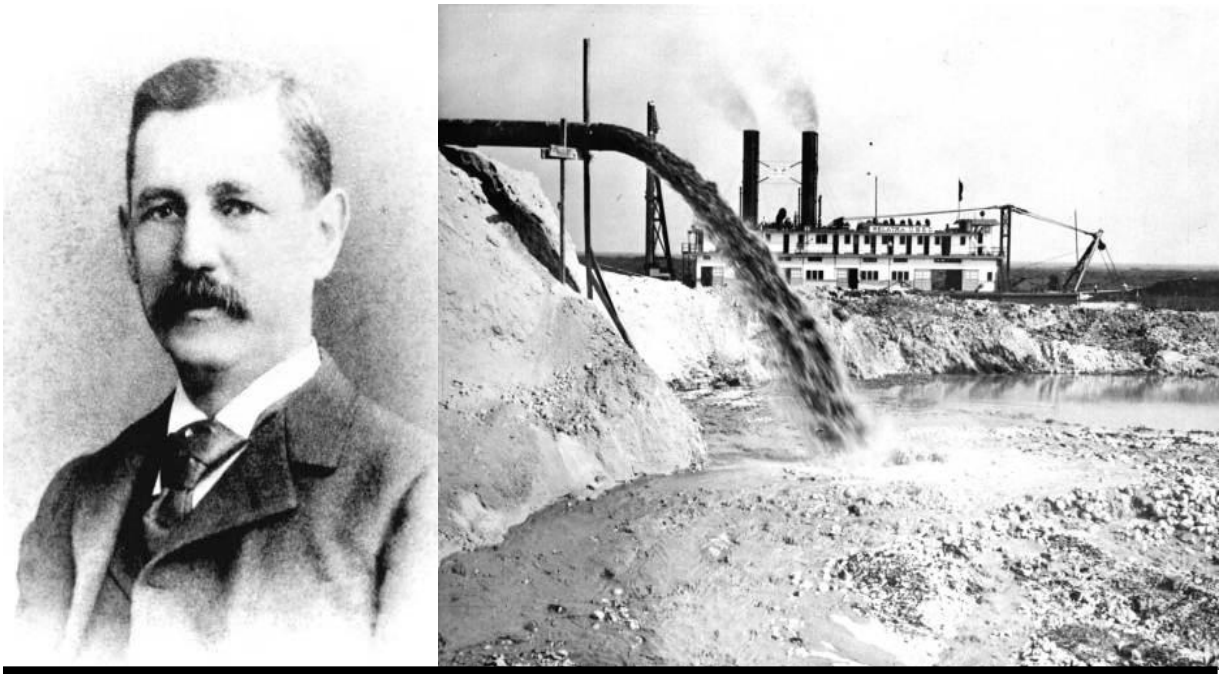
Hamilton Disston and the River Drainage Projects (1881 - 1909)

From the year of statehood in 1845, the Florida legislature passed several resolutions to drain the Everglades and wetlands in the interior of Florida. The ability to successfully drain those areas had already been demonstrated by English settlers, who successfully drained wetlands on the East Coast in the late 1700s and converted these lands to sugar cane and other crops. When the Seminole boundaries were being mapped under the Treaty of Ft. Moultrie in 1823, multiple military engineers and surveyors had evaluated the possibility of a drainage project for the Everglades. To the surveyors' surprise, they discovered that the Everglades basin was several feet above sea level and could be drained by dredging canals that tied into the natural river systems along the coast. In 1847, U.S. Senator J.D. Westcott Jr. requested a report on the feasibility of reclaiming interior organic wetland soils through drainage for agricultural production. Buckingham Smith was appointed to create the report and submitted his findings to the U.S. Treasury Department in 1848. His report outlined how high-quality organic soils in the Kissimmee Chain of Lakes, around Lake Okeechobee, and within the Everglades basin could be drained and cultivated by lowering the water level of Lake Okeechobee by 5 to 6 feet with a series of drainage canals that would simultaneously create a cross-state navigable waterway through the lake.


Buckingham Smith

Hamilton Disston was an entrepreneur from Philadelphia who organized the Florida Land and Improvement Company and the Atlantic and Gulf Coast Canal and Okeechobee Company. The State entered into an agreement with Disston in 1881 where Disston purchased four million acres of odd-numbered sections of a nine-million-acre drainage district that included most of the interior peninsula of Florida, south of Kissimmee. Disston paid 25 cents per acre and was also entitled to half of the remaining sections upon their successful reclamation. Railroad companies also received a large portion of the remaining even-numbered sections because the legislature had promised them 4,000 to 10,000 acres for every mile of railroad constructed. The general policy of the railroad companies and Disston was to sell off the extra land to settlers and other investors.

In 1882, Disston initiated a reclamation operation by constructing a large steam-powered bucket chain dredge barge. The barge could dig a 37-foot wide and 6-foot-deep canal at a speed of 12 linear feet per hour. As the barge moved through the prairies, it automatically built a levee on either side. A crew of 12 worked on the dredge to begin constructing a canal that connected Lake Tohopekaliga and Cypress Lake during the summer of 1882. Disston employed the steamer Roseada to move the dredge. The barge was propelled by the lake water, which pushed it towards Cypress Lake. By May 1883, the canal was completed, and a steady current of 2½ miles per hour had drained Lake Tohopekaliga by 5 feet, draining 40,000 acres of land. However, Disston only cultivated a small portion of this land, with 2,000 acres planted in sugar cane and 6,000 acres in rice.



Hamilton Disston and his steam dredge

Disston's company also improved the Kissimmee River navigation by creating cut-off canals, removing snags and limbs, and dredging shoals. By 1884, the Kissimmee River and Kissimmee Chain of Lakes were navigable by 100-foot steamers from Ft Myers to the Town of Kissimmee. Disston's Florida enterprises were essentially terminated by plummeting land prices following the 1895 Great Freeze, which came after a previous freeze in 1894, the economic panic of 1893, and the elimination of a two-cent per pound subsidy on sugar in 1894.

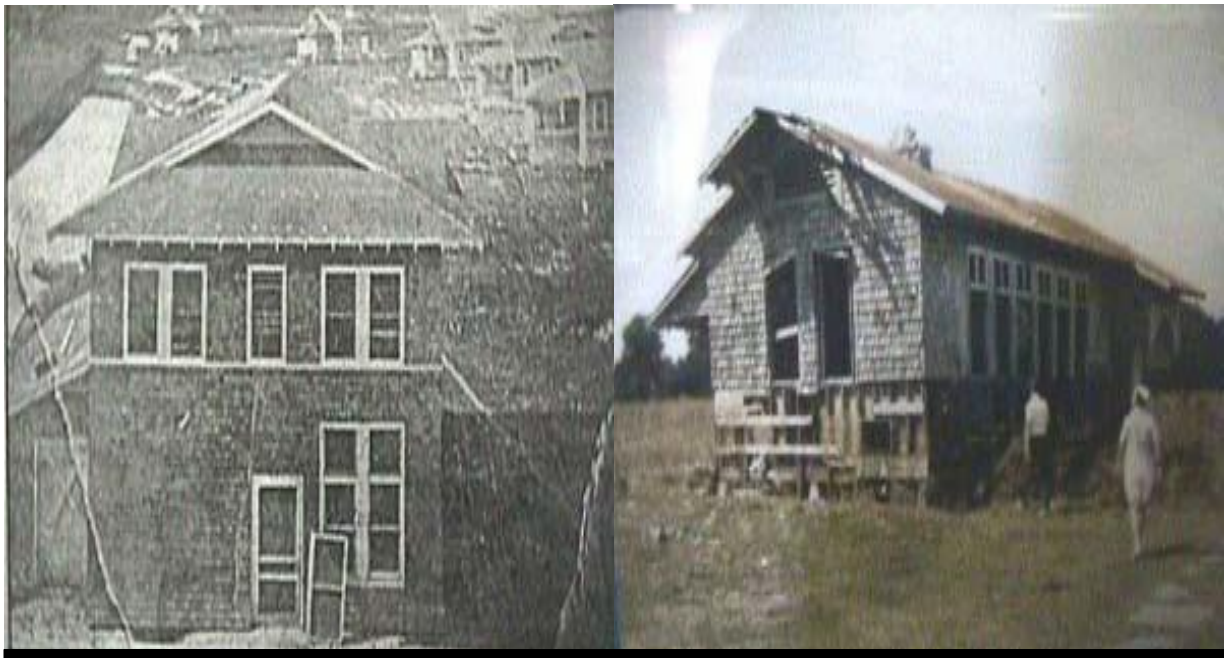
Between 1902 and 1909, several additional improvements were made to the Kissimmee Chain of Lakes to enhance navigation. These included clearing out shoals, armoring the entrances to Disston's canals to prevent further shoaling, and creating more cut-off canals. This work was done to secure a minimum three-foot deep and 30-foot-wide channel navigable from Kissimmee to Ft. Basinger.

Timber and Cattle

Cattle ranching in Central and South Florida saw significant growth from the 1840s up to the Civil War. Cattle were shipped to the Confederate Army or traded with Cuba for supplies. After the war, the cattle industry was revitalized and established itself as the primary industry it remains today. The improved river navigation drew ranchers to settle in the Kissimmee River Basin. Land southwest of Lake Kissimmee stayed unfenced, with scattered homesteads along the river's banks. These residents were later incorporated into the small town of KICCO, a small town founded by the Kissimmee Island Cattle Company, which coordinated the annual drives of the native-range cattle. Livestock grazing continued to increase, relying less and less on the free-roaming Spanish cattle that had long been part of the landscape. From 1926 to 1929, over 5,000 “purebred” cattle were introduced into the area.

The channelized river drained the floodplain wetland, later converted to improved pasture.

The town was established at the site of a former steamboat port and supported operations and employees of KICCO from around 1915 to the late 1920s. Although the town declined after this period, several homesteads remained occupied until a major flood in 1947 destroyed many structures. Remnants of these buildings persisted on the property into the late 1980s. Following the acquisition of the site by the District, the Florida Division of Historical Resources (FDHR) surveyed the remaining house and school building for historical preservation. As no agencies or organizations were able to facilitate the relocation of these buildings, they were ultimately demolished.



The houses (left) and school building (right) at KICCO.

Town of KICCO, 1941

Town of KICCO, 1953

The improved navigation also provided access to the pinelands in the Kissimmee River basin for timber and turpentine operations. The pines were heavily logged in the 1920s (**Figure 4**). By 1929, Polk County had 21 operational sawmills. The remnants of a turpentine operation still existed near the southwest shore of Lake Kissimmee.

A river steamboat loading rosin for transportation to a turpentine still.

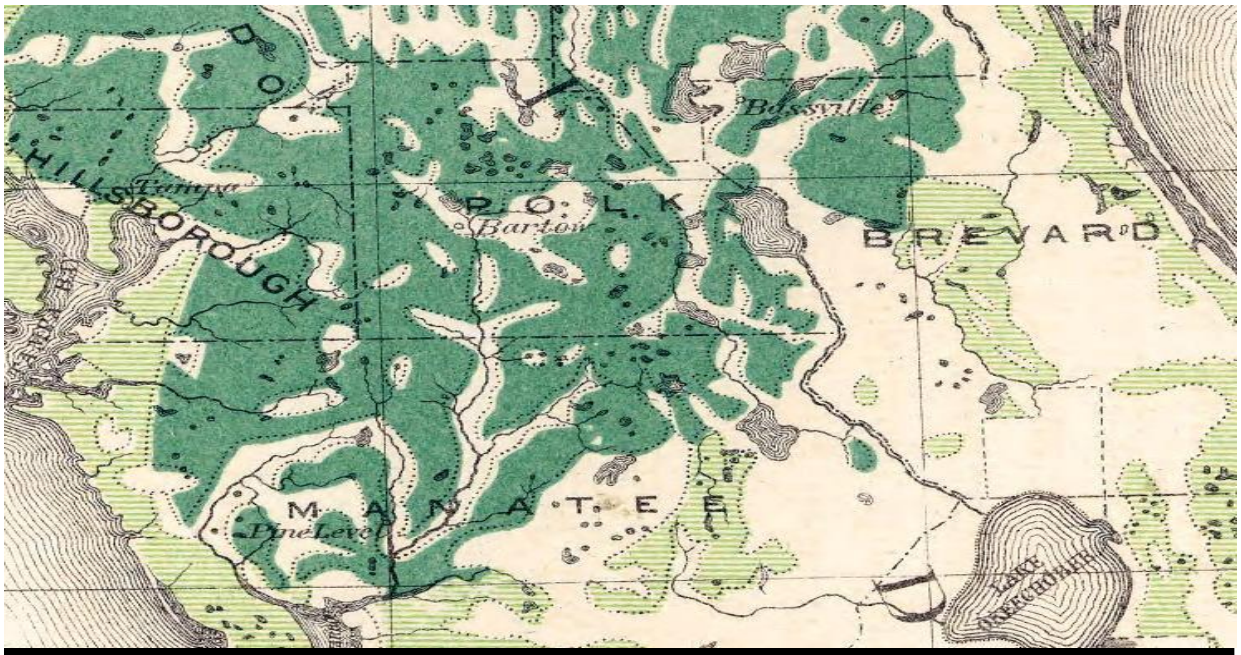
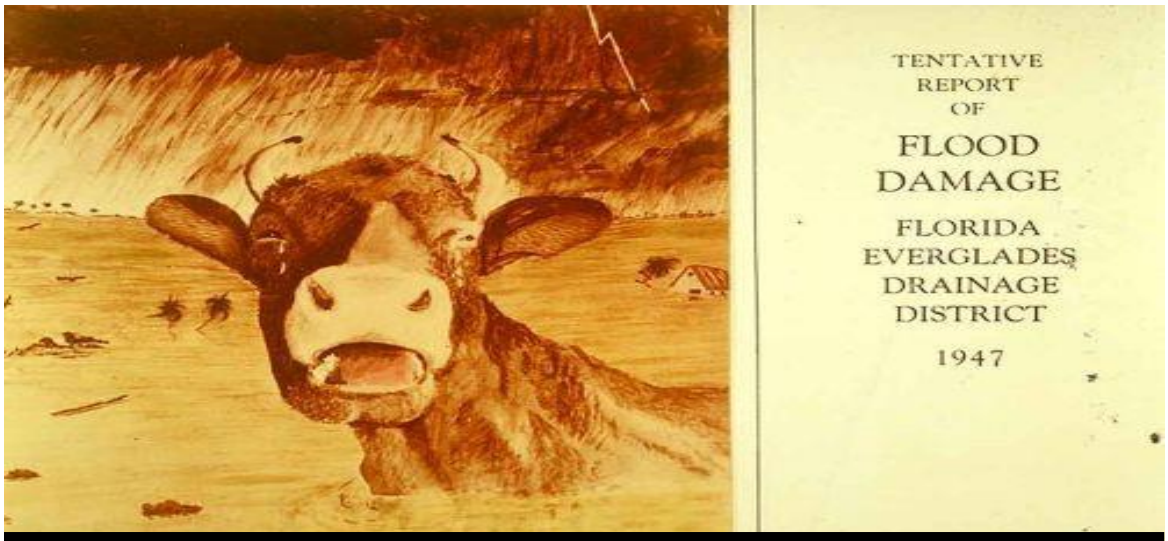


Figure 4. A 1881 timber map with longleaf pine in dark green and slash pine in light green.

Kissimmee River Flood Control and Restoration Projects

After World War II, the floodplain experienced more rapid settlement. The establishment of the Everglades Drainage District by the State of Florida in 1907 and the enactment of the General Drainage Act in 1913 also contributed to the rapid development in central and south Florida, setting the stage for extensive flooding in the Kissimmee River basin. These settlements suffered extensive damage during a series of hurricanes in 1926, 1928, and 1947. The mass flooding events following the 1947 hurricane intensified public pressure for measures to reduce the threat of flood damage within the Kissimmee system. The State of Florida responded with a request to the federal government to design a flood-control plan for central and southern Florida.



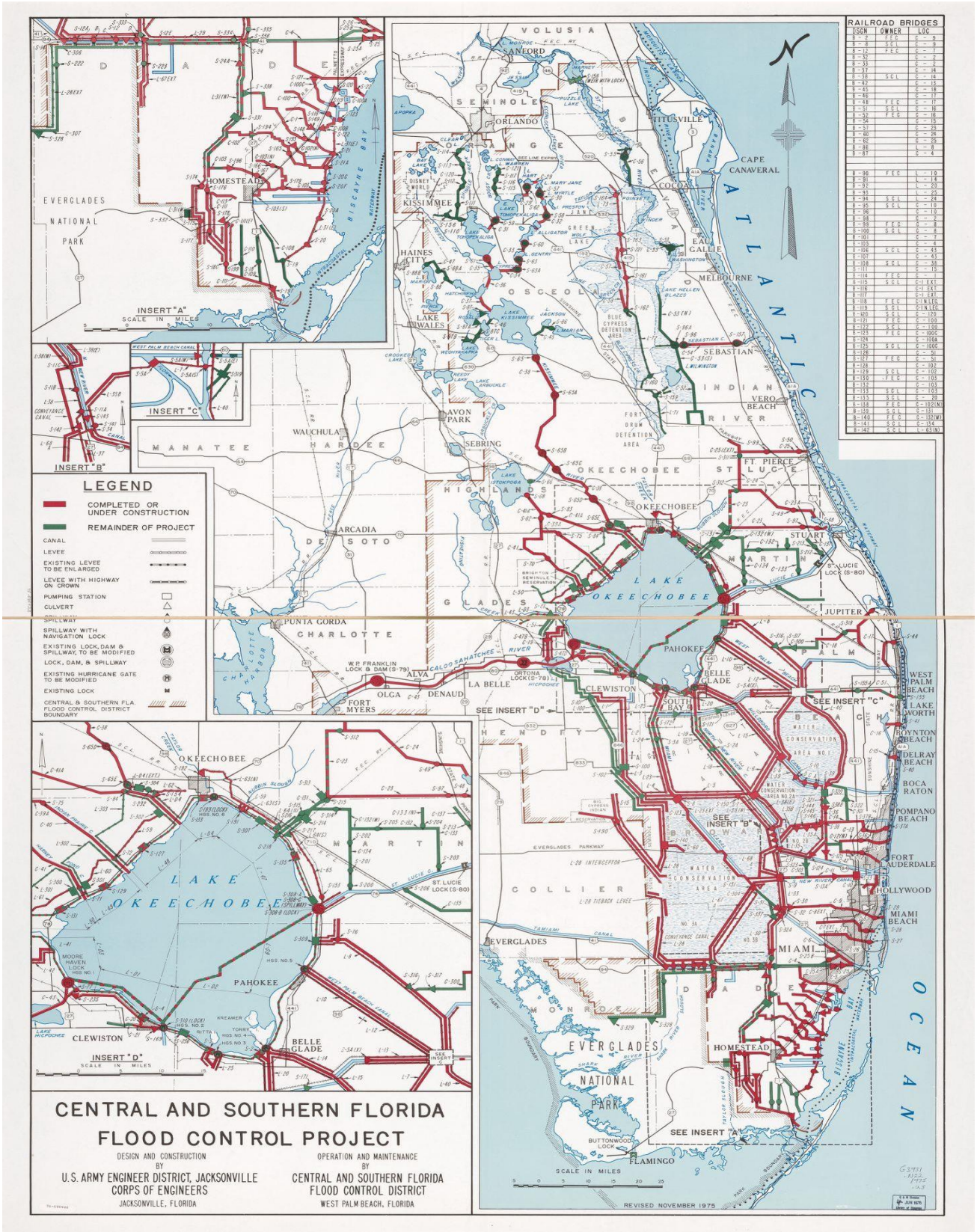
Cover of the 1947 "Crying Cow" report that demanded better flood management.

Figure 5. Photographs of the 1948 flooding in Kissimmee.

In 1948, Congress authorized the USACE to initiate construction of the Central & Southern Florida Project for Flood Control and Protection. In 1954, Congress authorized the Kissimmee River portion of the project, which was planned and designed from 1954 to 1960. The state acquired roughly 11,312 acres of land for the channelization of the Kissimmee River. Between 1962 and 1971, the meandering river was transformed into a 56-mile-long, 30-foot deep, 300-foot-wide canal. Excavation of the canal and deposition of the resulting spoil eliminated approximately 35 miles of river channel and 6,200 acres of floodplain wetland habitat. The floodplain was transformed into a series of impounded reservoirs, designated as Pools A-E. Six water control structures regulated inflow from the Kissimmee Chain of Lakes, the first of which was located at the outflow of Lake Kissimmee into the Kissimmee River. Water control structures and canals were constructed in the Kissimmee region, enabling the regulation of water flow within and between the lakes in the Upper Basin.

The hydrologic alterations and the transformation of the river-floodplain ecosystem into a series of deep impoundments drained much of the floodplain, eliminated historical water-level fluctuations, and substantially modified flow characteristics. Approximately 26,000 to 31,000 acres of pre-channelized floodplain wetlands were drained, covered with spoil, or converted into canals. The floodplain at the lower end of each pool remained inundated, but the pre-channelization water level fluctuations were eliminated, and the upper pools dried out. The effects of channelization, including these hydrologic alterations, largely destroyed the floodplain wetlands and degraded the fish and wildlife habitat of the Kissimmee River ecosystem. Most of the converted floodplain was used as ranch land, owned by local ranchers for beef cattle production. To support ranch operations, extensive drainage ditch networks were constructed to remove water from the land. Additionally, the natural vegetation was replaced with non-native pasture grasses.

The Channelized river in the 1950s and 60s.



Map 1. 1975 map showing the C&SF Project drainage network.

In 1981, the Florida Legislature passed the Save Our Rivers program, which allowed the five water management districts to acquire environmentally sensitive land. This legislation, §373.59, Florida Statutes, established the Water Management Lands Trust Fund and granted the water management districts the authority to acquire lands necessary for managing, protecting, and conserving the state's water resources. Once acquired, these lands would be restored to their natural state and managed for conservation.

The Kissimmee River Restoration Project was authorized by Congress later in the 1992 Water Resources Development Act as a joint partnership between the District and the USACE. The project was initially designed to restore over 40 square miles of river and floodplain ecosystem, including 43 miles of meandering river channel and 27,000 acres of wetlands. The restoration involved reestablishing inflows from the Kissimmee Chain of Lakes to achieve flow velocities and volumes similar to those that existed prior to channelization. The construction of the Kissimmee River Restoration Project involved backfilling approximately 22 miles of the C-38 Canal, reconnecting the original river channel across the backfilled sections, restoring portions of the river channel that were destroyed during the construction of the C-38 Canal, and removing the S-65B and S-65C water control structures along with their associated tieback levees.

The District began acquiring additional land for water storage, water quality, and flood control through the Save Our Rivers initiative. This decision followed findings from District and USACE scientists and engineers involved in the Kissimmee River Restoration Project, who concluded that an additional 100,000 acre-feet of water storage was necessary to ensure adequate water levels in the Upper Basin, providing year-round base flow, and creating the seasonal flow variability needed in the Lower Basin. The additional storage would allow modification to the regulation schedule and operational rules, enabling lake stages to fluctuate more naturally in response to rainfall and inflows from the Upper Basin's watershed. The proposed schedule modification would raise the current lake elevations from 52.5 feet to 54.0 feet NGVD. Additional real estate interests, such as fee title or flowage easements around the Headwaters Lakes (Kissimmee, Cypress, Tiger, and Hatchineha), would be essential for the proposed modification. To date, land acquisition has resulted in the acquisition of 65,603 acres in the Lower Basin and 36,612 acres in the Upper Basin.

The Kissimmee River Restoration Project dismantled Structures S-65B and S-65C, eliminating these impoundments. Additionally, Structures S-65, S-65A, S-65D, and S-65E were modified to enhance the management of flow and water levels in the Kissimmee River and its floodplain. The construction of the Kissimmee River Restoration Project was completed in July 2021. The physical shape of the river floodplain was reconstructed in four construction phases, as illustrated in **Figure 6**. **Map 2** illustrates the major hydrologic and structural features within the Lower Kissimmee Basin, including canals, water control structures, and impoundments. **Figure 8** highlights the construction phases and their respective completion dates, providing context for the timeline and scope of restoration and flood control efforts in the region.

Water levels and flow to or from the Kissimmee River and its floodplain are managed by control structures S-65, S-65A, and S-65D. The purpose of these structures is to aid the restoration of the river-floodplain ecosystem while also providing flood control. The regulated discharge from these structures is based on an established schedule known as the Interim Schedule. Several variations of discharge plans under the Interim Schedule have been partially implemented in recent

years in efforts to improve the duration and continuity of floodplain inundation in the Kissimmee River. The completion of the Kissimmee River Restoration Project sets the stage for gradually implementing a new stage regulation schedule, known as the Headwaters Revitalization Schedule (HRS), for the S-65 water control structure and the Headwaters Lakes. With HRS, the lake's water levels are expected to rise to 1.5ft higher than the current S-65 Interim Schedule, increasing the water storage capacity of Lakes Kissimmee, Hatchineha, Cypress, and Tiger to approximately 100,000 acre-feet. This will help restore hydrological conditions for the lake's littoral zones while achieving the desired durations and seasonal flow variability to the Lower Basin.

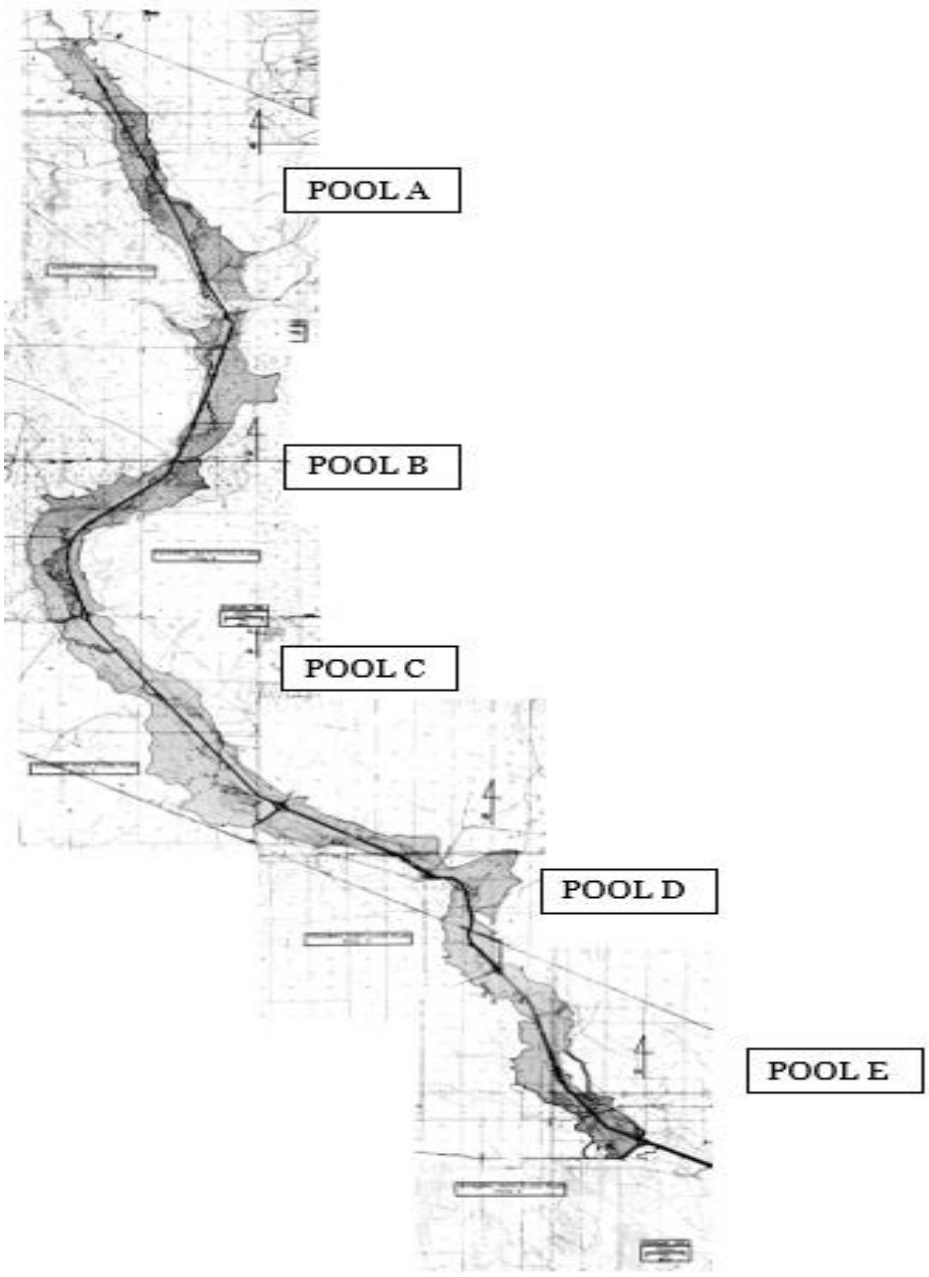
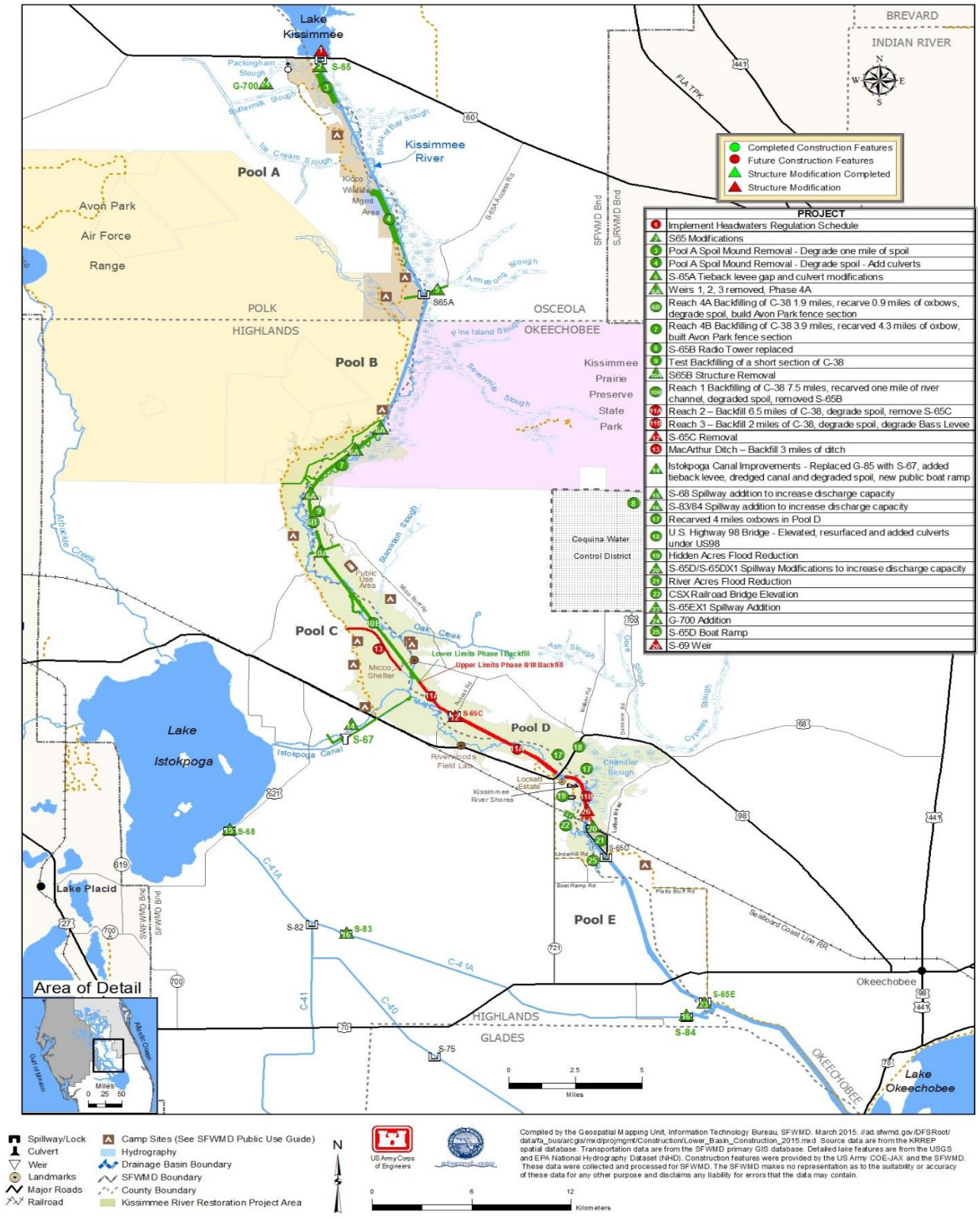


Figure 6. Map showing Pools A-E created by the Kissimmee River channelization project.



Map 2. 2015 map showing the construction features and completed phases of the restoration project.

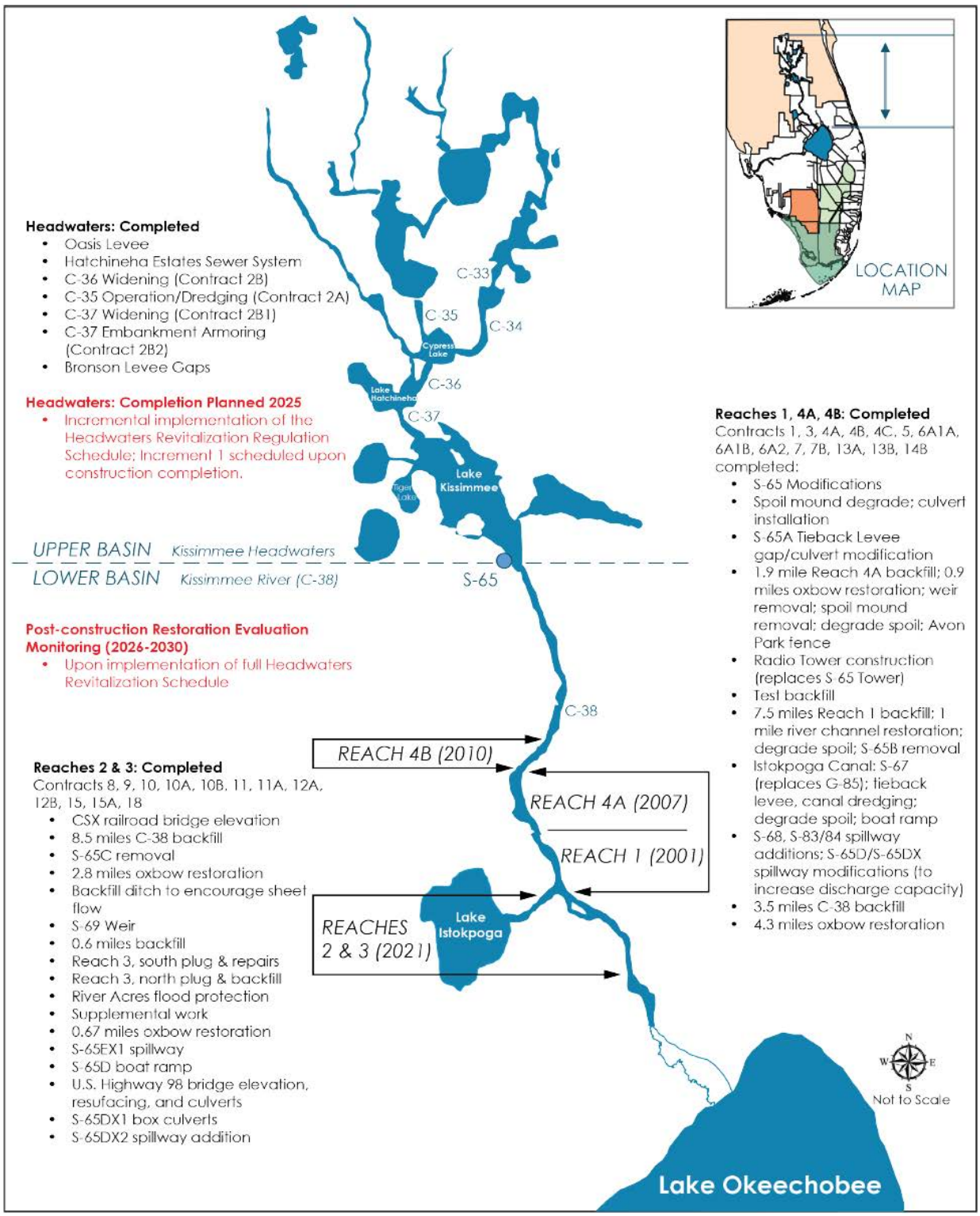


Figure 8. Completion of the Kissimmee River Restoration Project Construction phase.

References

Brinton, D. G. 1859. *Notes on the Floridian Peninsula: its literary history, Indian tribes and antiquities*. Retrieved from the Library of Congress, https://www.loc.gov/item/01021606/.

Brown, C. J. 1991. *Tampa and the Coming of the Railroad, 1853-1884*. Sunland Tribune: Vol. 17, Article 4. Available at: https://digitalcommons.usf.edu/sunlandtribune/vol17/iss1/4

Champion de Crespigny, C., Dewar G. A. B. 2010. *Memoirs of Sir Claude Champion De Crespigny (1896)*. Kessinger Publishing.

Dodge, M. M. 1894. *St. Nicholas for Young Folks*. The Century Co., New York / Louis Rhead. Retrieved from the Library of Congress, https://www.loc.gov/item/2002721207/.

Drake, S. G. 2007. *Biography and history of the Indians of North America, from its first discovery to the year 1841*. Digitized by FamilySearch International.

Florida Department of Agriculture. 1935. *Central Florida*. Department of Agriculture.

Hodge. F.W. 1910. *Handbook of American Indians north of Mexico.* Bureau of American Ethnology Bulletin. 30 (2):1–1221.

Norton, C. L. 1891. *A handbook of Florida*. New York, Longmans, Green & co. Retrieved from the Library of Congress, https://www.loc.gov/item/01013464/.

Williams, J. L. 1837. *The territory of Florida*. New York A.T. Goodrich

Winter, N. O. 1918. *Florida, the land of enchantment*. Boston, The Page Company. Retrieved from the Library of Congress, https://www.loc.gov/item/18002916/.

Worth, J. E. 2003. *The Evacuation of South Florida, 1704-1760*. Florida Museum of Natural History.

Appendix B.

KR MA Natural Communities

The KR MA comprises 13 distinct natural communities and several altered landcover types, based on a combination of vegetation, landscape position, and hydrology (FNAI 2010). These communities are managed through achieving and maintaining optimal fire return intervals for fire-dependent communities, control of invasive plant and animal species, maintenance of natural hydrological functions, maintenance of proper vegetative structure that represents the natural diversity of the community, maintenance of healthy populations of plant and wildlife species (including those that are imperiled or endemic), and maintenance of intact ecotones between natural communities across the landscape.

The natural communities within the KR MA were historically impacted by agricultural practices and other land use activities. Over decades, targeted management efforts such as manipulating vegetation structure, facilitating natural recruitment, and restoring hydrology have led to substantial ecological recovery and the successful restoration of key ecosystem functions. These communities now exhibit strong indicators of recovery, including the dominance of native plant species, reduced invasive cover, reestablished hydroperiods, improved vegetation structure, increased wildlife utilization, and the return of natural fire regimes. While no longer pristine, these systems are not classified as altered land cover types, as they can function as resilient, sustainable habitats that are consistent with Florida's natural ecological patterns and overall align with FNAI's descriptions of natural communities.

The natural communities and other landcover types identified on the KR MA are classified as follows:

- Altered Landcovers
- Baygall
- Blackwater Stream
- Cypress/Tupelo
  - Dome Swamp
  - Floodplain Swamp
- Dry prairie
- Freshwater Forested Wetland
- Hardwood Hammock
  - Mesic Hammock
  - Xeric Hammock
- Hydric Hammock
- Marshes
  - Depression Marsh
  - Floodplain Marsh
- Mesic Flatwoods
- Scrub
- Wet Flatwoods
- Wet Prairie

Community Description and Assessment

NATURAL LANDCOVER TYPES

BAYGALL (0.06%)

Baygalls are generally characterized as densely forested wetlands of bay species typically found on wet soils at the edges of floodplains, bases of slopes, and in depressions and stagnant drainages. Baygall can develop from deep swamps dominated by cypress/tupelo when peat accumulation raises the soil level, eventually allowing bay species to become established. As broad-leaved species proliferate, shade-intolerant Bald cypress (*Taxodium distichum*) and swamp tupelo (*Nyssa sylvatica var. biflora*) seedlings are inhibited, shifting vegetation and soil conditions to favor broadleaf species that can germinate and grow in low light. Baygall is ranked statewide and globally as apparently secure (G4/S4), though it may be quite rare in parts of its range, especially at the periphery.

In the KR MA, the baygall community encompasses 24 acres. These small, dense thickets are mostly surrounded by hardwood communities. The common vegetation in the canopy includes loblolly bay (*Gordonia lasianthus*), red bay (*Persea borbonia var. borbonia*), swamp bay (*Persea palustris*), and sweetbay (*Magnolia virginiana*). The subcanopy is densely covered with dahoon holly (*Ilex cassine*), wax myrtle (*Morella cerifera*), red maple (*Acer rubrum*), fetterbush (*Lyonia lucida*), and sweet gallberry (*Ilex coriacea)*. Groundcover typically includes a variety of ferns, including chain fern (W*oodwardia spp.*) and cinnamon fern (*Osmundastrum cinnamomeum*).

Broad-leaved baygall species are fire-intolerant and are best managed by maintaining high-quality upland-wetland ecotones around them. In the KR MA, prescribed fire is applied to adjacent communities and naturally extinguishes at the edges of the baygall. The objective for managing the vegetation in this community is to target the recurrence of nuisance and invasive species to achieve and maintain maintenance condition.

BLACKWATER STREAM (1%)

Blackwater Streams are characterized as perennial or intermittent, seasonal watercourses that originate deep in sandy lowlands. These lowlands contain wetlands with organic soils that act as reservoirs, collecting rainfall and gradually releasing it into the stream. Emergent and floating aquatic vegetation may be found along the slow-moving and shallow parts of the stream. Blackwater Streams are ranked as apparently secure globally and vulnerable statewide (G4/S3) due to a restricted range, relatively fewer populations (often fewer than 80), recent and widespread declines, or other factors.

In the KR MA, the Blackwater streams encompass approximately 470 acres. These include oxbows of the Kissimmee River and small river segments located within the management area boundaries. Generally, these streams do not require active management. Some oxbows, previously disconnected from the river's historic flow due to the construction of the C-38 canal, have naturally recruited vegetation over time. With the completion of the Kissimmee River

Restoration and implementation of the Headwaters Revitalization Strategy (HRS), more natural water level fluctuations are expected. These changes should help restore historic flow patterns and improve conditions in oxbows that were once isolated from the main river channel.

The primary management objective for blackwater streams in the KR MA is to monitor and assess the effects of water level fluctuations on adjacent ecological communities.

HYDRIC HAMMOCK (0.2%)

Hydric hammocks are characterized by well-developed hardwood and cabbage palm forests with a variable understory often dominated by palms and ferns. Typical plants include cabbage palm *(Sabal palmetto),* red maple, swamp bay, sweetbay, water oak (*Quercus nigra*), wax myrtle (*Morella cerifera*), saw palmetto (*Serenoa repens*), dahoon holly, royal fern (*Osmunda spectabilis*), and vines such as poison ivy (*Toxicodendron radicans*), pepper vine *(Nekemias arborea*), and Virginia creeper *(Parthenocissus quinquefolia).* Hydric hammocks are ranked globally and statewide as apparently secure (G4/S4), though they may be quite rare in parts of their range, especially at the periphery.

In the KR MA, the hydric hammock community encompasses 86 acres. This community features a closed-canopy hardwood system dominated by cabbage palm. Common vegetation includes cabbage palm, sweet gum (*Liquidambar styraciflua*), sweetbay, red maple, common persimmon (*Diospyros virginiana*), American elm (*Ulmus Americana*), and various oaks. The understory is generally open and sparsely vegetated, with species like wax myrtle, twinberry (*Mitchella repens*), Green arrow arum (*Peltandra virginica),* St. John's wort (*Hypericum spp.),* and occasional patches of ferns, like netted chain fern (*Woodwardia areolata),* and cinnamon fern (*Osmundastrum cinnamomeum).*

Hydric hammock communities are not fire-dependent. Due to the limited herbaceous groundcover and moist soil throughout most of the year, hydric hammocks rarely burn. Typically, fires spread into this community from surrounding fire-maintained communities during the dry season, burning the available fuels. Hydric hammocks in the KR MA have the desired vegetation structure. The objectives for managing vegetation in this community include treating nuisance and invasive species to maintain vegetation condition and periodically assessing the area to evaluate the effects of lake water-level changes on vegetation structure.

WET FLATWOODS (1%)

Wet flatwoods are characterized as pine forests with a sparse midstory and a dense groundcover of hydrophytic grasses, herbs, and low shrubs. The density of shrubs and herbaceous vegetation can vary significantly in wet flatwoods, with shrubs dominating where fire has been suppressed for a long period or where winter burns predominate. Wet flatwoods are ranked as apparently secure in their range globally and statewide (G4/S4).

In the KR MA, the wet flatwoods community encompasses approximately 441 acres. The wet flatwoods community in the KR MA is characterized by a canopy dominated by Florida slash pine (*Pinus elliotti*) and interspersed with scattered cabbage palm. Scattered cypress and hardwood

species such as water oak, laurel oak (*Quercus laurifolia*), red bay, and red maple can also be found in the peripherals. The understory is composed of a variety of native grasses, including maidencane (*Hymenachne hemitomon)*, yellow-eyed grass (*Xyris caroliniana*), blue-eyed grass (*Sisyrinchium* spp.), beakrush (*Rhynchospora spp.*), and arrowhead (*Sagittaria lancifolia*). Typical wet flatwoods shrubs, including wax myrtle, and dahoon holly, and sweet gallberry, are scattered. In areas where pasture grasses (i.e., bahia grass *(Paspalum notatum*) had previously displaced native groundcover, natural regeneration has been allowed to re-establish the native understory. These naturally recruited species include maidencane (*Hymenachne hemitomon)*, rushes (*Juncus* spp.), beakrush (*Rhynchospora spp.*), wiregrass, bluestem (*Andropogon spp.*), blue maidencane (*Amphicarpum muehlenbergianum*), meadowbeauty (*Rhexia spp.*), blue-eyed grass (*Sisyrinchium* spp.), carpet grass (*Axonopus spp*.), and yellow-eyed grass (*Xyris caroliniana*).

Prescribed fire considerations in the wet flatwoods community are similar to those for mesic flatwoods. In the absence of frequent fire, this community tends to accumulate dense shrubby undergrowth, which can alter its structure and ecological function. The desired vegetation structure is a relatively open canopy forest of pine trees, sparsely scattered cabbage palms and shrub midstory, and a dense groundcover dominated by grasses. The objectives for managing wet flatwoods vegetation in the KR MA include treating nuisance and invasive species to maintain maintenance conditions and applying prescribed fire to limit shrub coverage in the understory.

SCRUB (2%)

Scrubs are characterized as a community of evergreen shrubs, with or without a canopy of pines. These communities typically occur on the highest, driest elevations, underlain by sandy, well-drained, loose, and nutrient-poor soils. Signature scrub species are Florida rosemary (*Ceratiola ericoides*), sand pine (*Pinus clausa*), and a variety of shrubby oaks. Scrub communities are being lost at an alarming rate, ranking them at the second most endangered level both statewide and globally (G2/S2).

In the KR MA, the scrub community encompasses approximately 768 acres. It is characterized by dense thickets of scrub oak (*Quercus inopina)* and other shrubs in the understory. Common vegetation in this community includes sand live oak, myrtle oak (*Quercus myrtifolia*), scrub oak, Silk bay (*Persea borbonia var. humilis*), Florida rosemary, big-flower pawpaw (*Asimina obovata*), and scrub-hyssop *(Sophronanthe hispida*). Saw palmetto, rusty staggerbush (*Lyonia Ferruginea)*, and wiregrass are occasionally found in transitional areas but are not widespread throughout the scrub matrix.

Scrub communities within the KR MA provide habitats that can support the expansion of the Florida scrub-jay. Scrub ecosystems rely on fire for maintenance, but due to sparse groundcover and the slow accumulation of fuels, they are not easily ignited. However, under dry conditions, the woody shrub vegetation can burn rapidly and with high intensity. In the absence of fire, scrub communities gradually accumulate organic matter and eventually transition into xeric hammocks. The desired vegetation structure for scrub in the KR MA is an open canopy, dense patches of low shrubs interspersed with areas of bare sand, and minimal grass cover. This vegetation structure is currently well-established due to the application of frequent prescribed fire. Management objectives for the scrub communities in the KR MA include treating invasive species to maintain

maintenance conditions, using prescribed fire to preserve the existing vegetation structure, and employing mechanical vegetation treatments between fire intervals to restructure the vegetation when low-intensity burns don't achieve the desired results. Additionally, although not expected to impact the scrub communities directly, an important management consideration is to ensure that seasonal water level fluctuations resulting from hydrologic changes associated with the implementation of the HRS do not lead to elevated seasonal groundwater levels within the scrub habitats.

DRY PRAIRIE (3%)

Dry prairies are characterized as low-shrub and grass-dominated communities with few or no pines and a dense understory of wiregrass, saw palmetto, and a variety of grasses, herbs, and low shrubs. They occur on similar soils and share many species with mesic flatwoods. Common shrub species include saw palmetto, dwarf live oak, gallberry (*Ilex glabra*), fetterbush, shiny blueberry, netted pawpaw (*Asimina reticulata*), Atlantic St. John's wort (*Hypericum tenuifolium*), wax myrtle, and dwarf huckleberry (*Gaylussacia dumosa*). Groundcover vegetation typically includes wiregrass (*Aristida stricta* var. *beyrichiana*), bottlebrush threeawn (*Aristida spiciformis*), hemlock witchgrass (*Dichanthelium portoricense*), broomsedge bluestem (*Andropogon virginicus*), lopsided Indiangrass (*Sorghastrum secundum*), and cypress witchgrass (*Dichanthelium ensifolium*), narrowleaf silkgrass (*Pityopsis graminifolia*), milkworts (*Polygala* spp.), meadowbeauties, yellow-eyed grasses (*xyris spp.*), and wild pennyroyal (*Piloblephis rigida*). Dry prairies are ranked at the second most endangered level both statewide and globally (G2/S2).

In the KR MA, the dry prairie community encompasses 1,423 acres. It is characterized by an open canopy and a low-shrub understory dominated by saw palmetto, shiny blueberry, and grasses. Common species include wiregrass, broomsedge, threeawn, tarflower (*Bejaria racemosa*), slender flattop goldenrod (*Euthamia caroliniana),* fetterbush (*Lyonia lucida*), Coastalplain staggerbush (*Lyonia fruticosa*), gallberry, Atlantic St. John's-wort, elephant's foot *(Elephantopus elatus),* gayfeather *(Liatris spp.),* and various sedges *(Carex spp.).* Scattered shrubs include dwarf live oak, sand live oak, and myrtle oak.

Dry prairie communities within the KR MA provide habitats that can support the expansion of the Florida grasshopper sparrow. Pines are rarely found in the dry prairie communities of the KR MA due to the regular application of prescribed fire. The desired vegetation structure has been largely achieved through natural recruitment and consistent fire management. However, remnants of past and current agricultural use have resulted in the presence of pasture grasses within the prairie matrix. Management objectives for dry prairie communities in the KR MA include treating nuisance and invasive species to maintain maintenance condition and utilizing prescribed fire to promote healthy grass cover and sustain the target vegetation structure. Growing season burns are particularly emphasized to enhance native grass coverage and maintain the open, fire-adapted prairie matrix.

MESIC FLATWOODS (3%)

Mesic flatwoods are characterized by an open-canopy forest of widely spaced pine trees with a dense understory of herbs and shrubs. These communities occur on poorly drained soils that are

seasonally saturated during the wet season but rarely inundated for extended periods. In northern and central Florida, longleaf pine (*Pinus palustris*) is typically present or dominant, while in southern Florida, slash pine (*Pinus elliottii*) is more common. The shrub layer often includes saw palmetto, gallberry, coastalplain staggerbush, fetterbush, dwarf live oak, runner oak, shiny blueberry, Darrow's blueberry (*Vaccinium darrowii*), and dwarf huckleberry. The herbaceous layer is predominantly grasses, including wiregrass, dropseed (*Sporobolus spp*.), panicgrass (*Dichanthelium spp*.), and broomsedges (*Andropogon spp*.), and various showy forbs. Mesic flatwoods are ranked as apparently secure in their range globally and statewide (G4/S4).

In the KR MA, the mesic flatwoods community encompasses 1137 acres. These flatwoods are dominated by slash pine, with occasional scattered patches of longleaf pine, cabbage palm (*Sabal palmetto*), and live oak (*Quercus virginiana*) in the canopy. The midstory is generally absent due to the regular application of prescribed fire. The dense shrub layer is dominated by saw palmetto, gallberry, and fetterbush, shiny blueberry, queen's delight (*Stillingia sylvatica*), wax myrtle, myrsine (*Myrsine cubana),* coastalplain staggerbush. The groundcover consists of a diverse mix of herbs and grasses, including threeawn, goldenrod, broomsedge, pawpaw, gopher apple (*Geobalanus oblongifolius*), St. Johns-wort, tarflower, carpet grass (*Axonopus spp*.), wiregrass, Spanish needles (*Bidens bipinnata*), and various sedges, vines, and other ruderal species. Nuisance grasses such as rose natalgrass (*Rhynchelytrum repens)* and bahia grass can be problematic in some areas.

Mesic flatwoods in the KR MA provide important habitat for red-cockaded woodpeckers (*Dryobates borealis*), which are established in the northern portion of the site (i.e., KICCO Unit). The desired vegetation structure for this community is a pine-dominated canopy with an understory of low shrubs, grasses, and forbs. The objectives for managing mesic flatwoods vegetation in the KR MA include treating nuisance and invasive species to maintain maintenance condition, applying prescribed fire to control shrub density and maintain the fire-adapted structure of the community, and utilizing growing season burns to promote healthy grass coverage.

CYPRESS/TUPELO (5%)

Cypress/tupelo wetlands are frequently flooded wetlands dominated by cypress or tupelo (black gum) species. In the KR MA, the cypress/tupelo community covers 2,142 acres and includes a mix of floodplain and dome swamps.

Floodplain Swamp

Floodplain swamps are closed-canopy forests that occur along streams, rivers, depressions, and oxbows within floodplains. These communities are ranked as apparently secure both globally and statewide (G4/S4), though they may be rare in certain parts of their range, particularly at the periphery.

In the KR MA, floodplain swamps are identified by their cypress-dominated canopy, which distinguishes them from other areas mapped as freshwater forested wetlands. These swamps generally have flowing water during high water periods. The canopy includes bald cypress, water oak, and black gum, while pond Cypress (*Taxodium ascendens*) is commonly found along stretches

of the river. The midstory is vegetated with swamp bay, pop ash (*Fraxinus caroliniana*), black gum, pond apple (*Annona glabra*), swamp bay, sweet bay, Carolina willow (*Salix caroliniana*), laurel oak, and cabbage palm. The understory includes wax myrtle and buttonbush (*Cephalanthus occidentalis*), false nettle (*Boehmeria cylindrica*), lizard's tail (*Saururus cernuus*), alligator flag (*Thalia geniculata*), woolly witchgrass (*Dichanthelium scabriusculum),* sawgrass (*Cladium jamaicense*), rushes (*Juncus* spp.), sedges (*Carex spp*.), and various ferns and *Tillandsia spp*.

Dome Swamp

Dome swamps are isolated, forested, depressional wetlands within fire-maintained communities. They are typically circular in shape and exhibit a domed profile, with taller trees in the center and shorter vegetation along the edges. Shrub cover ranges from sparse to moderate but is often absent in areas with frequent fire. Dome swamps are ranked as apparently secure both globally and statewide (G4/S4), although they may be rare in certain parts of their range, particularly at the periphery.

In the KR MA, dome swamps are relatively small and scattered across the landscape. The canopy is dominated by bald cypress. Transitional zones along the swamp edges support red maple, dahoon holly, and occasional slash pine. Shrub vegetation is generally limited but includes species such as St. John's wort (Hypericum spp.), buttonbush, and wax myrtle. Common groundcover species include a mix of ferns, soft rush (*Juncus effusus var. solutus*), maidencane, smartweed (*Persicaria spp.*), bladderwort, ten-angled pipewort (*Eriocaulon decangulare*), sedges, rushes, arrowhead, pickerelweed, and alligator flag. The center of the dome typically features open water with floating vegetation, including bladderwort (*Utricularia spp.*) and floating heart (*Nymphoides aquatica*), or supports emergent vegetation, such as alligator flag. In some areas, it has become overgrown with shrubs like Carolina willow and pond apple.

While not usually managed with prescribed fire, periodic fire is essential for maintaining the cypress component and limiting hardwood encroachment in cypress/tupelo systems. Fire plays a critical role in preserving the structure and species composition of dome swamps. Without regular fire, peat accumulation and hardwood intrusion can reduce cypress dominance, potentially leading to a transition toward baygall communities. However, reintroducing fire in long-unburned cypress/tupelo areas can result in high tree mortality due to accumulated fuels and altered stand structure. In the KR MA, prescribed fire is typically applied to the surrounding communities when the swamp soil is saturated. Under these conditions, fire often spreads to the swamp edges but is extinguished before reaching the interior. Fire frequency in the cypress/tupelo varies, with the edges burning every 3-5 years, while the interior, where longer hydroperiods typically maintain high moisture levels, does not burn. Past land use, including hydrologic alterations within the Kissimmee River floodplain, has impacted the natural hydrology of the cypress/tupelo communities. In addition, fire exclusion and the spread of nuisance and invasive species have altered the vegetation structure, contributing to increased hardwood composition. The cypress/tupelo systems in the KR MA are mature and reflect structural characteristics typical of communities affected by these types of disturbances. Despite these changes, the cypress/tupelo communities currently exhibit the desired vegetation structure. Management objectives include preserving the cypress canopy structure in floodplain swamps, preventing hardwood encroachment in dome swamps with prescribed fire, and treating nuisance and invasive species to maintain

desired ecological conditions.

FRESHWATER FORESTED WETLANDS (5%)

The freshwater forested wetlands within the KR MA encompass approximately 2,208 acres and are subclassified as mixed hardwood-coniferous swamps. These communities were classified under the broader category of freshwater forested wetlands rather than being grouped with the cypress/tupelo type, due to the predominance of hardwood species in their canopy composition and overall structure. This classification reflects the ecological distinctiveness of these hardwood-dominated systems and helps differentiate them from cypress-dominated wetlands, which exhibit different successional dynamics.

Mixed hardwood-coniferous swamps are seasonally or semi-permanently flooded or saturated forested wetlands characterized by a diverse canopy composed of both broadleaf deciduous hardwoods and needle-leaved conifers. These wetlands typically occur in low-lying areas such as floodplains, depressions, or along the rivers and streams, where hydrologic conditions fluctuate seasonally. The canopy is often a mosaic of species, with dominant hardwoods including red maple, black gum, and laurel oak, interspersed with conifers such as bald cypress and slash pine. The midstory may include species like swamp bay, dahoon holly, and wax myrtle, while the understory and groundcover layers support a mix of ferns, sedges, rushes, lizard's tail, false nettle, and smartweeds (*Polygonum spp*.).

In the KR MA, mixed hardwood-coniferous swamps exhibit sparse cypress coverage, primarily along river margins and occasionally scattered throughout the landscape. These swamps likely originally formed from floodplain swamps, primarily as a result of hydrologic alterations in the Kissimmee River floodplain. Due to their shared origin and the integration of cypress within a diverse matrix of wetland hardwoods, they can be difficult to distinguish from floodplain swamps in aerial interpretation. Differentiating them from mixed wetland hardwoods (hydric hammocks) on the property can also be challenging, particularly where mosaic hardwood species are prevalent. However, the deeper water levels and longer hydroperiods typical of mixed hardwood-coniferous swamps help distinguish them from mixed wetland hardwoods. The canopy of mixed hardwood-coniferous swamps typically includes bald cypress, black gum, water hickory (*Carya aquatica*), and laurel oak. The midstory is composed of species such as swamp bay, pop ash, pond apple, and cabbage palm. The understory supports a diverse assemblage of shrubs and herbaceous plants, including wax myrtle, buttonbush, Carolina willow, pickerelweed, lizard's tail, alligator flag, bladderwort, arrowhead, smartweed, and various sedges, rushes, and various ferns.

Mixed hardwood-coniferous swamp wetlands in the KR MA may experience occasional fire, particularly during dry years or along their upland margins. As with other communities not actively managed with prescribed fire, burns are typically applied to adjacent fire-adapted communities when swamp soils are saturated. Under these conditions, fire may occasionally creep into the swamp edges but is usually extinguished before reaching the interior. Given the maturity of these communities, a reversal of the hardwood-dominated trend is not expected despite hydrologic improvements from the restoration efforts and the implementation HRS. As the current vegetation structure persists, these areas will continue to be managed as mixed hardwood-coniferous swamp communities. The primary management objective for these wetlands is to control nuisance and

invasive species to achieve and maintain maintenance condition.

WET PRAIRIE (8%)

Wet prairies are characterized by an herbaceous community with many showy flowering herbs intermixed with short shrubs. They are some of the most diverse communities in the United States. Wet prairies are found on continuously saturated soils between lower-lying depression marshes, shrub bogs, or dome swamps and slightly higher wet, mesic flatwoods, or dry prairie. Wet prairies are ranked as the second most endangered level both statewide and globally (G2/S2).

In the KR MA, the wet prairie community encompasses 3,459 acres. Historically, these areas were heavily impacted by intensive cattle grazing and pasture conversion prior to acquisition by the District. Many wet prairie areas were modified for pasture use, with the introduction of non-native grasses such as bahia grass, smutgrass (*Sporobolus indicus*), and crabgrass (*Digitaria* spp.), which significantly altered the native plant composition. Since acquisition, reduced grazing pressure and hydrologic restoration efforts have facilitated the natural recruitment of native vegetation in many areas, although some sites continue to be grazed.

Vegetation in the KR MA wet prairie includes low-growing groundcover typical of reference sites, as well as dense woody shrubs that are more common in areas affected by hydrologic alteration and fire suppression. Dominant shrubs include wax myrtle, saltbush (*Baccharis halimifolia*), Carolina willows, common persimmon, and elderberry. Scattered pockets of tree species, such as red maple, cabbage palm, and oaks, as well as occasional cypress, and slash pine, can be observed in the landscape or encroaching in transitional zones. Pasture grass remains prominent in some areas, particularly where grazing is still active. The low-growing groundcover commonly includes diverse species including St. John's-wort, blue maidencane, maidencane, sugarcane plumegrass (*Saccharum giganteum*), bog white violet (*Viola lanceolata*), bladderworts, primrose-leaf violet (*Viola primulifolia*), bearded prangletop (*Diplachne fusca* var. *fascicularis)*, pink sundew (*Drosera capillaris*), threeawn, goldenrod, ten-angled pipewort (*Eriocaulon spp.*), Yellow bristlegrass (*Setaria parviflora*), beggarticks *(Bidens sp.)*, whitehead bogbutton (*Lachnocaulon anceps)*, milkwort, butterwort (*Pinguicula spp.*), bluestem, cordgrass (*Spartina bakeri*), yellow-eyed grass, crab grass (*Digitaria spp.*), bahia grass, smutgrass, nutrush (*Scleria spp.)*, and various sedges and rushes.

Like other grassland ecosystems, wet prairies are fire-dependent. Without regular fire, they can become overgrown with dense shrubs, reducing herbaceous diversity and altering habitat structure. In the KR MA, past fire suppression and hydrologic changes have contributed to the development of shrub-dominated pockets within the wet prairie. These areas remain classified as prairie communities and are managed with the intent of reestablishing a dominant herbaceous groundcover. Exceptions are made where shrub dominance supports desired wildlife habitat and where maintaining a mosaic structure is ecologically beneficial. The management objective for wet prairie vegetation in the KR MA is to promote a diverse mix of herbaceous species and low shrubs, interspersed with dense shrub pockets, to achieve structural and ecological diversity that supports optimal wildlife use. Management actions include the application of prescribed fire, control of invasive and nuisance plant species, and regulated grazing in appropriate areas.

HARDWOOD HAMMOCK (10%)

Hardwood forested uplands or hardwood hammocks are hardwood-dominated communities. The hardwood hammock communities within the KR MA are classified as xeric and mesic hammocks, encompassing approximately 4,375 acres.

Mesic Hammock

Mesic hammocks are characterized by a dense, evergreen hardwood canopy dominated by live oak (*Quercus virginiana*) and cabbage palm (*Sabal palmetto*), along with a shrubby understory. The mature canopy trees support a variety of epiphytes. including listed species. Unlike hydric hammocks, mesic hammocks lack wetland trees such as sweetbay and swamp tupelo. Mesic hammocks are ranked as vulnerable globally and statewide (G3/S3?) due to either a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors, although additional research is required for a definitive statewide classification for this community.

The mesic hammock community is the largest among hardwood-dominated communities in the Management Area. In the KR MA, the mesic hammock community is dominated by live oaks and cabbage palms, as is typical of such habitats. Abundant epiphytes are also found in this community. Other common canopy vegetation includes sweetgum (*Liquidambar styraciflua)*, Hackberry (*Celtis laevigata*), and slash pine. The common shrubby understory typically consists of a mix of saw palmetto, American beautyberry (*Callicarpa americana)*, gallberry*, hog plum (Ximenia americana),* common persimmon, and various berry species (*Vaccinium spp.)*. In the KR MA, mesic hammocks generally have a well-developed canopy, though portions of this habitat are still subject to low-intensity cattle grazing. The understory is naturally sparse due to shading; however, cattle grazing and trampling have further degraded the shrub and groundcover layers, reducing the abundance of species typically associated with mesic hammocks. In grazed areas, native vegetation has often been replaced by opportunistic species such as broomweed/fanpetals (*Sida sp*.), tropical soda apple (*Solanum viarum*), and caesarweed (*Urena lobata*). The main objective for managing mesic hammock vegetation in the KR MA is to control nuisance and invasive species to maintain maintenance conditions. Regulated grazing will continue in the interim.

Xeric Hammock

Xeric Hammocks are characterized by a relatively closed, low canopy dominated by sand live oak. The understory is typically open and includes a sparse or absent herbaceous layer and shrubs that are typical of sandhill or scrub, depending on the hammock's origin. Xeric hammocks can be distinguished from scrub and scrubby flatwoods by the relatively closed canopy of evergreen oaks. Xeric hammocks are ranked as vulnerable globally and statewide (G3/S3) due to either a restricted range, relatively few populations (often fewer than 80), recent and widespread declines, or other factors.

In the KR MA, xeric hammock is a scarce community type. It is characterized by a closed canopy dominated by oaks. Common canopy species include live oak, sand live oak, myrtle oak,

Chapman oak, and red bay. The understory is relatively sparse due to dry soil conditions and overstory shading. Common understory species include Florida rosemary, saw palmetto, rusty staggerbush, fetterbush, blueberry, goldenrod, and patches of wiregrass and witchgrass, Carolina jessamine (*Gelsemium sempervirens*), dog fennel (*Eupatorium* spp.), and other ruderal species. Wild pine (*Tillandsia balbisina*) and various vines are common arboreal species. The main objective for managing xeric hammock vegetation in the KR MA is to treat nuisance and invasive species to maintain maintenance conditions.

Mesic hammocks can tolerate occasional ground fires; however, the presence of live oaks tends to limit fuel buildup in the understory. These hammocks typically burn only when fire spreads from adjacent habitats, and fires often extinguish naturally where fuel is insufficient. In contrast, xeric hammocks usually develop in areas where fire has been excluded, allowing the oak canopy to establish and persist. This community is not maintained through prescribed fire.

MARSHES (54%)

Marshes are the most prevalent natural community type within the KR MA, encompassing approximately 23,374 acres. These marshes are classified as floodplain marshes and depression marshes.

Marshes in the KR MA are characterized by expansive, open herbaceous systems dominated by a diverse assemblage of grasses, sedges, broadleaf emergents, and floating aquatic plants. However, in areas where vegetation has been disturbed, fire has been historically excluded, or hydrology has been altered, dense thickets of shrubs have replaced the native herbaceous communities through natural successional processes. Many of the marshes within the KR MA have also been historically used for cattle grazing. In the past, much of this land was intensively grazed, and some areas were successfully converted to pasture. While grazing continues in certain locations, overall grazing pressure has been significantly reduced. This reduction in grazing, combined with ongoing hydrologic restoration efforts, has facilitated the natural recruitment and recovery of native vegetation in many areas that were previously converted to pasture. In currently grazed areas, opportunistic ruderal species and remnant pasture grasses are still commonly observed.

Depression Marsh

Depression marshes are characterized as shallow depressions in the sand substrate with herbaceous vegetation, often in concentric bands. They frequently form an outer rim around swamp communities, are seasonally inundated, and often burn with the surrounding landscape. Depression marshes are ranked as apparently secure in their range globally and statewide (G4/S4).

In the KR MA, depression marshes are scattered throughout the management area. The common vegetation includes St. John's wort (*Hypericum sp.*), spikerush *(Eleocharis sp.)*, yellow-eyed grass, chain fern, primrose willow (*Ludwigia spp.)*, pickerelweed, maidencane, arrowhead, alligator flag, pickerelweed, and bladderwort. other species include umbrella sedge (*Fuirena sp.*), marsh pennywort *(Hydrocotyle spp.)*, soft rush *(Juncus sp.)*, dotted smartweed, beakrush, pipewort, torpedo grass (*Panicum repens*), cordgrass, buttonbush, and wax myrtle.

Floodplain Marsh

Floodplain Marshes are herbaceous and shrubby wetlands found in river floodplains. They are associated with and often grade into wet prairies or riverine communities. These marshes are typically flooded with flowing water for most of the year. Floodplain marshes are ranked as vulnerable globally and statewide (G3/S3) due to either a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.

In the KR MA, floodplain marshes dominate the river's floodplain, supporting a diverse assemblage of wetland shrubs and herbaceous species. The vegetation is characterized by a mosaic of plant communities, including emergent and floating species such as sawgrass, floating marsh pennywort, smartweed, pickerelweed, arrowhead, yellow pondlily (*Nuphar advena*), bladderwort, water-lettuce (*Pistia stratiotes*), Para grass (*Urochloa mutica*), primrose willow, West Indian marshgrass (*Hymenachne amplexicaulis)*, and cordgrass. Shrub-dominated areas, particularly on isolated islands and previously farmed lands, are dominated by species such as water hemlock, groundsel tree (*Baccharis halimifolia*), common buttonbush, wax myrtle, and Carolina willow. These zones reflect subtle changes in hydrology and elevation, transitioning from clumps of forbs to grasses, sedges, and rushes, to floating aquatics, and finally to dense shrub thickets.

Wet depressions within the floodplain tend to retain water and support a rich diversity of broadleaves dominated by pickerelweed, arrowhead, alligator flag, and smartweed species. Closer to the river, marshes are deeper and remain inundated for longer periods, favoring broadleaf emergent vegetation. These deeper marshes are typically dominated by yellow pondlily, Southern watergrass (*Luziola fluitans*), pickerelweed, arrowhead, alligator flag, maidencane, smartweed, and bulrush (*Scirpus* spp.). Interspersed within these broadleaf marshes are pockets of shrub-dominated vegetation, particularly buttonbush and Carolina willow. Along the river's edge and in open water pockets, floating-leaved aquatics such as yellow pondlily, waterlily (*Nymphaea* spp.), and water hyacinth (*Pontederia crassipes*) are abundant. These areas also support mats of species like Southern watergrass, bulrush, American cupscale (*Sacciolepis striata*), and marsh pennywort, which form dense floating or emergent vegetation. The aquatic plant communities are rich in both free-floating and submersed species. Common species include water spangles (*Salvinia minima*), frog's-bit (*Limnobium spongia*), Valdivia duckweed (*Lemna valdiviana*), coontail (*Ceratophyllum demersum*), hydrilla (*Hydrilla verticillata*), bladderwort (*Utricularia* spp.), and muskgrass (*Chara* spp.). These species contribute to the structural complexity and ecological function of the aquatic habitat throughout the floodplain.

Marsh communities generally require periodic fire to maintain their vegetation structure and ecological function. Herbaceous-dominated marshes typically experience fire every three to five years, while shrub-dominated marshes tend to burn less frequently, on a three to ten-year cycle. Unburned marshes accumulate peats, which gradually raise the ground surface. This elevation change reduces the marsh's water storage capacity and can shift the plant community toward a hardwood swamp. In the absence of fire or with reduced hydroperiods, these systems are vulnerable to encroachment by woody species such as wax myrtle, saltbush, and various invasive shrubs. Conversely, the reintroduction of fire promotes habitat heterogeneity, helps maintain open herbaceous structure, and enhances foraging opportunities for a wide range of waterbird species.

Within the KR MA, floodplain marshes are not actively managed with prescribed fire but are allowed to burn opportunistically when site conditions permit. This is primarily due to the limited availability of fine fuels necessary to ignite and sustain fire, variable water levels, and the narrow range of weather conditions suitable for conducting safe and effective prescribed burns, which makes planning and implementation challenging.

Vegetation zonation within marshes is primarily influenced by water depth and the extent of peat accumulation. Therefore, the zonation patterns in the floodplain marshes are expected to shift with the implementation of the HRS. The HRS project aims to restore an optimal hydroperiod in the KR MA, aligning with the broader goals of the Kissimmee River Restoration Project. The desired outcome is a vast, herbaceous-dominated system characterized by a diverse mix of grasses, broadleaf plants, and floating aquatics. From a land management perspective, maintaining a mosaic of grasses, sedges, rushes, broadleaves, and scattered shrubs is more feasible with the available resources. While long-term goals include controlling nuisance and invasive species, effective treatment methods for many of these species have yet to be fully developed. Currently, control efforts are being conducted on a trial basis by the restoration team through systematic experimental treatments. These trials aim to identify optimal strategies for long-term management of invasive and nuisance species within the floodplain marshes. In the interim, land management objectives for marshes in the KRMA focus on treating nuisance and invasive species in depression marshes to maintain them in a maintenance condition. Additionally, the land stewardship management focus is to enhance the vegetation structure across the floodplain marshes in collaboration with the restoration team. This includes supporting invasive species control where manageable and applying prescribed fire and mechanical treatments to reduce undesirable shrub cover when water levels and site conditions permit.

OTHER LANDCOVER TYPES

OPEN WATER (0.1%)

The open water areas within the KR MA comprise approximately 43 acres of small waterbodies, including small segments of ditches that have been plugged or are used for conveyance and small artificial (cattle) ponds. Depending on the depth and slope, these waterbodies usually have an open water zone with occasional floating and submerged aquatic plants. Typically, the open water areas in the KR MA do not require direct management.

ALTERED LANDCOVERS (7%)

Altered land cover types within the KRMA encompass approximately 2,847 acres where natural vegetation has been significantly modified. These areas include former agricultural fields, unrestored improved pastures, spoil piles, remnant levees, berms, ditches, open spaces with recreational infrastructure, and various other small-scale disturbances. These sites are often dominated by native opportunistic species and invasive plants.

Spoil banks are primarily vegetated with ruderal species and invasive grasses such as cogongrass and torpedograss. Old fields are overgrown with invasive species including smutgrass, cogongrass, and torpedograss. Improved pastures are scattered with native woody vegetation, primarily wax myrtle, slatbush, and oak species, and are commonly dominated by bahia grass, Bermuda grass (*Cynodon dactylon*), crabgrass, smutgrass, dog fennel, flatsedge (*Cyperus spp.*), carpetgrass, and rustweed (*Polypremum procumbens*). These pastures are actively grazed and may be periodically mowed, burned, or treated for invasive species in coordination with management of adjacent natural communities.

Due to the site's riverine origin and past land use, natural levees and manmade linear features such as plugged ditches, berms, and degraded spoil piles are dispersed throughout the natural community landscape. While these features may still be visible in aerial imagery, small in scale and well-integrated into the surrounding natural communities. As a result, they were mapped as part of the adjacent natural systems and are not included in the total for the altered landcover types.

REFERENCES

Bridges, E. L. , Noss, R. F. 2006. Landscape Ecology of Florida Dry Prairie in the Kissimmee River Region. Land of Fire and Water: The Florida Dry Prairie Ecosystem. Proceedings of the Florida Dry Prairie Conference. https://www.ces.fau.edu/fdpc/proceedings/3-17145_p.0142_Brid_FDPC_d.pdf

Duever, M. J., J. E. Carlson, L. A. Riopelle, L.H. Gunderson, and L. C. Duever. 1976. *Ecosystem analyses at Corkscrew Swamp. In* HT Odum, KC Ewel, JW Ordway & MK Johnson (eds.), Cypress wetlands for water management, recycling and conservation (pp. 707-737). Third annual report to National Science Foundation and The Rockefeller Foundation. Center for Wetlands, University of Florida, Gainesville, FL.

Florida Natural Areas Inventory (FNAI). 2010. *Guide to the natural communities of Florida: 2010 edition.* Florida Natural Areas Inventory, Tallahassee, FL Available online at. https://www.fnai.org/PDF/FNAI-Natural-Community-Classification-Guide-2010_20150218.pdf as of June 2021.

Kawula, R. and J. Redner. 2018. *Florida Land Cover Classification System*. Center for Spatial Analysis Fish and Wildlife Research Institute. Florida Fish and Wildlife Conservation Commission, Tallahassee, FL. Available online at. https://myfwc.com/media/20455/land-cover-classification-revision-2018.pdf as of June 2021.

Myers, J. and J. Ewel. 1990. *Ecosystems of Florida*. University of Central Florida Press. University Presses of Florida, Orlando, FL.

U.S. Fish and Wildlife Service. 1999. *Florida Scrub Including Scrubby Flatwoods and Scrubby High Pine*. South Florida multi-species recovery plan. Atlanta, Georgia. 2172 pp.

Wade, D., J. Ewel, and R. Hofstetter. 1980. *Fire in South Florida Ecosystems*. United States Department of Agriculture Forest Service, Southeast Forest Experiment Station, Gen. Tech. Rep., No. SE-17. 125pp. Asheville, NC.

Appendix C. Species List

Table 1. List of plants on the KR MA and status.[a]

Scientific Name	Common Name	Listing Status
Abrus precatorius	Rosary pea	Non-Native
Acalypha gracilens	Slender threeseed mercury	
Acer rubrum	Red maple	
Acrostichum danaefolium	Giant leather fern	
Alternanthera philoxeroides	Alligatorweed	Non-Native
Amaranthus australis	Southern amaranth	
Amaranthus spinosus	Spiny amaranth	Non-Native
Ambrosia artemisiifolia	Ragweed; common ragweed	
Ambrosia trifida	Giant ragweed	
Ammannia latifolia	Pink redstem; toothcup	
Amphicarpum muehlenbergianum	Blue maidencane	
Andropogon glomeratus	Bushy broom grass; busy bluestem	
Andropogon gyrans	Elliott's bluestem	
Andropogon virginicus	Chalky bluestem; broomsedge bluestem	
Annona glabra	Pond apple	
Apios americana	Groundnut	
Aristida patula	Tall threeawn	Endemic
Aristida stricta	Wiregrass	
Asclepias currisavica	Tropical milkweed	Non-Native
Asclepias incarnata	Swamp milkweed	
Asclepias lanceolata	Fewflower milkweed	
Asclepias pedicellata	Savannah milkweed	
Asimina obovata	Big-flower pawpaw	
Asimina reticulata	Netted pawpaw	
Axonopus compressus	Broadleaf carpetgrass, flat joint carpetgrass; tropical carpetgrass	
Axonopus fissifolius	Common carpetgrass	
Axonopus furcatus	Big carpet grass	
Azolla caroliniana	Carolina mosquito fern	
Azolla filiculoides	American waterfern	
Baccharis halimifolia	Groundsel tree; salt bush; sea myrtle	
Bacopa caroliniana	Lemon bacopa; blue waterhyssop	
Bacopa monnieri	Water hyssop; herb-of-grace	
Bejaria racemosa	Tarflower	
Bidens alba	Beggarticks	
Bidens bipinnata	Spanish needles	
Bidens laevis	Bur marigold	

Table 1 (Continued). List of plants on the KR MA and status.

Scientific Name	Common Name	Listing Status
Bidens mitis	Marsh beggartick; smallfruit beggarticks	
Boehmeria cylindrica	Smallspike false nettle; bog hemp	
Boltonia diffusa	Smallhead boltonia; doll's daisy	
Borreria remota	Woodland false buttonweed	
Callicarpa americana	American beautyberry	
Calystegia sepium var. *limnophila*	Hedge false bindweed	
Canna flaccida	Golden canna; bandanna- of-the-everglades	
Cardiospermum microcarpum	Heartseed	
Carex alata	Broadwing sedge	
Carex glaucescens	Clustered sedge	
Carex longii	Long's sedge	
Carex lupuliformis	False hop sedge	
Carex verrucosa	Warty sedge	
Carex vexans	Florida hammock sedge	
Carya aquatica	Water hickory	
Celtis laevigata	Hackberry	
Cenchrus echinatus	Southern sandspur	
Cenchrus purpureus	Napier grass; elephant grass	Non-Native
Cenchrus spinifex	Field sandbur	
Centella asiatica	Asian coinleaf, spadeleaf	
Cephalanthus occidentalis	Buttonbush	
Ceratophyllum demersum	Coontail	
Ceratopteris thalictroides	Watersprite	
Chamaecrista nictitans	Sensitive partiridge pea	
Chamaecrista nictitans var. *aspera*	Sensitive pea	
Chara spp.	Chara; muskgrass	
Chloris neglecta	Fingergrass	Non-Native
Cicuta maculata	Spotted water hemlock	
Cirsium horridulum	Yellow thistle; purple thistle	
Cirsium nuttallii	Nuttall's thistle	
Citrus spp.	Citrus	Non-Native
Cladium jamaicense	Sawgrass; jamaica swamp sawgrass	
Coelorachis rugosa	Wrinkled jointtailgrass	
Coleataenia anceps	Beaked panic grass; beaked panicum	
Coleataenia rigidula	Redtop panicum	
Colocasia esculenta	Wild taro	Non-Native
Commelina diffusa	Spreading or common dayflower	Non-Native
Commelina gigas	Climbing dayflower	Non-Native
Conoclinium coelestinum	Blue mistflower	
Coreopsis leavenworthii	Leavenworth's tickseed	

Table 1 (Continued). List of plants on the KR MA and status.

Scientific Name	Common Name	Listing Status
Commelina gigas	Climbing dayflower	Non-Native
Cornus foemina	Swamp dogwood; stiff dogwood	
Crotalaria pallida var. obovata	Smooth rattlebox	Non-Native
Ctenium aromaticum	Toothache grass	
Cuphea carthagenensis	Columbian waxweed	Non-Native
Cynodon dactylon	Bermudagrass	Non-Native
Cyperus articulatus	Jointed flatsedge	
Cyperus blepharoleptos	Cuban bulrush; burhead sedge	Non-Native
Cyperus brevifolius	Shortleaf spikesedge	Non-Native
Cyperus compressus	Poorland flat sedge	
Cyperus croceus	Baldwin's flatsedge	
Cyperus distinctus	Marshland flatsedge; swamp flatsedge	
Cyperus erythrorhizos	Redroot flatsedge	
Cyperus esculentus	Yellow netgrass	Non-Native
Cyperus flavescens	Yellow flatsedge	
Cyperus haspan	Sharp edge sedge; haspan flatsedge	
Cyperus hortensis	Low spikesedge	
Cyperus lanceolatus	Epiphytic flatsedge	Non-Native
Cyperus odoratus	Fragrant flatsedge	
Cyperus polystachyos	Manyspike flatsedge	
Cyperus retrorsus	Retrorse flat sedge; pinebarren flatsedge	
Cyperus sesquiflorus	Fragrant flatsedge	
Cyperus spp.	Flat sedges	
Cyperus strigosus	Strawcolored flatsedge	
Cyperus surinamensis	Tropical flatsedge	
Cyperus virens	Green flatsedge	
Dalbergia sissoo	Indian rosewood	Non-Native
Decodon verticillatus	Willow herb; swamp loosestrife	
Desmodium incanum	Zarzabacoa comun	Non-Native
Desmodium triflorum	Threeflower ticktrefoil	Non-Native
Dichanthelium aciculare	Needleleaf witchgrass	
Dichanthelium dichotomum	Cypress witchgrass	
Dichanthelium erectifolium	Erectleaf witchgrass	
Dichanthelium erectifolium	Erectleaf witchgrass	
Dichanthelium scabriusculum	woolly witchgrass	
Dichanthelium sphaerocarpon	Roundseed witchgrass	
Dichondra carolinensis	Carolina ponysfoot	
Dichromena colorata	White-tops	
Dichromena latifolia	White-bracted sedge	

Table 1 (Continued). List of plants on the KR MA and status.

Scientific Name	Common Name	Listing Status
Digitaria ciliaris	Southern crabgrass	
Digitaria longiflora	Indian crabgrass	Non-Native
Digitaria pentzii	Pangolagrass	Non-Native
Digitaria serotina	Dwarf crabgrass; blanket crabgrass	
Digitaria spp.	Crabgrass	
Digitaria subcalva	Plant city crabgrass	Endemic
Diodia virginiana	Virginia buttonweed	
Dioscorea bulbifera	Air potato	Non-Native
Diospyros virginiana	Common persimmon	
Diplachne fusca v. fascicularis	Bearded sprangletop grass	
Drosera brevifolia	Dwarf sundew	
Drosera capillaris	Pink sundew	
Drymaria cordata	Drymary	Non-Native
Dysphania ambrosioides	Mexican tea	Non-Native
Echinochloa crus-galli	Barnyard grass	Non-Native
Echinochloa walteri	Walter's millet; coast cockspur	
Eclipta prostrata	Yerba de tajo, eclipta; false daisy	
Edrastima uniflora	Clustered mille graine	
Eichhornia crassipes	Water hyacinth; common water-hyascinth	Non-Native
Eleocharis baldwinii	Baldwin's spikerush; roadgrass	
Eleocharis cellulosa	Club-rush; gulf coast spikerush	
Eleocharis flavescens	*Pale spikerush; yellow spikerush*	
Eleocharis geniculata	*Canada spikerush*	
Eleocharis interstincta	Jointed spikerush; knotted spikerush	
Eleocharis olivacea	*Brightgreen spikerush*	
Eleocharis vivipara	Sprouting spikerush; vivparous spikerush	
Elephantopus elatus	Tall elephant's foot	
Eleusine indica	Indian goosegrass	Non-Native
Emilia fosbergii	Florida tassleflower	Non-Native
Emilia sonchifolia	Lilac tassleflower	Non-Native
Enterolobium contortisiliquum	Earpod tree	Non-Native
Eragrostis atrovirens	Thalia lovegrass	Non-Native
Eragrostis bahiensis	Bahia lovegrass	Non-Native
Eragrostis elliotti	Elliot's lovegrass	
Eragrostis lugens	Morning lovegrass	Non-Native
Eragrostis spectabilis	Purple lovegrass	
Erechtites hieraciifolius	American burnweed	
Eremochloa ophiuroides	Centipedegrass	Non-Native
Erigeron quercifolius	Oakleaf fleabane	
Eriocaulon compressum	Flattened pipewort	

Table 1 (Continued). List of plants on the KR MA and status.

Scientific Name	Common Name	Listing Status
Eriocaulon decangulare	Tenangle pipewort	
Eriocaulon ravenelii	Ravenel's pipewort	
Eryngium baldwinii	Baldwin's eryngo	
Eucalyptus grandis	Grand eucalyptus	Non-Native
Eupatorium capillifolium	Small dogfennel; dogfennel	
Eupatorium serotinum	Lateflowering thoroughwort	
Euthamia caroliniana	Fragrant goldenrod; slender flattop goldenrod	
Ficus aurea	Strangler fig	
Fimbristylis autumnalis	Slender fimbry	
Fimbristylis caroliniana	Carolina fimbry	
Fimbristylis dichotoma	Tall fimbry; forked fimbry	
Fimbristylis schoenoides	Ditch fimbry	Non-Native
Fraxinus caroliniana	Carolina ash; pop ash	
Fraxinus pennsylvanica	Green ash	
Fuirena breviseta	Saltmarsh umbrellasedge	
Fuirena pumila	Dwarf umbrella-grass; dwarf umbrellasedge	
Fuirena scirpoidea	Rush fuirena, southern umbrellasedge	
Funastrum clausum	White twinvine	
Galactia elliottii	Elliott's milkpea	
Galactia regularis	Eastern milkpea	
Galium bermudense	Coastal bedstraw	
Galium tinctorium	Stiff marsh bedstraw	
Gelsemium sempervirens	Carolina jessamine	
Geobalanus oblongifolius	Gopher apple	
Geranium carolinianum	Carolina cranesbill	
Gymnopogon chapmanianus	Chapman's skeletongrass	
Habenaria floribunda	Toothpetal false reinorchid; mignonette orchid	
Habenaria repens	Water-spider orchid; false reinorchid	
Helianthus agrestis	Southeastern sunflower	
Helianthus angustifolius	Swamp sunflower; narrowleaf sunflower	
Hemarthria altissima	Limpograss	Non-Native
Heterotheca subaxillaris	Camphorweed	
Hibiscus grandiflorus	Swamp rosemallow	
Hydrilla verticillata	Hydrilla; waterthyme	Non-Native
Hydrocotyle ranunculoides	Floating penny wort; floating marsh pennywort	
Hydrocotyle umbellata	Manyflower marsh pennywort	

Table 1 (Continued). List of plants on the KR MA and status.

Scientific Name	Common Name	Listing Status
Hymenachne amplexicaulis	West indian marsh grass	Non-Native
Hymenachne hemitomon	Maidencane	
Hypericum brachyphyllum	Coastalplain St. John's-wort	
Hypericum cistifolium	Roundpod St. John's-wort	
Hypericum fasciculatum	Sandweed, peelbark St. John's-wort	
Hypericum hypericoides	St. Andrew's cross	
Hypericum mutilum	Slender st. John's-wort	
Hypericum myrtifolium	Myrtleleaf St. John's-wort	
Hypericum tenuifolium	Atlantic St. John's-wort	
Hypericum tetrapetalum	Fourpetal St. John's-wort	
Hyptis alata	Clustered bushmint; musky mint	
iatris tenuifolia	Shortleaf gayfeather	
Ilex cassine	Dahoon holly; dahoon	
Ilex coriacea	Sweet gallberry; Large gallberry	
Ilex glabra	Inkberry; gallberry	
Imperata cylindrica	Cogongrass	Non-Native
Ipomoea alba	White morning glory	
Ipomoea quamoclit	Cypressvine	
Ipomoea sagittata	Saltmarsh morning glory	
Iris savannarum	Blue flag; virginia iris	
Iva microcephala	Piedmont marshelder	
Juncus effusus	Soft rush	
Juncus marginatus	Shore rush	
Juncus megacephalus	Bighead rush	
Juncus spp.	Rush	
Justicia angusta	Pineland waterwillow	
Kellochloa verrucosa	Warty panic grass	
Kosteletzkya pentacarpos	Virginia seashore mallow; virginia saltmarsh mallow	
Lachnanthes caroliana	Redroot	
Lachnocaulon anceps	Whitehead bogbutton	
Lachnocaulon beyrichianum	Southern bogbutton	
Landoltia punctata	Dotted duckweed	Non-Native
Lantana strigocamara	Lantana; shrub verbena	Non-Native
Leersia hexandra	Southern cutgrass	
Lemna sp.	Duckweed	
Lepidium virginicum	Poor man's peppergrass; virginia pepperweed	
Liatris garberi	Garber's gayfeather	
Liatris gracilis	Slender gayfeather	

Table 1 (Continued). List of plants on the KR MA and status.

Scientific Name	Common Name	Listing Status
Liatris spicata	Dense gayfeather	
Limnobium spongia	Frog's-bit; american spongeplant	
Lindernia dubia	Yellowseed false pimpernel	
Lindernia grandiflora	Savanna false pimpernel	
Liquidambar styraciflua	Sweetgum	
Lobelia feayana	Bay lobelia	
Ludwigia alternifolia	Seedbox	
Ludwigia decurrens	Primrosewillow; wingleaf primrosewillow	
Ludwigia hexapetala syn. grandiflora	Uruguay water-primrose	Non-Native
Ludwigia leptocarpa	Anglestem primrosewillow	
Ludwigia maritima	Seaside primrosewillow	
Ludwigia octovalvis	Mexican primrosewillow	
Ludwigia peruviana	Peruvian primrosewillow	Non-Native
Ludwigia repens	Red ludwigia; creeping primrosewillow	
Ludwigia suffruticosa	Shrubby seedbox	
Luziola fluitans	Southern watergrass	
Lygodium japonicum	Japanese climbing-fern	Non-Native
Lygodium microphyllum	Old world climbing fern, small leaf climbing fern	Non-Native
Lyonia ferruginea	Rusty lyonia	
Lyonia fruticosa	Coastalplain staggerbush	
Lyonia lucida	Fetterbush	
Lythrum alatum	Winged loosestrife	
Lythrum flagellare	Lowland loosestrife	SE
Macroptilium lathyroides	Wild bushbean	Non-Native
Magnolia virginiana	Sweetbay; magnolia	
Melaleuca quinquenervia	Melaleuca; punktree	Non-Native
Melia azedarach	Chinaberry tree	Non-Native
Melinis repens	Natalgrass; rose natalgrass	Non-Native
Melothria pendula	Creeping cucumber	
Micranthemum umbros	Baby tears; shade mudflower	
Mikania scandens	Climbing hempweed; climbing hempvine	
Mitchella repens	Twinberry	
Mitreola petiolata	Stalked miterwort; lax hornpod	
Momordica charantia	Wild balsam apple; balsampear	Non-Native
Morella cerifera	Wax myrtle; southern bayberry	
Myriophyllum aquaticum	Parrot feather; watermilfoil	Non-Native
Myrsine cubana	Myrsine	
Najas guadalupensis	Southern naiad; southern waternymph	

Table 1 (Continued). List of plants on the KR MA and status.

Scientific Name	Common Name	Listing Status
Nekemias arborea	Pepper vine	
Nuphar advena	Spatterdock; yellow pondlily	
Nymphaea mexicana	Yellow waterlilly	
Nymphaea odorata	Fragrant white waterlilly	
Nymphoides aquatica	Banana lilly; big floatingheart	
Nymphoides cristata	Crested floatingheart	Non-Native
Nyssa sylvatica var. biflora	Swamp black gum; swamp tupelo	
Orthochilus ecristatus	Giant orchid	ST
Osmunda spectabilis	Royal fern	
Osmundastrum cinnamomeum	Cinnamon fern	
Oxalis corniculata	Creeping woodsorrel; common yellow woodsorrel	
Oxalis debilis	Pink woodsorrel	Non-Native
Packera glabella	Butterweed	
Panicum repens	Torpedograss	Non-Native
Parietaria floridana	Florida pellitory	
Parthenocissus quinquefolia	Virginia creeper; woodbine	
Paspalidium geminatum	Egyptian paspalidum; kissimmeegrass	Non-Native
Paspalum acuminatum	Brook crowngrass	Non-Native
Paspalum conjugatum	Sour paspalum; hilograss	
Paspalum dilatatum	Dallisgrass	Non-Native
Paspalum dissectum	Mudbank paspalum; mudbank crowngrass	
Paspalum distichum	Joint paspalum; knotgrass	
Paspalum floridanum	Florida paspalum	
Paspalum laeve	Field paspalum	
Paspalum notatum	Bahiagrass	Non-Native
Paspalum pubiflorum	Hairyseed paspalum	
Paspalum repens	Water paspalum	
Paspalum setaceum	Thin paspalum	
Paspalum urvillei	Vasey grass	Non-Native
Passiflora incarnata	Purple passionflower; maypop	
Passiflora suberosa	Corkystem passionflower	
Peltandra sagittifolia	Spoonflower; white arrow arum	
Peltandra virginica	Green arrow arum	
Persea borbonia	Red bay	
Persea borbonia var. humilis	Silk bay	
Persea palustris	Swamp bay	
Persicaria glabra	Denseflower smartweed; denseflower knotweed	
Persicaria hirsuta	Hairy smartweed	
Persicaria hydropiperoides	Swamp smartweed; mild waterpepper	

Table 1 (Continued). List of plants on the KR MA and status.

Scientific Name	Common Name	Listing Status
Persicaria punctata	Knotweed, smartweed	
Phragmites australis	Common reed	Non-Native
Phyla nodiflora	Turkey tangle fogfruit; capeweed	
Physalis pubescens	Husk tomato	
Phytolacca americana	Common pokeweed; american pokeweed	
Piloblephis rigida	Wild pennyroyal	
Pinguicula lutea	Yellow butterwort	ST
Pinus elliotti var. Densa	South Florida slash pine	
Pinus palustris	Longleaf pine	
Pistia stratiotes	Water lettuce	Non-Native
Pleopeltis michauxiana	Resurrection fern	
Pluchea baccharis	Stinkweed; rosy camphorweed	
Pluchea foetida	Stinking camphorweed	
Pluchea odorata	Sweetscent	
Polygonum punctatum	Dotted smartweed	
Polypremum procumbens	Juniperleaf; rustweed	
Pontederia cordata	Pickerelweed	
Proserpinaca palustris	Marsh mermaidweed	
Psidium cattleianum	Strawberry guava	Non-Native
Psidium guajava	Common guava	Non-Native
Ptilimnium capillaceum	Mock bishopsweed; herbwilliam	
Quercus chapmanii	Chapman oak	
Quercus geminata	Sand live oak	
Quercus inopina Ashe	Scrub oak	
Quercus laurifolia	Laurel oak; diamond oak	
Quercus minima	Dwarf live oak	
Quercus myrtifolia	Myrtle oak	
Quercus nigra	Water oak	
Quercus virginiana	Live oak	
Ranunculus parviflorus	Smallflower buttercup	Non-Native
Rhexia mariana	Pale meadowbeauty; maryland meadowbeauty	
Rhexia nashii	Maid marian	
Rhus copallinum	Winged sumac	
Rhynchospora cephalantha	Bunched beaksedge	
Rhynchospora chalarocephala	Loose head beakrush	
Rhynchospora colorata	Star-rush	

Table 1 (Continued). List of plants on the KR MA and status.

Scientific Name	Common Name	Listing Status
Rhynchospora decurrens	Swampforest beaksedge	
Rhynchospora divergens	Spreading beaksedge	
Rhynchospora eximia	Florida breaksedge	
Rhynchospora fascicularis	Fasciculate beak ush	
Rhynchospora globularis	Globe beakrush	
Rhynchospora grayi	Gray's beakrush	
Rhynchospora inundata	Inundated beakrush; narrowfruit horned beaksedge	
Rhynchospora microcarpa	Southern beakrush; souther beaksedge	
Rhynchospora microcephala	Capitate beakrush; bunched beaksedge	
Rhynchospora nitens	Baldrush; shortbeak beaksedge	
Rhynchospora odorata	Fragrant beakrush; fragrant beaksedge	
Rhynchospora scirpoides	Longbeak beaksedge	
Rhynchospora tracyi	Tracy's beakrush	
Ricciocarpos natans	Liverwort; purple-fringed riccia	
Richardia scabra	Rough mexican clover	Non-Native
Ricinus communis	Castorbean	Non-Native
Rotala ramosoir	Lowland rotala	
Rubus cuneifolius	Sand blackberry	
Ruellia sp.	Wild petunia	
Sabal palmetto	Cabbage palm	
Sabatia bartramii		
Sabatia decandra	Bartram's rosegentian	
Saccharum giganteum	Sugarcane plumegrass	
Sacciolepis indica	Glenwood grass; indian cupscale	Non-Native
Sacciolepis striata	American cupscale	
Sacoila lanceolata	Leafless beaked orchid	
Sagittaria lancifolia	Duck potato; bulltongue arrowhead	
Sagittaria latifolia	Broadleaf arrowhead; common arrowhead; duck potato	
Salix caroliniana	Coastalplain willow; carolina willow	
Salvinia minima	Water fern; water spangles	Non-Native
Sambucus nigra spp.	Elderberry	
Sarcostemma clausum	White twinevine	
Saururus cernuus	Lizard's-tail	
Schinus terebinthifolius	Brazilian pepper	Non-Native
Schoenoplectus californicus	Southern bulrush; giant bulrush; california bulrush	
Schoenoplectus californicus	Giant bulrush; california bulrush	
Schoenoplectus tabernaemontani	Softstem bulrush	

Table 1 (Continued). List of plants on the KR MA and status.

Scientific Name	Common Name	Listing Status
Scleria reticularis	Netted nutrush	
Scoparia dulcis	Licoriceweed; sweetbroom	
Senecio vulgaris	Common groundsel	
Senna obtusifolia	Coffeeweed, sicklepod	
Senna occidentalis	Septicweed; coffee senna	Non-Native
Serenoa repens	Saw palmetto	
Sesbania herbacea	Danglepod	
Sesbania punicea	Spanish gold; rattlebox	Non-Native
Sesbania vesicaria	Bagpod ratlle bush; bladderpod	
Setaria geniculata	Bristlegrass	
Setaria magna	Giant foxtail; giant bristlegrass	
Setaria parviflora	Knotroot foxtail; Yellow bristlegrass	
Sida cordifolia	Lima	Non-Native
Sida elliottii	Elliott's fanpetals	
Sida rhombifolia	Arrow leaf sida; cuban jute; indian hemp	
Sida ulmifolia	Sida; common wireweed; common fanpetals	
Sisyrinchium angustifolium	Blue-eyed grass; narrowleaf blue-eyed grass	
Smilax auriculata	Wild bamboo	
Smilax bona-nox	Saw greenbrier	
Smilax laurifolia	Laurel greenbrier; bamboo vine	
Smilax rotundifolia	Common greenbrier; bullbrier; roundleaf greenbrier	
Smilax walteri	Coral greenbrier	
Solanum americanum	American black nightshade	
Solanum capsicoides	Soda apple, cockroach- berry	Non-Native
Solanum diphyllum	Twoleaf nightshade	Non-Native
Solanum jamaicense	Jamaican nightshade	Non-Native
Solanum tampicense	Aquatic soda apple	Non-Native
Solanum viarum	Tropical soda apple	Non-Native
Solidago fistulosa	Pinebarren goldenrod	
Solidago tortifolia	Twistedleaf goldenrod	
Sophronanthe hispida	Scrub hyssop, rough hedge hyssop	
Sorghastrum secundum	Lopsided indiangrass	
Spartina bakeri	Sand cord grass	
Sphagnum spp.	Sphagnum moss	
Sphenoclea zeylanica	Chickenspike	Non-Native

Table 1 (Continued). List of plants on the KR MA and status.

Scientific Name	Common Name	Listing Status
Spiranthes longilabris	Giantspiral ladiestresses	ST
Spiranthes vernalis	Spring ladiestresses	
Sporobolus indicus	Smutgrass	Non-Native
Steinchisma hians	Gaping panic grass	
Stillingia aquatica	Corkwood; water toothleaf	
Stillingia sylvatica	Queen's delight	
Suriana maritima	Bay cedar	
Symphyotrichum carolinianum	Climbing aster	
Symphyotrichum dumosum	Rice button aster	
Symphyotrichum elliotti	Elliott's aster	
Taxodium ascendens	Pond cypress	
Taxodium distichum	Bald-cypress	
Telmatoblechnum serrulatum	Swamp fern; toothed midsorus fern	
Teucrium canadense	American germander; woodsage; canadian germander	
Thalia geniculata	Fireflag; alligatorflag	
Thelypteris dentata	Downy maiden fern; downy shield fern	
Thelypteris interrupta	Willdenows maiden fern; willdenow's fern; downy maiden fern	
Thelypteris kunthii	Widespread maiden fern; souther maiden fern	
Thelypteris palustris var. pubescens	Marsh fern	
Thelypteris spp.	Maidenferns	
Tillandsia balbisiana	Bulbous wild pine; northern needleleaf	ST
Tillandsia fasciculata	Cardinal airplant; stiff-leaved wild pine	SE
Tillandsia usneoides	Spanigh moss	
Tillandsia utriculata	Giant wild pine	SE
Toxicodendron radicans	Poison ivy	
Triadenum virginicum	Marsh st. John's wort	
Triadica sebifera	Chinese tallow	Non-Native
Trifolium repens	White clover	Non-Native
Triumfetta semitriloba	Burweed; sacramento burrbark	Non-Native
Typha domingensis	Southern cattail	
Typha latifolia	Broadleaf cattail	
Urena lobata	Caesarweed	Non-Native
Urochloa distachyos	Tropical signalgrass	Non-Native
Urochloa maxima syn. Megathyrsus	Guineagrass	Non-Native
Urochloa mutica	Paragrass	Non-Native
Urtica chamaedryoides	Heartleaf nettle	

Table 1 (Continued). List of plants on the KR MA and status.

Scientific Name	Common Name	Listing Status
Utricularia spp.	Bladderwort	
Vaccinium corybossum	Highbrush blueberry	
Vaccinium myrsinites	Shiny blueberry	
Vallisneria americana	Tapegrass	
Verbena scabra	Sandpaper vervain; harsh vervain	
Vicia acutifolia	Fourleaf vetch	
Vigna luteola	Cowpea; hairypod cowpea	
Vigna speciosa	Wandering cowpea	Non-Native
Viola lanceolata	Bog white violet	
Viola palmata	*Early blue violet*	
Viola primulifolia	Primroseleaf violet	
Viola sororia	Common blue violet	
Vitis aestivalis	Summer grape	
Vitis munsoniana	Wild grape	
Vitis rotundifolia	Muscadine grape	
Vittaria lineata	Shoestring fern	
Wolffiella gladiata	Sword bogmat; florida mudmidget	
Woodwardia areolata	Netted chain fern	
Woodwardia spp.	Chain fern	
Woodwardia virginica	Virginia chain fern	
Ximenia americana	Hog plum	
Xyris ambigua	Coastalplain yelloweyed grass	
Xyris brevifolia	Shortleaf yelloweyed grass	
Xyris calcicola	Limestone yelloweyed grass	
Xyris caroliniana	Carolina yelloweyed grass	
Xyris difformis var. floridana	Florida yelloweyed grass	
Xyris elliotti	Elliott's yellow-eyed grass	
Xyris fimbriata	Fringed yelloweyed grass	
Xyris flabelliformis	Savannah yelloweyed grass	
Xyris jupicae	Richard's yellow-eyed grasses	
Xyris jupicai	Richard's yelloweyed grass	
Xyris platylepis	Tall yelloweyed grass	
Xyris smalliana	Small's yelloweyed grass	
Yucca filamentosa	Adam's needle	

a. Key to abbreviations: Species listed by the State of Florida State-designated Threatened (ST) and State-designated Endangered (SE).

Table 2. List of birds utilizing the KR MA and status.[a, 1]

Scientific Name	Common Name	Listing Status	Presence
Empidonax virescens	Acadian Flycatcher		◆
Anhinga anhinga	American Anhinga		♋
Botaurus lentiginosus	American Bittern		♋
Corvus brachyrhynchos	American Crow		♋
Carduelis tristis	American Goldfinch		♋
Falco sparverius	American Kestrel		♋
Anthus rubescens	American Pipit		◆
Setophaga ruticilla	American Redstart		♋
Turdus migratorius	American Robin		♋
Mareca americana	American Wigeon		◆
Scolopax minor	American Woodcock		♋
Aimophila aestivalis	Bachman's Sparrow		♋
Haliaeetus leucocephalus	Bald Eagle		♋
Riparia riparia	Bank Swallow		◆
Tyto alba	Barn Owl		♋
Hirundo rustica	Barn Swallow		♋
Strix varia	Barred Owl		♋
Ceryle alcyon	Belted Kingfisher		♋
Anas rubripes	Black Duck		◆
Coragyps atratus	Black Vulture		♋
Mniotilta varia	Black-and-white Warbler		♋
Dendrocygna autumnalis	black-bellied Whistling duck		♋
Coccyzus erythropthalumus	Black-billed Cuckoo		◆
Nycticorax nycticorax	Black-crowned Night heron		♋
Himantopus mexicanus	Black-necked Stilt		♋
Setophaga striata	Blackpoll Warbler		♋
Dendroica caerulescens	Black-throated Blue Warbler		♋
Setophaga virens	Black-throated Green Warbler		♋
Vireo altiloquus	Black-whiskered Vireo		◆
Guiraca caerulea	Blue Grosbeak		◆
Cyanocitta cristata	Blue Jay		♋
Polioptila caerulea	Blue-gray Gnatcatcher		♋
Vireo solitarius	Blue-headed Vireo		♋
Spatula discors	Blue-winged teal		♋
Quiscalus major	Boat-tailed Grackle		♋
Dolichronyx oryzivorus	Bobolink		♋
Colinus virginianus	Bobwhite Quail		♋
Euphagus cyanocephalus	Brewer's Blackbird		♋
Pelecanus occidentalis	Brown Pelican		◆
Toxostoma rufum	Brown Thrasher		♋
Molothrus ater	Brown-headed Cowbird		♋

Table 2 (Continued). List of birds utilizing the KR MA and status.

Scientific Name	Common Name	Listing Status	Presence
Athene cunicularia floridana	Burrowing Owl		♋
Aythya varisineria	Canvasback		◆
Thryothorus ludovicianus	Carolina Wren		♋
Bombycilla cedrorum	Cedar Waxwing		♋
Chaetura pelagica	Chimney Swift		♋
Spizella passerina	Chipping Sparrow		♋
Petrochelidon pyrrhonota	Cliff Swallow		◆
Gallinula galeata	Common Gallinule		♋
Quiscalus quiscula	Common Grackle		♋
Columbina passerina	Common Ground Dove		♋
Gavia immer	Common Loon		◆
Chordeiles minor	Common Nighthawk		♋
Sterna hirundo	Common Tern	FT	◆
Geothlypis trichas	Common Yellowthroat		♋
Oporonis agilis	Connecticut Warbler		◆
Accipiter cooperii	Cooper's Hawk		♋
Caracara plancus	Crested caracara		♋
Nannopterum auritum	Double-crested Cormorant		♋
Picoides pubescens	Downy Woodpecker		♋
Laterallus jamaicensis jamaicensis	Eastern Black Rail	FT	◆
Sialia sialis	Eastern Bluebird		♋
Sturnella magna	Eastern Meadowlark		♋
Sayornis phoebe	Eastern Phoebe		♋
Megascops asio	Eastern Screech-owl		♋
Pipilo erythrophthalmus	Eastern Towhee		♋
Caprimulgus vociferus	Eastern Whip-poor-will		♋
Contopus virens	Eastern Wood-pewee		♋
Streptopelia decaocto	Eurasian collared-Dove		♋
Sturnus vulgaris	European Starling		♋
Sturnus vulgaris	European Starling		♋
Rostrhamus sociabilis plumbeus	Everglade Snail Kite	FE	♋
Corvus ossifragus	Fish Crow		♋
Ammodramus savannarum floridanus	Florida Grasshopper Sparrow	FE	♋
Antigone canadensis pratensis	Florida Sandhill Crane	ST	♋
Plegadis falcinellus	Glossy Ibis		♋
Ammodramus savannarum	Grasshopper Sparrow		♋
Dumetella carolinensis	Gray Catbird		♋
Ardrea herodias	Great Blue Heron		◆
Myiarchus crinitus	Great Crested Flycatcher		♋
Ardea alba	Great Egret		♋
Bubo virginianus	Great Horned Owl		♋
Tringa melamoleuca	Greater Yellowlegs		♋

Table 2 (Continued). List of birds utilizing the KR MA and status.

Scientific Name	Common Name	Listing Status	Presence
Butorides virescens	Green Heron		♋
Anas crecca	Green-winged Teal		♋
Picoides villosus	Hairy Woodpecker		♋
Numida meleagris	Helmeted Guineafowl		♋
Ammodramus henslowii	Henslow's Sparrow		◆
Catharus guttatus	Hermit Thrush		♋
Lophodytes cullulatus	Hooded merganser		♋
Wilsonia citrina	Hooded Warbler		◆
Passer domesticus	House Sparrow		♋
Troglodytes aedon	House Wren		♋
Pavo cristatus	Indian Peafowl		♋
Passerina cyanea	Indigo Bunting		♋
Oporonis formosus	Kentucky Warbler		◆
Charadrius vociferus	Killdeer		♋
Rallus elegans	King Rail		◆
Ammodramus leconteii	Le Conte's Sparrow		◆
Ixobrychus exilis	Least Bittern		♋
Calidris minutilla	Least Sandpiper		♋
Tringa flavipes	Lesser Yellowlegs		♋
Aramus guarauna	Limpkin		◆
Egretta caerulea	Little blue heron	ST	♋
Lanius judovicianus	Loggerhead Shrike		♋
Limnodromus scolopaceus	Long-billed Dowitcher		♋
Parkesia motacilla	Louisiana Waterthrush		♋
Cistothorus palustris	Marsh Wren		♋
Falco columbarius	Merlin		♋
Anas fulvigula	Mottled Duck		♋
Zenaida macroua	Mourning Dove		♋
Stelgidopteryx serpennis	N. Rough-winged Swallow		◆
Colinus virginianus	Northern Bobwhite Quail		♋
Cardinalis cardinalis	Northern Cardinal		♋
Colaptes auratus	Northern Flicker		♋
Circus cyaneus	Northern Harrier		♋
Mimus polyglottos	Northern Mockingbird		♋
Baltimore Oriole	Northern Oriole		◆
Parula americana	Northern Parula Warbler		♋
Anas acuta	Northern Pintail		◆
Spatula clypeata	Northern shoveler		♋
Parkesia noveboracensis	Northern Waterthrush		♋
Leiothlypis celata	Orange-crowned Warbler		♋
Pandion haliaetus	Osprey		♋
Seiurus aurocapilla	Ovenbird		♋

Table 2 (Continued). List of birds utilizing the KR MA and status.

Scientific Name	Common Name	Listing Status	Presence
Passerina ciris	Painted Bunting		♋
Setophaga plamarum	Palm Warbler		♋
Calidris melanotos	Pectoral Sandpiper		♋
Falco peregrinus	Peregrine Falcon		♋
Podilymbus podiceps	Pied-billed Grebe		♋
Dryocopus pileatus	Pileated Woodpecker		♋
Setophaga pinus	Pine Warbler		♋
Setophaga discolor	Prairie Warbler		♋
Protonotaria citrea	Prothonotary Warbler		◆
Porphyrio martinica	Purple Gallinule		♋
Progne subis	Purple Martin		♋
Gallus gallus	Red Junglefowl		♋
Melanerpes carolinus	Red-bellied Woodpecker		♋
Mergus serrator	Red-breasted Merganser		◆
Picoides borealis	Red-cockaded Woodpecker	FT	♋
Vireo olivaceus	Red-eyed Vireo		♋
Melanerpes erythrocephalus	Red-headed Woodpecker		♋
Buteo lineatus	Red-shouldered Hawk		♋
Buteo jamaicensis	Red-tailed Hawk		♋
Agelaius phoeniceus	Red-winged Blackbird	ST	♋
Larus delawarensis	Ring-billed Gull		♋
Columba livia	Rock Pigeon		♋
Platalea ajaja	Roseate spoonbill	ST	♋
Corthylio calendula	Ruby-crowned Kinglet		♋
Archilochus colubris	Ruby-throated Hummingbird		◆
Passerculus sandwichensis	Savannah Sparrow		♋
Tyrannus forficatus	Scissor-tailed Flycatcher		◆
Aphelocoma coerulescens	Scrub Jay		♋
Cistothorus platensis	Sedge Wren		♋
Accipiter striatus	Sharp-shinned Hawk		♋
Asio flammeus	Short-eared Owl		◆
Buteo brachyurus	Short-tailed Hawk		♋
Crotophaga ani	Smooth-billed Ani		◆
Egetta thula	Snowy Egret		♋
Tringa solitaria	Solitary Sandpiper		♋
Melospiza melodia	Song Sparrow		◆
Porzana carolina	Sora		♋
Falco sparverius paulus	Southeastern American Kestrel		♋
Actitis macularius	Spotted Sandpiper		♋
Piranga rubra	Summer Tanager		♋
Elanoides forficatus	Swallow-tailed Kite		♋
Melospiza georgiana	Swamp Sparrow		♋

Table 2 (Continued). List of birds utilizing the KR MA and status.

Scientific Name	Common Name	Listing Status	Presence
Leiothlypis peregrina	Tennessee Warbler		♋
Tachycineta bicolor	Tree Swallow		♋
Egretta tricolor	Tricolored heron	ST	♋
Baeolophus bicolor	Tufted Titmouse		♋
Cathartes aura	Turkey Vulture		♋
Rallus limicola	Virginia Rail		♋
Ardea ibis	Western Cattle Egret		♋
Eodcimus albus	White Ibis		♋
Accipiter striatus	White Pelican		♋
Vireo griseus	White-eyed Vireo		♋
Elanus caeruleus	White-tailed Kite		♋
Zonotrichia albicollis	White-throated Sparrow		♋
Zenaida asiatica	White-winged Dove		♋
Meleagris gallopavo	Wild Turkey		♋
Gallinago delicata	Wilson's Snipe		♋
Aix sponsa	Wood Duck		♋
Mycteria americana	Wood stork	FT	♋
Sphyrapicus varius	Yellow-bellied Sapsucker		♋
Coccyzus americanus	Yellow-billed Cuckoo		♋
Nyctanassa violacea	Yellow-crowned Night-heron		♋
Setophaga coronata	Yellow-rumped Warbler		♋
Vireo flavifrons	Yellow-throated Vireo		♋
Setophaga dominica	Yellow-throated Warbler	ST	◆

a. Key to abbreviations: Species listed as Federally-designated Endangered (FE) and Federally-designated Threatened (FT).

1. Key to abbreviations: ◆ = Potential and ♋ = Confirmed

Table 3. List of reptiles and amphibians on the KR MA and status.[a]

Scientific Name	Common Name	Listing Status	Presence
SNAKES			
Agkistrodon piscivorus conanti	Florida Cottonmouth		♋
Cemophora coccinea coccinea	Florida Scarlet		♋
Coluber constrictor priapus	Southern Black Racer		♋
Crotalus adamanteus	Eastern Diamondback rattlesnake		♋
Diadophis punctatus	Southern Ringneck		◆
Drymarchon corais couperi	Eastern Indigo snake	FT	♋
Farancia abacura abacura	Eastern Mudsnake		♋
Farancia erytrogramma seminola	Southern Florida Rainbow	endemic	◆
Heterodon platyrhinos	Eastern Hognose snake		◆
Lampropeltis calligaster occipitolineata	South Florida Mole Kingsnake		♋
Lampropeltis extenuate	Short-tailed Snake	ST	◆
Lampropeltis getulus	Common Kingsnake snake		♋
Lampropeltis triangulum elapsoides	Scarlet Kingsnake		◆
Liodytes alleni	striped swampsnake		♋
Masticophis flagellum flagellum	Eastern Coachwhip		◆
Micrurus fulvius fulvius	Eastern Coral snake		♋
Nerodia cyclopion floridana	Florida Green Watersnake		♋
Nerodia fasciata pictiventris	Florida Watersnake		♋
Nerodia taxispilota	Brown Watersnake		♋
Opheodrys aestivus	Rough Green snake		♋
Pantherophis guttata guttata	Corn snake		♋
Pantherophis quadrivittatus	Eastern Rat snale		♋
Pituophis melanoleucus mugitus	Florida Pine Snake		♋
Rhadinaea flavilata	Pine woods snake		◆

Table 3 (Continued). List of reptiles and amphibians on the KR MA and status.

Scientific Name	Common Name	Listing Status	Presence
Sistrurus miliarius barbouri	Dusty Pygmy rattlesnake		♋
Storeria victa	Florida Brown Snake		◆
Tantilla relicta relicta	Florida Crown Snake		◆
Thamnophis sauritus sackenii	Peninsula Ribbon snake		♋
Thamnophis siralis	Common Garter snake		♋
LIZARDS			
Anolis carolinensis	Green Anole		♋
Anolis sagrei sagrei	Brown Anole		♋
Eumeces inexpectatus	Southeastern Five-lined Skink		♋
Neoseps reynoldsi	Sand skink	FE	◆
Ophisaurus ventralis	Eastern Glass Lizard		♋
Plestiodon egregius lividus	Bluetailed Mole Skink	FT	◆
Sceloporus undulatus undulatus	Southern Fence Lizard		◆
Sceloporus woodi	Florida scrub lizard		◆
Scincella lateralis	Ground Skink		♋
FROGS & TOADS			
Acris gryllus dorsalis	Florida Cricket Frog		♋
Bufo quercicus	Oak Toad		♋
Bufo terrestris	Southern Toad		♋
Dryophytes femoralis	Pinewoods Treefrog		♋
Gastrophryne carolinensis carolinensis	Eastern Narrow-mouthed Toad		♋
Hyla cinerea	Green Treefrog		♋
Hyla gratiosa	Barking Treefrog		♋

Table 3 (Continued). List of reptiles and amphibians on the KR MA and status.

Scientific Name	Common Name	Listing Status	Presence
Hyla squirella	Squirrel Treefrog		♋
Limaoedus ocularis	Little Grass Frog		♋
Osteopilus septentrionalis	Cuban Treefrog		♋
Pseudacris nigrita verrucosa	Southern Chorus Frog		♋
Rana areolata aesopus	Florida Gopher Frog		♋
Rana catesbeiana	Bullfrog		♋
Rana grilio	Pig frog		♋
Rana sphenocephala	Southern Leopard Frog		♋
Scaphiopus holbrooki	Eastern Spadefoot		◆
SALAMANDERS			
Amphiuma means	Two-toed Amphium		♋
Eurycea quadridigitata	Southeastern Dwarf Salamander		♋
Notophthalmas viridescens piaropicola	Peninsula Newt		♋
Pseudobranchus striatus axanthus	Narrow-striped Dwarf Siren		◆
Pseudobranchus striatus belli	Everglades Dwarf Siren		◆
Siren intermedia intermedia	Eastern Lesser Siren		♋
Siren lacertina	Greater Siren		♋
TURTLES			
Apalone ferox	Florida Softshell		♋
Chelydra serpentina osceola	Florida Snapping		♋
Deirochelys reticularia chrysea	Florida Chicken		♋

Table 3 (Continued). List of reptiles and amphibians on the KR MA and status.

Scientific Name	Common Name	Listing Status	Presence
Gorpherus polyphemus	Gopher Tortoise	ST	♋
Kinosternon baurii	Striped Mud		♋
Kinosternon subrubrum steindachneri	Florida Mud		◆
Pseudemys floridana peninsularis	Peninsula Cooter		♋
Pseudemys nelsoni	Florida Redbelly		♋
Sternotherus odoratus	Common Musk		◆
Terrapene carolina bauri	Florida Box		♋
CROCODYLIA			
Alligator mississippiensis	American Alligator	FT(S/A)	♋

a. Key to abbreviations: Species listed as Federally-designated Threatened because of similarity of appearance [FT(S/A)] and FXN Federally-designated Threatened Nonessential Experimental Population.

Table 4. List of mammals utilizing the KR MA and status.

Scientific Name	Common Name	Listing Status	Presence
Blarina carolinensis	Short-tailed Shrew		♋
Canis latrans	Coyote		◆
Cryptotis parva	Least Shrew		♋
Dasypus novemcinctus	Nine-banded Armadillo		♋
Didelphis marsupialis	Opposum		♋
Eptesicus fuscus fuscus	Big Brown Bat		♋
Eumops floridanus	Florida Bonneted bat	FE	♋
Felis concolor coryi	Florida Panther	FE	♋
Geomys pinetis	Southeastern Pocket Gopher		◆
Glaucomys volans	Southern Flying Squirrel		◆
Lasiurus cinereus	Hoary Bat		◆
Lasiurus intermedius floridanus	Northern Yellow Bat		◆
Lasiurus seminolus	Seminole Bat		◆
Lontra canadensis	River Otter		♋
Lynx rufus	Bobcat		♋

Table 4 (Continued). List of mammals utilizing the KR MA and status.

Scientific Name	Common Name	Listing Status	Presence
Mephitis mephitis	Striped Skunk		♋
Mustela frenata	Long-tailed Weasel		◆
Mustela frenata peninsulae	Florida long-tailed Weasel		◆
Myotis austroriparius	Southeastern Brown Bat		◆
Neofiber alleni	Round-tailed muskrat		♋
Neotoma floridana	Eastern Woodrat		♋
Nycticeius humeralis	Evening Bat		◆
Odocoileus virginianus	Whitetail Deer		♋
Oryzomys palustris	Rice Rat		♋
Peromyscus gossypinus	Cotton Mouse		♋
Pipistrellus subflavus	Eastern Pipistrel		◆
Plecotus rafinesquii	Southeastern Big-eared Bat		◆
Podomys floridanus	Florida Mouse		◆
Procyon lotor	Raccoon		♋
Scalopus aquaticus	Eastern Mole		♋
Sciurus carolinensis	Eastern Gray Squirrel		♋
Sciurus niger niger	Southern Fox Squirrel		♋
Sigmodon hispidus	Hispid Cotton Rat		♋
Spilogale putorius	Spotted Skunk		♋
Sus scrofa	Feral Hog		♋
Sylvilagus floridanus	Eastern Cottontail rabbit		♋
Sylvilagus palustris	Marsh Rabbit		♋
Tadarida brasiliensis cynocephala	Brazilian Free-tailed Bat		◆
Trichechus manatus latirostris	Florida Manatee	FT	♋
Urocyon cinereoargenteus	Gray Fox		♋
Ursus americanus floridanus	Florida Black Bear		◆
Vulpes vulpes fulvus	Red Fox		◆

Table 5. List of invertebrates on the KR MA and status.

Family	Genus
AMPHIPODA - Shrimps	
Hyalellidae	*Hyalella*
COLEOPTERA - Beetles	
Gyrinidae	*Dineutus*
Haliplidae	*Peltodytes*
Hydrophilidae	*Berosus*
DIPTERA - Flies	
Ceratopogonidae	*Bezzia*
Ceratopogonidae	*Forcipomyia*
Chironomidae	*Rheotanytarsus*
Chironomidae	*Tribelos*
Chironomidae	*Dicrotendipes*
Chironomidae	*Nanocladius*
Chironomidae	*Polypedilum*
Chironomidae	*Stenochironomus*
Chironomidae	*Tanypodinae*
Chironomidae	*Chironomus*
Chironomidae	*Goeldichironomus*
Chironomidae	*Cricotopus*
Chironomidae	*Glyptotendipes*
Chironomidae	*Tanytarsini*
Chironomidae	*Parachironomus*
Chironomidae	*Tanytarsus*
Chironomidae	*Kiefferulus*
Chironomidae	*Endochironomus*
Chironomidae	*Corynoneura*
Chironomidae	*Thienemanniella*
Chironomidae	*Trebelos*
EPHEMEROPTERA - Mayflies	
Baetidae	*Baetis*
Baetidae	*Callibaetis*
Caenidae	*Caenis*
GASTROPODA - Snails, Slugs	
Corbiculidae	*Corbicula*
Physidae	*Physella*
Planorbidae	*Planorbella*
Sphaeriidae	
LEPIDOPTERA - Butterflies, Moths, Skippers	
Pyralidae	
TRICHOPTERA - Caddisflies	
Hydropsychidae	*Cheumatopsyche*
Hydroptilidae	*Orthotrichia*

Table 5 (Continued). List of invertebrates on the KR MA and status.

Family	Genus
Hydroptilidae	*Hydroptila*
Hydroptilidae	*Oecetis*
Hydroptilidae	*Oxythira*
Polycentropodidae	*Cyrnellus*

Table 6. List of fish species frequently observed and captured in Kissimmee River surveys.

Species Name	Common Name	Listing Status
Ameiurus catus	White Catfish	
Ameiurus natalis	Yellow Bullhead	
Ameiurus nebulosus	Brown Bullhead	
Amia calva	Bowfin	
Cichlasoma urophthalmus	Mayan Cichlid	Non-native
Clarias batrachus	Walking Catfish	Non-native
Dorosoma cepedianum	Gizzard Shad	
Dorosoma petenense	Threadfin Shad	
Elassoma gilberti	Pigmy Sunfish	
Erimyzon sucetta	Lake Chubsucker	
Esox niger	Chain Pickerel	
Etheostoma fusiforme	Swamp Darter	
Fundulus chrysotus	Golden Topminnow	
Fundulus seminolis	Seminole killifish	
Gambusia spp.	Mosquitofish	
Hemichromis letourneuxi	African jewelfish	Non-native
Heterandria formosa	Least Killifish	
Hoplosternum littorale	Brown Hoplo	Non-native
Ictalurus punctatus	Channel Catfish	
Jordanella floridae	Flagfish	
Labidesthes sicculus	Brook Silverside	
Lepisosteus osseus	Longnose Gar	
Lepisosteus platyrhincus	Florida Gar	
Lepomis auritus	Redbreast Sunfish	
Lepomis gulosus	Warmouth	
Lepomis macrochirus	Bluegill Sunfish	
Lepomis microlophus	Redear Sunfish	
Lepomis punctatus	Spotted Sunfish	
Micropterus salmoides	Largemouth Bass	
Notemigonus crysoleucas	Golden Shiner	

Table 6 (Continued). List of fish species frequently observed and captured in Kissimmee River surveys

Species Name	Common Name	Listing Status
Notropis maculatus	Taillight Shiner	
Oreochromis aureus	Blue Tilapia	Non-native
Poecilia latipinna	Sailfin Molly	
Pomoxis nigromaculatus	Black Crappie	
Pterygoplichthys multiradiatus	Sailfin Catfish	Non-native

Florida Fish and Wildlife Conservation Commission

myfwc.com

South Florida Water Management District

sfwmd.gov

Kissimmee River

Public Use Area

Regulations Summary and Area Map
July 01, 2025 - June 30, 2026

2025-2026 Hunting Season

This brochure is designed to provide the public with information and a summary of regulations pertaining to hunting and other recreational use on the Kissimmee River Public Use Area. **Regulations that are new or differ substantially from last year are shown in bold print.** Area users should familiarize themselves with all regulations. For exact wording of the wildlife laws and regulations, see the Florida Fish and Wildlife Conservation Commission's wildlife code, on file with the Secretary of State and state libraries. This brochure, the Florida Hunting Regulations handbook, and quota permit worksheets should provide the information necessary for you to plan your hunting activities. These publications are available at MyFWC.com.

Persons using the public use area are required to have appropriate licenses, permits and stamps. The following persons are exempt from all license and permit requirements (except for quota permits when listed as "no exemptions," recreational use permits, antlerless deer permits; the Migratory Bird Hunting and Conservation Stamp [federal duck stamp], and **WMA deer-dog hunting permit**, if applicable): Florida residents who are 65 years of age or older; residents who possess a Florida Resident Disabled Person Hunting and Fishing Certificate; residents in the U.S. Armed Forces, not stationed in Florida, while home on leave for 30 days or less, upon submission of orders; and children under 16 years of age. Children under 16 years of age are exempt from the federal duck stamp. Anyone born on or after June 1, 1975 and 16 years of age or older must have passed a Commission-approved hunter-safety course prior to being issued a hunting license, except the Hunter Safety Mentoring exemption allows anyone to purchase a hunting license and hunt under the supervision of a licensed hunter, 21 years of age or older.

Youth and mentor license holders are required to be accompanied by a supervisor during any hunt. A youth hunter (less than 16 years of age) must be supervised by a person at least 18 years of age. A mentor license holder must be supervised by a licensed hunter at least 21 years of age. Unless exempt, only those supervisors with proper licenses and permits may hunt.

Licenses and permits may be purchased from county tax collectors, license agents, by telephone at 888-486-8356 or at GoOutdoorsFlorida.com. A no-cost Migratory Bird Permit is available when purchasing a hunting license. Any waterfowl hunter 16 years of age or older must possess a federal duck stamp.

Quota Permit Information:
Quota permits are not required for this area.

General Area Regulations:
All general laws and regulations relating to wildlife and fish shall apply unless specifically exempted for this area. Hunting or the taking of wildlife or fish on this area shall be allowed only during the open seasons and in accordance with the following regulations:
1. Any person hunting deer or accompanying another person hunting deer shall wear at least 500 square inches of daylight fluorescent-orange material as an outer garment, above the waistline. These provisions are not required when hunting with a bow and arrow during archery season.
2. Taking of spotted fawn, swimming deer or roosted turkey is prohibited.
3. It is illegal to hunt over bait or place any bait or other food for wildlife on this area.
4. Driving a metal object into any tree, or hunting from a tree into which a metal object has been driven, is prohibited.
5. No person shall cut, damage or remove any natural, man-made or cultural resource without written authorization of the landowner or primary land manager.
6. Taking or attempting to take any game with the aid of live decoys, recorded game calls or sounds, set guns, artificial light, net, trap, snare, drug or poison is prohibited. Recorded calls and sounds can be used to hunt furbearers, wild hog and crows.
7. The wanton and willful waste of wildlife is prohibited.
8. Hunting, fishing or trapping is prohibited on any portion of the area posted as closed to those activities.
9. Taking or herding wildlife from any motorized vehicle, aircraft or boat which is under power is prohibited, until power and movement from that power, has ceased.
10. Most game may be hunted from ½ hour before sunrise until ½ hour after sunset (see exceptions under each season).
11. The release of any animal is prohibited, except by permit from FWC or written authorization from the landowner or primary land manager.
12. The skull plate with any attached antler, if applicable, shall remain with any harvested deer. The head and beard, if applicable, shall remain with any harvested turkey. See the Florida Hunting Regulations handbook for details.
13. The planting or introduction of any non-native plant is prohibited, without written authorization of the landowner or primary land manager.
14. Wild hog may not be transported alive.
15. A hunting license is not required to hunt wild hog.
16. Littering is prohibited.
17. It is unlawful to set fire to any forest, grass or woodlands.
18. A Law Enforcement Officer may search any camp, vehicle or boat, in accordance with law.

19. Falconers may hunt during the statewide falconry season anytime this area is open for public access, except rabbit may be hunted only when squirrel hunting is allowed and crow hunting is allowed during the first phase of crow season only.
20. Wild hogs are considered wildlife and may only be hunted from ½ hour before sunrise until ½ hour after sunset and only with those methods of take allowed for taking game mammals during each open season.
21. An annual hunting license is required for nonresidents to hunt wild turkey.

Public Access and Vehicles:
1. Open to public access year round.
2. Persons must enter and exit the area from the Florida National Scenic Trail, the Kissimmee River, the Istokpoga Canal, the C-38 Canal, the C-41 Canal and at designated entry points.
3. Camping, vehicle authorization, gate combinations, and horses require a Special Use License (SUL) from South Florida Water Management District (SFWMD). To apply and receive an SUL by email, visit www.SFWMD.gov/sul. To receive an SUL by US Mail, contact SFWMD at 1-800-432-2045 (allow 7-10 business days). All vehicles used under an SUL must have the SUL reference number displayed on the driver's side of the dashboard.
4. The use of airboats is prohibited in those areas posted as closed to airboat use.
5. The use of tracked vehicles, swamp buggies, all-terrain vehicles and other types of off-road vehicles is prohibited.
6. A marked footpath called the Florida Trail traverses the area. This trail is open to hikers throughout the year.
7. Class 1 electric bicycles may be operated according to rules for traditional, non-motorized bicycles. All other electric bicycles may be operated only on named or numbered roads open to motorized vehicles. For more information visit MyFWC.com/ebike.

Personal Property:
1. Erecting or maintaining treestands or elevated shooting platforms more than 10 days before or more than 10 days after any authorized hunting season is prohibited.
2. The FWC is not responsible for protection of personal property and will not be liable for theft of or damage to personal property.

Hunters and Harvest Reporting:
1. Hunters must log each harvested deer or turkey prior to moving it from the point of recovery and report any deer or turkey they harvest within 24 hours of recovery. See Florida Hunting Regulations handbook or MyFWC.com for deer and turkey harvest reporting instructions.
2. Zone A is that portion of the area South of State Road 70 and Zone C is that portion of the area north of State Road 70.
3. Harvesting wildlife with any gun, crossbow or bow is prohibited in the northern portion of Bluff Hammock (see map).
4. Hunting is prohibited outside of the Kissimmee River Channel, the C-38 Canal and the Istokpoga Canal except from the beginning of rail season through the end of the spring turkey season.
5. Hunting is prohibited within 300 yards of any active construction site.

Guns:
1. Hunting with centerfire rifles is prohibited.
2. In the Starvation Slough Hunt Area, hunting is allowed only with the following guns: only bows may be used during archery, crossbow and general gun seasons; only muzzleloading guns may be used during muzzleloading gun season; only bows and muzzleloading guns may be used during small game season (after the close of general gun season) and only bows and muzzleloading shotguns may be used during spring turkey season.
3. Hunting at night with a gun is prohibited (see furbearer season for exceptions).
4. Muzzleloading guns used for taking deer must be .30 caliber or larger, if firing a single bullet, or be 20 gauge or larger if firing 2 or more balls.
5. Hunting deer with rimfire or non-expanding, full metal jacket (military ball) ammunition is prohibited.
6. Hunting wildlife (other than migratory birds) with air guns. See Florida Hunting Regulations handbook for details. Hunting with air guns is prohibited in the Starvation Slough Hunt Area.
7. Hunting deer with air guns is prohibited, except pre-charge pneumatic (PCP) air guns propelling a bolt, arrow or bullet .30 caliber or larger.
8. Hunting turkey with air guns is prohibited, except PCP air guns propelling a bolt or arrow. During general gun season, PCP air guns propelling a bullet .20 caliber or larger may also be used for hunting turkey.
9. Children under the age of 16 hunting with a firearm or air gun must be in the presence of a supervising adult.
10. No person shall discharge a firearm or have a loaded firearm in hand while under the influence of alcohol or drugs.
11. For hunting non-migratory game, only shotguns, rifles (rimfire only), pistols, air guns, muzzleloading guns, bows, crossbows, **airbows** or falconry may be used.
12. For hunting migratory game, only centerfire and muzzleloading shotguns, bows, crossbows, **airbows** or falconry may be used. Shotguns shall not be larger than 10 gauge and shall be incapable of holding more than 3 shells in the magazine and chamber combined.
13. Hunting with full-automatic firearms, explosive or drug-injecting devices and set guns is prohibited.
14. The discharge of a firearm outside of periods open to hunting or in areas closed to hunting is prohibited per s. 790.15 FS.

Dogs:
1. Hunting deer with dogs is allowed during general gun season.
2. Hunting wild hog with dogs is allowed during general gun, wild-hog dog and small game seasons only.
3. Hunting with dogs is prohibited in the Starvation Slough Hunt Area before January **19**.
4. Hunting deer or wild hog with dogs is prohibited during the archery, crossbow and muzzleloading gun seasons (Note: wild hog may be hunted with dogs during the "overlap" with small game season).
5. The taking or pursuing of deer, wild hog, fox or coyote with dogs (only as allowed during area seasons) is prohibited unless each dog is equipped and monitored with devices that allow remote tracking and behavior correction.

6. No person shall allow any dog to pursue or molest any wildlife during any period in which the taking of wildlife by the use of dogs is prohibited.
7. Dogs on leashes may be used for trailing wounded game.
8. Dogs are allowed during periods or in areas closed to hunting with dogs, but must be kept under physical restraint at all times.
9. A valid WMA deer-dog hunting permit is required to hunt deer with the aid of dogs.

Camping:
1. Camping is allowed by persons possessing a Special Use License. Camping is limited to 8 continuous days.
2. Quiet Hours: Between the hours of 11 p.m. and 7 a.m. loud music, barking dogs or any other activity causing excessive noise is prohibited in camping areas. Generators are allowed except as restricted by posted sign.
3. Pets must be leashed and under control within camping areas.

Bag and Possession Limits:
1. Deer - No person shall exceed statewide bag limits.
   A. Area limits -
   Archery season - Daily limit 2 deer, except in Zone A where antlerless deer may only be harvested **August 23 -31**.
   Crossbow, muzzleloading gun and general guns seasons - Daily limit 2 antlered deer.
   B. Statewide limits - Annual limit 5 deer (only 2 of which may be antlerless), daily limit 2, possession limit 4.
   C. As part of the statewide annual deer limit, youth less than 16 years of age may harvest 1 deer annually not meeting antler point requirements but having at least 1 antler 5 inches or more in length.
2. Wild hog - No size or bag limit.
3. Turkey - No person shall exceed statewide bag limits.
   A. Area limits - Daily limit 1.
   B. Statewide limits - All fall seasons combined limit 2, spring season limit 2, daily limit 2, possession limit 2.
4. Gray squirrel, quail and rabbit - Daily limit 12, possession limit 24 for each.
5. Raccoon, opossum, armadillo, beaver, coyote, skunk and nutria - No bag limits.
6. Bobcat and otter - Possession limit 1 unless in possession of a trapping license.
7. Migratory birds - See Florida Hunting Regulations handbook.
8. Non-protected birds (African and Eurasian collared-doves, common pigeon, Egyptian goose, house sparrow, and common starling) – No bag limits.

Archery Season:
Zone A: August **2-31**
Zone C: September **13** - October **12**
Permit, Stamp and License Requirements - Hunting license, archery permit, deer permit (if hunting deer), wild turkey permit (if hunting wild turkey), migratory bird permit (if hunting migratory birds), and state waterfowl permit and federal duck stamp (if hunting waterfowl).
Legal to Hunt - Deer with at least 1 antler having 3 or more points (each point 1-inch or more in length) OR a main beam length of 10 inches or more, antlerless deer (Zone A: Aug. **23-31** only; Zone C: Sept. **13** through Oct. **12**) (which includes does and bucks with antlers less than 5 inches in length), wild hog, bearded turkey or gobbler, gray squirrel, quail (beginning November **8**), rabbit (beginning October **11**), armadillo, migratory birds in season, and non-protected birds.
Regulations Unique to Archery Season -
1. Only bows may be used for hunting, except that centerfire and muzzleloading shotguns are allowed for hunting migratory birds and non-protected birds. Hunting with crossbows, airbows, or bows equipped with a draw-lock device is prohibited (except by Persons With Disabilities Crossbow Permit).
2. Only bows may be used for hunting in the Starvation Slough Hunt Area. Hunting with crossbows, airbows, or bows equipped with a draw-lock device is prohibited (except by Persons With Disabilities Crossbow Permit).
3. An annual hunting license is required for nonresidents to hunt wild turkey.

Crossbow Season:
Zone A: September **1-5**
Zone C: October **13-17**
Permit, Stamp and License Requirements - Hunting license, crossbow permit, deer permit (if hunting deer), wild turkey permit (if hunting wild turkey) and migratory bird permit (if hunting migratory birds).
Legal to Hunt - Deer with at least 1 antler having 3 or more points (each point 1-inch or more in length) OR a main beam length of 10 inches or more, wild hog, bearded turkey or gobbler, gray squirrel, quail (beginning November **8**), rabbit (beginning October **11**), armadillo, migratory birds in season, and non-protected birds.
Regulations Unique to Crossbow Season -
1. Only bows, crossbows, and **airbows (pre-charged pneumatic airguns firing arrows)** may be used for hunting, except that centerfire and muzzleloading shotguns are allowed for hunting migratory birds and non-protected birds.
2. Only bows may be used for hunting in the Starvation Slough Hunt Area. Hunting with crossbows is prohibited (except by disabled crossbow permit).
3. An annual hunting license is required for nonresidents to hunt wild turkey.

Muzzleloading Gun Season:
Zone A: September **6-19**
Zone C: October **18-31**
Permit, Stamp and License Requirements - Hunting license, muzzleloading gun permit, deer permit (if hunting deer), wild turkey permit (if hunting wild turkey) and migratory bird permit (if hunting migratory birds).

Legal to Hunt - Deer with at least 1 antler having 3 or more points (each point 1-inch or more in length) OR a main beam length of 10 inches or more, wild hog, bearded turkey or gobbler, gray squirrel, quail (beginning November **8**), rabbit (beginning October **11**), armadillo, migratory birds in season, and non-protected birds.

Regulations Unique to Muzzleloading Gun Season -

1. Only bows, crossbows, **airbows (pre-charged pneumatic airguns firing arrows)** or muzzleloading guns may be used for hunting, except that centerfire and muzzleloading shotguns are allowed for hunting migratory birds and non-protected birds.
2. Only muzzleloading guns may be used for hunting in the Starvation Slough Hunt Area.
3. **An annual hunting license is required for nonresidents to hunt wild turkey.**

General Gun Season:

Zone A: September **20** - October **19**, November **22** - January **4**
Zone C: November **1** - January **18**

Permit, Stamp and License Requirements - Hunting license, deer permit (if hunting deer), WMA deer-dog hunting permit (if hunting deer with dogs), wild turkey permit (if hunting wild turkey), migratory bird permit (if hunting migratory birds), and state waterfowl permit and federal duck stamp (if hunting waterfowl).

Legal to Hunt - Deer with at least 1 antler having 3 or more points (each point 1-inch or more in length) OR a main beam length of 10 inches or more, wild hog, bearded turkey or gobbler (Zone A: Oct. **6-19** and Nov. **22** through Jan. **4**; Zone C: Nov. **1** through **Dec. 28** only), gray squirrel, quail, rabbit (beginning October **11**), raccoon, opossum, armadillo, beaver, coyote, skunk, nutria, migratory birds in season, and non-protected birds. Bobcat and otter beginning December 1 until the end of the general gun season in each zone.

Regulations Unique to General Gun Season -

1. Hunting with dogs is allowed, except in the Starvation Slough Hunt Area.
2. **A valid WMA deer-dog hunting permit is required to hunt deer with the aid of dogs.**
3. Hunting with centerfire rifles is prohibited.
4. Only bows (except by disabled crossbow permit) may be used for hunting in the Starvation Slough Hunt Area.
5. **An annual hunting license is required for nonresidents to hunt wild turkey.**

Small Game Season:

October **11** - March **1**

Permit, Stamp and License Requirements - Hunting license, migratory bird permit (if hunting migratory birds), and state waterfowl permit and federal duck stamp (if hunting waterfowl).

Legal to Hunt - Wild hog, gray squirrel, quail (beginning November **8**), rabbit, armadillo, migratory birds in season, and non-protected birds.

Regulations Unique to the Small Game Season -

1. Hunting with dogs is prohibited in the Starvation Slough Hunt Area before January **19**.
2. Hunting with centerfire rifles is prohibited.
3. Only bows (except by disabled crossbow permit) may be used for hunting in the Starvation Slough Hunt Area before January **19**, and only bows (except by disabled crossbow permit) or muzzleloading guns may be used during the remainder of the small game season.

Furbearer Season:

Zone A: September **20** - October **19**, November **22** - January **4**
Zone C: November **1** - January **18**

Permit, Stamp and License Requirements - Trapping license (if using traps or taking for commercial purposes) or hunting license (if using only guns and dogs, and taking for noncommercial purposes).

Legal to Trap or Hunt - Raccoon, opossum, armadillo, beaver, coyote, skunk and nutria. Bobcat and otter beginning December 1.

Regulations Unique to Furbearer Season -

1. Except in the Starvation Slough Hunt Area, raccoon or opossum may be hunted at night by the aid of a light and dogs, with .22 rimfire firearms other than .22 magnum, or with a single-shot .410 gauge shotgun using shot no larger than No. 6. Hunting raccoon or opossum by display or use of a light from a moving vehicle, boat or animal is prohibited.
2. Only bows may be used in the Starvation Slough Hunt Area. Hunting with crossbows is prohibited (except by disabled crossbow permit).

Spring Turkey Season:

Youth Turkey, Zone A: February **27** - March **2**
Spring Turkey, Zone A: March **7** - April **12**
Youth Turkey, Zone C: March **13-16**
Spring Turkey, Zone C: March **21** - April **26**

Permit, Stamp and License Requirements - Hunting license and wild turkey permit.

Legal to Hunt - Bearded turkey or gobbler.

Regulations Unique to Spring Turkey Season -

1. Only bows, crossbows, PCP air guns propelling a bolt or arrow and centerfire and muzzleloading shotguns using a #2 or smaller shot size may be used for hunting.
2. Only bows or muzzleloading shotguns using a #2 or smaller shot size may be used for hunting in the Starvation Slough Hunt Area. Hunting with crossbows is prohibited (except by disabled crossbow permit).
3. Legal shooting hours are ½ hour before sunrise until sunset.
4. Hunting other animals is prohibited.
5. During the youth turkey hunt, only youth under 16 years of age may hunt and must be under the supervision and in the presence of an adult not younger than 18 years of age. Adults with required licenses and permits may participate when in the presence of a youth, but may not harvest a wild turkey.
6. **An annual hunting license is required for nonresidents to hunt wild turkey.**

Wild Hog-Dog Season:

2025 Hunt Dates: April **30** - May **4**, May **23**-**27**
2026 Hunt Dates: April **29** - May **3**, May **22**-**26**
Permit, Stamp and License Requirements - No license or permit required.
Legal to Hunt - Wild hog.
Regulations Unique to Wild Hog-Dog Season -
1. Hunting with centerfire rifles is prohibited.
2. Only bows or muzzleloading guns may be used for hunting in the Starvation Slough Hunt Area. Hunting with crossbows is prohibited (except by disabled crossbow permit).

Migratory Bird Season:
Migratory game birds may be hunted during their respective statewide seasons. Crows may be hunted during the first phase of crow season only. See migratory game bird hunting regulations.
Permit, Stamp and License Requirements - Hunting license, migratory bird permit, military license or ID (if harvesting waterfowl during the Veterans and Active Military Waterfowl Hunt Days), and state waterfowl permit and federal duck stamp (if hunting waterfowl).
Legal to Hunt - See migratory bird season dates, bag limits and regulations. Non-protected birds may also be taken.
Regulations Unique to Migratory Bird Seasons - All Migratory Bird Regulations shall apply.
1. Hunting ducks, geese and coot with lead shot is prohibited.
2. Centerfire and muzzleloading shotguns are allowed for hunting during established area seasons when migratory birds are legal to hunt, except in the Starvation Slough Hunt Area.
3. Shooting hours for mourning and white-winged doves are ½ hour before sunrise until sunset.
4. Non-hunting assistants with required licenses and permits may actively participate in the Veterans and Active Military Waterfowl Hunting Days, provided they may not harvest wildlife.
5. Adults with required licenses and permits may actively participate in Youth Waterfowl Hunting Days, provided they may not harvest wildlife.

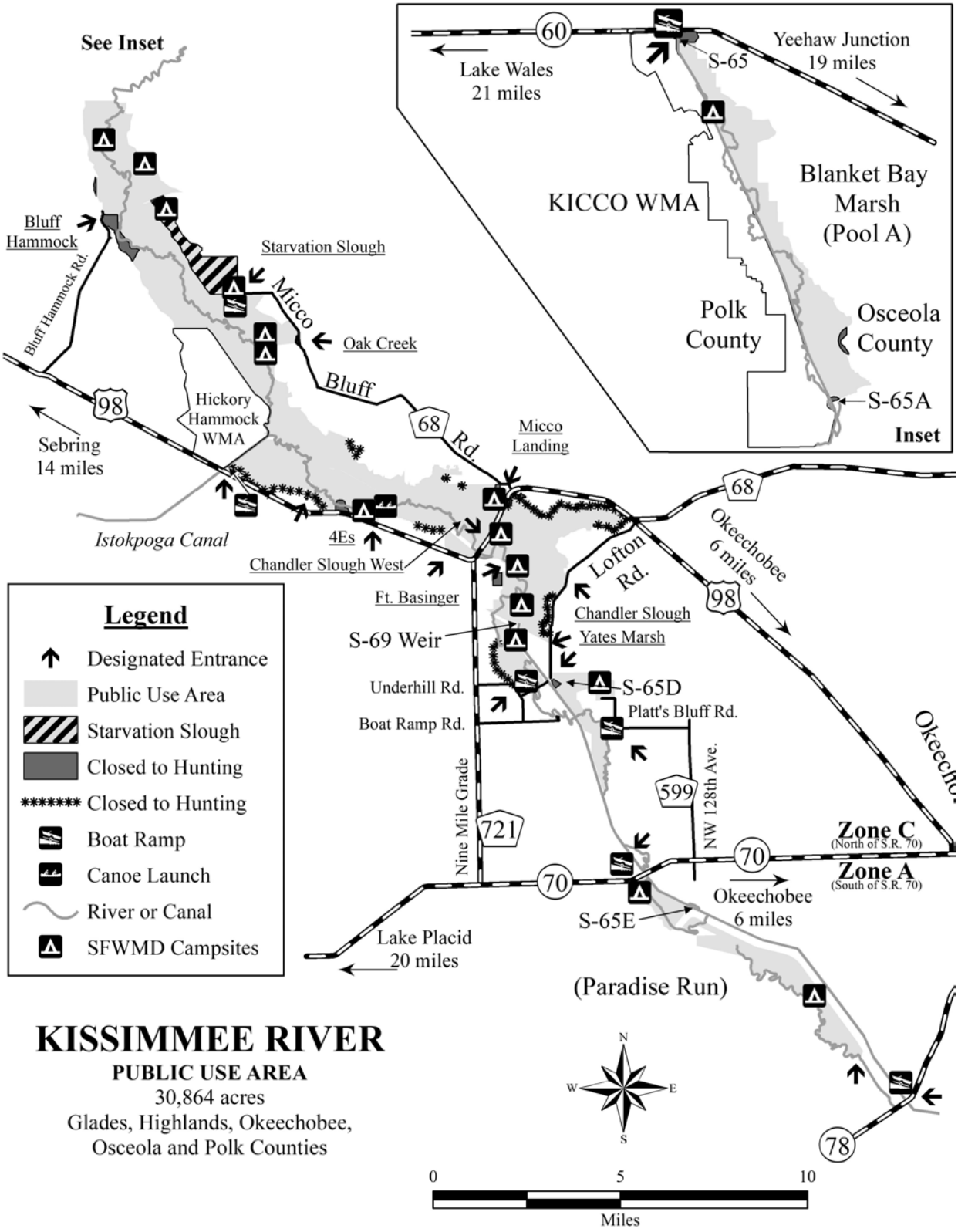
Fishing and Frogging:
Allowed year round.
Permit, Stamp and License Requirements - Fishing license (if fishing).
Legal to Take - See Florida Freshwater Fishing Regulations Summary.
Regulations Unique to Fishing and Frogging - All General Freshwater Fishing Regulations shall apply. Shooting frogs is allowed only during the listed open hunting seasons and only with the legal methods of take during each particular season. Frogs may only be taken by firearms during daylight hours.

General Information:
1. Information for persons with disabilities can be found at MyFWC.com/ADA.
2. If you have any questions about this material, please call the Fish and Wildlife Conservation Commission at 863-648-3200 (TDD 800-955-8771).
3. Zone A is that portion of the area South of State Road 70 and Zone C is that portion of the area north of State Road 70.
4. Please report the location of any sick or extremely skinny deer to the Chronic Wasting Disease hotline, toll free at 866-293-9282.

South Florida Water Management District Information:
This land was acquired under the Save Our Rivers (SOR) Program. The purpose of SOR is to conserve and protect unique and irreplaceable lands, restore areas to their original condition as much as possible, and allow controlled multiple recreational and educational uses consistent with this purpose.

Cooperation Requested:
If you see law violators or suspicious activities, contact your nearest Commission regional office or call 888-404-FWCC. You may qualify for a cash reward from the Wildlife Alert Reward Association.

The FWC receives financial assistance from the Department of the Interior (DOI), U.S. Fish & Wildlife Service. The DOI prohibits discrimination on the basis of race, color, national origin, age, sex, or disability. If you believe that you have been discriminated against in any program, activity, or facility or you need more information, please contact the FWC at: FWC, Office of Human Resources, 620 S Meridian St., Tallahassee, FL 32399, (850) 488-6411, or write to: Office of Diversity, Inclusion & Civil Rights, Dept. of the Interior, 1849 C St., NW, Washington, D.C. 20240.



DISCLAIMER: This graphical representation is provided for informational purposes and should not be considered authoritative for navigational, engineering, legal, and other uses.