Loxahatchee River National Wild and Scenic River Management Plan

Plan Update 2010

Florida Department of Environmental Protection

South Florida Water Management District

This document is the result of a successful partnership of the Loxahatchee River Management Coordinating Council members and many other interested stakeholders.

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EXECUTIVE SUMMARY

The unique ecosystem of the approximately 14-mile long Northwest Fork of the Loxahatchee River has captured the attention and imagination of residents, visitors, agency and community leaders for many years. Consisting of 10.3 miles of federally-designated Wild and Scenic River, it provides essential habitats that support a wide spectrum of ecological resources including freshwater riverine floodplain vegetation such as bald cypress, freshwater and estuarine fishes, and tidal floodplain vegetation and animals such as mangroves, oysters and seagrasses. In addition, the National Wild and Scenic Loxahatchee River contains unique cultural resources, provides the public with recreational opportunities and was the first of only two rivers in Florida to receive the national designation.

As late as the 1980s, the unique resources of the Loxahatchee River were in danger of being irreparably damaged. More than a century of ditching, draining and re-engineering had altered the river's natural hydrology, resulting in saltwater intrusion which changed the river's freshwater ecosystems. Natural drainages and wetlands, which once cleansed the water, were rapidly disappearing to make way for agricultural and urban development.

First written by the Florida Department of Natural Resources, now the Florida Department of Environmental Protection, and the South Florida Water Management District in 1985, the *Loxahatchee River National Wild and Scenic River Management Plan* ensures that special consideration and review is given to the watershed surrounding the river. The principal goals of that plan, a second update in 2000 and this revision are to preserve and enhance the river's unique natural values, restore the river's historical hydrology and reverse the deleterious impacts of saltwater intrusion on the river's ecosystems.

The 2010 *Loxahatchee River National Wild and Scenic Management Plan* contains an overview of enacting legislation and policy, government agency authority and responsibilities, a description and assessment of natural and cultural resources within the river area, preservation objectives, strategies and tasks and progress to date.

The managing agencies responsible for implementing the plan embrace adaptive management practices and recognize the multi-agency effort to conserve the river's resources which necessitate the need for plan updates every five years. These updates maintain the protection and enhancement objectives from the original plan while updating the strategies and tasks to fit current conditions and activities occurring within the National Wild and Scenic Loxahatchee River.

This document will only be available online or electronically in our effort to save paper and use "greener" practices.

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Chapter 1

BACKGROUND

The Loxahatchee River is often referred to as the "last free-flowing river in southeast Florida." In 1985, 10.3 miles of the Northwest Fork of the Loxahatchee River were designated as Florida's first National Wild and Scenic River. Portions of the river and estuary are also designated as Outstanding Florida Waters and an Aquatic Preserve, and are located within Jonathan Dickinson State Park, which contains outstanding examples of unique ecosystems and cultural and archeological treasures.

The Loxahatchee River, including the National Wild and Scenic portion, is impacted by urban and rural development, transportation networks, flood control and water supply projects. Historically, the Northwest Fork drained the majority of the watershed and the headwaters originated in Loxahatchee and Hungryland Sloughs. Over the past century, canals and levees were constructed for drainage and flood control that changed the natural flows into the river. Construction of the C-18 canal in 1958 diverted all water away from the Northwest Fork, thereby depriving the Northwest Fork of the volume of freshwater it once had. Channelization of the Southwest Fork caused the obliteration of Limestone Creek. Jupiter Inlet was permanently opened in 1947 and since then tidal and estuarine influences have migrated further upstream. As a result, portions of vegetation along the river have shifted from a freshwater swamp to salt tolerant mangroves. Additional erosion of the river's natural hydrology occurred incrementally as ditching and draining of headwater areas of the Northwest Fork further diverted flows and deprived the river of much needed freshwater.

Today, the Northwest Fork of the Loxahatchee River is the focus of a multi-agency restoration effort. The Florida Department of Environmental Protection (FDEP) and the South Florida Water Management District (SFWMD) has teamed with federal, state and local governments to implement the management measures contained within the Loxahatchee River National Wild and Scenic River Management Plan. The Management Plan provides these agencies and the public with guidance through objectives, strategies and tasks to achieve the goal of protecting and enhancing the National Wild and Scenic portion of the Northwest Fork of the Loxahatchee River.

MANAGEMENT POLICIES

The river management program described in this plan derives its authorization and direction from several federal and state policies which, when combined, represent the foundation of the Loxahatchee River National Wild and Scenic River Management Plan and Program.

Wild and Scenic Rivers Act of 1968

The *Wild and Scenic Rivers Act* of 1968 (16 United States Code 1271-1287) provides the framework for the establishment of a national system of wild and scenic rivers (Addendum A -

Wild and Scenic Rivers Act, Public Law 90-542, as amended). The Act identifies the processes by which the Loxahatchee River and other rivers throughout the United States are selected for study, recommended for designation and included in the National Wild and Scenic Rivers System. The Act also defines the philosophy that will be pursued in the management of rivers in the system. Section 10(a) of the Act provides that:

> *Each component of the national wild and scenic rivers system shall be administered in such a manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration primary emphasis shall be given to protecting its esthetic, scenic, historic, archaeological, and scientific features.*
>
> *Within this Act, under Section 2, there are rivers that are authorized for inclusion into the National Wild and Scenic River System by a Act of Congress and are considered a 2 (a)(i) river and then there are those designated as wild, scenic or recreation rivers by an act of the legislature of a State through which they flow. The Governor of that State then applies to the U.S. Secretary of Interior to see if the river fits the criteria established in this Act. These rivers, such as the Northwest Fork of the Loxahatchee River, once designated are under the clause 2(a)(ii) and are administered by the State or its political subdivision.*

The Act establishes a classification system for designated rivers. Each river eligible to be included in the system is classified, designated and administered as one of the following: Wild river areas (essentially primitive), Scenic river areas (largely primitive and undeveloped) and Recreational river areas (some development and readily accessible by road).This classification system is important to the management program for the Loxahatchee River in that it provides the basic criteria for approval of the program at the federal level. In order for designation to be approved, the state's management program must ensure that the various river segments will continue to meet the criteria for each classification.

The goal of the National Wild and Scenic River designation is to preserve select free-flowing rivers in their natural condition and protect water quality. For a river to obtain the designation of “National Wild and Scenic,” two requirements need to be met:

- *the river must be designated as a "wild, scenic or recreational river” by, or pursuant to, an act of the applicable state legislature; and*
- *the river must be permanently administered as a wild, scenic or recreational river by an agency or political subdivision of the State.*

Wild and Scenic Eligibility, Classification and Management Guidelines

On August 26, 1982, the United States Department of the Interior published guidelines for implementing the Wild and Scenic Rivers Act in the Federal Register. These guidelines expand upon the provisions of the legislation and interpret how the Wild and Scenic Rivers Act will be applied with respect to river studies and management plans. The interpretation of Section 10(a) of the Act contained in these guidelines provides the river management program with its basic philosophy.

This section is interpreted as stating a non-degradation and enhancement policy for all designated river areas, regardless of classification. Each component will be managed to protect and enhance the values for which the river was designated, while providing for public recreation and resource uses which do not adversely impact or degrade those values. Specific management strategies will vary according to classification but will always be designed to protect and enhance the values of the river area. Land uses and developments on private lands within the river which were in existence when the river was designated may be permitted to continue. New land uses must be evaluated for their compatibility with the purposes of the Act.

The direction of the National Wild and Scenic Rivers System: Final Revised Guidelines for Eligibility, Classification & Management of Rivers Areas and subsequent sections of the guidelines is that protection and enhancement of the river's natural and cultural qualities must be the highest priorities for the management program. Further, while the management program may allow for the continuation of existing land uses and developments within the corridor, new developments must be considered within the context of their effects on the special attributes of the protected area. The guidelines can be accessed at http://www.rivers.gov/publications/guidelines.pdf.

Loxahatchee River Resolution of 1983

On January 11, 1983, the Governor and Cabinet adopted a resolution directing the FDEP, with the assistance of affected local, regional, state and federal agencies, to begin the development of a management plan for the river (Addendum 4: Resolution by Florida Cabinet, January 11, 1983). The resolution states:

> *The principal goals of the plan will be to preserve and enhance the river's unique natural values, restore the river's historical hydrologic regime and reverse deleterious saltwater intrusion into the river.*

Loxahatchee River Wild and Scenic Designation and Preservation Act

The Loxahatchee River Wild and Scenic Designation and Preservation Act (Addendum 2 Florida Statutes, Chapter 83-358) was enacted on June 24, 1983 to serve as the "Act of the State Legislature" required by Section 2(a) (ii) of the Wild and Scenic Rivers Act for designation

of the Loxahatchee River by the Secretary of the Department of the Interior. The Act reaffirms the environmental preservation and enhancement policy of the national act:

> *The Legislature finds and declares that a certain segment of the Loxahatchee River in Palm Beach and Martin Counties possesses uniquely remarkable ecological, fish and wildlife, and recreational values which are unique in the United States. These values give national significance to the river as one which should be permanently preserved and enhanced, not only for the citizens of the State of Florida, but for citizens of the United States, of present and future generations.*

The Act provides the most comprehensive guidelines of the management program's various legal authorities and provides the management program with its basic and most important source of policy direction. The Act also includes river boundaries, river area delineation, permit and rulemaking authority and creation of a coordinating council.

MANAGEMENT PLAN DEVELOPMENT

The *Loxahatchee River Wild and Scenic Designation and Preservation Act* required the FDEP and SFWMD to jointly develop, administer, and implement a Wild and Scenic River Management Plan. The Act also authorizes the FDEP and SFWMD to develop procedures for periodically modifying or amending the plan.

The designation of the Northwest Fork as a component of the National Wild and Scenic River System was the result of a local grass-roots effort. Public involvement was invaluable during the designation process, so much so that the *Loxahatchee River Wild and Scenic Designation and Preservation Act* established the Loxahatchee River Management Coordinating Council (Council) to assist the FDEP and SFWMD in plan development. Today the Council consists of representatives from the following agencies and organizations:

City of Palm Beach Gardens

Florida Department of Agriculture and Consumer Services

Florida Department of Community Affairs

Florida Department of State, Division of Historical Resources

Florida Department of Transportation

Florida Department of Environmental Protection

Florida Fish and Wildlife Conservation Commission

Jupiter Inlet District

Palm Beach County

Palm Beach County Farm Bureau

Palm Beach County Conservation represented by Florida Native Plant Society

Loxahatchee River Environmental Control District

Martin County

Martin County Conservation represented by Martin County Audubon Society

National Park Service represented by U.S. Fish and Wildlife Service

Northern Palm Beach County Improvement District

River Land Owners represented by Gulfstream Boy Scouts of America

River Users represented by Palm Beach Pack and Paddle Club

South Florida Water Management District

South Indian River Water Control District

Town of Jupiter

Treasure Coast Regional Planning Council

United States Department of Interior, Bureau of Land Management

United States Geological Survey

Village of Tequesta

In early 1985, the *Loxahatchee River Wild and Scenic Management Plan* was completed and approved by the Governor of Florida, and sent to the U.S. Secretary of the Interior for consideration for the Wild and Scenic designation. The National Park Service also published a final report concluding the Northwest Fork of the Loxahatchee River was eligible for designation as a National Wild and Scenic River. This report also delineated the segment of the river to be considered for designation and established the management criteria and standards required for designation. On May 17, 1985, the Northwest Fork of the Loxahatchee River was designated the first National Wild and Scenic River in Florida.

The Loxahatchee River National Wild and Scenic Management Plan is based on adaptive management practices and updated every five years or as needed. The 2010 Loxahatchee River: National Wild and Scenic River Management Plan is the third in a series. The original plan was written in 1985 and updated in 2000.

DESCRIPTION OF THE RIVER CORRIDOR

The Loxahatchee River is located along the southeast coast of Florida, within Martin and Palm Beach counties. The Loxahatchee River watershed drains an area of approximately 240 square miles and consists of three main tributaries – the Northwest Fork, the North Fork, and the Southwest Fork.

The Northwest Fork of the Loxahatchee River originates at the G-92 water control structure in Palm Beach County, flows north and eastward into Martin County and Jonathan Dickinson State Park then back into Palm Beach County where it ultimately connects to the Atlantic Ocean via the Jupiter Inlet. The Northwest Fork is designated as a National Wild and Scenic River from the southernmost area of Jonathan Dickinson State Park (River Mile 5.2) to the southern extreme of Riverbend Park (River Mile 15.5) and is 10.3 miles in length. Table 1 shows landmark sites of the Northwest Fork of the Loxahatchee River with old river miles from existing documents (when applicable), and the new river miles used throughout this document.

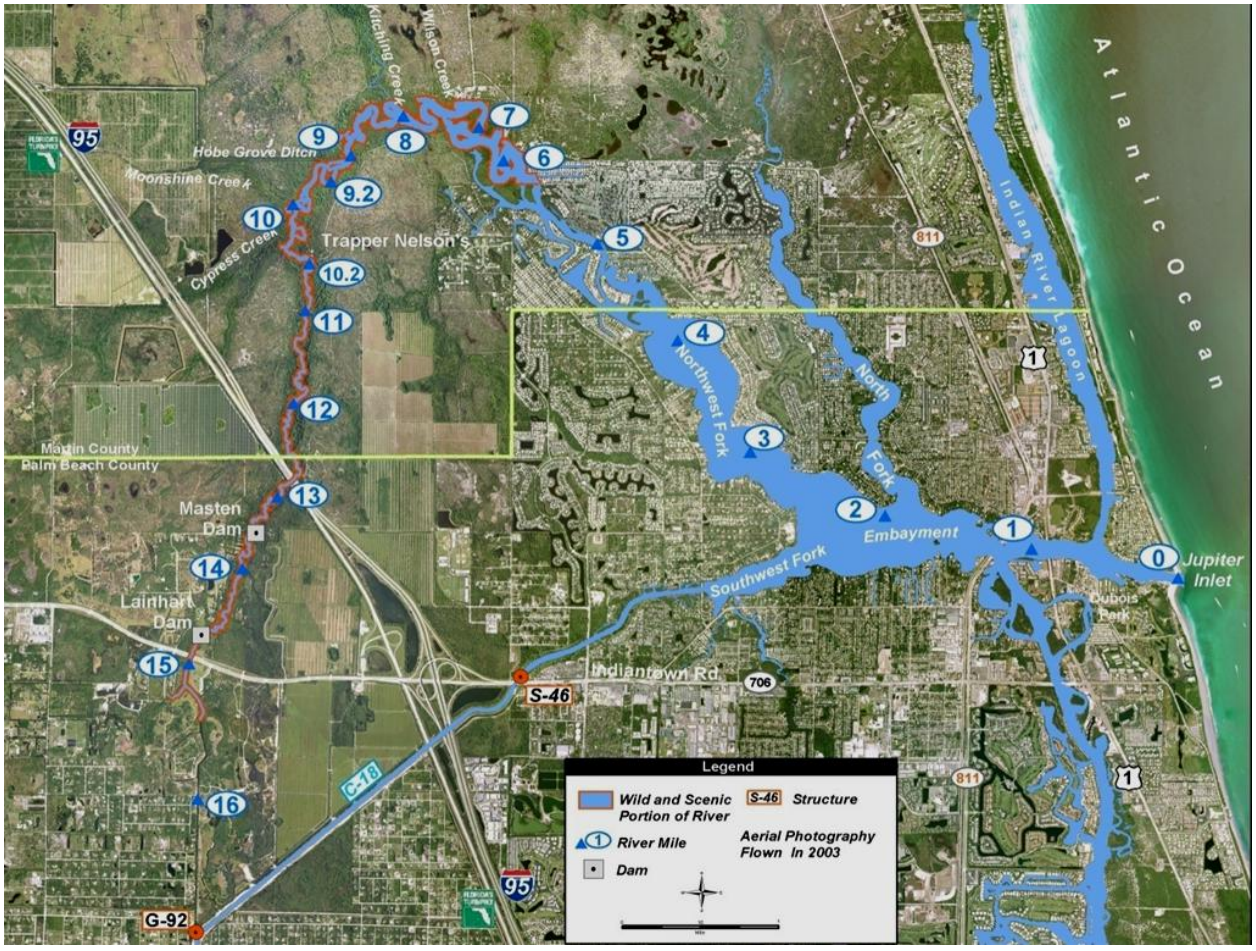


Figure 1 - The Loxahatchee River in Martin and Palm Beach Counties, Florida

National Wild and Scenic Loxahatchee River Boundaries

The Loxahatchee River Wild and Scenic Designation and Preservation Act delineates the boundaries of the designated portion of the Northwest Fork:

> *...described as that portion of the Northwest Fork downstream of the southern boundary of Riverbend Park* [RM 15.5] *located in Palm Beach County and upstream of an east-west line passing through a point where the southern boundary of Jonathan Dickinson State Park intersects the eastern shoreline of the river* [RM 5.2]*.*

River Area or River Corridor Delineation

The National Wild and Scenic Loxahatchee River is the geographic focus of the Management Plan. FS, Chapter 83-358 defines the federally designated portion of the river as:

> *"River area" means that portion of the Northwest Fork of the Loxahatchee River from river mile 6 to river mile 13.5* [these river miles have been revised to 5.2 to 15.5, respectively, due to improved mapping techniques, see above]*, together with such abutting uplands as determined in the permanent management plan to form the corridor having visual impact on the river user, and which may be necessary to maintain the natural and scenic appeal of the river.*

The Wild and Scenic river area corridor and boundaries as depicted in Figures 2 and 3 and have been defined as the greater of the following:

- The maximum upland extent of the floodplain's freshwater or saltwater wetland vegetation, plus a buffer of 100 feet on each side of the river; or
- 350 feet on each side of the river, measured from the center of the main river channel whichever is greater; unless,
- It is the 1,600 feet of river on the west bank of the river north of Indiantown Road and the area just north of the I-95 right-of-way 1000 feet, then the "river area" is the boundary of the SFWMD's acquisition area which is now managed as part of JDSP.

In essence the River Area or River Corridor references floodplain or upland areas that are in public ownership. For more detail on the methodology used to determine river area boundaries, refer to the 2000 Loxahatchee River National Wild and Scenic Management Plan (FDEP and SFWMD, 2000).

Table 1 - River Mile Locations of Landmark Sites of Northwest Fork of Loxahatchee River

Landmark Sites	Old River Miles	New River Miles
Riverbend Park Canoe Launch	--	15.30
Riverbend Park	13.50	15.00
Indiantown Road	12.80	14.93
Lainhart Dam	12.50	14.78
Masten Dam	--	13.50
Turnpike/I-95	--	12.76
Trapper Nelson Camp	10.80	10.50
Cypress Creek	10.00	10.33
Moonshine Creek	--	10.00
Hobe Grove Ditch	--	9.07
JDSP Boat Ramp	--	6.45
Boy Scout Dock	6.00	5.92

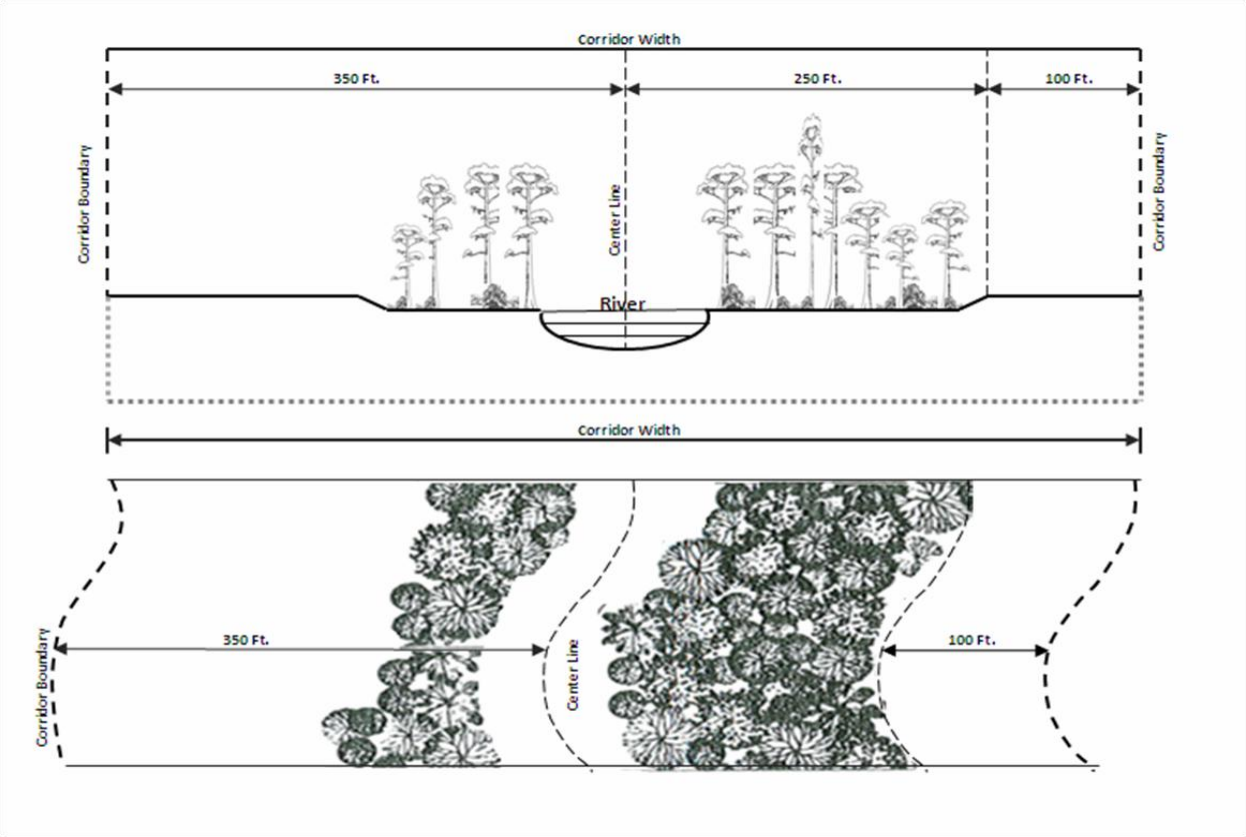
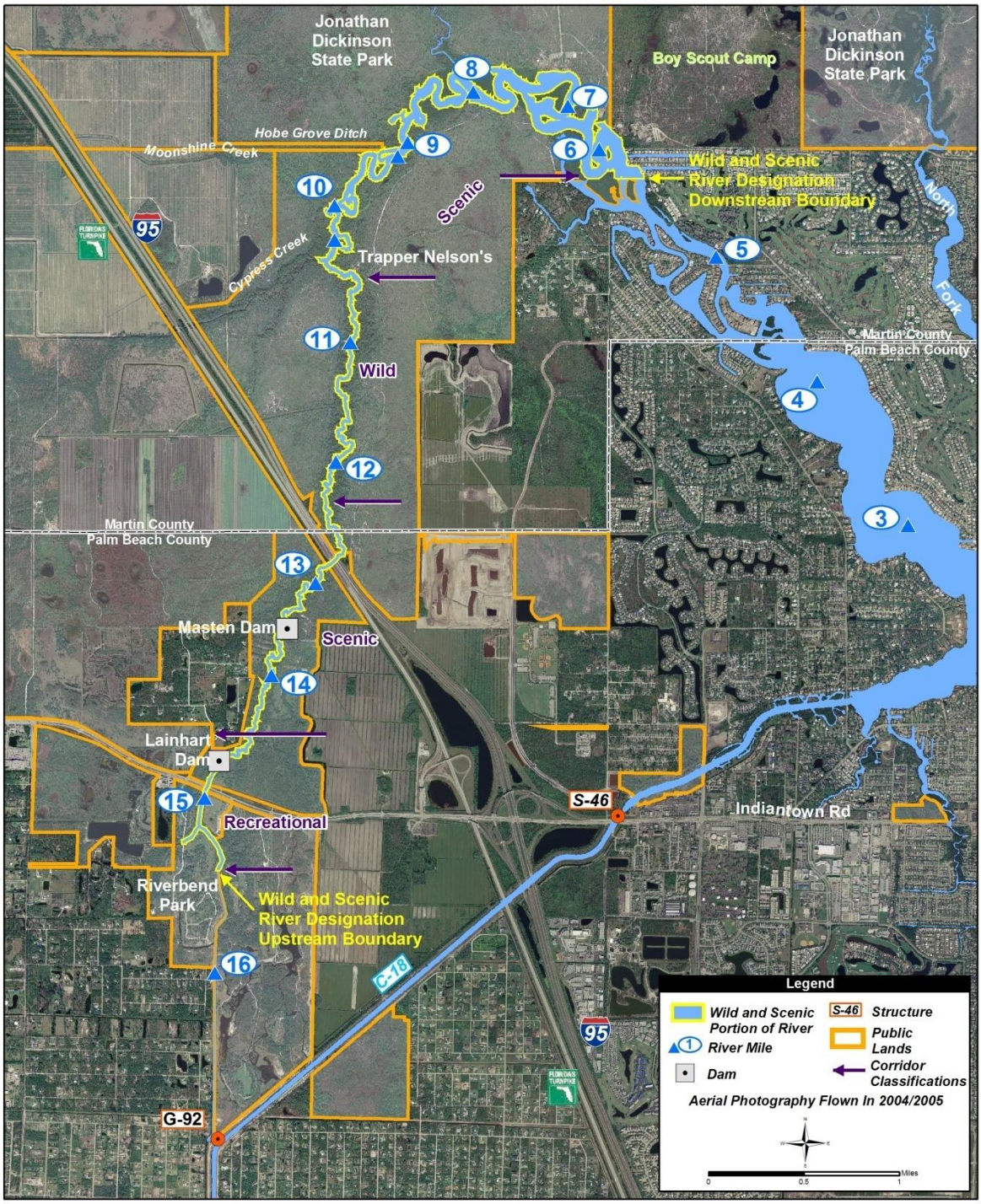


Figure 2 - Delineation of the River Area Corridor



Wild and Scenic Loxahatchee River

Figure 3 - Northwest Fork of Loxahatchee River Wild and Scenic Boundaries

PERMITS AND RULEMAKING AUTHORITY

The Loxahatchee River Wild and Scenic Designation and Preservation Act provides for adoption of rules and for separation of regulatory authority between the FDEP and the SFWMD (FS, Chapter 83-358, Section 9.1 and 9.2):

9.1 The Department shall have full and exclusive authority to adopt rules concerning and to regulate activities within the river area having a direct and substantial adverse effect on any resource value within the river area.

9.2 The Board shall have full and exclusive authority to adopt rules concerning and to regulate activities outside the river area having substantial impact on any resource values within the river area.

In 2008, the SFWMD enacted the Loxahatchee River Regional Water Availability Rule, which will be discussed further in Chapter 5.

ROLE OF THE LOXAHATCHEE RIVER MANAGEMENT COORDINATING COUNCIL

The Act defines the role of the Council (FS, Chapter 83-358, Section 5.3[o]):

A permanent management coordinating council composed of one representative from each of the participants provided for in subsection (2). The coordinating council shall review and make recommendations, in the first instance, on all applications for permits required by this act, as well as all proposals for amendments or modifications to the permanent management plan, and render its nonbinding advisory opinion to the board [Governing Board of the SFWMD] *and the department. Each participant shall appoint one member to the coordinating council. The coordinating council shall elect a chairman, vice chairman, and secretary to serve for a term of 1 year. The coordinating council shall adopt bylaws to provide for such other officers as it may deem necessary, election of officers, removal of officers for just cause, meetings quorum, procedures for the conduct of its business, and such other matters as the membership may deem advisable in the conduct of its business. Such professional staff as the coordinating council may require shall be provided by the South Florida Water Management District.*

PLAN MANAGEMENT

Management of the Wild and Scenic Northwest Fork is accomplished through partnerships and cooperative actions of vested federal, state and local agencies and the interested public. The *Loxahatchee River Wild and Scenic Designation and Preservation Act* established the Council to ensure the objectives of the management plan were achieved through interagency cooperation and coordination, as well as public input.

The Council advises the FDEP and the SFWMD on activities that may affect achieving the Management Plan objectives (refer to Chapter 3) within their authority as granted in Chapter 83-358. The Council follows the process and procedures as granted in Chapter 83-358 and the approved bylaws of the Council.

The Council also oversees and approves updates to the Loxahatchee River National Wild and Scenic Management Plan. All amendments to the plan must be approved by the FDEP and the SFWMD.

LEAD AGENCIES AND AUTHORITY

The FDEP and the SFWMD are the lead agencies responsible for implementing the management program for the National Wild and Scenic Loxahatchee River. However, there are a multitude of other federal, state and local government agencies that are key to the protection, restoration and management of the Wild and Scenic River. The following section describes the agencies, authority and role in managing the river.

Florida Department of Environmental Protection

Executive authority for administration and management of the National Wild and Scenic Loxahatchee River ultimately lies with the Governor and Cabinet, serving as both the Executive Board of the FDEP and as the Board of Trustees of the Internal Improvement Trust Fund, acting through the FDEP. The FDEP's basic authority for planning and implementing a program for managing the river is found in Chapter 83-358, FS (Addendum 2). This statute authorizes the FDEP, in cooperation with the SFWMD, to develop and periodically amend a river management plan, conduct necessary resource management activities, establish a visitor capacity for recreational use on the river and adopt rules to regulate activities in the designated river corridor area.

The FDEP is authorized to manage state-owned parks and recreation areas and to adopt rules for managing these areas (Chapter 258, FS). Section 258.034 declares the policy to be, in part, to acquire typical portions of the State's original environment for public access and to manage these areas so as to conserve the natural values which derive from them. In implementing this policy, the FDEP is authorized to cooperate with county governments in park and recreation matters (Section 258.041), and to negotiate interagency agreements with water management districts to manage district lands reserved for recreational purposes (Section 258.004).

Chapter 258 also clearly establishes the proprietary overview role of the Board of Trustees of the Internal Improvement Trust Fund in the management of sovereign submerged lands. The *Florida Aquatic Preserve Act* (Sections 258.35-258.46) authorizes the FDEP to establish aquatic preserves on sovereign submerged lands and to evaluate the use of submerged lands within preserves based on the public interest and on the merits of proposed projects within the context of environmental impact. Chapter 16Q-20, Florida Administrative Code, provides for

management of sovereign lands within a preserve primarily to maintain essentially natural conditions, promote development of fish and wildlife, and provide opportunities for public recreation, including hunting, fishing and boating where deemed consistent with the overall purpose of the Aquatic Preserve Act. The Trustees have also granted management authority of certain sovereign submerged lands to the Division of Recreation and Parks (DRP) under Management Agreement MA 68-086. The management area includes a 400-foot zone from the edge of mean high water where a park boundary borders sovereign submerged lands fronting beaches, bays, estuarine areas, rivers or streams. Where emergent wetland vegetation exists, the zone extends waterward 400 feet beyond the vegetation.

Chapter 403, FS, provides for the maintenance and enhancement of water quality and wetlands protection through programs administered by the FDEP. Section 403.061 authorizes the FDEP to perform a variety of functions with regard to waters of the State. As far as protection of the National Wild and Scenic Loxahatchee River is concerned, the most important FDEP responsibilities involve the establishment of ambient water quality standards, water quality sampling, regulation of known sources of pollution and enforcement of rules pertaining to Outstanding Florida Waters. The FDEP's administrative rules concerning ambient water quality standards and Outstanding Florida Waters are contained in Chapters 17-3 and 17-4, Florida Administrative Code (FAC), respectively. Chapter 84-79, FS, *the Warren S. Henderson Wetlands Protection Act of 1984*, authorizes the FDEP to establish rules concerning water quality criteria for wetlands to enable the State to more effectively regulate use of wetlands under FDEP jurisdiction.

The *Florida Environmental Reorganization Act* of 1993 requires FDEP to develop and implement measures to "protect the functions of entire ecological systems through enhanced coordination of public land acquisition, regulatory, and planning programs." Within the FDEP, the Division of Recreation and Parks' Florida Park Service Operations Manual provides the guiding management philosophy (Chapter 10, Section 3):

Chapter 258, FS is understood to mean that, to the extent possible, the goal of natural resource management should be to protect, restore, and maintain functioning representative examples of the full diversity of natural communities within the state, while providing appropriate recreational and educational benefits. Attaining this goal not only requires acquisition and protection of representative lands within the Florida state park system, but also active restoration and maintenance of the natural processes that sustain complex and dynamic biological systems on those lands.

Against the background of climate, geology, and soils, Florida's ecosystems have evolved under and depend on the dynamic interaction of forces, or processes, associated primarily with hydrology, lightning-set fires, and competition between native species. However, human-caused disturbances have disrupted these processes. These have included large-scale drainage, lowering of water tables, disruption of sheet flow, exclusion of lightning-set fires, introduction of invasive exotic species, reduction or eradication of populations of predators and keystone species, landscape fragmentation, and large-scale habitat loss.

To the extent possible, the Division practices natural systems management, whereby the processes that shaped (and continue to shape) the structure, function, species composition, and relative species abundances of Florida's natural communities are restored and maintained. Because park units are often cornerstones of surrounding ecosystems, whenever feasible the Division adapts management practices to benefit the greater ecosystem, and encourages similar management practices and compatible land uses beyond park boundaries.

The task of the FDEP's Florida Park Service is made more challenging by the two-pronged nature of its mission statement (Operations Manual, Chapter 1, Section 3):

"Provide resource-based recreation while preserving, interpreting and restoring natural and cultural resources."

The Operations Manual goes on to say:

"Public service is the central theme of every FPS endeavor. Traditional high standards of management and service are the FPS trademark. Quality resource-based outdoor recreational experiences assure that Florida's state parks will continue to serve as major tourist destinations, thereby contributing significantly to the State's economy."

Jonathan Dickinson State Park, through which the Loxahatchee River flows, provides abundant resource-based recreation opportunities to the public. These include camping in two different full-service family campgrounds, several different primitive camping choices, hiking, canoeing and kayaking, both on-and-off-road bicycling, picnicking, fishing and swimming. The park's Elsa Kimbell Environmental Education and Research Center houses a visitor center in which the natural and cultural history of the park is presented and interpreted through a comprehensive series of interactive displays and exhibits. Two classrooms and a laboratory serve the area's schoolchildren. Interpretive programs of numerous different kinds are presented here and throughout the park, explaining the park's many storylines to visitors. Upriver, on the banks of the Loxahatchee, Park Rangers bring the story of the famous Trapper Nelson to patrons who arrive at his restored home site, either by small boat or in the park's tour boat, the *Loxahatchee Queen II*, allowing them a glimpse into life along the river as it was many years ago.

In addition to regulatory and resource management portions of the FDEP, there is also a Division of Law Enforcement which has multiple functions including emergency response, investigating environmental violations and law enforcement on FDEP managed properties, including Florida State Parks. The Florida Park Police patrols properties with the full power of arrest as sworn state law enforcement officers.

South Florida Water Management District

In 1949, the Florida Legislature created the Central and Southern Florida Flood Control District, (the predecessor to the SFWMD) to manage the Central and Southern Flood Control Project; a regional flood control and water supply project being designed and built by the U.S. Army Corps of Engineers.

In 1972, with the Florida Water Resources Act (Chapter 373 FAC), the State created five water management districts, with expanded responsibilities for regional water resource management and environmental protection. In 1976, voters approved a constitutional amendment giving the districts the authority to levy property taxes to help fund these activities.

The Florida Water Resources Act gives the SFWMD authority to provide flood protection, regulate and manage surface water and groundwater supplies, conduct environmental restoration and to acquire property for water management purposes, including the conservation and protection of water resources.

The SFWMD is authorized to participate in the management of the National Wild and Scenic Loxahatchee River by the provisions of Chapter 83-358, FS (Addendum B). Chapter 83-258 authorizes the SFWMD to have regulatory authority outside of the designated river area on those activities that may affect the Wild and Scenic River.

The SFWMD is responsible for critical water resources management activities to help achieve the protection and enhancement objectives of the management plan. In summary, relevant activities include:

- Construction, operation and maintenance of Central and Southern Florida Flood Control Project water control structures and canals;
- Regulation of discharge of surface waters and consumptive use;
- Establishment and implementation of Minimum Flows and Levels;
- Timing, quantity, and quality of water flowing into the Northwest Fork;
- Development and implementation of a Restoration Plan for the Northwest Fork;
- Development and implementation of the Lower East Coast Regional Water Supply Plan;
- Local sponsor for the U.S. Army Corps of Engineers Northern Palm Beach County Comprehensive Everglades Restoration Plan project;
- Land acquisition and management; and
- Review of proposed amendments to local governments' Comprehensive Development Plans, as a commenting agency to Florida Department of Community Affairs.

The SFWMD plays an advisory role to the Department of Community Affairs by reviewing and commenting on amendments to local comprehensive plans. Comprehensive plans are the expression of a local government's authority to designate the type, location, and intensity of development in the Loxahatchee River watershed. State oversight of local land use planning rests with the Florida Department of Community Affairs (DCA) under Chapter 163 Florida Statutes. The SFWMD is one of many resource-protection agencies providing review comments

to DCA. The SFWMD also provides technical assistance to local governments on an informal basis.

LOCAL GOVERNMENTS

Palm Beach County

Chapters 125, 162, and 163, FS, vests Palm Beach County (PBC) with the authority to regulate use and development of private property adjacent to its jurisdiction, including property within the wild and scenic river area. Specifically, Chapter 125, FS, authorizes PBC to adopt and enforce a comprehensive plan for development, zoning ordinances to implement the Comprehensive Plan and other regulations necessary for the protection of the public's health, safety and welfare. Section 125.01(f), FS, grants PBC the power to provide parks, preserves, playgrounds, recreational areas and other recreational facilities for the welfare of its citizens. It also allows for the Board of County Commissioners to promulgate rules for the use of its parks and recreational areas so as to provide for the effective utilization of such areas. Additionally, Chapter 125 empowers PBC to prescribe fines and penalties for violations of the regulations.

Chapter 162 authorizes PBC to establish a code enforcement board to enforce land development regulations. Chapter 163 (*Local Government Comprehensive Planning and Land Development Regulation Act*) expressly elaborates on the County's authority to establish and implement comprehensive plan programs to guide and control future development and growth. Rule 9J-5, FAC, provides the minimum criteria for the preparation, review and determination of compliance of comprehensive plans and plan amendments pursuant to Chapter 163, FS.

The 1989 PBC Comprehensive Plan provides for the protection and conservation of the Loxahatchee Slough area natural resources with the implementation of the land use, conservation and coastal elements. In 1992, PBC adopted the Unified Land Development Code to implement and ensure that all development orders approved in the unincorporated PBC are consistent with the comprehensive plan.

Riverbend Park is managed by the PBC Parks and Recreation Department under the authority of the Board of County Commissioners and the PBC ‘Parks and Recreation Ordinance' (No.89-34). This ordinance provides for rules and regulations for all recreation areas operated and maintained by PBC for control of park traffic, wildlife and recreational activity. It also defines prohibited acts, provides for sanitation and pollution control, public utility regulation, park hours, enforcement of traffic regulations, park rules, permit regulations and for penalties and the prosecution of offenders. Riverbend Park is a managing partner in the management of the National Wild and Scenic Loxahatchee River.

The PBC Comprehensive Plan identifies the Loxahatchee River as an "Area of Particular Concern" to be preserved in its natural state. County subdivision regulations provide two processes for approval of subdivision plans. The first process is applied in cases when the applicant demonstrates that the proposed activity satisfies standard subdivision requirements. The second process is utilized for evaluating applications with proposed Planned Development

Districts and other cases when an applicant seeks a Conditional Use Approval relating to use, density, drainage, or similar requirements. In the latter process, development standards may exceed code requirements based upon the conditions for approval. In these cases, PBC may require the applicant to meet certain performance criteria, such as higher-than-standard building setbacks from wetlands and other environmentally sensitive areas, as a condition of approval. This process has been effective in directing land development activities away from the river area.

Special regulatory protection is provided for the Loxahatchee Slough. Development adjacent to the Slough is subject to special performance standards and a review coordination process. The Slough is designated as a "Conservation Area" and is zoned to allow passive recreational uses. Owners of property in this area may transfer, using Palm Beach County's Transfer of Development Rights (TDR) program, a density allotment of one dwelling unit per five acres to other property within the PBC Urban Service TDR Receiving Area to compensate for the loss of the right to develop their land for residential purposes.

Martin County

The general local government statutory authorities identified for PBC also apply to Martin County (MC). In addition to these authorities, the MC Comprehensive Plan prohibits development in wetland areas (since 1982, last revised in 2006), including the Loxahatchee River, Cypress Creek and Kitching Creek. This plan also applies the requirement for a 50-foot building setback in ecotonal areas adjacent to wetlands as a performance standard for new development (Chapter 9.4.A.7.d.1.e).

Although the land use regulatory methods utilized by MC are similar in many respects to those of PBC, several important differences exist. All development is prohibited in areas with wetland soils. In addition, a requirement for a 50-foot shoreline protection zone has been established in ecotonal areas adjacent to saltwater wetlands. No site alterations, including filling, grading or dredging, are permitted upland from the mean high water line in these buffer areas. Further, when subdivision approval or zoning exceptions are sought for activities in the vicinity of Cypress Creek, Kitching Creek or the Loxahatchee River, an application review process is used to require mitigation of adverse effects on water quantity and quality. If Planned Unit Development approval is sought, county regulations provide for the transfer of up to one-half of the permitted density for that portion of the property having wetland characteristics.

Town of Jupiter

The Town of Jupiter is authorized by applicable laws to regulate the use and development of private lands for the public health, safety and welfare. The Town has adopted a comprehensive plan in accordance with Section 163.3161, FS. This plan designates areas subject to flooding as Conservation Areas and discourages development in these areas. However, there is no ordinance in effect to enforce compliance. All wetlands and environmentally sensitive areas within the Town of Jupiter, especially those subject to flooding, are classified as "Conservation Areas" in the Town's comprehensive plan.

Village of Tequesta

In addition to PBC, MC and the Town of Jupiter, which exercise direct control over portions of the river area, the Village of Tequesta exercises control over land use and development within the vicinity of the National Wild and Scenic Loxahatchee River. The Village of Tequesta Comprehensive Plan includes a number of objectives and policies that address protection of the Loxahatchee River, including specific reference to the Loxahatchee River National Wild and Scenic Management Plan.

City of Palm Beach Gardens

Sections six (6) and seven (7) of the City of Palm Beach Gardens' Comprehensive Plan detail the City's goals and objectives toward protection, management, and conservation of wetlands, recreation, and open space lands within the City. Policy 6.1.4.5 of the City's Comprehensive Plan ensures protection of environmentally sensitive areas and listed species by implementing certain criteria; furthermore, wetland habitats are set aside as preserves, and development is prohibited in wetlands except under certain circumstances consistent with the Treasure Coast Regional Planning Council Strategic Regional Policy Plan. The City currently manages Sandhill Crane Park which permits access by water or land around major conservation areas to the Loxahatchee Slough. With such connections, the City has a link with the Florida Trail System and Palm Beach County's Riverbend Park in Jupiter.

FEDERAL AGENCIES

National Park Service

This National Park Service administers the National Wild and Scenic Rivers System in accordance with the *Wild and Scenic Rivers Act* (Addendum 1). Under the broad authority of this act, the National Park Service conducts studies on the eligibility of rivers proposed for designation in the national system and coordinates with states in the development and implementation of management plans for rivers in the system. The National Park Service also reviews permits required by the U.S. Army Corps of Engineers under Section 404 of the *Clean Waters Act* of 1972 for potential environmental impacts on national wild and scenic rivers. Based on the authority of Section 7(a) of this Act, no federal agency may assist by loan, grant, license or otherwise in the construction of any water resources project that would have a direct and adverse affect on any of the resource values of the designated segment of the river.

United States Department of Interior, Bureau of Land Management

Section 202 of the Consolidated Natural Resources Act of 2008 (PL 110-229) charges the Secretary of Interior (through the Bureau of Land Management) with the management of the Jupiter Inlet Lighthouse Outstanding Natural Area (JILONA). JILONA lies within the Loxahatchee River watershed. In addition, the southern boundary of the Outstanding Natural

Area is the lower reach of the Loxahatchee River east of U.S. Highway 1. Lastly, PL 110-229 directs the Secretary to include objectives in the management of JILONA to ensure the restoration of native plant communities and estuaries in the Outstanding Natural Area, with an emphasis on the conservation and enhancement of healthy, functioning ecological systems in perpetuity.

United States Fish and Wildlife Service

Section 401 of the *Fish and Wildlife Coordination Act of 1958* (16 U.S. Code 661, as amended), authorizes the USFWS to participate in the review of dredge and fill permit applications. The USFWS's participation in this activity is based on its vested interest in the conservation of wetlands as wildlife habitat for federally protected species. In addition, the Service is authorized to administer the *Endangered Species Act* of 1973 (10 U.S. Code 1531, as amended). This Act seeks to ensure the continued existence of endangered species by requiring federal agencies to consult with the Service whenever an agency's actions may be detrimental to an identified species or its habitat.

The *Migratory Bird Treaty Act* of 1918 (16 U.S. Code 703 to 712) and subsequent amendments implemented Conventions between the United States and Canada, Japan, Mexico, and Russia for the protection of migratory birds. Birds and their parts, including eggs, nests, and feathers are protected under this law.

In addition, the *National Wildlife Refuge System Administration Act* of 1966 (16 U.S. Code 668dd-668ee, as amended) provides for the administration and management of National Wildlife Refuges. Hobe Sound National Wildlife Refuge is an example of such a refuge within the Loxahatchee River watershed.

United States Army Corps of Engineers

Section 10 of the *Rivers and Harbors Act of 1899*, (30 Statute 1131, as amended), authorizes the United States Army Corps of Engineers to regulate dredging of obstructions and review proposals for channel construction and improvements in navigable waterways including the Loxahatchee River. This Act, together with Section 404 of the *Clean Waters Act of 1972* (33 U.S. Code 1344, as amended), relating to the regulation of dredge and fill activities in wetlands, involves the Corps indirectly in the management of the National Wild and Scenic Loxahatchee River.

OTHER STATE AGENCIES

Florida Department of Community Affairs

The Florida Department of Community Affairs ensures consideration of the Northwest Fork of the Loxahatchee River in local and regional planning efforts. The Florida Department of

Community Affairs is authorized to establish resource planning and management committees, coordinate designation of areas of critical state concern, and administer the review of developments of regional impact by Chapters 380 and 163, FS. Section 163.3184 authorizes the Department to coordinate state agency review of local government comprehensive plans.

Florida Department of State

The Division of Archives, History and Records Management hold title to historical and archaeological resources and artifacts on state-owned lands by Chapter 267, FS. The statute provides the Department with the authority to locate and arrange for the protection, preservation and restoration of historical and archaeological property of other governmental agencies.

Florida Fish and Wildlife Conservation Commission

The Florida Fish and Wildlife Conservation Commission have administrative, management and enforcement authority with respect to Florida's fish and wildlife by Chapter 372, FS. Specific sections which authorize Commission activities in the river management program include Sections 372.07(2) (enforcement of freshwater fishing laws), 372.072(4) (a) (1) (research and management of freshwater/upland species), and 372.77 (implementation of wildlife restoration projects).

The Florida Fish and Wildlife Conservation Commission manage John C. and Mariana Jones Hungryland Wildlife and Environmental Area (12,215 acres) and JW Corbett Wildlife Management Area (60,228 acres), both of which are headwater areas for the various parts of the Northwest Fork of the Loxahatchee River.

The Commission also has a multi-functional Division of Law Enforcement tasked with protection of wild animal and aquatic resources of the State, providing for boater safety, general enforcement of the law, and emergency response.

Florida Department of Agriculture and Consumer Services

The *Clean Water Act* (Section 303[d] and Section 403.067[7] [c] [2]) establishes and describes the implementation of the Total Maximum Daily Load (TMDL) program to promote improvements in water quality throughout the State through the coordinated control of point and nonpoint sources of pollution. In support of the TMDL program, the Florida Department of Agriculture and Consumer Services (FDACS) is responsible for the development and adoption of best management practices (BMPs) by rule for different types of agricultural operations. The adopted BMPs are then used in the FDACS BMP Program to provide a path for agricultural lands to comply with state water quality standards, including the load reduction allocations established by the FDEP TMDL Program. Farmers can also receive technical help and financial assistance to reduce their impacts to water quality through voluntary participation in the FDACS BMP Program and advance implementation of the adopted BMPs before an FDEP TMDL is established for their farm's basin.

FDACS is required under Section 570.085, FS to promote agricultural water conservation programs to include provisions "for increased efficiencies in the use and management of water for agricultural production …"

FDACS has the authority under Section 576.045, FS, to address fertilization-management practices that could be a source of nitrogen and phosphorus residues contamination in groundwater, surface water and drinking water in various areas throughout the State. The law requires research to promote improved fertilization-management practices as soon as practicable in a way that protects the State's water resources and preserves a viable agricultural industry.

Pursuant to the Lake Okeechobee and Estuary Recovery Plan (LOER), FDACS revised its rule on fertilizer content standards for urban settings. In cooperation with manufacturers, the University of Florida Institute of Food and Agricultural Sciences, agencies and others, FDACS modified the rule provisions to require that all fertilizer products labeled for use on urban turf or lawns and sports turf be limited to the amount of nitrogen and phosphorous available to support healthy turf maintenance. This modification will help protect water quality by reducing the amount of phosphorus and nitrogen runoff from lawns and gardens, which often enters lakes, rivers, estuaries, and other water resources. More information about the rule is located at: http://www.flaes.org/pdf/Urban_turf_fact_sheet.pdf.

Florida Department of Transportation

The mission of the Florida Department of Transportation (FDOT) is to balance natural, human, cultural and physical considerations with sound engineering principles, with the goal of preserving the quality of our environment and communities. The Florida Turnpike and Interstate 95 cross the Loxahatchee River within the boundaries of the wild and scenic designation. The Florida Department of Transportation (FDOT) is authorized to operate and maintain these facilities in a manner that provides for safety and ensures the mobility of people and goods, enhances economic prosperity, and preserves the quality of our environment and communities under Sections 20.23(3)(a) and 334.048(3), Florida Statutes (F.S.).

When considering transportation improvements to these facilities, FDOT is required to coordinate with the National Park Service – Rivers, Trails, and Conservation Assistance (RTCA) Program and follow the Wild and Scenic Rivers Assessment process. This process was established under *Presidential Directive dated August 2, 1979*, "*Wild and Scenic Rivers and National Trails;*" *Council of Environmental Quality Memorandum dated August 10, 1980*, "*Interagency Consultation to Avoid or Mitigate Adverse Effects of Rivers in the Nationwide Inventory;*" and *Federal Register, Volume 47, Number 173 dated September 7, 1982*, "*National Wild and Scenic Rivers System-Final Revised Guidelines for Eligibility, Classification, and Management of River Areas.*" In order to understand and assess impacts that may occur to the resource, FDOT participates in the Loxahatchee River Management Coordinating Council.

Treasure Coast Regional Planning Council

Authority for the participation of the Treasure Coast Regional Planning Council in the river management program is based on Sections 380.06 and 163.3164, FS. The former provides for regional planning councils to coordinate the review of development of regional impact applications with affected governmental agencies. The latter mandates the Council to review and comment on the content of local comprehensive plans prior to their adoption by local governments. The Council reviews development proposals and planning documents for consistency with the Strategic Regional Policy Plan.

SPECIAL DISTRICTS

Two Special Districts are located within the watershed of the Northwest Fork of the Loxahatchee River.

Loxahatchee River Environmental Control District

The Loxahatchee River Environmental Control District (LRECD) provides water supply, wastewater management, storm drainage and various planning, regulatory and operational functions (Chapter 71-822, Special Acts of Florida, 1971, as amended). The jurisdictional area of the LRECD includes the majority of the developed portions of the Loxahatchee River watershed. The LRECD has active roles in wastewater management, aquatic monitoring, environmental education and public information.

LRECD's wastewater management responsibilities include operation of a regional wastewater treatment and water reuse system that serves the municipalities of Jupiter, Tequesta, Juno Beach, along with the unincorporated areas of northern Palm Beach and southern Martin Counties. The wastewater treatment facility has a permitted treatment capacity of 11 million gallons per day (MGD), which is presently sufficient to meet anticipated needs of our growing community. LRECD's reuse (water recycling) program uses reclaimed water to meet landscape irrigation needs at area golf courses, parks, and residential communities. This innovative water recycling program lowers the demands on natural water resources, and preserves untapped water to help meet the needs of the river. Since 1983, LRECD's reuse program has saved over 33 billion gallons of freshwater for the natural environment.

For more than 20 years, the LRECD has served as one of the primary agencies conducting research and monitoring on the Loxahatchee River. Wild Pine Ecological Laboratory is the LRECD's state-certified laboratory, which provides the needed scientific staff, equipment and professional analysis to conduct research and monitoring. This laboratory is available to the public and scientific community for the purpose of advancing knowledge about the river.

LRECD also operates The Loxahatchee River Environmental Center, known locally as the River Center, which opened August 23, 2008. The River Center traces the Loxahatchee River from

its headwaters in Palm Beach County through the cypress dominated floodplain in the Wild & Scenic segment, into the central embayment and finally out through Jupiter Inlet into the Atlantic Ocean and the Gulf Stream. Visitors can explore the history of the watershed, its environmental value, modifications and problems associated with ever-increasing human population and development, and programs and projects underway to help preserve and restore this valuable and unique system. LRECD also hosts on its grounds the Busch Wildlife Sanctuary, a wildlife refuge and educational facility offering animal exhibits, including American Bald eagles, deer, panthers, osprey, reptiles, as well as rehabilitation program and nature trails. The River Center and Busch Wildlife Sanctuary are used to educate our community and create better stewards of our beautiful river.

Jupiter Inlet District

The Jupiter Inlet District has broad authority to construct and maintain an inlet at the mouth of the Loxahatchee River, to deepen and maintain the river where required, and to construct any improvements needed to accomplish these purposes (Chapter 8910, Special Acts of Florida, 1921).

DRAINAGE DISTRICTS

Under Chapter 298 and various special acts and amendments, these drainage districts are authorized to levy special taxes and to provide surface water management and control in areas not served by municipal or county agencies. The districts are also authorized to construct and maintain canals, ditches, levees, dikes, pumping plants and other works and improvements. The activities of the districts are subject to state regulation by the FDEP and the SFWMD under authority of Section 403.061 and Chapter 373, Part IV, FS. Six drainage districts are located within the Loxahatchee River basin:

Hobe-St. Lucie Conservancy District

The Hobe-St. Lucie Conservancy District was created in 1972 and services primarily agricultural areas, but also residential areas (Hobe Sound Polo Club) and public lands. In total, this District provides drainage, irrigation and road services for approximately 12,000 acres, of which 9,000 acres are located in the Kitching Creek and Cypress Creek watersheds. The balance of the properties covered in this district fall within the C-44 / St. Lucie River watershed.

Indian Trail Water Control District

Indian Trail Water Control District was created in 1957, serves over 40,000 people, and is approximately located from just north of Northlake Boulevard to Southern Boulevard in the south, 110th Ave N in the east, to M2 impoundment area in the west. The District provides drainage and road improvements.

Northern Palm Beach County Improvement District

The Northern Palm Beach County Improvement District was created in 1959 and covers 128 square miles, reaching from A1A west to the L8 canal, south to the Southern Boulevard area, and north to the Palm Beach County line. General responsibilities include waterway maintenance, storm water control, drought protection, roadway construction and utilities construction.

North Palm Beach Heights Water Control District

North Palm Beach Heights Water Control District was created in the late 1950s and its primary responsibility is to maintain canals for storm runoff. The District services the Heights of Jupiter community, an area bounded on the south by Donald Ross Road, on the west by I-95, on the east by Heights Road, and on the north by Egret's Landing.

Pal-Mar Water Control District

Created in the 1960s, the Pal-Mar Water Control District serves an area of more 34 square miles (22,000 acres) in northern Palm Beach County and southern Martin County that was planned to be developed into a residential area called Rotunda. Currently, no one resides within the district, a majority of the land remains in a natural state and approximately 70 percent of the area is publicly owned while the rest remains in private lots that range in size from .25 to 1.5 acres.

South Indian River Water Control District

South Indian River Water Control District was founded in 1923 and provides road maintenance and water management for 13,000 people in Jupiter Farms, Palm Beach Country Estates, Egrets Landing and Jupiter Commerce Park. The South Indian River Water Control District covers 20 square miles and includes 60 miles of canals and 376 miles of swales.

Chapter 2

RESOURCE DESCRIPTION & ASSESSMENT

A key value of the National Wild and Scenic Northwest Fork is the river's multitude of natural, cultural and recreational resources. This section summarizes the natural and cultural resources of the Wild and Scenic Northwest Fork and assesses those resources that are in need of preservation and protection relative to the goals of this plan.

Since the original management plan was written in 1985, several studies have been completed that document the unique resources contained within the Wild and Scenic Northwest Fork of the river. These studies include the National Park Service's Loxahatchee River Wild and Scenic Study/Environmental Impact Statement, the Jonathan Dickinson State Park Unit Management Plan (2000) and the *Restoration Plan for the Northwest Fork of the Loxahatchee River* (2006). For more detailed natural and cultural resources descriptions, refer to the previously noted reports.

The Loxahatchee River Watershed

Water is the most essential component of the Loxahatchee River ecosystem. Freshwater of sufficient quantity, quality, and appropriate periodicity is essential to maintaining the river's scenic qualities, diverse native plant communities and wildlife populations. Human alterations to the river's natural drainage basins and patterns have reduced the quantity and quality of water in the river, and have contributed to corresponding declines in the river's natural and scenic qualities.

Prior to the arrival of Europeans, the headwaters of the Loxahatchee River were in the Loxahatchee and Hungryland Sloughs and north-central Palm Beach County with a direct connection to the Everglades. Historically, this area was characterized by hydric flatlands interspersed with small, interconnected ponds and streams that produced sheet flow toward the north. Drainage patterns were determined by the poorly defined natural landforms and topography of the area.

Today, the Loxahatchee River watershed covers 240 square miles in Martin and Palm Beach Counties and includes the North Fork of the Loxahatchee River, the Northwest Fork of the Loxahatchee River and the Southwest Fork of the Loxahatchee River. The Northwest Fork is the largest of the three tributaries in terms of watershed size and includes the portions designated as a National Wild and Scenic River.

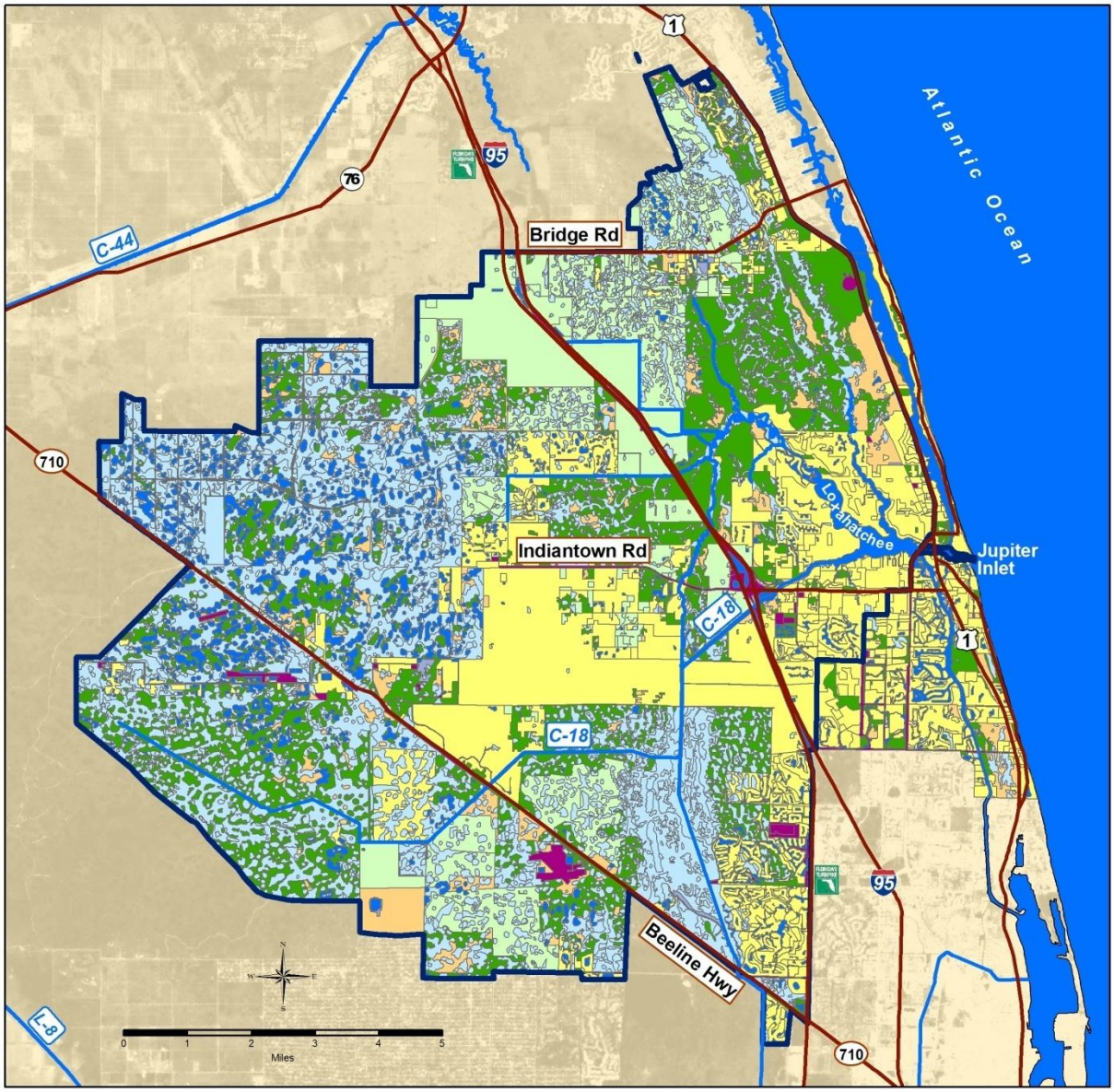
The watershed drainage patterns have been significantly altered with the building of roads (e.g. S.R. 710, I-95 and the Florida Turnpike), construction of the C-18 and C-18 West canals and other associated water control structures, and the development of an extensive secondary canal network and wellfields. Canals were designed to provide drainage and flood protection for agricultural and urban development and the conveyance of water for potable use and irrigation.

Over time, drainage and development in the watershed have lowered ground water levels and altered natural flow regimes and drainage patterns.

As the C-18 and C-18W canals were dredged through the Loxahatchee Slough, the dredged material was placed on both sides of the canals forming a barrier to flow from the slough into the canals. To prevent water from backing up behind these levees and flooding adjacent land, a series of culverts were placed through the levees. Control boards were placed in the culverts to prevent over-drainage of the slough into the canals that were controlled at a much lower level than the natural water level of the slough into the canals that were controlled at a much lower level than the natural water level of the slough. With the passage of time these culverts deteriorated harmfully increasing drainage of the slough. The culverts draining into the C-18 canal have been repaired, but those draining into the C-18W canal continue to create environmental problems.

The SFWMD's C-18 canal drains the south and southwest basins and terminates at the S-46 structure. The South Indian River Water Control District's C-14 canal connects to the C-18 canal, through the G-92 structure, with the beginning of the Northwest Fork of the Loxahatchee River where the river's natural meander pattern begins, approximately two miles south of Indiantown Road. Prior to construction of G-92, water that historically flowed to the Northwest Fork was diverted by the C-18 directly to the Loxahatchee estuary via the S-46 structure (Figure 1). With the construction, and recent rehabilitation, of G-92 the C-18 canal serves as the headwaters of the Northwest Fork when water is available.

Approximately 63 percent of the watershed is in the natural areas land use designation (Figure 4). The property adjacent to the Northwest Fork is primarily in public ownership. The 168,393 acres that are now in public ownership is a direct result of land acquisition for conservation and preservation by federal, state, and local agencies. Urban areas cover 25 percent of the watershed and agricultural and other land uses comprise the remainder of the watershed. The Loxahatchee River watershed and its primary basins are depicted in Figure 5.



Land Use In The Loxahatchee Watershed

Level 1 Landuse 2004

Urban	Water
Agriculture	Wetlands
Rangeland	Barren
Forested	Transportation, Communication, Utilities

Figure 4 - Loxahatchee River Watershed Land Use Map

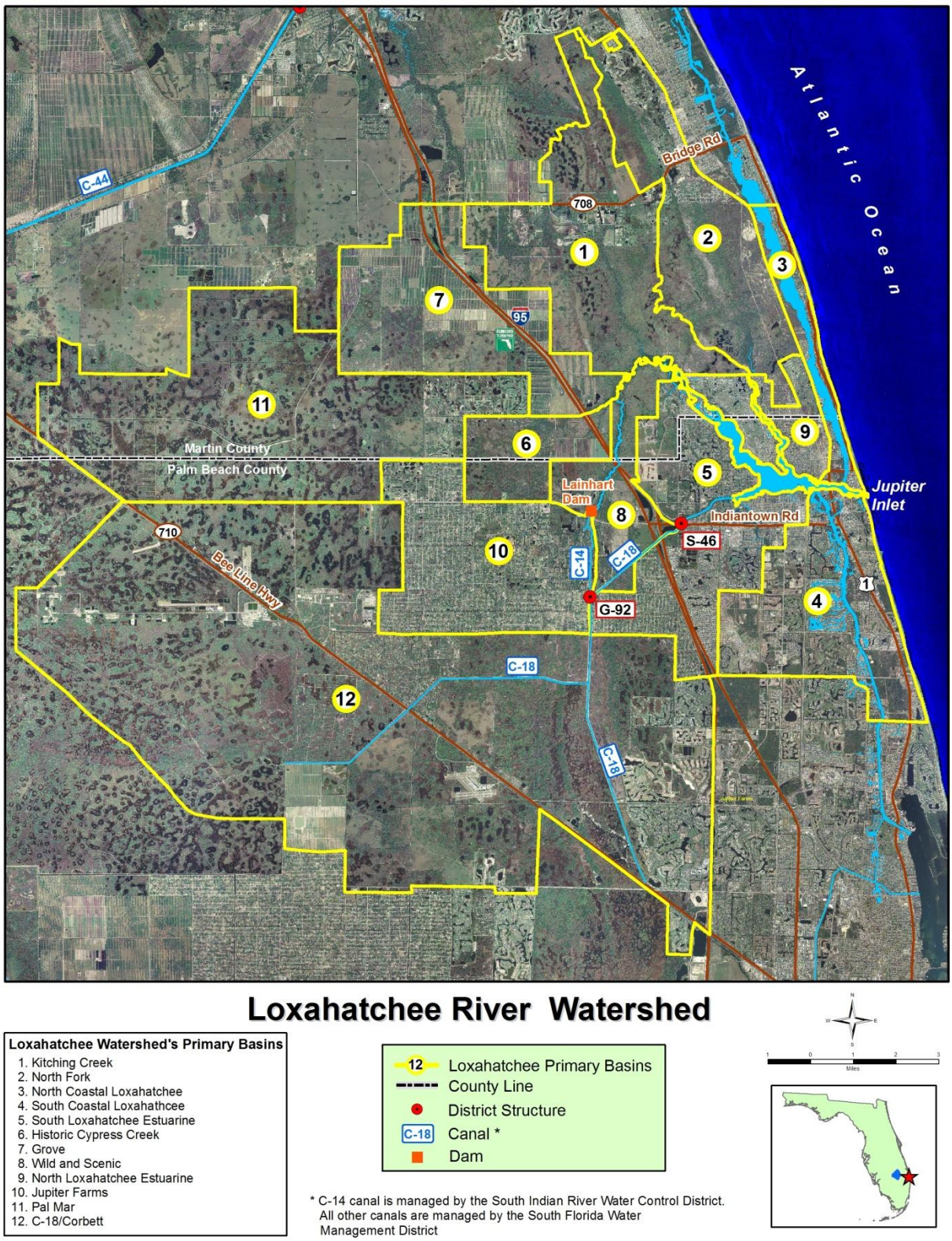


Figure 5 - Loxahatchee River National Wild and Scenic River Watershed Map

The climate of the Loxahatchee River watershed is typical for south Florida and can be categorized by two parameters: rainfall and temperature. The wet season usually begins in late May and lasts until the end of October and the dry season begins in November and lasts until May. The wet season coincides with hurricane season, which typically provides tropical moisture to south Florida. On average, 65 inches of rain were recorded annually at Jonathan Dickinson State Park from 1989 to 2004. Two-thirds of the precipitation typically occurs during the wet season. Average daily temperatures are in the low 90s (°F) in the wet season and the low 80s (°F) in the dry season. Of the 5,758 days on record, only 33 days reached below freezing temperatures (Figure 6).

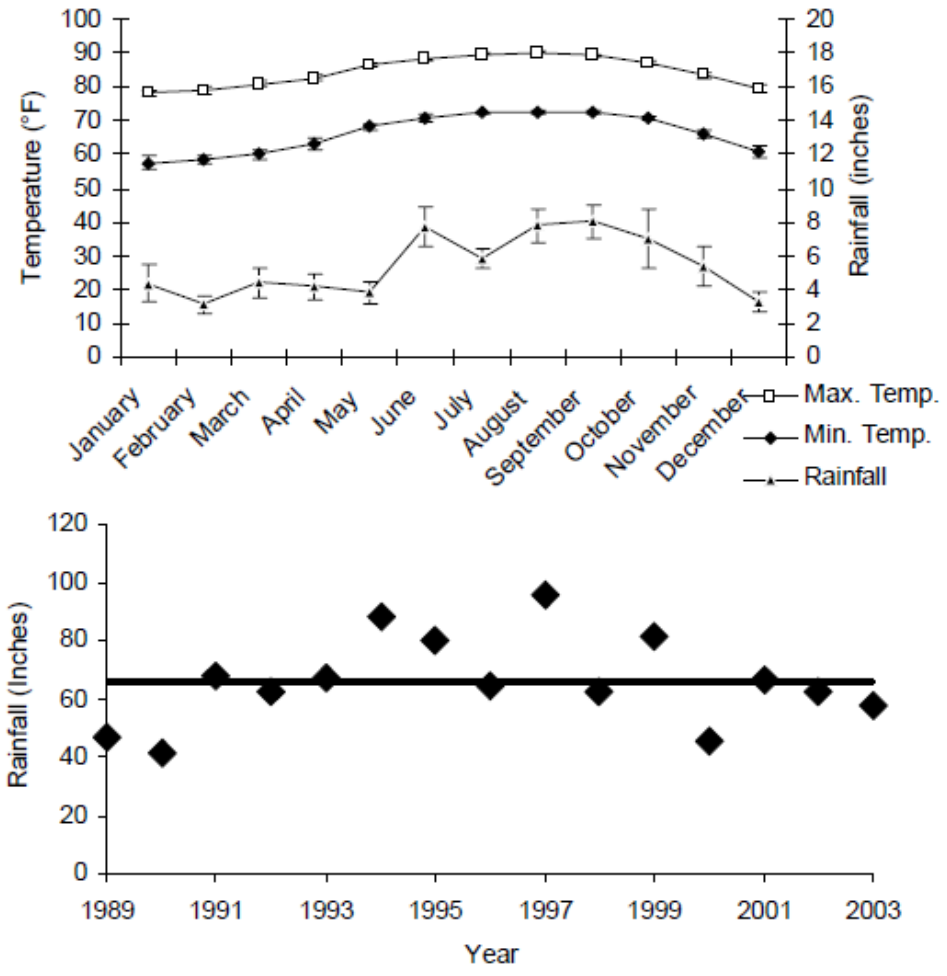


Figure 6 - Seasonal Rainfall and Temperature Patterns

Data from 1989 to 2003 collected within Jonathan Dickinson State Park near US1 north of the main park entrance show distinctive seasonal rainfall and temperature patterns and a large fluctuation in yearly rainfall.

The geologic formations underlying the watershed of the Loxahatchee River form two aquifers separated by confining beds. A shallow, non-artesian aquifer known as the Surficial Aquifer is composed of permeable Pamlico sand, Anastasia limestone, shell beds and Caloosahatchee marl. While this aquifer is the primary source of potable water, the water bearing qualities of this aquifer vary widely throughout the area. The bottom of the shallow aquifer is generally about 180 feet below the land surface.

The second aquifer, the Floridan Aquifer, is separated from the Surficial by several hundred feet of impermeable clay, and extends to depths of about 1,500 feet. This aquifer contains water under sufficient pressure to flow to the surface. In the Loxahatchee River area, the aquifer is composed of limestone of the Hawthorn, Tampa, Suwannee, Ocala and Avon Park Formations, ranging in age from 30 to 60 million years. This aquifer is hydrologically isolated from the Surficial Aquifer and contains moderately high salt concentrations.

The Town of Jupiter obtains water from the surficial and the Floridan aquifers to meet potable water needs within the watershed. The surficial aquifer water is treated using nanofiltration, while the Floridan aquifer water is treated by reverse osmosis.

Data from long-term groundwater monitoring wells in the Loxahatchee River watershed extend back to 1950 and show that water levels within the watershed have decreased. A shallow groundwater well, M-140, with data from 1950 to 1990 shows a 2 foot water level decline (Figure 7) or about 0.06 feet/year over the 40 year period of record. Both actual measurements and a linear regression line of the data are shown. During the 1990's and early 2000 other wells were installed and monitored. The overall statistical trend was a downward trend in groundwater levels. This well is located in the vicinity of the southern terminus of the Ranch Colony Canal and Old Indiantown Road. Further information can be found in the report *Assessment of Groundwater Input and Water Quality Changes Impacting Natural Vegetation in the Loxahatchee River and Floodplain Ecosystem, Florida (*U.S. Geological Survey, 2006).

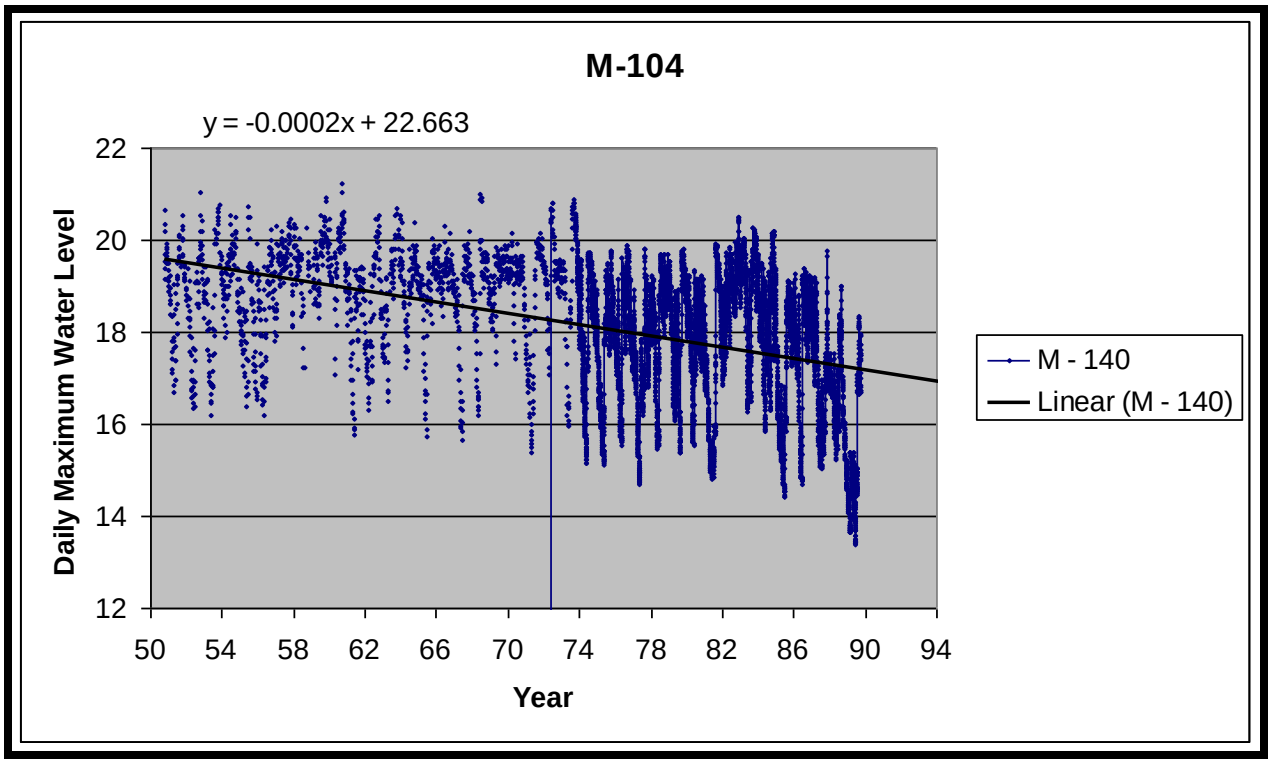


Figure 7 - Groundwater Levels in M-140

The Wild and Scenic Northwest Fork Drainage Basin

The federally designated National Wild and Scenic Northwest Fork extends from river mile 5.2 to river mile 15.5. The headwaters of the Northwest Fork currently originate in the Grassy Waters/Loxahatchee Slough and the Hungryland Slough Natural Area. The Northwest Fork's designated 'recreational' segment begins at the confluence of C-14 and the Northwest Fork and extends approximately one half mile north to Indiantown Road.

North of Indiantown Road (State Road 706), the river enters Jonathan Dickinson State Park (JDSP) and continues north, into a closed canopy of cypress swamp. This segment of the river is designated as 'Scenic' and extends for over two miles. Two small cabins and the Lainhart and Masten Dams are located along this stretch of river.

Within JDSP, two major structures on the river are the side by side bridges of Florida's Turnpike and Interstate 95. Just downstream of these bridges, the next segment is designated as 'Wild,' and continues for the next two miles. Here, the river flows north and is characterized by high-quality and comparatively pristine cypress swamp. There are no significant man-made structures between the I-95 highway and Trapper Nelson Zoo Historic District.

Downstream of Trapper Nelson's, the next segment is designated as 'Scenic,' and extends for approximately four and a half miles. In this segment, the river widens and the riparian corridor

transitions to a mix of cypress and mangrove. Major tributaries flow into the river in this area, including Cypress Creek, the remnants of Moonshine Creek, Hobe Grove Ditch, Kitching Creek and several smaller tributaries. Upstream of River Mile 7 are a dock for pontoon boats, motor boats, canoes and kayaks and a swimming area for JDSP. By River Mile 7.5, the river banks and floodplain are completely dominated by red and white mangroves. The National Wild and Scenic portion of the Northwest Fork ends at River Mile 5.2.

In 1973, the United States Geologic Survey published a report entitled *The Loxahatchee - A River in Distress, Southeast Florida* by Harry Rodis. The report described un-natural changes in the vegetative community, and concluded that the primary cause of environmental problems and changes in the flora and fauna along the Northwest Fork of the river was the decrease in freshwater moving downstream, and the subsequent upstream movement of salt water from the Atlantic Ocean. The study indicated that a minimum continuous flow of 23,000 gallons per minute, or 50 cubic feet per second (cfs) of freshwater across the Lainhart dam was required to retard further upstream movement of saltwater in the area of the Trapper Nelson Zoo Historic District.

Much of the reduction in flow in the Northwest Fork has been attributed to the diversion of historic flows that resulted from construction and operation of the C-18 canal. The C-18 canal is of particular significance because it drains the Loxahatchee Slough, which originally flowed into the Northwest Fork, and redirects those flows to the Southwest Fork. The C-18 was constructed in 1958 as part of the Central and South Florida Flood Control Project to improve drainage and flood protection for adjacent agricultural, residential, and industrial land and the JW Corbett Wildlife Management Area. The C-18 canal drains a 106 square-mile area (40 percent of the watershed) and discharges flood control releases primarily through the S-46 structure to the Southwest Fork.

Flows may be diverted from the C-18 to the C-14 to improve conveyance to the Northwest Fork. A water control structure, the G-92, was constructed to recreate the connection severed by the construction of local drainage works. Originally a small culvert, this structure was enlarged to convey up to 130 cfs in 1975. In 1987, it was replaced by a gated control structure capable of passing up to 400 cfs in either direction. On average, 34 percent of the water that flows over Lainhart Dam comes through the G-92 structure.

The operation schedule for G-92 determines water flows to the Northwest Fork. During normal conditions water is discharged from C-18 through G-92 to the C-14 into the Northwest Fork and ultimately over Lainhart Dam. During periods of excessive rainfall and high groundwater levels water is discharged from SIRWCD drainage canals to the C-14 through G-92 and into the C-18 and then through S-46 as flood control releases to the Loxahatchee River estuary.

Discharges to the Northwest Fork have increased significantly since the initial operation of G-92. This is partially a result of higher rainfall amounts, but also C-18 has been maintained at higher levels, and water levels in the upstream portion of the river have been increased due to the maintenance of the weirs at Lainhart and Masten Dams. Past erosion of these weirs, along with

additional drainage canal construction, may have increased drainage in the area, thus increasing discharges into the river with subsequent over-drainage and loss of base flow.

The C-18 canal has limited storage capacity and therefore cannot provide water for prolonged controlled discharges, which are needed to increase base flows in the Northwest Fork to the established minimum flow of 35 cfs. The installation and operation of the G-92 structure has not completely achieved the goal of a guaranteed minimum flow of 35 cfs to preserve the freshwater character of the river. Sustaining baseflow discharges to the Northwest Fork during drought is the next step toward achieving the baseflow objective.

Another local drainage system in the Loxahatchee River watershed is west of C-18 in an area known as Jupiter Farms. Drainage occurs through a series of seven east-west collector canals that drain to the SIRWCD C-14 canal. The C-14 contributes approximately 10 percent of the flows over Lainhart Dam to the Northwest Fork. In addition to flows coming in from upstream via the C-14 canal, the segment of the Northwest Fork between Indiantown Road and the Florida Turnpike/I-95 receives an average of nearly 5 percent of its total flow from several small unnamed tributaries within this reach.

The G-160 and G-161 structures were constructed to deliver water from the Grassy Waters Preserve (aka City of West Palm Beach Water Catchment Area) to the Loxahatchee Slough, and eventually to the Northwest Fork of the Loxahatchee River. The intent of these structures was to provide supplemental flow to the headwaters of the C-18 Canal; to meet the established MFL flow targets (35 cfs) for the Northwest Fork of the Loxahatchee River; and to allow for improved hydroperiods in the Loxahatchee Slough.

Although the structures were built in 2003 (G-160) and 2006 (G-161), they were not operated in accordance with their permits or identified target hydroperiods until recently. Stakeholders had concerns that the increase in waters levels within Loxahatchee Slough would adversely affect flood protection in adjacent residential areas. However, on July 1, 2009, after notifying and closely coordinating with the stakeholders, the SFWMD started to operate the system in accordance with the permits and the MFL requirements.

On June 1, 2009, the stage upstream of the G-160 structure was raised to elevation 16.5 feet NGVD, in order to maintain stages within the Loxahatchee Slough that were consistent with the identified target hydroperiods. The optimal stage targets for the slough are 15.5 feet NGVD in May to 17.5 feet NGVD by the end of the wet season (±0.5 ft.). Storing water in the slough during the wet season allows for environmental water deliveries during the dry season.

The SFWMD also began operating the G-161 structure during the early 2009-2010 dry season to deliver supplemental flows through the C-18 canal providing water supply for the Loxahatchee River. The structure was operated several times during the 2010 dry season to meet the MFL requirement during the dry season. In addition, the L-8 reservoir was operated to help replenish the water that was sent north to the River to ensure that the Grassy Waters preserve and the City's water supply would not be impacted by the deliveries.

The historic Cypress Creek drainage basin enters the river from the west just downstream of the Cypress Creek flow gauge and drains 3,581 acres of land. The majority of land within this basin has been purchased by state and local governments for restoration and preservation. Cypress Creek contributes an average of 3 percent of the total flow to the Northwest Fork.

The Pal Mar drainage basin is another significant source of surface water to the Northwest Fork, particularly during periods of low flows. The western portion of the basin is undeveloped wet prairie. The eastern portion of the basin has been impacted by rural development. Water from this basin flows into Cypress Creek upstream of the Cypress Creek flow gauge and then flows into the historic Cypress Creek basin. This basin drains 22,663 acres of land and contributes 28 percent of the total flow to the Northwest Fork.

The Grove drainage basin is an outlet for an extensive network of agricultural canals, draining an area of about 11,209 acres maintained by the Hobe-St. Lucie Conservancy District. The western portion of this basin flows into Cypress Creek upstream of the Cypress Creek flow gauge and then flows to the historic Cypress Creek basin. Approximately 7,500 acres of land drain through the Cypress Creek structure. The eastern portion of the basin flows into Hobe Grove Ditch and Moonshine Creek which both flow into the Northwest Fork near river miles 9.0 and 10.0, respectively. The Grove drainage basin contributes approximately 10 percent of the total flow to the Northwest Fork.

Kitching Creek originates to the north of, and within, JDSP in an area of scattered ponds and marshes. The Kitching Creek drainage basin has the least urban development of the major tributaries and contributes an average of 8 percent of the total flow to the Northwest Fork.

River Hydrology

One of the major accomplishments of the *Restoration Plan for the Northwest Fork of the Loxahatchee River* (2006) was to set goals for the amounts of water needed for river restoration within a scientific framework, specifically using plants as ecosystem indicators, quantitative floodplain measurements and scientific literature. The objective of this section within this document is to highlight the important points of this part of the restoration plan.

The first problem to solve was that specific numbers on water levels and lengths of inundation were not available for the historic Northwest Fork of the Loxahatchee River. To solve the problem hydrologists, engineers and biologists within the SFWMD, FDEP and LRD researched literature and collected vegetation data to determine inundation lengths and depths. Figure 8 replicates the consensus product from the *Restoration Plan for the Northwest Fork of the Loxahatchee River* (2006). The 0 foot stage approximates the mean ground level of the cypress community and 3 feet approximates the mean ground level for the hydric hammock community. Essentially, it states that inundation of the floodplain should be from four to eight months in length and one to two months in the adjacent hydric hammock.

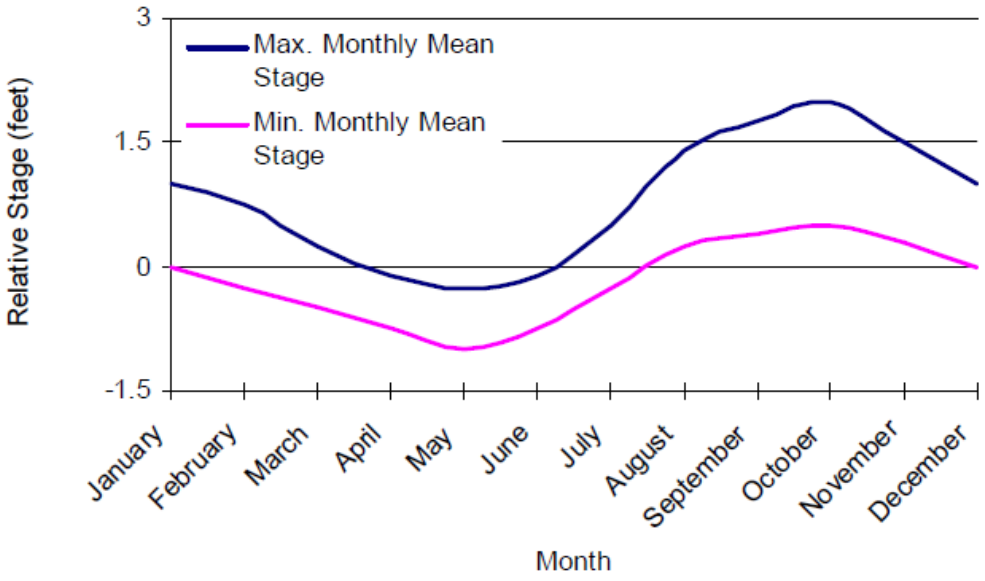


Figure 8 - Hydrograph for the Northwest Fork of the Loxahatchee River

Next the question of how much flow is needed to recreate the hydrograph in Figure 8 was answered. The process was done in two steps. The first was to map the contours of the floodplain in four transects along the Northwest Fork. Transects run perpendicular to the river channel from the top of the edge of the floodplain (marked by steep slopes and changes in vegetation) to the edge of the river channel. The first four transects were particularly important in determining river hydrology because they were the most pristine in terms of riverine vegetation and were relatively unaffected by tides, which average about two feet downstream of the Trapper Nelson Zoo Historic District. The second task was to determine the flow levels required for floodplain inundation. Transect 1 at River Mile 14.5 in Figure 9 shows an elevational cross-section of the river floodplain correlated with water stages. Generally speaking, at 90 cfs or less water was contained within the river channel and at 110 cfs or more water was flowing out of the river channel. As stated previously, the 110 cfs or more scenario was thought to occur during four to eight months of any given year.

Given this information of stage and flow, several alternatives were considered and a consensus alternative (LV90-TV60) was picked both by management agencies and the public at large through various open meetings. Details for the restoration scenario can be found in the *Restoration Plan for the Northwest Fork of the Loxahatchee River* (2006) Chapter 8. The preferred restoration flow scenario provides a dynamic flow pattern with dry season mean monthly flows of 69 cfs over Lainhart Dam. In the freshwater riverine floodplain, the riverine floodplain swamp will be inundated four to eight months and the hydric hammocks will be inundated for about 30 to 60 days in a year. Note that other components, other than the health of the riverine floodplain swamp, were factored into picking this scenario including fish larvae, oysters and seagrasses. Harm to these important components will be minimal according to the

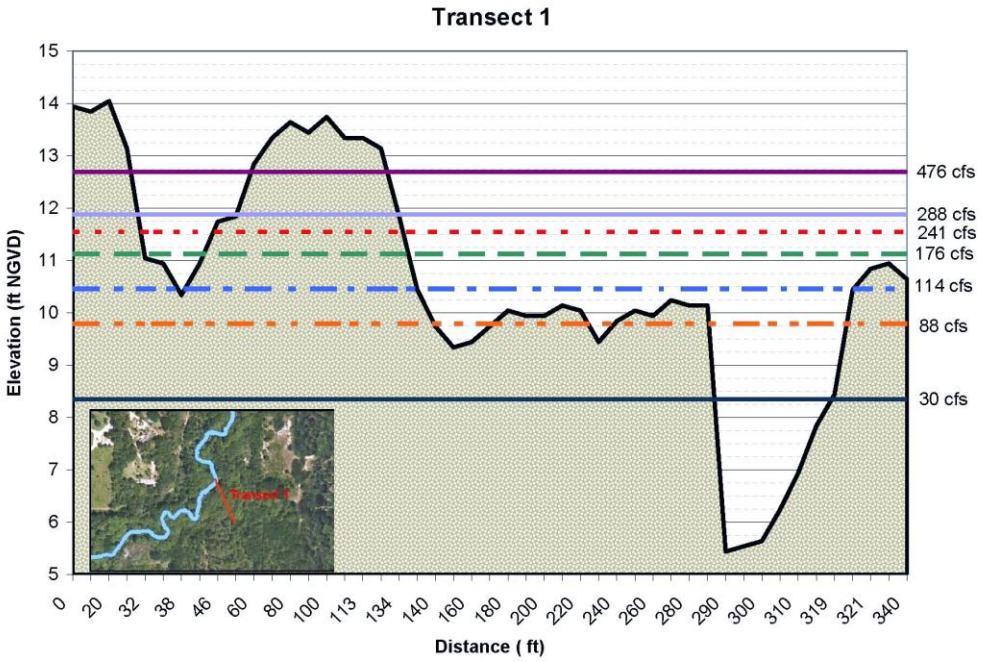


Figure 9 - Elevational Cross-Section of Transect 1 of the River Floodplain

best available science presented in the *Restoration Plan for the Northwest Fork of the Loxahatchee River* (2006).

Water Quality in the Northwest Fork of the Loxahatchee River

Over the past 35 years, water quality conditions, including spatial and temporal variability, within the Loxahatchee River watershed have been characterized by staff from the Loxahatchee River District's Wild Pine Laboratory. The goal of this water quality monitoring effort, initiated in the 1970s, is to document the ecological health of the river and to determine the location and extent of water quality issues within the watershed that need to be addressed. Three primary water quality monitoring projects are ongoing: (1) RiverKeeper water quality sampling; (2) datasonde (i.e., continuous) monitoring; and (3) stormwater sampling.

The primary goal of the RiverKeeper water quality monitoring program is to assess long-term compliance with the interim water quality targets as established in the 2006 Restoration Plan for the Northwest Fork of the Loxahatchee River. In addition, results from this project are used to identify short-term deviations in water quality conditions, which are then used to discover anthropogenic activities leading to degradation of water quality. LRD staff collects 10 monthly and approximately 30 bi-monthly water quality samples from throughout the watershed (Figure 10). Each sample is then analyzed in LRECD's National Environmental Laboratory Accreditation Program (NELAP) certified laboratory for nearly 30 parameters (e.g., dissolved oxygen, pH, specific conductance, total nitrogen, orthophosphorus, fecal coliform bacteria, chlorophyll a, etc).

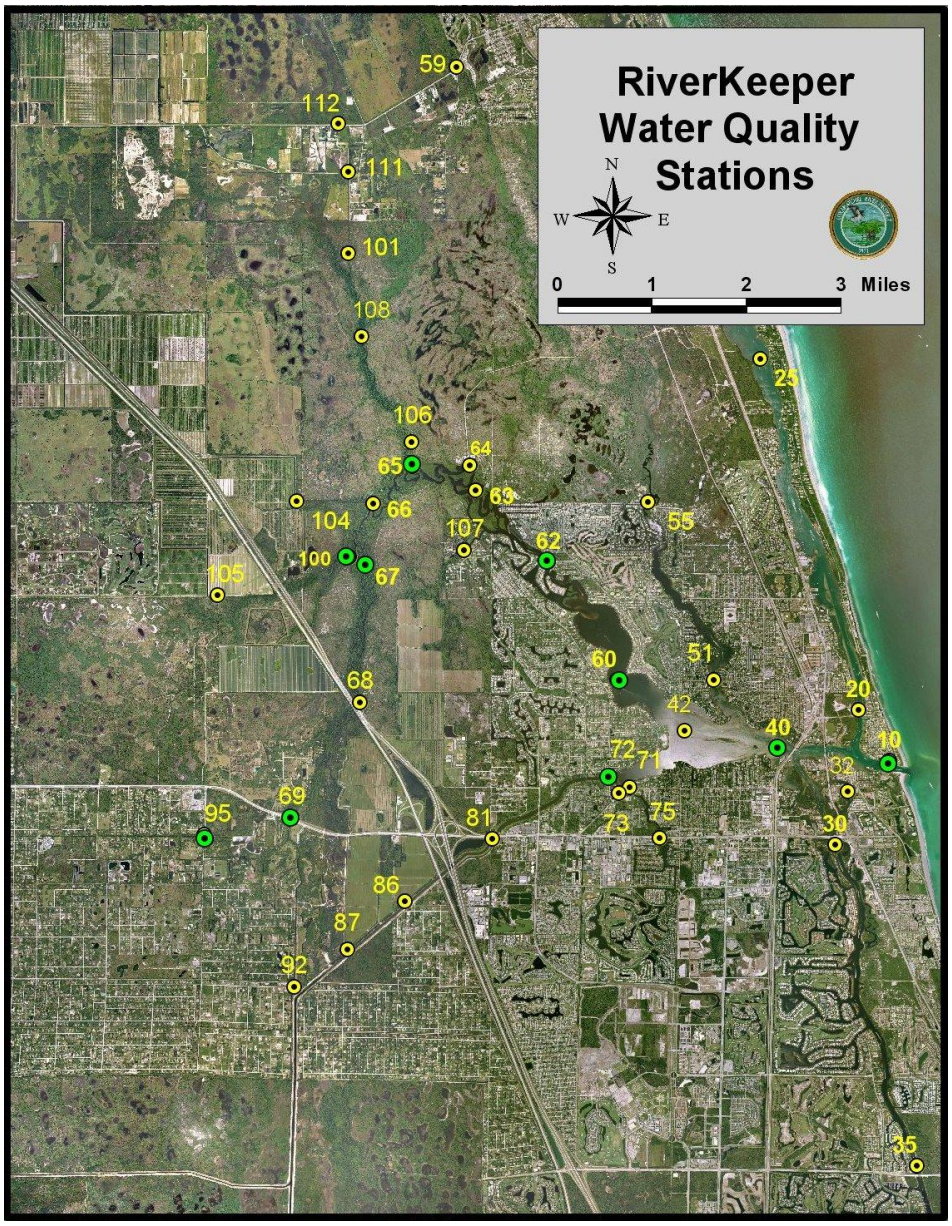


Figure 10 - LRECD's Water Quality Monitoring Stations

Figure 11, a box and whisker plot, is presented here to illustrate how data from the Riverkeeper water quality monitoring project are used to assess spatial and temporal deviations in water quality. Here, total nitrogen is plotted across nine stations from the C-18 (headwaters) to the G-92 structure and down the Northwest Fork to approximately the Jonathan Dickinson State Park boat ramp. An increase in total nitrogen is noticeable in the more downstream samples such as stations 66, 65, 64 and 63, which correlates with studies from other rivers that show elevated nutrient concentrations at intermediate salinities. Also, the figure clearly shows significantly higher total nitrogen concentrations during the 2004-2005 and 2005-2006 periods, when

multiple hurricanes impacted the watershed and produced several large stormwater runoff events.

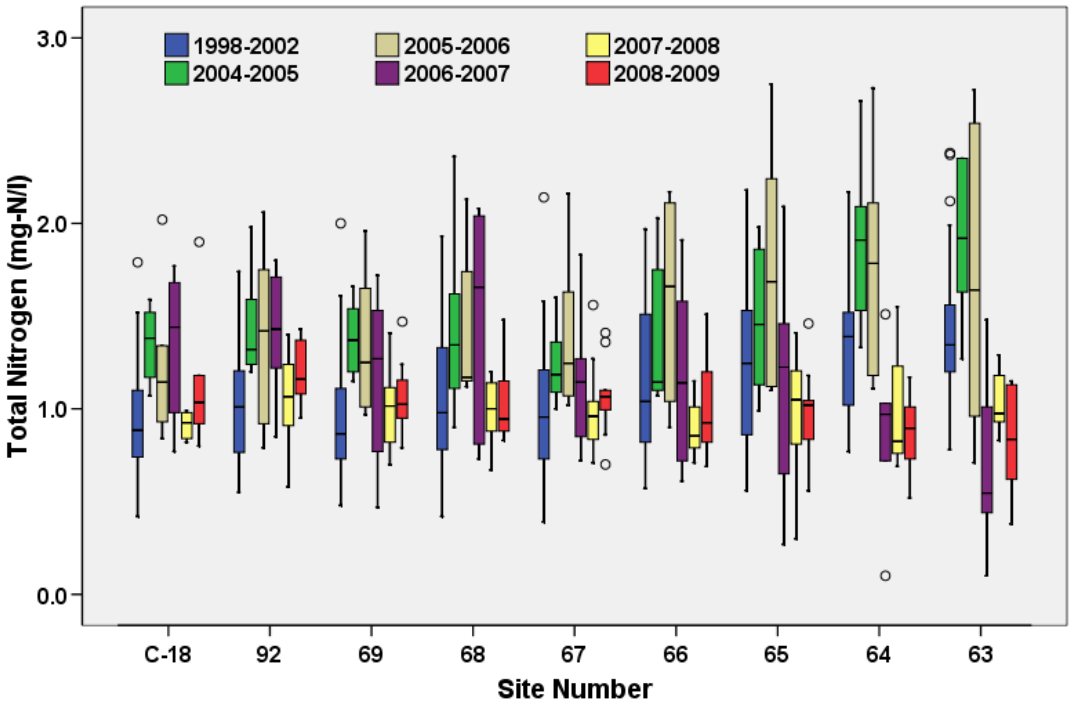


Figure 11 - Spatial and Temporal Variation in Total Nitrogen Concentrations

Nitrogen concentrations during the 1998-2002 period represents 'target' water quality values. Nitrogen was sampled across nine sites spanning from the C-18 (headwaters) to station 63, near the downstream extent of the wild and scenic boundary. Noticeable higher nitrogen concentrations were observed during 2004-2005 and 2005-2006, when the region was impacted by multiple hurricanes and excessive stormwater runoff.

Finally, water quality of a given year can be assessed relative to the established target water quality conditions by comparing the median condition (horizontal line within each bar) of a given year against the median condition of the 1998-2002 period, i.e., the Interim Water Quality Targets (**Table 2**) as established in the 2006 *Restoration Plan for the Northwest Fork of the Loxahatchee River*. Such comparisons allow a quick assessment of relative water quality conditions across sampling locations and across years. Again, the most notable exceptions were observed during the 2004-2005 and 2005-2006 periods. It appears that the excessive stormwater runoff resulted in elevated turbidity and nutrient concentrations in Northwest Fork water samples, and these signals were amplified at the more downstream sites with intermediate salinity conditions.

Table 2 - Interim Water Quality Targets

WATER QUALITY PARAMETER	LOXAHATCHEE RIVER AND NORTHWEST FORK STATIONS				
	Estuarine Reach		Tidal Floodplain	Riverine Floodplain	
	Marine	Polyhaline Ecozone	Mesohaline/ Oligohaline Ecozones	Wild & Scenic Reach	Fresh Water Tributaries
	Stations 10, 20, 30	Stations 51, 60, 72	Stations 62, 63, 64	Stations 67, 68, 69	Stations 81, 95, 100
Temperature(◦C)	25.4	25.4	24.3	24.1	24.4
pH (units)	7.83	7.69	7.56	7.37	7.44
Alkalinity (mg/L)	117	115	135	159	146
Salinity (ppt)	31.5	23.9	7.6	0.5	0.5
Specific Conductivity (mmho/cm)	48.2	37.7	12.1	0.5	0.5
Color (PCU/units)	18	46	61	64	63
Total Suspended Solids (mg/L)	6.8	6.1	4.2	4.1	4.4
Turbidity (NTU)	2.7	3.0	2.1	2.3	2.5
Secchi Disc (Meters)	1.74	1.27	1.39	1.10	1.26
P.A.R. @ 1M (%)	61.7	40.1	21.6	--	--
Dissolved Oxygen (mg/L)	6.53	6.41	5.54	5.30	6.21
Dissolved Oxygen Saturation (%)	94.8	89.2	67.5	63.5	70.7
Total Phosphorus (*μ*g/L)	25	38	56	46	51
Total Nitrogen (mg/L)	0.98	1.31	1.41	0.99	1.03
Ammonia Nitrate (mg/L)	0.058	0.072	0.065	0.087	0.077
Chlorophyll a (*μ*g/L)	3.45	8.02	4.74	2.94	4.79
Fecal Coliform Bacteria CFU/100mL	17	99	211	282	325

Continuous water quality monitoring, using *in situ* autonomous instruments (i.e., datasonde), occurs at four locations in the Wild and Scenic segment of the Northwest Fork of the Loxahatchee River. These sites are Stations 69, 67, 66 and Kitching Creek (KC). Station 69 is the most upstream location and was located where Indiantown Road crosses the Loxahatchee River. Station 67 is located at Trapper Nelson's dock. Station 66 is in the Loxahatchee River near the confluence of Hobe Grove ditch. The Kitching Creek (KC) site is in the Loxahatchee River at the confluence of Kitching Creek (Figure 12). Note that two datasondes were deployed at Kitching Creek – one at the surface (0.5 m deep) and one in the middle of the channel approximately 20 cm off the bottom. At each of these monitoring locations in the Wild and Scenic River the following parameters were monitored: temperature, pH, DO, salinity, conductivity and water depth. Stations 67 and 66 were added during a period of extended drought. These additional stations were implemented to help understand the dynamic

movement of the salt wedge upstream into the Northwest Fork as a result of diminished freshwater discharge over Lainhart Dam (Figure 13). The chart plots maximum daily salinity at Kitching Creek as a function of mean daily flow over Lainhart Dam. The red, vertical dashed line is at 35 cfs, the MFL for the river. As flow over Lainhart Dam falls below 35 cfs, bottom salinity at Kitching Creek increases rapidly to levels that stress cypress seedlings. It includes data from 1,479 days during 2005 – 2009.

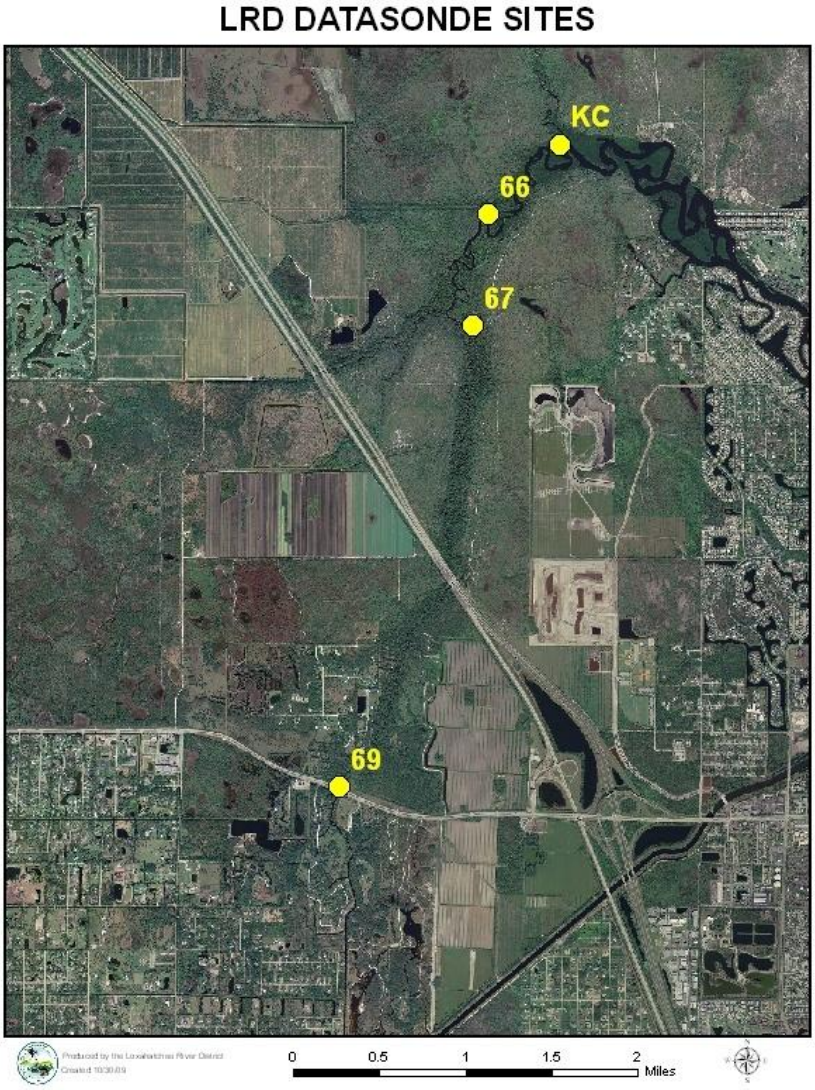


Figure 12 - LRECD Datasonde Sites

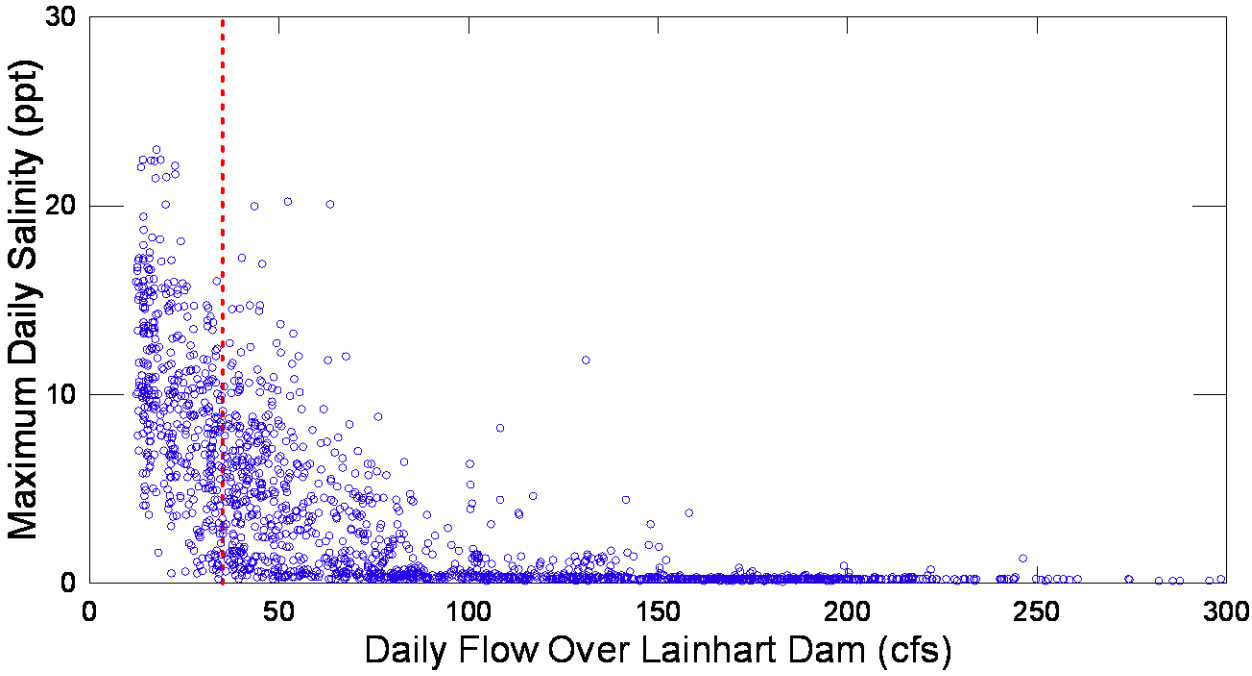


Figure 13 - Maximum Daily Salinity at Kitching Creek

Finally, during significant rainfall events, Loxahatchee River District staff monitors water quality at high temporal resolution (every four hours) at a few sites to characterize the nutrient load flowing into the river during periods of elevated stormwater runoff. One example of the results from this monitoring is shown in Figure 14, which shows nitrate and nitrite concentration in simultaneously collected samples from an upstream and downstream site in Jupiter Farms. The upstream site, station 95, was located in SIRWCD's canal 2, immediately east of Jupiter Farms Road, while the downstream site, station 93, was located in canal 2 immediately upstream of SIRWCD's control structure approximately 300 meters before flowing into the Northwest Fork.

Thus, the two sites were selected to assess the potential reduction in nutrients in the water column as canal 2 water flowed through the 18.5 acre lake on Palm Beach County's Hatcher/Halperin property. The results presented in Figure 14 show a significant reduction in nitrate and nitrite concentration in the water column after the water flowed through the lake. Nitrate and nitrite are useful when trying to evaluate the impact of runoff on nutrient loading, because nitrate and nitrite are both highly soluble and mobile and have a high potential for entering surface water when it rains. Thus, these data clearly suggest the effectiveness of this stormwater lake in reducing the nitrate and nitrite nutrient load to the Northwest Fork. When

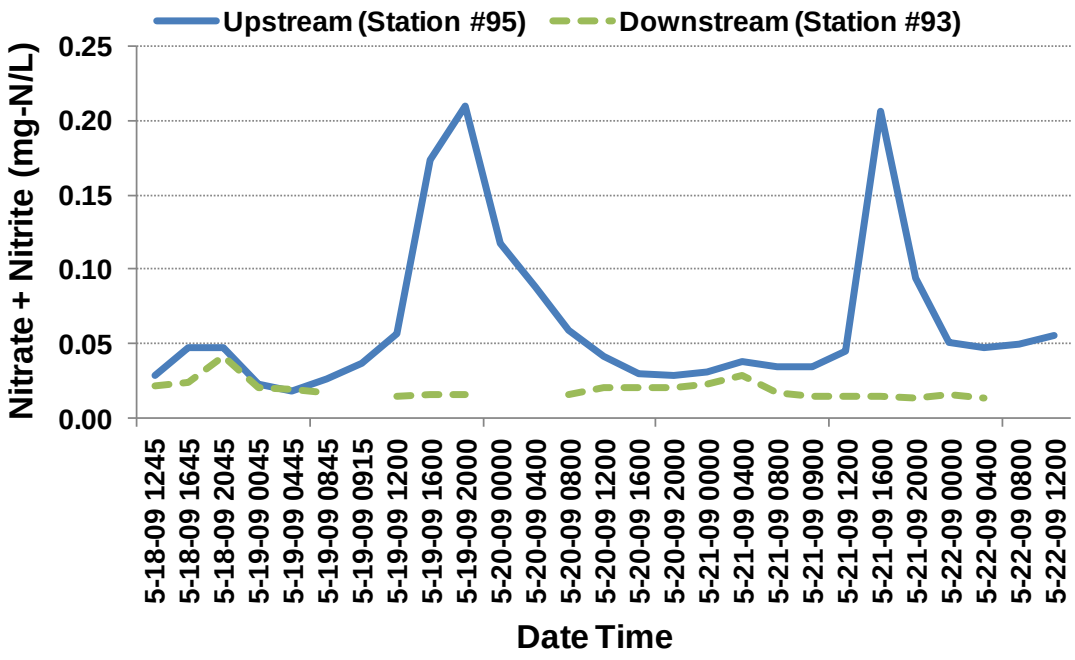


Figure 14 - High Frequency Water Quality Sampling During Major Rainfall Events

combined with hydrologic and biological data, these water quality studies offer a powerful tool to understand and adaptively manage the watershed.

Plant Communities

The *Restoration Plan for the Northwest Fork of the Loxahatchee River* (2006) and *Riverine and Tidal Floodplain Vegetation of the Loxahatchee River and its Major Tributaries* (2009 Vegetation Report) detail the forest types on the Northwest Fork of the Loxahatchee River. The findings printed in these documents resulted from data collection on 10 transects, each with numerous plots within Jonathan Dickinson State Park. The plant communities of the floodplains of the Northwest Fork were divided into three distinct groups or reaches of river: riverine, upper tidal and lower tidal. Riverine was defined as 80 percent or more of the canopy dominated by Bald Cypress, Pop Ash or Water Hickory. For lower tidal areas, mangroves were found to cover more than 75 percent of the canopy and pond apple made up less than 10 percent of the canopy. The in-between reach of upper tidal consisted either of pond apple or pop ash, with 60 percent or more coverage or mangroves and pop ash in abundance of greater than 60 percent. Five plant communities including swamp, bottomland hardwoods, hammock (hydric and mesic), and upland (wet flatwoods) were identified in the three reaches and can be found in the *Restoration Plan for the Northwest Fork of the Loxahatchee River* (2006), Chapter 3, Table 3-2.

The riverine section of the Loxahatchee extends from Riverbend Park to river mile 9.5. This part of the floodplain has primarily freshwater canopy forest that is generally unaffected by salinity.

The upper tidal reach extends from river mile 9.5 to river mile 8.13 and has a mixed freshwater/brackish canopy forest that has experienced some saltwater intrusion. The lower tidal reach from river mile 8 to beyond the National Wild and Scenic portion of the river (Figure 1) has primarily salt tolerant species and is highly influenced by tides.

A variety of non-native, invasive plants occur in and around the floodplain of the Northwest Fork of the Loxahatchee River. Generally there are few invasive aquatic species in the channel of the river with the exception of the area in the upper part of the river (near Indiantown Road) where there is some Water Lettuce (*Pistia stratiotes*) and Water Hyacinth (*Eichhornia crassipes*). All along the floodplain from Indiantown Road to the Florida Turnpike the worst non-native invasives are: Arrowhead Vine (*Syngonium podophyllum*), Wild Taro (*Colucasia esculenta*), Asian Marsh Weed (*Limnophilia sessiliflora)*, and Indian Swamp Weed *(Hygrophilia polysperma)*. All along the rest of the floodplain of the river (all parts) Java Plum (*Syzigium cumini*), Brazilian Pepper (*Schinus terebinthifolius*), Strawberry Guava (*Psidium catteleianum*), and Old World Climbing Fern (*Lygodium microphyllum*) can be found in localized thickets or as individual plants that are scattered. In general, many of these non-native plants have a low tolerance of salt and therefore are not as prolific further downstream, but they may still occur as individuals or in small clumps in higher, drier areas. There is a variety of other non-native, invasive plants but the above six are the main target of invasive plant control efforts. More detailed information on non-native invasive plants can be found on pages 68 – 70 of the 2009 Vegetation Report.

Of particular interest to this plan are the anthropogenic changes in the riverine reach, including:

- Logging of cypress in select parts of the river in early and mid-parts of the 20th century;
- Non-native, invasive plant proliferation into the floodplain; and
- Re-engineering of the Loxahatchee River watershed, which has decreased the hydroperiod of the river, increased saltwater intrusion and thereby reduced the geographic extent of the riverine reach.

The third of these problems, the gradual reduction in the number and geographic extent of healthy bald cypress in the floodplain and their replacement by mangroves is the major target of restoration efforts. In 1967, just upstream of the park's boat ramp, freshwater vegetation was still present, but approximately 67% of the cypress trees have since died. Presently, the vegetation at this research site (RM 6.46) is now dominated by white mangroves. Virtually all of the cypress in the lower areas of the National Wild and Scenic Northwest Fork of the Loxahatchee River and below Kitching Creek are not reproducing and are dying. In the lower and upper tidal reaches of the river one can see the remnants of many large bald cypress trees. Above Kitching Creek, the number of live cypress trees increases with increasing distance up the river.

An analysis conducted by the USGS between 1979 and 1982 further documented the extent of environmental stress in the cypress trees along the Northwest Fork. The study examined tree

core samples to identify changes in tree ring width and quality. The results of the study indicated that although all of the trees sampled had experienced stress at periodic intervals over their life histories, the proportion of stressed trees below River Mile 9 increased from 30 percent in 1940 to 80 percent in 1982. Stressed trees above River Mile 9 decreased from 11 percent to 3 percent during the same period. Further, the study found a high correlation between the incidence of growth stress and high salinities in surface water and soils.

A long-term tide and salinity monitoring network was established in the Loxahatchee River and the Northwest Fork in 2002. Additional flow measurement gauges were also installed on Cypress Creek and Hobe Grove Ditch, in addition to the existing flow gauges at Lainhart Dam and Kitching Creek. This monitoring network constantly takes measurement of the freshwater inflow to the Northwest Fork and records tide and salinity response at 15 minute intervals. Combined with the monitoring and data collection network that has been operated by the Loxahatchee River Environmental Control District, a large amount of flow and salinity data has been accumulated in recent years. This comprehensive dataset formed the basis for a more accurate and updated relationship between freshwater flow and salinity in the Northwest Fork of the Loxahatchee River.

In addition to the monitoring of surface water, twelve groundwater monitoring wells were installed along the floodplain of the Northwest Fork in 2003. Electronic monitoring at 15- to 20-minute intervals measured stage, temperature and conductivity. This information was useful in documenting hydroperiods and saltwater movement within the groundwater along vegetation transects and provided critical information for understanding the relationships between rainfall, groundwater input, inundation and stage levels in the floodplain.

In addition to the more enhanced data collection and monitoring in recent years, hydrological and hydrodynamic computer models were developed to predict the freshwater inflow to the river under various climate condition and system operation scenarios. The computer models also predict the salinity response to the changes in the freshwater inflow and tidal regime that are associated with any changes downstream and at the inlet. An integrated surface/groundwater model was developed for the floodplain along the upper Northwest Fork. The model simulates the interaction between surface and groundwater and calculates the amount of groundwater input to the river. Field data and computer models were used extensively in the scientific research and the development of the *Restoration Plan for the Northwest Fork of the Loxahatchee River* (2006).

Based on this study, and other available research, it is evident that the decline of cypress in the river is attributable to the upstream movement of saltwater. Occasional inundation by saline surface water probably does not result in serious or long term effects. Frequent inundation, however, gradually increases the salinity of the floodplain's peat soils. Because these soils are not readily flushed, the resulting stress gradually spreads to more and more trees. Attempts to identify the principal cause of saltwater intrusion and to make precise correlations between stress periods and the dates of known events likely to have affected tree growth have been inconclusive. Nonetheless, three causes have been identified as contributing factors:

- Insufficient flows to the Northwest Fork from its headwaters and major tributaries;
- Effects of dredging activities in the river's estuary and Jupiter Inlet; and
- The drawdown of groundwater levels by wells.

Each of these factors must be addressed if the deterioration of the river's cypress communities is to be reversed. The *Discussion and Conclusion* section of the *2009 Vegetation Report* further details the effects of salt water intrusion and inadequate hydroperiod on floodplain plant communities.

Fish and Wildlife

The combination of climate, vegetation and water bodies in the Loxahatchee River watershed has resulted in a high diversity of animal species. In 1965, 267 species, consisting of 169 genera and 78 families, were observed in and along the river and its estuary. Formal work on cataloging and quantifying abundance and distribution of fish and wildlife has been less consistent than vegetation work. Efforts are ongoing to determine baseline levels of abundance for several groups of animals as part of the *Loxahatchee River Science Plan*.

Invertebrate and vertebrate aquatic animals are numerous in the marshes, lakes and streams in the river area. Freshwater fish include largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), redbreast sunfish (*Lepomis auritus*), warmouth (*Lepomis gulosus*), bowfin (*Amia calva*), gar (*Lepisosteidae*), channel catfish (*Ictalurus punctatus*) and many species of minnows. Saltwater fish include snook (Centropomidae), tarpon (*Megalops atlantica*), mullet (*Mugilidae*), jack (*Carangidae*), sheepshead (*Archosargus probatocephalus*), sand perch (*Dipelectrum formosum*), grouper (*Serranidae)*, snapper (*Lutjandiae*) and flounder (*Paralichthys lethostigma*).

Amphibious vertebrates are some of the most recognizable animals and potential indicators of river health. Numerous amphibians, including a large number of frogs inhabit the river floodplain as outlined in the *JDSP Unit Management Plan*. The most prominent amphibious reptile is the American alligator (*Alligator mississippiensis*), along with several snakes and the river's namesake, turtles.

Lastly, there are two mammals that frequent the Loxahatchee River on a regular basis. The endangered aquatic mammal, the West Indian manatee (*Tirchechus manatus*), and the river otter (*Lontra canadensis*).

Many additional species are adapted to using primarily the river channel and floodplain. Birds include the nesting osprey (*Pandion haliaetus*), bald eagle (*Haliaeetus leucocephalus*), and barred owl (*Strix varia*). In the summer a suite of breeding songbirds (*Passeriformes*) use the river and in the winter a multitude of migratory birds utilize the river and floodplain. Mammals abound in the floodplain and include species from the very visible medium sized mammals such as white-tailed deer (*Odocoileus virginianus*), bobcat (*Lynx rufus*), and the ubiquitous raccoon (*Procyon lotor*). Additionally, there is an abundance of species of small mammals, including five

documented species of bats and the omnipresent cotton rat (*Sigmondon hispidus*), which provides food for many different predators.

In the floodplain of the Northwest Fork of the Loxahatchee River there are also a variety of non-native animals. Common animals include Feral Pigs (*Sus scofra*), Nine-Banded Armadillos (*Dasypus novemcinctus*), Cuban Anole (*Anolis sagrei*), Cuban Treefrogs (*Osteopilus septentrionalis*), and Greenhouse Frogs (*Eleutherodactylus planirostris*). Feral pigs commonly root up wetland vegetation in and around the floodplain and their population levels are managed through a trapping program. The other animals listed above are generally left unmanaged because of the high degree of difficulty in their removal.

Table 3 identifies several federal and state listed endangered or threatened plant and animal species specific to the Northwest Fork of the Loxahatchee River and its floodplain. In addition, the entire Loxahatchee River has been designated as "critical habitat" for the West Indian Manatee by the United States Fish and Wildlife Service.

Table 3 - Threatened, Endangered and Species of Special Concern Listing

Common Name	Genus and species	FDA / FFWCC	USFWS	FNAI
PLANTS				
Satinleaf	*Chrysophyllum oliviforme*	Threatened	--	--
Clamshell orchid	*Encyclia cochleata*	Endangered	--	S2
Butterfly orchid	*Encyclia tampensis*	Commercially Exploited	--	--
Giant sword fern	*Nephrolepis biserrata*	Threatened	--	--
Hand fern	*Ophioglossum palmatum*	Endangered	--	S2
Cinnamon fern	*Osmunda cinnamomea*	Commercially Exploited	--	--
Royal fern	*Osmunda regalis var. spectabilis*	Commercially Exploited	--	--
Low peperomia	*Peperomia humilis*	Endangered	--	--
Shield fern	*Thelylpteris reticulata*	Endangered	--	--
Lattice vein fern	*Thelylpterisserrata*	Endangered	--	--
Northern needleleaf	*Tillandsia balbisiana*	Threatened	--	--
Common wild-pine	*Tillandsia fasciculata*	Endangered	--	--

Giant wild-pine	*Tillandsia utriculata*	Endangered	--	--
Twisted air plant	*Tillandsia flexuosa*	Threatened	--	--
REPTILES				
American alligator	*Alligator mississippiensis*	SSC (1,3)	Threatened S/A	--
Eastern indigo snake	*Drymarchon corais couperi*	Threatened	Threatened	S3
BIRDS				
Roseate spoonbill	*Platalea ajaja*	SSC (1,4)	--	S2
Limpkin	*Aramus guarauna*	SSC (1)	--	S3
Little blue heron	*Egretta caerulea*	SSC (1,4)	--	S4
Snowy egret	*Egretta thula*	SSC (1)	--	S3
Tricolored heron	*Egretta tricolor*	SSC (1,4)	--	S4
Swallow-tailed kite	*Elanoides forficatus*	--	--	S2
White ibis	*Eudocimus albus*	SSC (2)	--	S4
Florida sandhill crane	*Grus canadensis*	Threatened	--	S2/3
Bald eagle	*Haliaeetus leucocephalus*	--	--	S3
Wood stork	*Mycteria americana*	Endangered	Endangered	S2
Osprey	*Pandion haliaetus*	--	--	S3/4
Brown pelican	*Pelecanus occidentalis*	SSC (1)	--	S3
Audubon's crested caracara	*Polyborus plancus*	Threatened	Threatened	S2
Snail kite	*Rostrhamus sociabilis*	Endangered	Endangered	S2
MAMMALS				
Florida manatee	*Trichechus manatus*	Endangered	Endangered	S2
FDA = Florida Dept. of Agriculture and Consumer Services (5B-40.0055 F.A.C., July 2010 and Division of Plant Industry List 2003)				
FFWCC = Florida Fish and Wildlife Conservation Commission (June 2010)				
USFWS = United States Fish and Wildlife Service (July 2010)				
FNAI = Florida Natural Areas Inventory				
Key to FFWCC SSC Numbers				

SSC = Species of Special Concern
SSC (1) = significant vulnerability to habitat modification, environmental alteration, human disturbance, human exploitation which may result in species becoming threatened
SSC (2) = may already be threatened, but there are insufficient data for that classification
SSC (3) = if population declines may adversely impact other species
SSC (4) = has sufficiently recovered from past population declines
Key to FNAI guide
S1 = Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.
S2 = Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.
S3 = Either very rare and local in Florida (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.
S4 = Apparently secure in Florida (may be rare in parts of range)
S5 = Demonstrably secure in Florida
SH = Of historical occurrence in Florida, may be rediscovered (e.g., ivory-billed woodpecker)
SU = Due to lack of information, no rank can be assigned.
S? = Not yet ranked (temporary)

Cultural History

At the time of European contact, the Jupiter Inlet was known as Hobe or Jobe. The English interpretation of Jobe was Jove, which later became Jupiter. The Jaega tribe originally inhabited the area around the Loxahatchee River near the Jupiter Inlet. Many believed that one of the earliest Europeans to visit the area was Juan Ponce De Leon. When his crew turned into the Jupiter Inlet in 1513 and they were met by fierce local inhabitants, who “immediately tried to take his boat, the oars and their weapons.” The explorer later visited the Loxahatchee River which he named La Cruz but “sixty Indians went there to hinder him,” and he subsequently sailed to the south.

By the late 1700s, European diseases and slavery had severely reduced the populations of the Jaega and other indigenous people. The few remaining were either killed or assimilated by the Creek indians from present-day Georgia as they moved south into Florida. The Creeks had themselves been displaced by white settlers. The former Creeks and those who joined them, including escaped slaves, became known as Seminoles. The name Loxahatchee originated from the two Seminole words, "Lowchow" meaning turtle, and "Hatchee" meaning river.

The Seminoles occupied south Florida during and shortly after the Second Seminole War of 1835-1842, which drove them into the swamps of the Everglades. Trying to end the war, Major General Thomas Jesup brought down the largest army, 1500 men, which included an amphibious patrol unit commanded by Navy Lt. Levin Powell. On January 15, 1838 Powell's unit was in search of the Seminoles in a dense hammock along the Northwest Fork of the Loxahatchee River, in what is today Riverbend Park. The unit was suddenly met by musket fire from Seminole warriors and overpowered by the much larger force of swamp fighters. The battle ended at dark and Powell's small group of 80 barely escaped. The event is commemorated in an historic marker at the site entitled "Powell's Battle."

Nine days later, on January 24, 1838, with news of the Seminole victory, Jesup's column marched to the headwaters of the river and encountered about 300 Seminoles at a crossing of the Loxahatchee, some 15 miles above the Jupiter Inlet. A brief but savage fight ensued. General Jesup was slightly wounded, seven of his soldiers were killed and 31 were wounded. The Seminoles fought and retired with slight losses. The next day, after a march towards Jupiter Inlet, the soldiers erected an enclosure which they named Fort Jupiter, where they remained for a week. This is referred to as "Jesup's Battle," after the commanding officer of the force pursuing the Seminoles, and is also the subject of an historic marker at the site. The spelling of the river name was changed from Lowchowhatchee to Lochahatchee by General Jesup in letters he wrote while serving at Fort Jupiter. In later years, the spelling was again revised to Loxahatchee by a barge painter who had difficulty spelling the previous version.

The Jupiter Inlet Lighthouse was commissioned on March 3, 1853, when Congress appropriated $35,000 for the erection of a first-class lighthouse near the Jupiter Inlet. The project was assigned to Lt. George Meade who would later defeat Robert E. Lee at Gettysburg. By the time the 108-foot lighthouse was completed in 1859, nearly twice the original $35,000 had been spent. This was mainly due to the high cost of transporting construction materials to the area and the eruption of the Third Seminole Indian War. The light was officially lit on July 10, 1860. During the Civil War, Confederate sympathizers removed the lamp and mechanism and hid it to prevent its use, presumably by the Union navy. The beacon was relit in June 1866. The Lighthouse is listed on the National Register of Historic Places and is managed by the Loxahatchee River Historical Society.

The 63-acre site of the Jupiter Inlet Lighthouse is environmentally as well as historically significant, and it was the third site in the nation to receive Federal designation as an Outstanding Natural Area. The "Jupiter Inlet Lighthouse Outstanding Natural Area" was established by the United States Congress on May 12, 2008. The Outstanding Natural Area designation was created by Congress to protect unique scenic, scientific, educational and recreational resources. The Outstanding Natural Area is a collaborative effort between Federal, county, local and non-governmental partners, and a comprehensive plan for managing the site is currently being developed.

According to Bruce Dawson, Jackson Field Manager for the Bureau of Land Management, "The creation of the Jupiter Inlet Lighthouse Outstanding Natural Area begins an exciting new phase

of expanded opportunities for the public and partners. Inclusion in the National Landscape Conservation System solidifies the long term conservation of the site as a regional and national treasure for generations to come." (source: website of the U.S. Department of the Interior, Bureau of Land Management)

During the period between the Second Seminole War and World War II, homesteaders came to the Jupiter area and settled on the land under the *Armed Occupation Act* of 1842, which offered homesteaders 160 acres of land. Industries in the area included logging of cypress and pine, fishing, farming and trapping of fur-bearing animals. Several early settlers' names are frequently found in local history accounts, including DuBois, Pennock, Carlin and Kitching, but the most famous is Trapper Nelson. The Trapper Nelson Zoo Historic District, now in the National Register of Historic Places, is located at River Mile 10.2 on the Northwest Fork within Jonathan Dickinson State Park. Nelson was born in New Jersey in 1908. Dislike for the bitter northern winters caused Nelson to move about the country and then finally to Florida while still in his teens. Because of poor trapping, Nelson abandoned his original beach settlement near Jupiter and moved to a wilderness area on the Northwest Fork in the mid-1930s. Trapper started to develop what was to become Trapper Nelson's Zoo and Jungle Garden after laws restricted him to trapping on a seasonal basis.

From 1942 to 1944 the federal government operated a radar training base, Camp Murphy, in what is now known as JDSP and relocated the settlers. After World War II, the property was donated to the state of Florida, and named Jupiter State Park, and opened to the public in 1950. Later, the park was renamed Jonathan Dickinson after the merchant who shipwrecked in the area in 1696.

After the Jonathan Dickinson State Park opened to the public, Trapper Nelson continued to operate in the area, but by the late 1950s or early 1960s he closed his property to the public. In 1968, Trapper Nelson was found dead of a shotgun blast and to this day his death remains the subject of conjecture. Following his death, his heirs sold approximately 857 acres of Trapper's property, which bordered the Northwest Fork, to Jupiter Hills Club. Jupiter Hills Club agreed with the state of Florida to swap Trapper's property with the land they desired for a golf course which saved the south side of the Northwest Fork from River Mile 6.0 to 11.0 from being developed. In 1985, the MacArthur Foundation donated to the SFWMD several tracts of property south of the former Trapper Nelson property to Indiantown Road extending protection of the Northwest Fork to River Mile 16 on both sides of the river. The SFWMD also purchased small land parcels and Palm Beach County worked with other land owners to implement density changes and land exchanges.

Archaeological and Historical Sites

During the 1990s, substantial archaeological work was conducted in and around the lands associated with the Wild and Scenic Northwest Fork (Kennedy, Lewis et al. 1991; Kennedy et al. 1993; Pepe and Kehoe 1992; Kennedy et al 1994; Carr, Steele, Pepe and Spears-Jester

1995; Carr, Spears-Jester, Pepe and Perez 1995; Pepe and Carr 1996a; Pepe and Carr 1996b; Pepe 1996a; Pepe 1996b; Wheeler and Lewis 1997; Pepe et al 1997).

As of April 1998, a total of 69 archaeological and historic sites had been identified. Five of these sites are, or were previously, located near the Jupiter Inlet. An additional site is on the North Fork of the Loxahatchee River. Two sites, on the Eastern Slough, and the "Seminole Skirmish Line," were destroyed by the widening of Indiantown Road (SR706) west of the Florida Turnpike. The remaining 61 sites are located on lands associated with the Wild and Scenic Northwest Fork. Of these sites, 22 are managed completely by JDSP and 39 by Palm Beach County. One site at Riverbend Park is partially managed by Palm Beach County while other portions of the site are privately owned. Most of the site where the Battle of the Loxahatchee occurred is managed by Palm Beach County and JDSP.

Sites within the Town of Jupiter are regulated by the Town's Historic and Archaeological Preservation Ordinance. The Town of Jupiter issued two Certificates to Dig to Palm Beach County in 2007, which provides for procedures for subsurface excavation work to be done in conjunction with development of Riverbend Park. Archaeological monitoring of subsurface excavation work was done consistent with the conditions of the Certificate to Dig from 2007 through 2010. In 2010, three new prehistoric sites were recorded as a result of the archaeological monitoring of development of the park.

The majority of sites associated with the National Wild and Scenic Northwest Fork are prehistoric. Most are seasonal and/or temporary camps located in the hammocks and floodplain swamps bordering the Loxahatchee and its associated streams and sloughs. Many of these sites can be described as "black dirt middens." The oldest sites date to the Late Archaic period (3000-750 B.C.) while the most recent sites date to the East Okeechobee IV period (A.D. 1500-1750). However, the vast majority of sites seem to date to the East Okeechobee I period (750 B.C. - A.D. 800).

Archeological and historic investigations conducted around the National Wild and Scenic Northwest Fork has shed important light on the two battles of the Loxahatchee. This is especially true of work conducted by the Archeological and Historical Conservancy during the Indiantown Road widening project and a survey of the Northwest Fork. Jesup's military camp and most of the battlefield can now be fairly safely interpreted as having been on the west side of the river, mostly in Riverbend Park. The Seminole village can be interpreted as having been on the east side of the river, on what became the Shunk tract, the Reese Life Estate and/or former Riverbend Trailer Park. Powell's battle began somewhere around the Eastern Slough of the Loxahatchee and his furthest advance was probably to the aforementioned Seminole village on the east bank of the river. In addition, archival research has demonstrated that the military trail between Ft. Van Sweringen and Ft. Jupiter passed through lands associated with the National Wild and Scenic River.

Unfortunately, it seems that most of the artifacts from and portions of the Seminole and military camps and the two battlefields have been recovered from the periphery of the actual original locations of these sites. The development and other disturbances which have taken place in

what is now Cypress Creek Natural Area (Jupiter Ranch Tract) property, Riverbend Park, Loxahatchee River Environmental Control District property, the original and present Sierra Square and Indiantown Road have all severely disturbed or destroyed the main portion of Jessup's battlefield and camp, the Seminole village, and probably a good deal of Powell's battlefield as well. Nonetheless, portions of all these sites and the military trail have been identified and have now all been subsumed under the site name "Loxahatchee Battlefield." The area of the Loxahatchee Battlefield site is believed to be eligible for listing on the National Register of Historic Places.

Recreational Resources

Unlike many rivers in Florida that are popular for outdoor recreation, the National Wild and Scenic Northwest Fork has relatively limited public access points. Existing access and major facilities that support public uses are clustered at each end of the 10.3 mile Wild and Scenic river segment, concentrating public use in these areas. Most existing river related recreational uses and major facilities are located within JDSP or at Riverbend Park.

River Access Facilities

Riverbend Park and JDSP are the two primary public access areas on the river. Riverbend Park comprises more than 683 acres and includes a half mile of the "Recreational" segment of the Northwest Fork. Riverbend Park is readily accessible from Indiantown Road and is the only designated launching point for canoe trips downriver to JDSP. A private canoe outfitter, operating as a concessionaire for Palm Beach County, is located at Riverbend Park (Figure 1). Palm Beach County is in the process of implementing a Park Master Plan that will include major facilities for passive recreational use by the public. Restoration and enhancement of the disturbed portions of the riverbank and park within this recreational area has largely been completed.

Additionally, public access to the Wild and Scenic Loxahatchee River is provided as part of the Northeast Everglades Natural Area (NENA), which stretches from Southern Boulevard in Palm Beach County, north to Bridge Road in Martin County, and from the Atlantic Ocean west to Lake Okeechobee. NENA provides access to over 165,000 acres of natural Florida lands through over 300 miles of hiking and horse trails, including the Ocean to Lake Greenway that connects Riverbend Park to Jonathan Dickinson State Park via the Florida Trail along the "Wild" and "Scenic" portions of the Northwest Fork of the Loxahatchee River.

Riverbend Park is located within the "Recreational" portion of the National Wild and Scenic designation. Public access and use within Riverbend Park may have a significant influence on the river's "Wild" and "Scenic" designated areas. Thus, there is a need to quantify its use. Development of visitor use surveys, collected within JDSP and by the canoe outfitter, is needed to identify visitor use status and trends. A cooperative effort between the PBC and JDSP will be required to analyze data for anticipated changes in facility development. Visitor use surveys can be incorporated into the analysis of visitor capacity studies to ensure resources are not

unduly impacted from over-development and access improvements. Resource user data will assist in development of sufficient facilities: parking space, picnicking, and camping to meet the public need without causing excessive impacts on the natural and cultural resources. Establishment of a monitoring program to assess resource impacts at developed areas is needed to update surveys done in 1999-2000.

Public access to the river at the downstream end of the National Wild and Scenic River is available at two points. The first is the primary launching and take-out point for canoeists who rent boats from the JDSP concessionaire (River Mile 7.2). It is also the staging area for river cruises on the 44-foot "Loxahatchee Queen II," which takes park visitors to the Trapper Nelson Zoo Historic District four times daily and is operated by the JDSP concessionaire. Restrooms, trails, cabins, picnic facilities, and a designated swimming area are located nearby this boat launch. The other launch facility is located at River Mile 6.4 and consists of a concrete boat dock and ramp with restroom. The boat ramp is adjacent to the JDSP River Campground (45 sites). The boat ramp is used primarily by visitors who bring their own boats and canoes, and is also used as the take-out point by canoeists completing the trip from Riverbend Park.

Several secondary access points exist, but these are relatively insignificant as contributing sources of public use. Both Lainhart (River Mile 14.77) and Masten Dams (River Mile 13.5) and their portage areas are a popular rest stop and unauthorized swimming area. Another secondary access point is located just downstream of the designated National Wild and Scenic river corridor at the Tanah Keeta Boy Scout Camp (River Mile 5.9) dock and paved boat ramp. This site is utilized exclusively as an access and take-out point for the Boy Scouts.

The Trapper Nelson Zoo Historic District (River Mile 10.2) is also used frequently as a rest stop by canoeists. The site is also the destination for the "Loxahatchee Queen II" cruises from the park. Overland public access to the site is prohibited, so the site does not contribute to the total volume of river use. Restroom, picnicking and interpretive facilities are located at the site.

Finally, a single private residential access point exists in the 'Scenic' segment of the river near Indiantown Road. This area was acquired for the preservation of the Northwest Fork, however, the Blakenship family was granted continued access across the property.

River Use Patterns

The Northwest Fork's natural features and proximity to urban areas make it exceptionally well-suited for outdoor recreation. Historically, canoeing has been the primary recreational use of the river, but other activities include kayaking, fishing, nature study, wildlife observation and motor boating. Motor boating is effectively restricted to the portion of the river downstream from the Trapper Nelson Zoo Historic District because of the narrow channel, numerous obstructions and shallow depth of the upper river. Since virtually all public recreational use of the upper river involves paddling, the following discussion is limited to use of the river by paddlers.

Types of Recreational Use

Two general types of recreational use have been identified in Table 4: commercial and non-commercial. Concession patrons comprise all commercial use and non-commercial use includes private individuals, or groups (such as scout troops, church groups, paddling clubs,

Table 4 - Recreational Use Data

Vessel Origin	1982-1983		1994-1995		1999-2000 (sub-sample of 56 days)	
	No. Canoes	% Use	No. Canoes	% Use	No. Canoes	% Use
Riverbend Park	2,426	13	4,923	29	1,311	73
JDSP	15,000	81	7,982	47	No Data	0
Other Commercial	None	0	240	1	0	0
Commercial Subtotal	**17,426**	**94**	**13,145**	**77**	**1,311**	**73**
Boy Scout Camp	726	4	84	0	No Data	0
Private Individuals	364	2	2,600	15	478	27
Private Groups	No Data	0	1,176	7	No Data	0
Non-Commercial Subtotal	**1,090**	**6**	**3,860**	**23**	**478**	**27**
TOTAL	**18,516**	**100**	**17,005**	**100**	**1,789**	**100**

etc.) which use their personal watercraft. Together, these two components account for all identified canoeing on the river.

In 1983, non-commercial use accounted for 6 percent and commercial use 94 percent of all use. This mix has changed over the years as non-commercial use has steadily increased. In 1995, non-commercial use accounted for 23 percent and commercial use 77 percent of all paddle trips. In 1999 to 2000, non-commercial use was 27 percent and commercial use was 73 percent.

Commercial Use

The two concession operations, situated at opposite ends of the 9.5-mile segment, serve canoeists' needs for boats, equipment and transportation. The Riverbend Park concession serves canoeists who either paddle short distances and return to the Park, or run the entire length of the Wild and Scenic portion of the river. Canoeists assemble at Riverbend Park and are launched in groups of varying sizes at periodic intervals. Canoeing the entire Wild and Scenic portion takes four to six hours and ends at the concessionaire's access site at the JDSP boat ramp. The concessionaire provides shuttle service back to Riverbend Park.

In 1983, the Riverbend Park concession documented approximately 2,400 trips per year and by 1995, the use increased to almost 5,000 trips per year.

The State Park concessionaire serves canoeists who paddle upstream from the concession dock to Kitching Creek or the Trapper Nelson Zoo Historic District (six mile round trip). An estimated 15,000 canoe trips were generated from the JDSP concession in 1983. In 1995, this total declined to about 8,000 trips. It appears that this decline may be partially due to increased canoe availability at Riverbend Park. Additionally, when canoe traffic was surveyed in 1982-83, the JDSP concessionaire provided a shuttle from the park to the upstream launch site at Riverbend Park. This service was discontinued and today all State Park canoe traffic returns to the State Park launch site eliminating about 400 trips per year to the upper Wild and Scenic portion of the river.

Non-Commercial Use

The Tanah Keeta Boy Scout Camp is located immediately downstream of the Jonathan Dickinson State Park boat launch. In the late 1980s, the camp generated 726 trips per year. During the summer, camp trips are reduced because Scout use is restricted to the immediate camp vicinity. Camp traffic rarely extends upriver as far as the Trapper Nelson Zoo Historic District. Additionally, the number of scout camp canoes has been reduced. As a result, total canoe trips from the camp declined from 726 trips in 1983 to only 290 in 1995. While in 1983 most scout trips traversed the entire Wild and Scenic portion of the river, only 84 of the trips recorded in 1995 from Tanah Keeta are believed to have traveled the entire route.

Just as the decline of one component of commercial use has been offset by another; the decline in use of the river by the Boy Scouts has been more than offset by the increase in the private recreational paddler. In 1985, use was estimated at 364 canoe trips each year, representing less than 2 percent of the total use. Over the past 20 years, south Florida has experienced phenomenal growth in the paddle sports industry. Numerous paddling clubs and outfitters now exist in south Florida and the Northwest Fork has been promoted in paddling guides and brochures. As a result, private boat use has increased significantly. Unfortunately, no records are maintained for private boat launchings at either Riverbend Park or the JDSP, so these trips are not quantified. Based upon observations by the concessionaires and park staff, and discussions with club representatives, current private boat use is estimated at 4,000 trips per year from Riverbend Park alone. The increase in non-commercial usage is significant because these groups of river users are not receiving any information on use policies, safety or education about the river.

Temporal Use Patterns

Recreational use of the river exhibits both seasonal and daily fluctuations. Annual usage is influenced by weather and water conditions. During extreme drought conditions with resultant low flow, paddlers may find insufficient water for an easy passage and use decreases. Conversely, high water conditions promote use by experienced paddlers.

Winter use is reduced during cold fronts, particularly during the weekend use periods. The heaviest use, in terms of total volume, occurred during spring of 1983. By 1995, the seasonal

differences appear less pronounced, with almost uniform usage occurring throughout the year (Table 5).

Table 5 - Recreational Use by Quarters in 1983 and 1995

1983	July-Sept.	Oct.-Dec.	Jan.-Mar.	April-June	Total
Riverbend Park	593	446	487	900	2,426
JDSP	3,990	2,535	3,825	4,650	15,000
TOTAL	4,583	2,981	4,312	5,550	17,426
Percent of Use	26%	17%	25%	32%	100%
1995					
Riverbend Park	1,378	1,182	1,133	1,230	4,923
JDSP	1,385	1,634	2,429	2,534	7,982
TOTAL	2,763	2,816	3,562	3,764	12,905
Percent of Use	21%	22%	28%	29%	100%

The second type of temporal fluctuation is the variation between weekend and weekday canoeing. As would be expected, higher river traffic occurs on weekends. In 1983, JDSP's weekend rentals comprised 66 percent of the total rentals. In 1995, weekend use comprised 61 percent of total use. The Riverbend Park launch site has a more pronounced difference between weekday and weekend use; 4,299 of 4,923 trips, or 87 percent of total weekend traffic. By 1999, this trend had changed significantly with 56 percent (1,003) of trips made on the weekends and 44 percent (786) of trips on weekdays. Although no data exists, it is intuitive that private boat usage is higher on weekends than during weekdays.

A third type of temporal variation is holiday versus non-holiday use. Public holidays which generate three-day weekends have been observed to substantially increase use above normal weekend levels. The highest levels of holiday use occur over the Labor Day, Independence Day and Memorial Day weekends.

Group Size

In 1982-1983, surveys indicated that single or paired canoes compromised most of the river traffic, and only 25 to 50 percent of river use was by groups of more than two canoes. Field observations in 1994-1995 suggest that use by organized groups of more than two canoes increased. Use by large groups (greater than 10 canoes) also appears to be increasing. The trend toward increasing group size may be attributable to the greater public awareness of the river as a recreational destination, and the concurrent increase in use by organized paddling clubs and social organizations.

Recreational Use Capacity

An important function of a river management plan is managing recreational use so that the objectives of the plan can be achieved and permanent damage to resources is prevented, per the *Loxahatchee River Wild and Scenic Designation and Preservation Act* of 1983, Section 5 (3)(c):

> *Periodic studies to determine the quantity and mixture of recreation and other public uses which can be permitted without adverse impact on the resource values of the river area.*

The relative objective of the *Loxahatchee River National Wild and Scenic Management Plan* is to "protect and enhance" the natural and cultural values of the river. Protection and enhancement of natural and cultural values in a high public use area such as the Wild and Scenic River, intuitively requires management and oversight of public uses.

Future River Use Patterns

Quantifying the impact of human use is critical to the sustainable management of the resource and should be science based. Since visitor capacity is the amount or type of use that can be handled by a system before it begins to deteriorate, it is a vital aspect of the sustainability of the Wild and Scenic Loxahatchee River. Canoe/user capacity can be defined as what volume of use the River can sustain in the long term and maintain a "Wild and Scenic" experience.

The implementation of a visitor capacity baseline data collection for examining interactions between use and affect on the resource conditions and perceived quality of impacted resources, the quantity of opportunities supplied, and the quality of the experience derived from them is needed. Visitor capacity could eventually form the basis of management decisions and resulting actions; eventually visitor capacity thresholds will be referenced as key decision making tools throughout the development of preferred numbers and distribution of River users. Understanding the volume and type of recreational use will help Loxahatchee River stakeholders (LRMCC, LRPI, FDEP Parks, PBC ERM, etc) make informed decisions regarding visitor use and protection of the sensitive wildlife habitats of the River.

Chapter 3

2010 LOXAHATCHEE RIVER MANAGEMENT PROGRAM

General Management Principles

Direction for the establishment and update of this management program, and the specific objectives and procedures to be implemented as a part of this program were derived from the legislative authorization and respective agency policy previously presented in this plan. In drafting this update, the FDEP researched and solicited a wide range of technical information and guidance to help in the refinement of principles. This information was obtained from state, federal and local environmental agencies and members of the Loxahatchee River Management Coordinating Council. This 2010 plan represents an updated document which reflects the original guidelines established when the river was designated as a component in the Wild and Scenic River system, as well as revisions based upon subsequent experiences in managing the Loxahatchee River corridor.

The recommendation of this plan for the day-to-day management of the river and its adjoining upland corridor are based on the general principles listed below:

1. The preservation and enhancement of the river's unique natural and cultural values are the primary purposes of the program.
2. Effective management of the river cannot take place in isolation from river basin management.
3. Management will be accomplished through a range of management tools, including but not limited to land acquisition, effective resource management activities, regulation of the corridor area, local government land use controls, and voluntary actions by citizens.
4. Management will be a continuing effort.
5. The specific management methods and the type of management provided by these methods may differ considerably from segment to segment (wild versus recreational).
6. Existing legal authorities and jurisdictions will not be curtailed or limited by any policy or action of the management program.
7. Coordination and cooperation between local, state, and federal agencies and private citizens are crucial to the success of the management program.
8. In conjunction with the above, the cooperation of the public is critical to the success of the management program.

2010 PLAN OBJECTIVES AND IMPLEMENTATION

This plan is required as a condition for designation of the Loxahatchee River as a component of the National Wild and Scenic Rivers program. The goal of this management plan is to ensure protection and enhancement of the natural and cultural values. The 2010 *Loxahatchee River National Wild and Scenic River Management Plan* objectives were developed through a series of meetings and workshops with the Loxahatchee River Water Management Coordinating Council, local and state agencies and other stakeholders:

Objective I: Preserve and enhance the river's unique natural and cultural values

Objective II: Restore the river's historical hydrologic regime and reverse deleterious saltwater intrusion

For each of the objectives the respective implementation strategies and tasks are listed below. The list includes incomplete tasks from the previous plan update and new strategies and/or tasks as a result of adaptive management.

Objective I: Preserve and enhance the river's unique natural and cultural values

The National Wild and Scenic Northwest Fork of the Loxahatchee River includes a multitude of unique natural and cultural resources. The natural resources in need of preservation, protection and enhancement include water resources, terrestrial and aquatic wildlife habitats, historical and archeological sites and the recreational value of the river.

Strategies

1. Prioritize land acquisition and acquire and manage select properties within the National Wild and Scenic Loxahatchee River watershed.
2. Develop and implement resource protection and enhancement management plans.
3. Develop and implement recreation and public use management plans.
4. Ensure relevant local, state and federal policies, regulations, plans, permits and approvals are consistent with objectives of the management plan.
5. Increase elected official, key stakeholder and public awareness of the need to protect and enhance the unique natural and cultural resources in the Wild and Scenic portion of the Northwest Fork.
6. Increase scientific understanding to improve adaptive management of the river's ecosystems.

Tasks

1. Prioritize land acquisition and acquire and manage select properties within the National Wild and Scenic Loxahatchee River watershed.

Continued land acquisition within the Loxahatchee watershed allows for increased connectivity for the purposes of hydrology, recreation and wildlife movement. Support for the land acquisition and review of land acquisition plans to local, state and federal agencies, where necessary, is deemed necessary for future improvements to the overall system.

a) Acquire 2,200 acre parcel east of Atlantic Ridge Preserve State Park to connect to Medalist property.
b) Acquire remaining private Pal Mar parcels through donations or acquisition of tax deeds.
c) Apply for land acquisition/restoration grants.
d) Partner with other stakeholders to leverage funds.

2. Develop and implement natural and cultural resource protection and enhancement management plans.

Many public land management agencies are required to have formal, publicly reviewed management plans that include an assessment of the property and desired future management activities. Obtaining stakeholder feedback in drafting these plans and during the evaluation process is necessary to maximize the utility of these plans. Specific actions for natural resource protection and restoration include, but are not limited to, non-native plant removal, prescribed fire and hydrological enhancements, elimination of adverse water quality impacts, and restoration (i.e. backfilling of agricultural ditches). Specific actions for cultural resource protections could include listing of sites with the Florida Division of Historical Resources or the U.S. Federal Register of Historic Places or general upkeep and restoration of historic sites.

a) Update the *Loxahatchee River National Wild and Scenic Management Plan* every five years amending strategies, tasks and schedules as needed.
b) Implement and update the restoration targets (as needed) set forth in the *Restoration Plan for Northwest Fork of the Loxahatchee River* (2006).
c) Monitor and provide input for management plans of specific properties within Loxahatchee River and evaluate the effectiveness of actions taken by agencies and provide feedback to management agencies.
d) Revise the watershed boundary map of the Loxahatchee River watershed.
e) Involve key state, federal and local agencies, advisory groups, organizations and the public in management decisions.
f) Support replacement of septic systems with sanitary sewers where demonstrated to be beneficial to the protection or enhancement of water quality in the Loxahatchee River.

3. Develop and implement recreation and public use management plans.

Many public land management agencies are required to have formal, publicly reviewed management plans that include recreational use components. Stakeholder feedback in terms of drafting these plans and evaluation are necessary parts of the process. A visitor capacity plan was included in the 1985 and 2000 versions of this plan but more specific knowledge needs to be acquired on the numbers of people using the upper part of the river before a visitor capacity plan can be implemented.

a) Implement and update the *Jonathan Dickinson Park Unit Management Plan* every 10 years (2010).
b) Assess current levels of recreational use on the Northwest Fork of the Loxahatchee River using methods that can be repeated.
c) Develop and implement a recreational public use capacity and management plan.
d) Involve key state, federal and local agencies, advisory groups, organizations, and the public in management decisions.
e) Integrate the riparian protection with recreational demands (e.g. role of downed snag removal in river).

4. Ensure relevant local, state and federal policies, regulations, plans, permits and approvals are consistent with objectives of the management plan.

The *Loxahatchee River Wild and Scenic Designation and Preservation Act* of 1983 confers regulatory roles to the FDEP and SFWMD and an oversight role to the LRMCC that includes commenting on specific issues outlined in that Chapter 83-358 and emphasized in previous portions of this plan. Review and comment on relevant:

a) Comprehensive plans.
b) Water supply plans.
c) Stormwater master plans.
d) Park and recreation plans.
e) Development regulations, permit applications and approvals.
f) Existing or needed state and local regulations.
g) North Palm Beach County CERP plan.

5. Increase elected official, key stakeholder and public awareness of the need to protect and enhance the unique natural and cultural resources in the Wild and Scenic portion of the Northwest Fork

As managers of public lands, we are responsible for informing the public and our stakeholders of park land enhancements, improvements and forward progress. Diverse efforts are underway to underscore accomplishments of specific tasks and the progress that is being made towards goals.

a) Implement and update programs and displays in the Loxahatchee River Environmental Center, Jonathan Dickinson State Park's Elsa Kimbell Education and Research Center,

Trapper Nelson's Zoo Historic District and Riverbend Park that highlight the importance of the Wild and Scenic River and watershed.

b) Develop and provide information on the river to recreational users and local educational institutions.
c) Host river tours for elected officials and legislative delegation members.
d) Encourage and support local initiatives such as Loxahatchee River Preservation Initiative (LRPI) and the Northeast Everglades Natural Area (NENA).
e) Update the Homeowners' Guide to the Protection of the Loxahatchee River.

6. Increase scientific understanding to improve management of the river's ecosystems

Scientific knowledge has allowed managers to put together various plans to restore the river and has documented the decline of freshwater swamp vegetation on the Loxahatchee River. Increasing the knowledge base of this river will provide for continued adaptive management of hydrological operations and restoration efforts.

a) Develop and implement a Science Plan for the river as identified in the *Restoration Plan for the Northwest Fork of the Loxahatchee River*.
b) Support grants to fund watershed research projects.
c) Encourage agencies to have work peer reviewed and published.

Objective II: Restore the river's historical hydrologic regime and reverse deleterious saltwater intrusion.

Restoration of the Northwest Fork's historical hydrological regime and reversal of saltwater intrusion will require a multi-agency, multi-decadal effort. The hydrology of the watershed to the Northwest Fork has been severely altered from more than a century of local and regional flood protection, inlet improvements, wetland drainage, and development and water supply projects. It is not feasible to restore the exact hydrologic regime considering the magnitude of the alterations to the watershed and current development. However, the historical hydrologic regime can be better managed using several tools including restoring key drainage basins, acquiring and restoring select properties, establishing base flows, constructing linkages to new sources of water, land use regulations, and stormwater retrofits and rules. A comprehensive description of completed and planned restoration projects can be found in Addenda 4 and 5.

Strategies

1. Improve the quality, quantity, timing and distribution of flows to the Northwest Fork.
2. Restore and/or replace natural water storage and conveyance to the Northwest Fork.

Tasks

1. Improve the quality, quantity, timing and distribution of flows to the Northwest Fork.

Over the past decade several plans have been developed to provide protection to the Northwest Fork of the Loxahatchee River. It is imperative that these plans be fully implemented to maintain the level of protection that the river deserves. Failure to do so will lead to further impacts and deleterious effects on the river's flora and fauna.

a) Meet minimum flow and level targets set in 2003.
b) Implement and update goals, strategies and projects within the *Restoration Plan Northwest Fork of the Loxahatchee River* (2006) by responsible agencies.
    i) Complete and implement North Palm Beach County CERP Part 1 Project.
    ii) Begin development of the North Palm Beach County CERP Part 2 Project.
    iii) Complete the L-8 storage project and develop a conveyance to the Northwest Fork of the Loxahatchee River.
    iv) Develop and implement an Operations Management Plan for L-8 and conveyance structures.
    v) Increase flows to the NW Fork over Lainhart Dam.
    vi) Increase tributary flows to the NW Fork.
    vii) Develop MFL's for the tributaries, including Loxahatchee Slough, Cypress Creek, Hobe Grove Ditch and Kitching Creek.
    viii) Develop project water reservations for North Palm Beach County CERP Part 1 and 2.
    ix) Develop operational protocols for a proposed flow regime for NW Fork.
    x) Continue to monitor, assess and apply adaptive management.
c) SFWMD will implement the recommendations in the Lower East Coast Water Supply Plan.
d) SFWMD will establish and implement a water reservation for the Northwest Fork.
e) SFWMD will ensure that the Regional Water Availability Rule is strictly enforced.
f) Complete the Cypress Creek East Restoration project.
g) Complete the North Jupiter Flatwoods Restoration project.
h) Ensure that all governmental jurisdictions pursue compliance with stormwater management regulations and best management practices with the intent of enhancing the quality of stormwater runoff.
i) SFWMD, FDEP Parks and LRECD will continue to monitor and evaluate results on an annual basis consistent with the Loxahatchee River Science Plan.

2. Restore and/or replace natural water storage and conveyance to the Northwest Fork.

Natural water storage and conveyance of that water to the Northwest Fork is crucial to the success of the River's survival. Some lands have been acquired but still need restoration and operational plans developed and implemented. Other lands are still needed for protection of the river corridor and those parcels with the most benefit to the river should be prioritized and targeted for acquisition.

a) Acquire and restore select properties adjacent to the Wild and Scenic River and its tributaries, including, but not limited to Cypress, Moonshine and Kitching Creeks, Pal Mar wetlands and Loxahatchee Slough.
b) Develop hydrologic restoration and enhancement plans for acquired and existing properties.
c) Complete the planned Hatcher/Jupiter Indiantown Venture water storage and conveyance project.
d) Complete the stormwater plan for the Hatcher-Halparin property adjacent to Jupiter Farms.
e) Complete the planned Mecca Farms Wetland Restoration project.
f) Complete a survey of Jonathan Dickinson State Park's existing non-functional agricultural and drainage ditches and restore to natural hydrology within the park.
g) Update the Atlantic Ridge Preserve State Park's survey of existing non-functional agricultural and drainage ditches and restore to natural hydrology.

Table 6 - 5-Year Implementation Schedule

	Lead Agencies	Target Completion Date
Objective 1: Preserve and enhance the River's unique natural and cultural values		
1. Prioritize land acquisition, acquired and manage properties within the National Wild and Scenic Loxahatchee River watershed		
a) Acquire 2,200 acre parcel east of Atlantic Ridge Preserve State Park to connect to Medalist property	MC and FDEP Parks	2020
b) Acquire remaining private Pal Mar parcels through donations or acquisition of tax deeds	MC	As available
c) Apply for land acquisition/restoration grants	All	As available
d) Partner with other stakeholders to leverage funds	All	Annually
2. Develop and implement resource protection and enhancement management plans		
a) Update the Wild and Scenic Management Plan every five years amending strategies, tasks and schedules as needed	FDEP/ SFWMD	2015
b) Implement and update restoration targets for the Northwest Fork of the Loxahatchee River Restoration Plan (2006)	SFWMD/ FDEP/ LRECD	2011
c) Monitor and provide input for management plans of specific properties within the Loxahatchee River watershed and evaluate the effectiveness of agency actions	LRMCC	Quarterly meetings and special workshops
d) Revise the watershed boundary map of the Loxahatchee River watershed.	LRMCC	2012
e) Involve key state, federal, and local agencies, advisory groups, organizations and the public in management decisions	LRMCC	Quarterly meetings and special

		workshops
f) Support replacement of septic systems with sanitary sewers where demonstrated to be beneficial to the protection or enhancement of water quality in the Loxahatchee River	LRECD	2015
3.Develop and implement recreation and public use management plans		
a) Implement and update the Jonathan Dickinson Park Unit Management Plan	FDEP Parks	2010
b) Assess current levels of recreational use on the river	FDEP	2011
c) Develop and implement a recreational public use capacity and management plan	FDEP and PBC	2012
d) Involve key state, federal and local agencies, advisory groups, organizations and the public in management decisions	LRMCC	Quarterly LRMCC meetings
e) Integrate the riparian protection with recreational demands	FDEP and PBC	2015
4.Ensure relevant local, state and federal policies, regulations, plans, permits and approvals are consistent with objectives of the management plan		
a)Review and comment on relevant local comprehensive plans	FDEP/ SFWMD/ LRMCC	As needed
b)Review and comment on relevant local water supply plans		As needed
c)Review and comment on relevant local stormwater master plans	FDEP/ SFWMD/ LRMCC	As needed
d)Review and comment on relevant local park and recreation plans	FDEP/ SFWMD/	As needed

	LRMCC	
e)Review and comment on relevant development regulations, permit applications and approvals	FDEP/ SFWMD/ LRMCC	As needed
f)Review and comment on relevant existing or needed state and local regulations	FDEP/ SFWMD/ LRMCC	As needed
g)Review and comment on North Palm Beach County CERP plan	FDEP/ SFWMD/ LRMCC/LRECD	Draft PIR Scheduled for 2010
5.Increase elected official, key stakeholder and public awareness of the need to protect and enhance the unique natural and cultural resources in the Wild and Scenic portion of the Northwest Fork		
a) Implement and update programs and displays in the Loxahatchee River Environmental and Jonathan Dickinson State Park's Elsa Kimbell Education and Research Center, Trapper Nelson's Zoo Historic District and Riverbend Park	FDEP/ SFWMD/ LRECD	As needed
b) Develop and provide information on the river to recreational users and local educational institutions	FDEP/ SFWMD/ LRECD/ LRMCC	As requested
c) Host river tours for elected officials and legislative delegation members	LRMCC	Bi-Annually
d) Encourage and support local initiatives such as Loxahatchee River Preservation Initiative (LRPI) and the Northeast Everglades Natural Area (NENA)	LRMCC	As needed
e) Update the Homeowners' Guide to the Protection of the Loxahatchee River	LRMCC	2012

6.Increase scientific and management understanding of the river's ecosystems		
a)Develop and implement a Science Plan for the river as identified in the Restoration Plan for the Northwest Fork of the Loxahatchee River	FDEP/ SFWMD/ LRECD	2010
b)Support grants to fund watershed research projects	All	As available
c)Encourage agencies to have work peer reviewed and published	All	As needed
Objective 2: Restore the river's historical hydrologic regime and reverse deleterious saltwater intrusion		
1.Improve the quality, quantity, timing and distribution of flows to the Northwest Fork		
a) Meet minimum flow and level targets set in 2003	SFWMD	2010
b) Implement and update the *Restoration Plan Northwest Fork of the Loxahatchee River* (2006)	SFWMD/ DEP/ LRECD	2011
c) Implement the recommendations in the Lower East Coast Water Supply Plan for the Loxahatchee Basin	SFWMD	2015
d) Establish and implement a water reservation for the Northwest Fork	SFWMD	To be determined
e)SFWMD will ensure that the Regional Water Availability Rule is strictly enforced	SFWMD	As needed
f) Complete the Cypress Creek East Restoration project	PBC	2011
g) Complete the North Jupiter Flatwoods Restoration project	PBC	2011
h)Ensure that all governmental jurisdictions pursue compliance with stormwater management regulations and best management practices with the intent of enhancing the quality of stormwater runoff	SFWMD/ FDEP/ LRECD	Annually
i) SFWMD, FDEP Parks and LRECD will continue to monitor and evaluate results on an annual basis	SFWMD, FDEP Parks, LRECD	Annually

consistent with the Loxahatchee River Science Plan		
2.Restore and or/replace natural water storage and conveyance to the Northwest Fork		
a) Acquire select properties adjacent to the Wild and Scenic River and its tributaries, including, but not limited to Cypress, Moonshine and Kitching Creeks, Pal Mar wetlands and Loxahatchee Slough as identified in the JDSP Unit Management Plan, CARL Priority One List, NPBC CERP Plan, and additional parcels as may be identified.	FDEP/ FFWCC/ MC/PBC/ SFWMD	As funds and properties become available
b)Develop hydrologic restoration plans for acquired properties	FDEP/ FFWCC/ MC/PBC/ SFWMD	Various dates
c) Complete the Hatcher/Jupiter Indiantown Venture water storage and conveyance project	PBC	2015
d) Complete a stormwater plan for the Hatcher-Halparin property adjacent to Jupiter Farms	PBC	2013
e) Complete the Mecca Farms Wetland Restoration project	PBC	2015
f) Complete a survey of Jonathan Dickinson State Park's existing non-functional agricultural and drainage ditches restore to natural hydrology within the park	FDEP Parks	2020
g) Update the Atlantic Ridge Preserve State Park's survey of existing non-functional ditches and restore to natural hydrology	FDEP Parks	2020

Chapter 4

2000 PLAN OBJECTIVES AND SUMMARY OF PROGRESS

In the preceding chapters, this plan has identified the key issues that must be addressed to effectively manage the Wild and Scenic River corridor. The plan, in Chapter 3, has also laid out key tasks that must be accomplished in the future to protect and enhance the biological and cultural values of the Northwest Fork of the Loxahatchee River. This chapter summarizes the progress made in completing tasks identified in the 2000 plan.

The 2000 *Loxahatchee River National Wild and Scenic River Management Plan* objectives were derived directly from the resolution passed by the Governor and Cabinet of the State of Florida on January 11, 1983:

Objective I: Protect and enhance natural and cultural values within the designated wild and scenic river corridor.

Objective II: Enhance the hydrologic relationship between the Wild and Scenic Northwest Fork of the Loxahatchee River and Loxahatchee Slough.

Objective III: Ensure that land use activities within the Loxahatchee drainage basins are conducive to maintaining the values of the Wild and Scenic River.

Objective IV: Facilitate public involvement in protecting the Wild and Scenic river corridor, including both planning and implementation efforts.

Objective I: Protect and enhance natural and cultural values within the designated wild and scenic corridor.

The evaluation of the Loxahatchee River for inclusion as a component of the Wild and Scenic River system identified several efforts necessary to support the designation, including public acquisition of the corridor, development of appropriate local management authorities and responsibilities, development and maintenance of this management plan and finally, periodic oversight of river conditions and management efforts. Progress to date is provided on the following strategies and tasks to reflect these obligations.

Strategy I-A: Acquire designated Wild and Scenic corridor.

Task 1: Consider adding Palm Beach County Loxahatchee River acquisition to the Wild and Scenic corridor.

The 2000 management plan proposed the possible addition of 367 acres adjacent to the river corridor to be added to the Wild and Scenic corridor. This parcel was purchased by Palm Beach County in 1995 and was formerly known as the Loxahatchee River Natural Area. Due to the existing public protections existing on this parcel, the primary management agencies, FDEP and SFWMD, have opted not to pursue this addition to the corridor.

In addition to the river corridor purchase, Table 7 identifies several properties that have been purchased for protection, restoration and public recreational use within and adjacent to the watershed.

Table 7 - Public Lands within and adjacent to the Loxahatchee River Watershed

Property Name	Initial Acquisition Date	Acres	Owner
"River Corridor" property – JDSP	1985	1,371	SFWMD
Acreage Pines Natural Area	2001	116	PBC
Atlantic Ridge Preserve State Park	1998	5,747	SFWMD
Banner Lake Conservation Area	2007	1.5	MC
C-18 Triangle Natural Area	2000	139	PBC
C-51 / L-8 Reservoir	2003	1,264	SFWMD
Cypress Creek Natural Area	1995	2,083	PBC
Delaware Scrub Natural Area	2005	16	PBC
Dupuis Reserve	1986	21,875	SFWMD
Grassy Water Preserve	1953	14,592	City of West Palm Beach
Gulfstream Groves / Cypress Creek	2003	3,547	MC and SFWMD
Halpatiokee Regional Park	1998	347	SFWMD
Hobe Sound National Wildlife Refuge	1969	1,035	USFWS
Hungryland Slough Natural Area	1997	2,896	PBC
John C. And Mariana Jones Hungryland Wildlife and Environmental Area	1994	19,349	MC and SFWMD
Jonathan Dickinson State Park	1947	10,108	Trustees of the Internal Improvement Trust Fund
JW Corbett Wildlife Management Area	1947	60,288	FFWCC
Limestone Creek Natural Area	2002	53	PBC
Loxahatchee Slough Natural Area	1996	12,836	PBC
North Jupiter Flatwoods Natural Area	2000	151	PBC
Pal Mar East		3,200	MC
Pal Mar Extension	2006	1,280	MC and SFWMD
Pine Glades Natural Area	1999	6,637	PBC
Pond Cypress Natural Area	1994	1,736	PBC
Riverbend Park	1985	888	PBC and SFWMD
Royal Palm Beach Pines Natural Area	1992	773	PBC
Winding Water Natural Area	2001	550	PBC
Total Acreage		**172,878.5**	

Strategy I-B: Develop and maintain corridor management plan

Task 1: Update management plan by 2005.

In late 2004, the staff of FDEP Southeast District Office, Florida Park Service – District 5 (FPS), LRECD and the SFWMD began working on a comprehensive restoration plan for the Northwest Fork of the Loxahatchee River. During this intensive effort to collect and analyze data to develop and evaluate restoration flow alternatives, all participating agencies agreed to delay the update to the Wild and Scenic River Management Plan. The *Restoration Plan for the Northwest Fork of the Loxahatchee River* was approved on April 12, 2006. The Loxahatchee River National Wild and Scenic Management Plan is scheduled for completion in 2010.

Strategy I-C: Develop detailed implementation plans in support of wild and scenic river management plan

Task 1: Develop upland vegetation management plan.

The Wild and Scenic River Management Plan has recognized the need to develop specific guidelines to achieve certain plan objectives. In support of this intent, FPS has completed plant community maps, a Fire Management Plan and an Upland Exotic Plant Management Plan. These maps and plans are contained within the encompassing Jonathan Dickinson State Park Unit Management Plan (JDSP UMP). The 2000 JDSP UMP is currently being updated and is scheduled for release in 2010.

Task 2: Develop archeological/historical survey.

Many of the archeological and historical sites within JDSP have been identified and Master site file forms have been prepared and are on file with the Division of Historical Resources (DHR). Prior to any ground disturbing activities within the river corridor or on adjacent parcels, the DHR must be consulted and guidance sought from their agency. JDSP maintains several staff members, as certified and trained “Archeological Resource Monitors,” who observe and monitor all ground disturbing activities within the river corridor and the park.

Task 3: Develop solid waste management plan.

A formal solid waste management plan has not been prepared for the river corridor. However, JDSP does remove solid waste on an ongoing basis. Park staff work with volunteer cleanup groups to collect and haul off debris during events such as National River Cleanup Day, Earth Day and International Coastal Cleanup Day. Trash receptacles are in place at Masten Dam and Trappers’ interpretive site and waste is removed on a routine basis.

Task 4: Develop aquatic plant management plan.

This task needs to be updated and will be included in the updated 2010 JDSP UMP.

Strategy I-D: Develop rules and management agreements for river corridor.

Task 1: Include corridor within ecosystem management area.

In 1996, FDEP developed the Ecosystem Management Area (EMA) approach to working within watersheds. The EMA approach has enhanced the coordination of planning, acquisition and regulation within the watershed and has been afforded more attention and protection than ever before. As a result of the EMA effort the LRPI was created in 2002. This group has leveraged $34 million from the legislature to kick start water quality enhancement projects. As discussed in Strategy I-B, the river corridor and watershed are included in the approved *Restoration Plan for Northwest Fork of the Loxahatchee River* dated April 12, 2006.

Task 2: Develop FDEP/PBC agreement for Riverbend Park.

This task has not been completed; however, there is still a desire to have this task completed. There needs to be ongoing dialogue regarding visitor capacity for the river as Riverbend Park is the "gatekeeper" and the entity responsible for managing that aspect of river usage.

Task 3: Enact corridor administrative rule.

Previously, a proposal was offered for the District to consider a "special basin rule." The District does not believe this approach is warranted. Since the LRM was first developed, the District, Palm Beach County and Martin County have acquired more than 22,000 acres in the watershed. Only slight future development is expected that would have a potential to affect the river corridor. All watershed runoff is already subjected to increased water quality standards. The District, through adoption of its Regional Water Availability Rule, has taken a strong measure to protect the River, its tributaries and the watershed.

Task 4: Develop corridor use permit system.

The National Wild and Scenic River Corridor is intended for public use, consistent with protecting the natural resources of the river and esthetic enjoyment of the river experience. A basic premise of the river designation is that river use is to be carefully managed through the use of designated access points and facilities.

Since 1985, three Carrying Capacity surveys (now known as Visitor Capacity surveys) have been conducted to help develop a corridor use rule or permit system for the river. The 1985 plan recommended a "quiet" and a "group" period. The plan went on to state that FDEP and Palm Beach County "will develop a system for scheduling and monitoring use of the river and

enforcing the plan's carrying capacity." This system will be jointly implemented by the Department and Palm Beach County in accordance with a formal interagency agreement."

In 1995, a *Visitor Use of the Loxahatchee River National Wild and Scenic River* report was completed by Cassy Lewis, SCA intern and Richard Roberts, FPS. Questionnaires were distributed to 825 river users, of which 227 were returned. The survey was designed to measure the proposed river's carrying capacity, determine the degree of human impacts, identify recreational use levels, check on canoeist's satisfaction levels and suggest further management approaches to protecting both the river and visitor.

In preparation for the 2000 Loxahatchee River National Wild and Scenic River Management Plan, a third carrying capacity survey was conducted. This was an on-site monitoring survey, rather than a questionnaire, and was conducted from April 2, 1999, until March 21, 2000, by Caroline Causey (SCA intern). The 52 page report was completed in March 2000 and titled *Visitor Use of the Loxahatchee River National Wild and Scenic River: Results of the Loxahatchee River Daily Use Level Survey*.

During the public meetings for the 2000 plan, the most debated discussion was the carrying or visitor capacity, especially as it related to the designated "quiet" period being impacted, what could be resolved about reverse or upstream paddling during the "quiet" period and maintaining a scheduled pickup for canoe and kayak users at the park dock.

In June 2001, Greg Rubin (SCA intern) continued the Causey and Roberts survey. He also tried to consider this 12-page report as more for an operational plan. There have been draft Annual Operational Plans presented to the Loxahatchee River National Wild and Scenic River Management Coordinating Council, with much discussion of the idea. However, the Council never supported the concept.

A Visitor Capacity Study is being planned for this next management plan cycle and to a larger extent, should be expanded to encompass the following subjects:

- The Restoration Plan for the Northwest Fork of the Loxahatchee River (stage and flow relationships for user safety and river impacts).
- Protection of the natural resources (accommodation of the visitor's experience without impacting the river's environment).
- Visitor education and outreach.
- Opening of Riverbend Park.
- More research on stream restoration using large wood (restore floodplain flow and measure the impacts on river use).

- Need to improve the semi-annually integrated monitoring trips to measure the adverse impacts by river users. (Review all portage sites, exotic vegetation and changes in riverine plant life.)

Strategy I-E: Develop and maintain appropriate public use facilities within river corridor.

Task 1: Maintain Lainhart and Masten dams.

Maintenance of both dams occurs in coordination with SFWMD and JDSP. Several major repairs and portages have been completed over the years to protect, maintain and enhance safety at these structures.

Task 2: Implement JDSP unit plan.

As per Chapter 18-2, Florida Administrative Code, the FPS is mandated to prepare and update unit management plans for all state parks. JDSP is working under the current approved 2000 unit management plan which is scheduled to be revised by 2010.

Task 3: Develop quantitative and qualitative evaluation of river use.

As discussed in strategy I-D above, a visitor capacity study is planned for this management plan cycle and will include a quantitative and qualitative evaluation of river use.

Task 4: Develop and staff Riverbend Park.

Riverbend Park was made possible through the cooperative efforts of Palm Beach County and the SFWMD. Now managed by the Palm Beach County Parks and Recreation Department, Riverbend Park features five miles of waterways and 15 miles of trails and access roads in 680 acres. Currently, 485 acres are open to the public to experience the parks' natural, historic and cultural resources through recreational hiking, bicycling, horseback riding, canoeing and kayaking.

An additional 195 acres within Riverbend Park will open to the public in early 2010. The staff at Riverbend Park includes a Park Coordinator, a Park Supervisor, and three full-time and one part-time maintenance employees. Contractual and volunteer instructors also provide recreational, historical and environmental education programming from August through May.

Task 5: Adopt and implement operation plan.

This task has not been completed; however, there is still a desire to have this task completed.

Strategy I-F: Create and maintain Loxahatchee River Management Coordinating Council.

Task 1: Staff and maintain LRMCC.

The SFWMD provides support staff for all four required council meetings and the annual tour of the watershed. Support staff coordinates meeting locations and agendas, provides legal advertising of meetings in the Florida Administrative Weekly, provides audio recording for all meetings, and is responsible for all e-mail correspondence to council members. All Council minutes, records, correspondence, and other documents are retained in the offices of the SFWMD.

Strategy I-G: Maintain resource monitoring programs.

Task 1: Develop biological monitoring protocols.

As per Chapter 10 of *Restoration Plan for Northwest Fork of the Loxahatchee River,* a Northwest Fork Science Plan (NWFSP) will be developed based on scientific questions that need to be answered to manage restorative flows. In 2009, the SFWMD, LRECD and FDEP began meeting together to develop the NWFSP. The plan will include specific monitoring programs and special projects to adaptively manage restoration flows on a real-time basis and establish a database for retrospective and predictive analyses. The NWFSP will be reviewed and updated on a five year basis and is scheduled to be released in 2010.

Task 2: Provide water quality and hydrologic monitoring.

The SFWMD and LRECD both perform water quality and other monitoring within the Loxahatchee Watershed. Water quality data can be accessed at LRECD's website at http://www.loxahatcheeriver.org. For more information regarding ongoing monitoring efforts see Chapter 2, Water Quality in the Northwest Fork of the Loxahatchee River section.

Objective II: Enhance the hydrologic relationship between the National Wild and Scenic Northwest Fork of the Loxahatchee and the Loxahatchee Slough.

The Northwest Fork of the Loxahatchee River historically derived a substantial portion of its total flow from the Loxahatchee Slough. Construction of the SFWMD C-18 canal in 1958 diverted this flow away for the Northwest Fork to the Southwest Fork of the river, and significantly reduced groundwater levels in the Slough. As a result, prolonged reduced flows and resultant saltwater encroachment have generated undesirable changes in the biological community of the Northwest fork. Protection and restoration of biological components of the Northwest Fork requires the reconnection of the Loxahatchee Slough and river to provide historic flows, and

restoration of water levels within the Slough to provide adequate storage to sustain dry season flows down the river. An update to the following strategies and tasks is provided below.

Strategy II-A: Provide adequate baseflow from C-18 to the National Wild and Scenic Northwest Fork.

Task 1: Provide a minimum baseflow of 50 cfs to the Northwest Fork.

In April 2003, the SFWMD adopted a Minimum Flows and Levels Rule, Chapter 40E-8, Florida Administrative Code, with a minimum flow (MFL) of 35 cubic feet per second for the Northwest Fork of the Loxahatchee River. As required by legislation, a Recovery Strategy was incorporated into the MFL Rule, which included a commitment by the SFWMD to develop, in partnership with the FDEP, "a practical Restoration Plan and goal" for the Northwest Fork of the Loxahatchee River. As discussed in strategy I-B, the restoration plan was completed in 2006.

An exceedance of the MFL criteria occurs when:

1. Flows over Lainhart Dam decline below 35 cfs for more than 20 consecutive days; or
2. The average daily salinity concentration expressed as a 20-day rolling average exceeds two parts per thousand. The average daily salinity will be representative of mid-depth in the water column (average of salinities measured at 0.5 meters below the surface and 0.5 meters above the bottom) at river mile 9.2 (latitude 26.9839, longitude 80.1609).

Task 2: Evaluate the appropriateness of USGS 50 cfs minimum flow target and develop a new target as necessary.

A hydrologic evaluation of the riverine floodplain was performed during the development of the *Restoration Plan for the Northwest Fork of the Loxahatchee River*. Both controlled release and episodic field studies were performed and are discussed in Chapter 5 of the completed restoration plan.

Task 3: Define Loxahatchee Slough Hydrologic Restoration area.

The Loxahatchee Sough Natural Area is Palm Beach County's largest natural area comprising a total of 12,836 acres. The property serves as the headwaters for the National Wild and Scenic Loxahatchee River. It lies south of Jupiter Farms and Palm Beach Country Estates, north of Northlake Blvd and west of Mirasol and PGA National.

Task 4: Acquire private lands necessary for restoration.

Since 2000, an additional 6,847 acres have been purchased by state and/or local agencies for restoration and enhancement purposes.

Palm Beach County ERM is currently in negotiations with Southpointe Palm LLC to acquire a 2.73-acre inholding within Cypress Creek Natural Area. ERM has also applied for a FCT grant

for $6.3 million for Cypress Creek Phase V, for the property known as Hatcher/Indiantown Jupiter Venture, which was acquired in 2008.

Task 5: Develop hydrologic restoration plan for Loxahatchee Slough (including NW Fork).

Included in the overall Draft Management Plan for the Loxahatchee Slough Natural Area (currently underway) is a section addressing Hydrological Restoration and Enhancement. One of the main goals of the management plan is to restore the hydroperiod at the Loxahatchee Slough Natural Area to a level that approaches the historic hydrograph as determined by Winchester (1989). Although the natural area reaches historic water levels during periods of heavy rains, the hydroperiod at this site has been reduced by excessive amounts of surface water leaving the site via internal and adjacent drainage ditches and canals. All of these ditches and canals empty into the C-18 Canal, which has a control elevation of 14.8 feet and drops as low as 12 feet during periods of low rainfall. Winchester's research has been used as the basis to determine proposed restoration targets for the natural area. The goal of natural area hydrological restoration is to achieve as much as possible target hydrograph water levels of approximately 17.5 feet during the rainy season months of July to October, with a gradual decline to a low of 15.5 feet at the end of the dry season in May, with a quick recovery of high water levels beginning in June when the rainy season commences.

In 2002, the Northern Palm Beach County Comprehensive Water Management Plan was developed that envisioned moving Lake Okeechobee water into the WCA and then north through the C-18 Canal and the natural area to provide additional water to utilities and the Loxahatchee River. As part of this regional conveyance system, the SFWMD constructed a control structure in 2004 on the east leg of the C-18 Canal, just below its juncture with the west leg. The structure would raise water levels in the C-18 Canal, and increase storage in the adjacent Loxahatchee Slough, while making the existing project culverts and riser boards unnecessary. Operation of the structure was delayed due to concerns regarding the PGA Blvd. roadbed and opposition from SIRWCD, NPBCID and John Bills. In 2005, the SFWMD bought a flowage and conservation easement over the John Bills property. Numerous studies and modeling were conducted to demonstrate that operating the G-160 structure would not flood neighbors. The G-160 began operating on August 10, 2005 under an interim schedule as follows: the dry season (Nov. 1 to May 31) operating schedule would maintain interim headwater stage of 15.5 ft. NGVD and the wet season (June 1 to Oct. 31) operating schedule would maintain an interim optimum headwater stage of 15.0 ft. NGVD in the C-18 Canal due to concerns from SIRWMD, NPBCID and PGA National. In 2009 FDEP mandated that SFWMD comply with its permit conditions for the G-160 to incrementally raise water levels in the C-18 Canal and the Loxahatchee Slough. The dry season stage remained at 15.5 ft NGVD while the wet season stage was raised to 16.5 ft NGVD on June 1, 2009 (practically operating between 16.3 and 16.7 ft NGVD). It is anticipated that the SFWMD will raise the controlling elevation of the G-160 in 2010 if there are no problems with the 16.5 ft level in 2009.

The SFWMD replaced the three project culverts on the west side north of the C-18 Canal north of PGA Boulevard in 1997, and the new culverts were boarded up to approximately 17 feet.

The project culverts on the east side of the C-18 Canal were replaced in the mid-2000s. This goal had been somewhat frustrated by riser boards either not being installed or disappearing after installation, but the risers are now boarded up to 16 feet. The northwestern tract project culverts were replaced in 2006, and the riser boards have remained in place. The project culverts south of the G-160 and north of PGA Blvd. in the Loxahatchee Slough are currently planned to be set at 16.0 ft NGVD.

The SFWMD began replacing the group of three project culverts that drained the Gentle Ben triangle in 2007, which allowed ERM to raise water levels in that area to 17 feet when the work was completed in 2008. The only remaining original project culverts are the four culverts on the west leg of the C-18 Canal where the main north-south internal drainage canal in the western portion connects to the canal. These culverts cannot be boarded up since they have rusted-through holes that bypass the risers. Since the holes create an uncontrolled connection to the west leg of the C-18 Canal, the water level of the drainage canal and connected wetlands are quickly drawn down to the control elevation of the C-18 Canal at14.8 feet. The County is working with the SFWMD to remove the four rusted-out culverts and replace them with no more than one new culvert with a functional riser.

The next step in hydrological restoration is to fill in and/or plug the internal drainage ditch systems. In the early 2000s, the County began the internal ditch restoration process by designating the County-owned eastern portions of the Gentle Ben triangle as the South Loxahatchee Slough regional off-site mitigation area. The focus of the restoration work funded by wetland mitigation funds was to remove heavy concentrations of melaleuca and other exotics and fill in the old MacArthur dredged canals. The exotic-dominated dredge spoil fans from the big east-west MacArthur canal were scraped down and pushed back into the canal in 2006 and 2007. Spoil ridges were also pushed back into the finger shell pits near the C-18 Canal.

In 2007, the county obtained funding from the Natural Resource Conservation Service to restore portions of the former agricultural areas in the western portion of the natural area to their historic wetland habitats. The exotic vegetation on the internal canals lying east of the main north-south canal was removed and mulched in 2008, and the spoil banks lining these canals are scheduled to be scraped down and used to fill in the canals in 2010. Additional perimeter and internal drainage ditches in the farmed areas are also scheduled for exotic removal and filling. SFWMD has already plugged many of the drainage ditches in the farmed areas of Sandhill Crane tract west of the main north-south internal canal, leaving this canal as the main barrier to restoring historic water flow pattern in the western portions of the natural area.

Additional improvements that have been made move water northward into the natural area and the C-18 Canal as part of the regional water conveyance system. The old Bee Line Highway bridge/culvert in the center of the Slough was replaced with an elevated bridge in 2006 as part of a road upgrade project. The elevated bridge spans allow better water and canoe movement between the northern portion of the WCA and the natural area. Three large culverts were placed under Northlake Boulevard in 2007 as part of the G-161 structure. This structure improves the water flow under the road from the main portion of the WCA to the beginning of

the C-18 Canal. A bridge across Northlake Boulevard that would increase water flows under this road from the southern to the northern portions of the WCA is under consideration.

The natural area's role in the regional conveyance system is as a pass-through conduit only. The natural area is not intended to be either a water storage or water supply area. Water will be discharged from the natural area only when it is above the target hydrograph for that time of the year. When discharges from the natural area are needed to supply baseflow to the Loxahatchee River, these discharges will be balanced with an equivalent amount of water entering the natural area from the regional conveyance system. The natural area itself is expected to benefit little from the regional conveyance system as the natural area can meet nearly all of its hydrological needs through normal rainfall.

Task 6: Modify S-46 Operation Schedule.

No persistent changes to the S-46 operation schedule have been made since 2000. The SFWMD has continued to divert as much water to the Northwest Fork of the Loxahatchee River using the G-92 structure while not impacting drainage within Jupiter Farms. The structure has, however, experienced upwelling on the downstream side of the structure for the past several years. The most occurrences were documented in 2003 and 2006. Additionally, the S-46 has the highest head differential across the structure among all of the coastal structures within the SFWMD boundaries. The SFWMD has implemented a feasibility study on the S-46 to review several options for repair. A stakeholder meeting was held on November 16, 2009 at the Jupiter Community Center. The feasibility study is nearly complete and one potential recommendation is to repair the rip rap protection downstream of the sill of the S-46 and to install a downstream weir.

Strategy II-B: Maintain and enhance hydrology between the Loxahatchee Slough and National Wild and Scenic Northwest Fork.

Task 1: Improve Jupiter Farms Water Management System.

The Jupiter Farms water management system improvements were completed in 2004. Five sheet pile weirs, each with an operable sluice gate, were constructed to retain stormwater runoff within the management system to improve the quality of water reaching the Northwest Fork of the Loxahatchee River. These weirs are located at the east ends of Canals 2, 3, 4 and 5 in the C-14 Canal north of its intersection with the Canal 6. The weirs were constructed with stone rubble riprap upstream and downstream of the structure for both erosion control and aeration of discharges over the weir. The operable gates are equipped with radio telemetry for remote sensing of water surface elevations and gate operations. The gates also have electric motor operations and the provision for manual operation should the electric service be disabled during a storm event. The total project cost was $1,300,000.

Task 2: Develop and implement hydrologic restoration plan for the Reese Gildan properties.

The Palm Beach County Parks and Recreation Department has worked in partnership with South Florida Water Management District staff to develop and implement a hydrologic restoration plan for the Reese and Gildan properties that are managed by the County as part of Riverbend Park. Over the past ten years historic sheet flow patterns have been restored through the permitting and installation of a series of 4 weirs that help naturally cleanse, store and convey rain water and stormwater discharges water from the C-18 Canal as it moves north across this 400 plus acre property to where it joins the eastern slough at Indiantown Road and then flows into the Northwest Fork of the river. This restoration project has helped recreate and/or rehydrate over 115 acres of open water bodies, oxbows, marshes, sloughs and wetlands. Outfalls form the C-18 canal are controlled and operated by the SFWMD and the weirs within the park by the P&RD.

Objective III: Insure that land use activities within Loxahatchee drainage basins are conducive to maintaining the values of the National Wild and Scenic River.

The effective exercise of local government land use regulatory authority is an integral component of the river management program in two respects. First, in order for national designation to have been approved, the management plan was required to demonstrate that alterations which would degrade the natural or scenic values of the designated river corridor area would be prevented. In the short term, local land use regulations are the best management tool available for directing potentially harmful land alteration activities away from the river corridor area. Until such time as other rules to implement the management programs outlined in this plan might be promulgated by the FDEP and/or the SFWMD, local governments bear the responsibility for preventing development that would impair the natural or scenic qualities of the river.

Land use controls also play a critical role in the overall management of the river's drainage system as a hydrologic unit. Land use changes in the basin inevitably affect the quantity and quality of water in the river. Since local land use controls help direct the timing, location and character of land development activities in the basin, the application and proper coordination of such controls are of continuing importance to the long term management of the river.

During consideration of the National Wild and Scenic River designation, it was recognized that local government land use decisions for properties surrounding the river corridor could impact the attributes of the river system. Local governments (which supported the river designation), were expected to review their respective comprehensive plans to ensure consistency with river corridor management objectives. Local governments were to maintain currently allowed zoning densities in the river corridor and in other areas with a potential to generate adverse impacts upon the river area. Requests for increases in zoning density anywhere in the area should undergo careful and rigorous review. Increases should only be granted when it is shown that

such actions will not result in a reduction of water storage capacity or deleterious effects on the natural or scenic qualities of the river or adjoining upland corridor. Additionally, local governments and agencies are to ensure that stormwater management practices do not adversely affect the river corridor.

Public improvements such as drainage, utility and road facilities have a profound influence on the location, timing and extent of land development in the drainage basin. The provision of these facilities should be carefully managed to ensure that development takes place in an orderly, planned manner, and that development does not result in negative environmental impacts on the resource values of the river or the river corridor area. When new improvements such as water and sewer lines are necessary, they should be located and sized to prevent incremental connections that could result in additional demand for improvements. New major road construction, because of its potential for further fragmenting natural systems, disturbing drainage patterns, and encouraging "leapfrog" development, particularly should be avoided. When no alternative routes are available, however, the location and construction of new utility or road rights-of-way should be done in a manner that minimizes adverse effects on resource values in the river corridor.

If a land-use change is granted, every effort should be made to reduce the degradation of resources of the adjacent Jonathan Dickinson State Park and the Loxahatchee River National Wild and Scenic River. Potential impacts of newly proposed developments can include visual encroachment, noise pollution, edge effects, exotic pest plant invasions, stray dog or cat problems, interference with prescribed burns, and hydrological impacts. Whenever possible, a buffer on private lands should be established to minimize any impacts caused by the proposed development plan. This would be in keeping with the 660 foot buffer strip that Palm Beach County enacted for development adjacent to the Park and Loxahatchee River National Wild and Scenic River corridor in the land use element of their Comprehensive Plan.

Strategy III-A: Review/amend local government comprehensive plans to ensure consistency with corridor management goals.

Comprehensive plans are the expression of a local government's authority to designate the type, location, and intensity of development in the Loxahatchee River watershed. Any stakeholder in the Loxahatchee watershed may petition a local government to affect comprehensive plan policies, or the use of land, in support of the River's protection. Opportunities to amend comprehensive plans exist on an annual twice-per-year cycle under Florida's growth management statutes. Proposed amendments to local comprehensive plans must follow established procedures for public participation and adoption. DCA reviews plan amendments with input from state and regional resource protection agencies, including DEP and the SFWMD.

Local governments are also required to periodically assess the need for improvements to their comprehensive plans. The first step in the process is completion of an Evaluation and Appraisal Report (EAR), the result of which is the identification of recommendations for changes to the

local plan. As of this writing, the local governments in Palm Beach County are beginning this process. Palm Beach County is leading the way by holding public workshops to identify county-wide issues as well as the suitability of land uses in the unincorporated area. Palm Beach County's jurisdiction includes portions of the C-18 basin, including the Jupiter Farms subdivision, Riverbend Park, and the Loxahatchee Slough. Palm Beach County will take the lead in revising as necessary, policies affecting its land use planning, stormwater planning, water quality protection, land acquisition, and other management activities within its portion of the Loxahatchee River watershed. Recommendations for changes to Palm Beach County's Comprehensive Plan, which may affect adjoining local governments in the Loxahatchee watershed, will be vetted through a coordinated review known as Intergovernmental Plan Amendment Review Committee (IPARC). Jupiter, Tequesta and Palm Beach Gardens will follow Palm Beach County in completing their EARs within the next two years. Following adoption of their EARs, each local government will have 18 months to draft and publicly workshop the changes to their comprehensive plan. EAR-based amendments to local comprehensive plans are submitted to DCA for review, with input from state and regional resource-protection agencies.

Task 1: Review Palm Beach County Comprehensive Plan.

Opportunities to review amendments to the Palm Beach County Comprehensive Plan occur biannually. Opportunities to participate in the development of the Palm Beach County EAR will occur in advance of the October 2011 deadline. Public workshops are scheduled at this time. The EAR-based amendments will be proposed by April 2013. Palm Beach County's EAR-related Comprehensive Plan amendments will then go through the formal DCA review process.

Task 2: Review Martin County Comprehensive Plan.

Opportunities to review amendments to the Martin County Comprehensive Plan occur biannually. Opportunities to participate in the development of the Martin County EAR will occur in advance of the October 2015 deadline. The County's EAR-related Comprehensive Plan amendments are anticipated to be submitted for DCA review in April 2017.

Task 3: Review Town of Jupiter Comprehensive Plan.

Opportunities to review amendments to Jupiter's Comprehensive Plan occur biannually. Opportunities to participate in the development of the Town's EAR will occur in advance of the June 2013 deadline. The Town's EAR-related Comprehensive Plan amendments are anticipated to be submitted for DCA review in December 2014.

Task 4: Review Village of Tequesta Comprehensive Plan.

Opportunities to review amendments to Tequesta's Comprehensive Plan occur biannually. Opportunities to participate in the development of the Village's EAR will occur in advance of the March 2014 deadline. The Village's EAR-related Comprehensive Plan amendments are anticipated to be submitted for DCA review in August 2015.

Task 5: Review City of Palm Beach Gardens Comprehensive Plan.

Opportunities to review amendments to Palm Beach Garden's Comprehensive Plan occur biannually. Opportunities to participate in the development of the City's EAR will occur in advance of the December 2013 deadline. The City's EAR-related Comprehensive Plan amendments are anticipated to be submitted for DCA review in June 2015.

Strategy III-B: Develop stormwater management plan for areas contributing to the National Wild and Scenic corridor.

Task 1: Develop a stormwater management plan.

In 1999 the *Stormwater Management Plan for the Wild and Scenic Northwest Fork of the Loxahatchee River* (Hazen and Sawyer, June 1999) was prepared for the Loxahatchee River Environmental Control District. The report provides an inventory of existing stormwater management systems which discharge to the National Wild and Scenic River; identifies major water quality and quantity problems associated with the discharges; and development of a management strategy for reducing existing and potential future problems associated with stormwater management. The recommended management strategy also provides for a mechanism to increase the duration of freshwater deliveries to the River while improving the timing of those deliveries and reducing the pollutant loading. The strategy includes structural and non-structural recommendations.

Task 2: Encourage local stormwater planning/implementation.

The Town of Jupiter (TOJ) created a Stormwater Utility in 1994 with a dedicated funding source to enhance stormwater runoff quality. The TOJ has been implementing many community stormwater system retrofits within the past 10 years in the watershed. In addition, a Surficial Aquifer Recharge Project includes construction of the water conveyance facilities for excess stormwater runoff that otherwise would be wasted to tide, to percolate into the ground water table and maintain normal surface water elevations in times of drought to the greatest extent possible. Operation of this system acts to minimize the risk of harm to the Loxahatchee River and surrounding freshwater ecosystem. LRPI has provided grant funds for most of these projects.

The construction of Flora Avenue (a 2 lane local road that connects Bridge Road to residential and commercial sites) was identified as a significant impact to the natural surface flow patterns in the area. Martin County designed and permitted a stormwater retrofit project for the Flora Avenue area with the most significant improvement being the construction of a 3.35 acre stormwater treatment pond that flows water into the North Fork of the Loxahatchee River watershed. Construction of the project was completed in November 2007. The pond was

designed to capture and treat water to regulatory standards in a 221-acre drainage basin. Initial work suggests that the system is working well removing 96% of Total Suspended Solids and 95% of Total Phosphorus.

In 2004, three small agricultural ditches that flow into the Loxahatchee River were filled on Jonathan Dickinson State Park between Indiantown Road and the Florida Turnpike. The ditches totaled over one half mile (3,121 feet) in length and had direct outfalls into the floodplain of the river along River Miles 13.9, 13.6, and 13.3. Indian River Lagoon License Plate funds were used to complete this project.

In 2006, two large canals "Hell's Canal" and "1 Mile Ditch" were backfilled. "Hell's Canal" was directly adjacent to I-95 and ran east into the Loxahatchee River just downstream of River Mile 11.5. The drainage for that area now runs north into the South Fork of Cypress Creek, meets with up with Cypress Creek proper, which then flows into the Northwest Fork of the Loxahatchee River just upstream of River Mile 10.3. This canal was about 10 feet deep and was about 0.42 miles long. "1 Mile Ditch" was also about 10 feet deep and was 1 mile long and drained uplands and seasonal wetlands directly into Kitching Creek about 1.2 miles upstream of where it flowed into the Northwest Fork of the Loxahatchee River. Both these projects allow for greater retention of water in over-drained upland and seasonal wetland areas and provide for a slower release of water into the Loxahatchee River. LRPI funds were used to complete this project.

Task 3: Promulgate basin management rules (as needed).

The discharge of stormwater within the State of Florida has been subject to regulation since the early 1980s to prevent pollution of Waters of the State and to protect the designated beneficial uses of surface waters. Currently, stormwater management is regulated at the State level by the Florida Department of Environmental Protection (FDEP), at the regional level by water management districts, and at the local level by local governments.

The goals for stormwater management within the State of Florida are outlined in Chapter 62-40 of the Florida Administrative Code (FAC), titled "Water Resource Implementation Rule." This rule establishes that stormwater design criteria adopted by FDEP and the water management districts shall achieve at least 80% reduction of the average annual load of pollutants that cause or contribute to violations of State Water Quality Standards. When the stormwater system discharges to an Outstanding Florida Water (OFW), the design and performance criteria increases to 95% reduction.

A wide range of stormwater design criteria have been implemented within the State of Florida to achieve these minimum stormwater treatment performance standards. However, recent research on the performance efficiency of current stormwater management systems indicates a high degree of variability in the pollutant removal effectiveness of commonly used systems. In addition, stormwater design criteria for the same type of stormwater management system vary widely throughout the State of Florida, which can impact the performance efficiency of stormwater management systems designed in one area compared to another.

To address growing concerns about over-enrichment of Florida's surface waters, ground waters, and springs by nutrients, the Department and the Water Management Districts are developing a statewide stormwater treatment rule. This rule represents a significant step forward in the control of nutrient loadings from stormwater discharges. Rule Development workshops are scheduled throughout the State of Florida between March and April 2010. Rule adoption is scheduled for the summer of 2010.

Strategy III-C: Acquire and manage natural systems important to protection of the Northwest Fork.

Task 1: Acquire Pal Mar wetlands.

Approximately 60% of Pal Mar is currently in public ownership. Lands have been acquired through tax sale acquisitions and donations.

Task 2: Develop management plan for Pal Mar and Cypress Creek basin.

Ongoing environmental restoration within the Pal Mar/Cypress Creek complex includes Cypress Creek, Pal Mar East (Nine Gems) and Culpepper Ranch. Cypress Creek is a cooperative effort including Martin Co., Palm Beach Co. and the SFWMD. Interim management for Cypress Creek has been developed by Martin Co. and the SFWMD. Restoration of Pal Mar East and Culpepper Ranch is a cooperative effort with Martin Co. and the SFWMD. The remaining portions of the Pal Mar complex will be addressed in the NPB-CERP plan.

Objective IV: Facilitate public involvement in protecting the National Wild and Scenic river corridor, including both planning and implementation efforts.

The designation of the Northwest Fork of the Loxahatchee River as a component of the federal Wild and Scenic river system was the result of a local grass-roots effort. Throughout the designation and plan development process, local public involvement was invaluable. Effective implementation of this management plan requires a continuing local interest and participation. Public education relative to river issues and efforts can be directed toward both users on the river, and the local community. A progress update on the following strategies and tasks is provided below.

Strategy IV-A: Provide educational information to river users.

Task 1: Develop and distribute educational materials.

One of the major functions of the former FDEP Loxahatchee River Watershed Management Planning Committee was to develop brochures, boating guides, plan guided boat tours and

organize the Loxahatchee River Science Symposium. Since 2000 there have been four science symposiums (2001, 2004, 2006 and 2008) and the fifth symposium is in the planning phase for 2011. The two day science symposiums attract over 200 scientists, consultants, government representatives and the general public per event.

In 2001, through funding from the Florida Fish and Wildlife Conservation Commission, Environmental Education Grant Program, the *Understanding the Loxahatchee River Watershed* brochure was produced. This document has been distributed at numerous events through the past several years. A reprinting of this document is needed at this time.

On June 27, 2003 the Decision Makers Forum hosted panel discussions on *Everglades Restoration: Can it Save the Loxahatchee River?* Over 125 scientists, consultants, government representatives, legislative staff, and general public attended this event.

In 2005, Elam Stoltzfus, director and cinematographer, filmed a documentary on the river entitled *Our Signature: The Wild and Scenic Loxahatchee River.* The LRPI funded this project and provided the DVD's free to public and private schools, public libraries and environmental centers throughout Martin and north Palm Beach counties. During this same timeframe, Clyde Butcher, nature photographer, was shooting pictures of the Loxahatchee River for a poster to help promote the film. Mr. Butcher signed free posters at the premiere viewing of the film on September 28, 2005.

In March 2006, Jupiter Inlet District (JID) and Florida Sea Grant produced 5000 copies of a waterproof boater's guide entitled *Navigational, Historical and Environmental Perspective of Jupiter Inlet and the Loxahatchee River.* All copies have been distributed and JID is revising the guide for a reprint during the summer of 2010.

On Saturday, May 15, 2010, local environmental leaders, managers, politicians and supporters gathered along the banks of the Loxahatchee River at Jonathan Dickinson State Park at the site of the historic dedication plaque. This year marks the 25th anniversary of the Loxahatchee River's national "Wild & Scenic" designation. The Loxahatchee River was the first river in Florida to receive this national designation, and remains one of only two National Wild & Scenic rivers in the State. The day was officially deemed "Loxahatchee River Day," including proclamations by the State of Florida, Palm Beach County, Martin County, the Town of Jupiter, Jupiter Inlet District, the Loxahatchee River District and the Village of Tequesta. Special guests for the ceremony included U.S. Congressman Tom J. Rooney, representatives for Florida Senator Joe Negron, Florida Representative Carl J. Domino, and Florida Representative William D. Snyder. In further celebration, the Loxahatchee River District is creating a time capsule to mark the anniversary event. The capsule will include environmental and historical data about the river, along with a collection of personal perspectives and experiences by local residents.

Task 2: Develop Otter Creek Environmental Learning Center.

Although no facility within the watershed is named "Otter Creek Environmental Learning Center" there are other facilities that have been developed and are dedicated to Loxahatchee River

environmental education. LRECD has developed and does distribute environmental education materials to the public through The River Center and Busch Wildlife Sanctuary and through their collaborative efforts with Friends of the Loxahatchee River. The Loxahatchee River Environmental Center (River Center) opened August 23, 2008. It traces the Loxahatchee River from its headwaters in Palm Beach County through the cypress dominated floodplain in the Wild & Scenic segment, into the central embayment and finally out through Jupiter Inlet into the Atlantic Ocean and the Gulf Stream. Visitors can explore the habitats and organisms found within the watershed, modifications and problems associated with ever-increasing human population and development, and programs and projects underway to help preserve and restore this valuable and unique system.

Busch Wildlife Sanctuary, an independent not-for-profit organization located on the LRECD grounds, operates a wildlife refuge and educational facility offering animal exhibits, including American Bald eagles, black bears, deer, panthers, osprey, reptiles, as well as rehabilitation program and nature trails. The Sanctuary provides wildlife rescue and rehabilitation through comprehensive medical care to thousands of sick, injured and orphaned wild animals each year, with the ultimate goal of returning recovered patients to their natural habitats. Rescued animals too injured to be released into the wild are maintained in one-of-a-kind opportunity to learn about Florida's wildlife and natural environments. More than just a "zoo" exhibiting caged animals, this unique refuge combines a community nature center with a wildlife rehabilitation hospital. Nature trails lead visitors through pine flatwoods, oak hammocks, and cypress wetlands. The River Center and Busch Wildlife Sanctuary are open free to the public and are offered to educate our community and create better stewards of our beautiful river.

Task 3: Develop Jonathan Dickinson State Park Visitor Center.

The Elsa Kimbell Environmental Education and Research Center opened on September 7, 2007. The center includes a 3,000 square foot exhibit hall, with a theater, and reception area that is open 7 days a week and 365 days a year. In addition to the exhibit hall the center features an 800 square foot classroom and a 650 square foot laboratory for use during special programs, such as field days for school children.

Strategy IV-B: Coordinate efforts to insure that local environmental education and public information programs include river information.

Task 1: Encourage and support local initiatives.

The Northeast Everglades Natural Area (NENA) is an amazing collection of public lands providing a wide range of nature-based outdoor recreational opportunities from bird watching in an area open only to foot traffic to hunting in an area accessible by off-road vehicles. NENA stretches from Southern Boulevard in Palm Beach County north to Bridge Road in Martin County and from the Atlantic Ocean west to Lake Okeechobee. NENA includes more than 165,000 acres of natural Florida lands and more than a dozen different activity and education

centers that provide information about the area's natural and human history. Each place in NENA is a different size, from a just a few to thousands of acres, and several different governmental and non-governmental organizations manage the individual NENA places.

Since the completion of the NENA Master Plan in 2005, NENA began connecting natural attractions by a unique shared-use trail system to create a world class destination. The Jesup Trail, one of NENA's major connector trails, is planned as an improved, alternative transportation route connecting Riverbend Park, Cypress Creek Natural Area, Cypress Creek Management Area, and Jonathan Dickinson State Park. Included in the design of this 6-mile connector will be such amenities as chickee shelters, hitching posts, bicycle racks, information kiosks and trailheads with parking facilities. This trail travels through distinctive ecosystems sustained by the Loxahatchee River and educational information about the River and its watershed will be displayed within the kiosks. Planning, design and project coordination for the trail is currently ongoing and includes respective land managing agencies and user groups.

Starting at the sandy shores of Hobe Sound Beach and ending at Lake Okeechobee at Port Mayaca, the 72-mile Ocean to Lake Trail is one of the newest spurs of the 1,400 mile Florida National Scenic Trail currently under development. Portions of the hiking-only trail are complete and open to the public in Jonathan Dickinson State Park, J.W. Corbett Wildlife Management Area, Dupuis Management Area, and Hungryland Slough and Loxahatchee Slough Natural Areas. Working in conjunction with many of the local, state, and federal agencies, volunteers from the Florida Trail Association are trail building and finalizing preferred routes within critical sections such as waterway and railroad crossings.

NENA works to connect different places not only by land, but also through areas only accessible by water. Several blueways, or water trails developed with launch points and points of interests for small boaters, are planned to encourage family recreation, environmental education and preservation of wildlife resources. Historically, the water of the Grassy Waters Preserve carried into the Loxahatchee River. One of the major designated blue-ways within NENA follows the historic flow that connects Grassy Waters Preserve and the Loxahatchee Slough Natural Area to the Loxahatchee River utilizing small water trails and the C-18 Canals.

Task 2: Provide river information to river users and local educational institutions.

The Loxahatchee River Preservation Initiative supports two boat trips on the river per year. At least one of the trips involves educating the current legislative delegation on river issues.

For the fiscal year 08-09, JDSP has provided educational outreach opportunities to Martin, Palm Beach and other county schools:

Martin County - A total of 1,578 total students, which includes five elementary and middle schools, all 7th grade students from Anderson and Murray Middle schools, one high school and various homeschooled groups.

Palm Beach County - A total of 497 total students, including nine elementary and middle schools, three high schools, the University of Florida and various homeschooled groups.

Other Counties from around the State - A total of 63 students from two schools.

Similarly, nearly 20,000 people were engaged and educated about the National Wild and Scenic Loxahatchee River at the River Center during the 2009 calendar year. Furthermore, LRECD and Friends of the Loxahatchee River produced several new brochures for public consumption that communicated relevant river data to various groups including river users as well as wastewater customers.

The Palm Beach County Parks and Recreation Department provides information brochures to park visitors who are both river users and those with the potential to be river users. More than 2,000 informational brochures are distributed annually at Riverbend Park and through special events open to the public. In addition, the canoe vendor inside the park provides river information and a map to canoe and kayak enthusiasts taking day trips. Park staff leading guided canoe programs, walking and bicycle tours and school programs also provided river information both orally and in brochure format to approximately 200 people in 2009.

Chapter 5

OTHER RELEVANT PLANS & INITIATIVES

During the past 20 years several plans and restoration-oriented activities have been initiated to protect and restore the Loxahatchee River, especially the Northwest Fork.

2005 – 2006 Lower East Coast Regional Water Supply Plan Update

In February 2007, the SFWMD Governing Board of the SFWMD approved the 2005 - 2006 Lower East Coast Plan Update (LEC Plan). The purpose of conducting water supply planning provided for under Section 373.0361, FS is to ensure an adequate supply of water to protect natural systems and to meet all existing and projected reasonable beneficial uses, while sustaining water resources for future generations. Implementation of the 2005 – 2006 Lower East Coast Plan Update is intended to do the following:

- Create a water supply that fully meets the future (2030) needs of almost seven million people, as well as agricultural, recreational and other industries during a one-in-ten year drought.
- Establishment of Minimum Flow and Levels (MFL) criteria including four areas of the Everglades, Lake Okeechobee, the northern portion of the Biscayne aquifer, and the Northwest Fork of the Loxahatchee River and Estuary and others.
- Support the protection of natural systems from consumptive use through the Restriction Allocation Areas rules as in the Lower East Coast and Lake Okeechobee Service Areas.
- Reduce the uncertainty for issuing long-term permits for water users as they invest in tomorrow's water supply infrastructure through 20-year permits.
- Provide public forums to modernize District operational procedures and promote greater flexibility in the operation of the regional water management system.

Several ongoing projects from the *1998 Interim Plan for Lower East Coast Regional Water Supply* (1998 Interim LEC Plan), LEC Regional Water Supply Plan, 2000 and the 2005-2006 LEC Water Supply Plan also provided the foundation for various actions to protect and restore the Northwest Fork of the Loxahatchee River:

- The District accepted the Northern Palm Beach County Comprehensive Water Management Plan in May 2002 (LEC WSP, 2000 recommendation #3)
- The C-51 and Southern L-8 Reservoir and L-8 Basin Modification components of the CERP North Palm Beach County (Part 1) are currently being evaluated during the planning phase to determine the most efficient and effective method to increase

environmental water supply deliveries to the Grassy Waters (LEC WSP, 2000 recommendation #21)

- Water Reservations planned for the Northwest Fork of the Loxahatchee River were expected by 2007(LEC WSP,2000 recommendation #34)

- The MFL for the Northwest Fork of the Loxahatchee River and Estuary was adopted in 2002 (LEC WSP, 2000 recommendation #35)

Water Supply Plans are updated every five years, with the next update due in September 2012.

Northern Palm Beach County Comprehensive Water Management Plan

Initiated in 1995, the Northern Palm Beach County Comprehensive Water Management Plan (Northern Plan) was accepted by the SFWMD Governing Board in May 2002. The sub-regional Northern Plan focuses on the southern L-8 Basin, the City of West Palm Beach Water Catchment Area (WCA-1) or Grassy Waters Preserve, C-18, the Loxahatchee Slough, and the Loxahatchee River, especially the Northwest Fork. The plan projects future water supplies for urban, agricultural and environmental uses for the year 2020 and identifies projects that when built will bring supplemental water into the northern PBC area.

The Northern Plan calls for a series of system improvements to be constructed in the area of PBC north of Southern Boulevard, generally east of the L-8 Levee, and west of I-95.

When all the proposed system improvements are in place, the Northern Plan will provide the projected 2020 public water supply demands of the area, hydrologic restoration of the Loxahatchee Slough, and protection of the Grassy Waters Preserve and a target base flow of 65 cubic feet per second (cfs), in the dry season, to the Northwest Fork of the Loxahatchee River, measured at the Lainhart Dam. Construction of the Loxahatchee Slough structure (G-160) was completed in January 2004; design of the Northlake Boulevard structure (G-161) was completed in 2006; and, the regional reservoir storage at the Palm Beach Aggregates site was increased to 47,000 acre-feet in 2004. The Northern Plan forms the basis for the North Palm Beach County CERP Project, Part 1.

North Palm Beach County Comprehensive Everglades Restoration Project – Part 1

The overall purpose of the North Palm Beach County CERP Project – Part 1 is to:

- Increase water supplies to the Grassy Waters Preserve and Loxahatchee Slough;

- Provide flows to enhance hydroperiod in the Loxahatchee Slough;

- Increase base flows to the Northwest Fork of the Loxahatchee River; and

• Reduces high flows to the Lake Worth Lagoon and Loxahatchee Estuary.

The North Palm Beach County CERP Project includes six individual elements including Pal-Mar and J.W. Corbett Wildlife Management Area Hydropattern Restoration, L-8 Basin Modifications, C-51 and L-8 Reservoir, Lake Worth Lagoon Restoration, C-17 Pumping and Treatment, and C-51 Pumping and Treatment. These elements have been combined into a single project to address the interdependencies and tradeoffs between the different elements and provide a more efficient and effective design of the overall project. Further details on this project are presented on the SFWMD's website at *http://www.evergladesplan.org*.

Minimum Flows and Levels Rule

The Minimum Flow and Level Rule **(**Chapter 40E-8, F.A.C.) for the Northwest Fork of the Loxahatchee River were developed to protect the remaining floodplain swamp community and downstream estuarine resources from "significant harm." Adopted in April 2003, the minimum flow is defined as:

> *The limit at which further withdrawals would be significantly harmful to water resources or ecology of the area....*

A MFL violation occurs within the Northwest Fork of the Loxahatchee River when an exceedance of the minimum flow criteria occurs more than once every six years. A MFL exceedance occurs in the Northwest Fork of the Loxahatchee River when:

1. *Flow over Lainhart Dam decline below 35 cubic feet per second for more than 20 consecutive days; or*

2. *The average daily salinity concentration expressed as a 20-day rolling average exceeds two parts per thousand. The average daily salinity will be representative of mid-depth in the water column at river mile 9.2.*

It was recognized that upon adoption, the District would be unable to meet the MFL criteria for the Northwest Fork during dry periods. Therefore, as required by legislation, a Recovery Strategy was incorporated into the Rule, which includes the following:

- Construction of projects which will increase flows to the Northwest Fork and which are identified in the Lower East Coast Regional Water Supply Plan, the North Palm Beach County CERP Project, Part 1 and the Northern Palm Beach County Comprehensive Water Management Plan projects;

- In partnership with the FDEP and the Florida Park Service, continue the development of a practical Restoration Plan and goal for the Northwest Fork of the Loxahatchee River (completed April 12, 2006);

- Adoption of an initial water reservation for the Northwest Fork of the Loxahatchee River to protect existing water used for the protection of fish and wildlife, and subsequent reservations to protect water made available for the recovery and restoration of the Loxahatchee River through implementation of projects which will increase flows in the dry season. These water reservations are intended to prevent the future allocation to consumptive uses the freshwater intended for restoration of the Northwest Fork of the Loxahatchee River;

- Continue to operate the G-92 Structure and associated structures to provide flows of approximately 50 cfs or more over Lainhart Dam to the Northwest Fork, when the SFWMD determines that water supplies are available; and

- It is the intent of the SFWMD to continue the current operational protocols of the G-92 Structure so as not to reduce the historical high, average and low flows as estimated over the 30-year period of rainfall record used as the basis for the MFL for the Northwest Fork of the Loxahatchee River.

Loxahatchee River Watershed Action Plan

In July 1996, the FDEP organized the Loxahatchee River Watershed Planning Committee with representatives from various state, local and federal agencies. A Loxahatchee River Watershed map was developed and through the development of the watershed boundaries, a comprehensive list of problems could be identified for each sub basin. In addition, water quality data and other environmental information were compiled to form a realistic view of the watershed.

In October 2002, the Loxahatchee River Watershed Action Plan was completed. The purpose of this plan was to identify natural resource problems within the watershed sub basins and solutions for those problems. One of the more successful results of the Loxahatchee River Watershed Action Plan was the Loxahatchee River Preservation Initiative, which has succeeded in gaining State appropriations for projects that contributed to the restoration and protection of the Loxahatchee River and Watershed.

Loxahatchee River Preservation Initiative

The Loxahatchee River Preservation Initiative (LRPI) is the outgrowth of the Loxahatchee River Watershed Action Plan. In the past, several key projects crucial to preserving the long-term health of the Loxahatchee River could not be implemented due to lack of resources and other regional priorities taking precedence. To address this problem, the LRPI was formed in 2000, with the single purpose of seeking funds for projects that would improve and protect the natural resources within the watershed. It is a 50-50 match grant funding program. Over the past six years, the LRPI has been instrumental in kick starting more than $34 million dollars in water quality enhancement projects. Urban stormwater improvements and the restoration of tributaries to the Loxahatchee, including the estuarine portion of the river system, are projects emphasized by the LRPI.

Jonathan Dickinson State Park Unit Management Plan

This plan serves as a basic statement of policy and direction of JDSP as a unit of Florida's State Park System (FDEP 2000). It identifies the objectives, criteria and standards that guide each aspect of park administration and sets forth specific measures that will be implemented to meet management objectives. The plan is divided into three interrelated components: resource management, land use and operations. Park goals and objectives include preserving the park's natural resources, creating awareness and appreciation for the park, enhancing organized programs and increasing attendance and visitation.

The park consists of approximately 11,471 acres in Martin County and northern Palm Beach County. Within the park, 2,600 acres comprise a wilderness preserve and 2,100 acres consist of the highly endangered scrub community. Fifteen natural communities occur within the unit, including eight wetland communities. The park also contains most of the National Wild and Scenic Northwest Fork of the Loxahatchee River and all the waters within the unit have been designated as Outstanding Florida Waters. These rare natural features create an exceptional environment for plants and wildlife including many designated species. There are 15 plant communities within the park, including 8 wetland communities and 899 plant taxa in 149 families.

Loxahatchee River-Lake Worth Creek Aquatic Preserve

The Loxahatchee River-Lake Worth Creek Aquatic Preserve was adopted by the Board of Trustees of the Internal Improvement Trust Fund in 1970 and is managed by the FDEP's Southeast Aquatic Preserves Field Office in Fort Pierce. The area north of river mile 5.5 on the Northwest Fork was designated as a "wilderness preserve." The primary management objective for this area is the maintenance of the Northwest Fork ecosystems in an essentially natural state. The area south of river mile 5.5 is designated as an "urban preserve." The management objective for this area is the maintenance of existing natural systems and restoration to that condition where possible. Management, which is achieved primarily through the permit review process, is also directed to public recreational opportunities while assuring the continued propagation of fish and wildlife. Primary management concerns include saltwater intrusion into the Northwest Fork, water quality, altered hydroperiod and diversion of water from the watershed due to potable water withdrawals and water for irrigation, and the presence of invasive exotic species. Aquatic Preserve staff relies heavily on research and monitoring data provided by the LRD, SFWMD and local researchers to protect the natural resources associated with the Loxahatchee River.

Jupiter Inlet District Management Plan for the Loxahatchee River

This plan is intended to continue public recreational uses, improve the productivity of the river, and preserve and enhance the natural resources and multiple uses of the Loxahatchee River for which JID has authority (JID 1993). The plan addresses the portion of the Loxahatchee River west of the Florida East Coast Railroad trestle including, the Central Embayment, North Fork,

Northwest Fork, Southwest Fork, C-18 Canal and minor tributaries. Thirty prioritized options were included in the plan. One of the specific actions that have been taken is the restoration of four oxbows in the Northwest Fork to preserve natural hydrological functions.

Restoration Plan for the Northwest Fork of the Loxahatchee River

In April 2003, the SFWMD adopted a Minimum Flows and Levels Rule, Chapter 40E-8, FAC, with a MFL for the Northwest Fork of the Loxahatchee River. As required by legislation, a Recovery Strategy was incorporated into the MFL Rule, which included a commitment by the SFWMD to develop, in partnership with the FDEP, "a practical Restoration Plan and goal" for the Northwest Fork of the Loxahatchee River. With this guidance in mind, it was the purpose of the plan to: document data collection and analysis, develop models and other analytic tools, identify constraints and assumptions, and identify alternative restoration flow scenarios. In summary, the best available scientific and technical information was used to develop a practical restoration goal and plan that provides restorative flows to the ecosystem of the Northwest Fork of the Loxahatchee River.

Together, the staff of the SFWMD, FDEP, FPS and the LRD collected and analyzed data used to develop and evaluate restoration flow alternatives. After an analysis of historic and current flora and fauna communities, the Northwest Fork ecosystem was partitioned into the five Valued Ecosystem Components (VEC):

1. Cypress swamp and hydric hammock in the freshwater riverine floodplain (RM 16 to RM 9.5).
2. Cypress swamp in the tidal floodplain (RM 9.5 to RM 5.5).
3. Fish larvae in the low salinity zone (RM 9.5 to RM 5.5).
4. Oysters in the mesohaline zone (RM 6.0 to RM 4.0).
5. Seagrasses in the polyhaline zone (RM 4.0 to RM 0.0).

The health of the VEC is assumed to reflect the health of the ecosystem. Performance measures for each VEC were developed to relate flow and stage in the floodplain and salinity in the river, to the ecological health of the VEC and were used to evaluate the relative biological effects of each restoration flow alternative.

An initial set of alternative flow scenarios represented five constant low flow targets during the 39-year period of record (1965 to 2003). These scenarios included constant flows of 65 cfs, 90 cfs, or 200 cfs over the Lainhart Dam coupled with 30 cfs, 65 cfs, 110 cfs or 200 cfs in flows from the other tributaries including Cypress Creek, Hobe Grove Ditch and Kitching Creek. The results from these flow scenarios were compared with the base condition. The ecological evaluations of the five constant flow scenarios indicated a few of the scenarios achieved some of the restoration goals; however, the overall ecological goals were not being fully achieved.

Furthermore, a constant flow of 200 cfs over the Lainhart Dam during the dry season was considered to be harmful to the freshwater riverine floodplain and estuarine biota. In response to the findings from the constant flow scenarios and public reaction to the results of the first five scenarios gained through a series of public meetings sponsored by the Council, three variable flow scenarios were developed to simulate a more natural, hydrological variability to achieve the restoration goal. Each variable flow scenario represented the Lainhart Dam flows with varying amount of augmented flows (mostly 65 cfs to 90 cfs during the dry season), added to which were three variable flows from the downstream tributaries, 60 cfs, 90 cfs and 120 cfs. Evaluation of each variable flow scenario to achieve the restoration goal resulted in the selection of the Preferred Restoration Flow Scenario. It incorporates both dry and wet season hydrologic flow patterns and provides the greatest ecological benefit to freshwater riverine and tidal floodplain VEC with minimal impact on the estuarine component.

In summary, the Preferred Restoration Flow Scenario is a variable dry season flow between 50 cfs and 110 cfs, with a mean monthly flow of 69 cfs over Lainhart Dam, while providing an additional 30 cfs of flow from the downstream tributaries when needed.

The Preferred Restoration Flow Scenario provides a dynamic flow pattern with dry season mean monthly flows of 69 cfs over Lainhart Dam to maintain total daily flows greater than 150 cfs within the Northwest Fork, to push the saltwater wedge downstream of RM 7.5 more than 70 percent of the time during the 39 year period of record.

By implementing the Preferred Restoration Flow Scenario, it is expected that saltwater intrusion will be reversed and portions of the tidal floodplain will be restored to freshwater swamp where during the dry season the proposed restored flows will push the salinity wedge from its current location, near river mile nine, downstream to a location near river mile 7.5. At this location the salinity is expected to be below one ppt most of the time, increasing to approximately two to three ppt during periods of low flow conditions (occurring only about 10 percent of the time). The modeling analysis of the entire 39 year modeling period indicates that the two ppt salinity wedge (two ppt) reaches no further upstream than river mile 8.1, which is the river reach immediately downstream of the confluence of Kitching Creek. Limiting saltwater intrusion within this portion of the floodplain will ensure suitable conditions for the propagation of seedlings and healthy growth of bald cypress and other freshwater species. It is anticipated that the restorative flows into the cypress swamp between river mile 16 and river mile 9.5, will be inundated for approximately four to eight months and the hydric hammocks will be inundated for about 30 to 60 days a year.

During the dry season, restoration flows will maintain low water levels in the freshwater riverine floodplain, without completely drying it out every year. In the tidal floodplain, between river mile 9.5 and river mile 5.5, flows will push the saltwater front downstream from river mile 9.5 to between river mile 8 and river mile 7.5. This will allow for recruitment of freshwater species in the upper tidal floodplain. Freshwater species will be expected to expand in number and dominate the canopy to the mouth of Kitching Creek near river mile 8.1. There will also be

recruitment of pond apple in the tidal floodplain due to the improvement in the freshwater environment near river mile 7.5.

The Preferred Restoration Flow Scenario is also designed to minimize the impact on the estuarine ecosystems. The low salinity zone, located between river mile 9.5 and river mile 5.5, requires a salinity regime of two to eight ppt during the dry season to function as a nursery for many saltwater fishes. Although restorative flows will move the appropriate salinity range downstream, the low salinity will still remain within an area that will provide suitable habitat for juvenile fish development. The optimal salinity range for oysters is from 10 to 20 ppt, which is currently located between river mile 6 and river mile 4. With increased flows during the dry season, these salinity levels will be moved downstream and the upstream oyster beds at river mile 6 will be lost. However, the majority of the oysters are located downstream of river mile 5 and will not experience harmful drops in salinity levels. The addition of oyster substrate near river mile 4 will mitigate the loss of oysters at river mile 6. It will have minimal impact on seagrasses in the Central Embayment area.

The Restoration Plan supports existing monitoring activities and proposes new activities and programs necessary to monitor the water quantity, water quality, timing and distribution of increased dry season flows and improved wet season flows in the Northwest Fork. The response of the biological communities to the effects of the Preferred Restoration Flow Scenario needs to be scientifically monitored. In addition to existing vegetation monitoring programs, new monitoring programs for fish and wildlife data are proposed. A science plan to clearly identify and justify basic monitoring programs, and special studies necessary for comprehensive adaptive management decisions to evolve is under development. The information collected from these monitoring programs and special projects will be used to update the restoration plan by the SFWMD, FDEP, FPS and LRECD every five years from the date of acceptance. The Science Plan data will be the basis for adaptive management decisions in the development of operational protocols and other implementation projects.

North Palm Beach Service Area/Loxahatchee River Regional Water Availability Rule

After completion of the restoration plan, the SFWMD initiated rule development to amend the District's rules to identify conditions for permit issuance for consumptive use permits for allocating water from the regional system, including North Palm Beach County/Loxahatchee River watershed waterbodies. The rule would limit water supply demands from the Loxahatchee River watershed over levels that existed prior to April 2006.

A key provision of the rule is that existing consumptive water use permits will not be affected. The rule only will apply when existing permits are scheduled to expire, requiring renewal by the District. The rule also provides a "grace" period during which temporary increases in dependence on Loxahatchee water will be allowed while alternative supplies are being developed. This will prevent immediate shortfalls in water necessary to continue meeting public drinking water needs as concrete steps are taken by water suppliers to implement other

sources. This provides a significant level of protection from potential water supply withdrawal proposals which otherwise might impact the watershed.

Addendum 1

Wild and Scenic Rivers Act Abridged

The current Act is available at:

http://www.rivers.gov/publications/act/current-act.pdf

Wild & Scenic Rivers Act

An Act[1]
To provide for a National Wild and Scenic Rivers System, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that

SECTION 1.

(a) This Act may be cited as the "Wild and Scenic Rivers Act."

(b) It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess uniquely remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. The Congress declares that the established national policy of dam and other construction at appropriate sections of the rivers of the United States needs to be complemented by a policy that would preserve other selected rivers or sections thereof in their free-flowing condition to protect the water quality of such rivers and to fulfill other vital national conservation purposes.

(c) The purpose of this Act is to implement this policy by instituting a national wild and scenic rivers system, by designating the initial components of that system, and by prescribing the methods by which and standards according to which additional components may be added to the system from time to time.

SECTION 2.

(a) The national wild and scenic rivers system shall comprise rivers

(i) that are authorized for inclusion therein by Act of Congress, or

(ii) that are designated as wild, scenic or recreational rivers by or pursuant to an act of the legislature of the State or States through which they flow, that are to be permanently administered as wild, scenic or recreational rivers by an agency or political subdivision of the State or States concerned, that are found by the Secretary of the

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1 The Wild and Scenic Rivers Act (16 U.S.C. 1271-1287) as set forth herein consists of Public Law 90-542 (October 2, 1968) and amendments thereto.

Interior, upon application of the Governor of the State or the Governors of the States concerned, or a person or persons thereunto duly appointed by him or them, to meet the criteria established in this Act and such criteria supplementary thereto as he may prescribe, and that are approved by him for inclusion in the system, including, upon application of the Governor of the State concerned, the Allagash Wilderness Waterway, Maine; that segment of the Wolf River, Wisconsin, which flows through Langlade County and that segment of the New River in North Carolina extending from its confluence with Dog Creek downstream approximately 26.5 miles to the Virginia State line.

Upon receipt of an application under clause (ii) of this subsection, the Secretary shall notify the Federal Energy Regulatory Commission and publish such application in the Federal Register. Each river designated under clause (ii) shall be administered by the State or political subdivision thereof without expense to the United States other than for administration and management of federally owned lands. For purposes of the preceding sentence, amounts made available to any State or political subdivision under the Land and Water Conservation [Fund] Act of 1965 or any other provision of law shall not be treated as an expense to the United States. Nothing in this subsection shall be construed to provide for the transfer to, or administration by, a State or local authority of any federally owned lands which are within the boundaries of any river included within the system under clause (ii).

(b) A wild, scenic or recreational river area eligible to be included in the system is a free-flowing stream and the related adjacent land area that possesses one or more of the values referred to in Section 1, subsection (b) of this Act. Every wild, scenic or recreational river in its free-flowing condition, or upon restoration to this condition, shall be considered eligible for inclusion in the national wild and scenic rivers system and, if included, shall be classified, designated, and administered as one of the following:

(1) Wild river areas -- Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

(2) Scenic river areas -- Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

(3) Recreational river areas -- Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

SECTION 3.

(a) The following rivers and the land adjacent thereto are hereby designated as components of the national wild and scenic rivers system:

[List of designated rivers omitted. Please see following list.]

(b) The agency charged with the administration of each component of the national wild and scenic rivers system designated by subsection (a) of this section shall, within one year from the date of designation of such component under subsection (a) (except where a different date is provided in subsection (a)), establish detailed boundaries therefore (which boundaries shall include an average of not more than 320 acres of land per mile measured from the ordinary high water mark on both sides of the river); and determine which of the classes outlined in section 2, subsection (b), of this Act best fit the river or its various segments. Notice of the availability of the boundaries and classification, and of subsequent boundary amendments shall be published in the Federal Register and shall not become effective until ninety days after they have been forwarded to the President of the Senate and the Speaker of the House of Representatives.

(c) Maps of all boundaries and descriptions of the classifications of designated river segments, and subsequent amendments to such boundaries, shall be available for public inspection in the offices of the administering agency in the District of Columbia and in locations convenient to the designated river.

(d) (1) For rivers designated on or after January 1, 1986, the Federal agency charged with the administration of each component of the National Wild and Scenic Rivers System shall prepare a comprehensive management plan for such river segment to provide for the protection of the river values. The plan shall address resource protection, development of lands and facilities, user capacities, and other management practices necessary or desirable to achieve the purposes of this Act. The plan shall be coordinated with and may be incorporated into resource management planning for affected adjacent Federal lands. The plan shall be prepared, after consultation with State and local governments and the interested public within 3 full fiscal years after the date of designation. Notice of the completion and availability of such plans shall be published in the Federal Register.

(2) For rivers designated before January 1, 1986, all boundaries, classifications, and plans shall be reviewed for conformity within the requirements of this subsection within 10 years through regular agency planning processes.

SECTION 4.

(a) The Secretary of the Interior or, where national forest lands are involved, the Secretary of Agriculture or, in appropriate cases, the two Secretaries jointly shall study and submit to the President reports on the suitability or nonsuitability for addition to the national wild and scenic rivers system of rivers which are designated herein or hereafter by the Congress as potential additions to such system. The President shall report to the Congress his recommendations and proposals with respect to the designation of each such river or section thereof under this Act. Such studies shall be completed and such reports shall be made to the Congress with respect to all rivers named in subparagraphs 5(a) (1) through (27) of this Act no later than October 2, 1978. In conducting these studies the Secretary of the Interior and the Secretary of Agriculture shall give priority to those rivers

(i) with respect to which there is the greatest likelihood of developments which, if undertaken, would render the rivers unsuitable for inclusion in the national wild and scenic rivers system, and

(ii) which possess the greatest proportion of private lands within their areas. Every such study and plan shall be coordinated with any water resources planning involving the same river which is being conducted pursuant to the Water Resources Planning Act (79 Stat. 244; 42 U.S.C. 1962 et seq.). Each report, including maps and illustrations, shall show among other things the area included within the report; the characteristics which do or do not make the area a worthy addition to the system; the current status of land ownership and use in the area; the reasonably foreseeable potential uses of the land and water which would be enhanced, foreclosed, or curtailed if the area were included in the national wild and scenic rivers system; the Federal agency (which in the case of a river which is wholly or substantially within a national forest, shall be the Department of Agriculture) by which it is proposed the area, should it be added to the system, be administered; the extent to which it is proposed that such administration, including the costs thereof, be shared by State and local agencies; and the estimated cost to the United States of acquiring necessary lands and interests in land and of administering the area, should it be added to the system. Each such report shall be printed as a Senate or House document.

(b) Before submitting any such report to the President and the Congress, copies of the proposed report shall, unless it was prepared jointly by the Secretary of the Interior and the Secretary of Agriculture, be submitted by the Secretary of the Interior to the Secretary of Agriculture or by the Secretary of Agriculture to the Secretary of the Interior, as the case may be, and to the Secretary of the Army, the Chairman of the Federal Power Commission, the head of any other affected Federal department or agency and, unless the lands proposed to be included in the area are already owned by the United States or have already been authorized for acquisition by Act of Congress, the Governor of the State or States in which they are located or an officer designated by the Governor to receive the same. Any recommendations or comments on the proposal which the said officials furnish the Secretary or Secretaries who prepared the report within ninety days of the date on which the report is submitted to them, together with the Secretary's or Secretaries' comments thereon, shall be included with the transmittal to the President and the Congress.

(c) Before approving or disapproving for inclusion in the national wild and scenic rivers system any river designated as a wild, scenic or recreational river by or pursuant to an act of the State legislature, the Secretary of the Interior shall submit the proposal to the Secretary of Agriculture, the Secretary of the Army, the Chairman of the Federal Power Commission, and the head of any other affected Federal department or agency and shall evaluate and give due weight to any recommendations or comments which the said officials furnish him within ninety days of the date on which it is submitted to them. If he approves the proposed inclusion, he shall publish notice thereof in the Federal Register.

(d) The boundaries of any river proposed in section 5(a) of this Act for potential addition

to the National Wild and Scenic Rivers System shall generally comprise that area measured within one-quarter mile from the ordinary high water mark on each side of the river. In the case of any designated river, prior to publication of boundaries pursuant to section 3(b) of this Act, the boundaries also shall comprise the same area. This subsection shall not be construed to limit the possible scope of the study report to address areas which may lie more than one-quarter mile from the ordinary high water mark on each side of the river.

SECTION 5.

(a) The following rivers are hereby designated for potential addition to the national wild and scenic rivers system:

[List of study rivers and study periods is omitted. If you need the list, please contact a Council member.]

(c) The study of any of said rivers shall be pursued in as close cooperation with appropriate agencies of the affected State and its political subdivisions as possible, shall be carried on jointly with such agencies if request for such joint study is made by the State, and shall include a determination of the degree to which the State or its political subdivisions might participate in the preservation and administration of the river should it be proposed for inclusion in the national wild and scenic rivers system.

(d)

(1) In all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas, and all river basin and project plan reports submitted to the Congress shall consider and discuss any such potentials. The Secretary of the Interior and the Secretary of Agriculture shall make specific studies and investigations to determine which additional wild, scenic and recreational river areas within the United States shall be evaluated in planning reports by all Federal agencies as potential alternative uses of the water and related land resources involved.

(2) The Congress finds that the Secretary of the Interior, in preparing the Nationwide Rivers Inventory as a specific study for possible additions to the National Wild and Scenic Rivers System, identified the Upper Klamath River from below the John Boyle Dam to the Oregon-California State line. The Secretary, acting through the Bureau of Land Management, is authorized under this subsection to complete a study of the eligibility and suitability of such segment for potential addition to the National Wild and Scenic Rivers System. Such study shall be completed, and a report containing the results of the study shall be submitted to Congress by April 1, 1990. Nothing in this paragraph shall affect the authority or responsibilities of any other Federal agency with respect to activities or action on this segment and its immediate environment.

SECTION 6.

(a)

(1) The Secretary of the Interior and the Secretary of Agriculture are each authorized to acquire lands and interests in land within the authorized boundaries of any component of the national wild and scenic rivers system designated in section 3 of this Act, or hereafter designated for inclusion in the system by Act of Congress, which is administered by him, but he shall not acquire fee title to an average of more than 100 acres per mile on both sides of the river. Lands owned by a State may be acquired only by donation or by exchange in accordance with the subsection (d) of this section. Lands owned by an Indian tribe or a political subdivision of a State may not be acquired without the consent of the appropriate governing body thereof as long as the Indian tribe or political subdivision is following a plan for management and protection of the lands which the Secretary finds protects the land and assures its use for purposes consistent with this Act. Money appropriated for Federal purposes from the land and water conservation fund shall, without prejudice to the use of appropriations from other sources, be available to Federal departments and agencies for the acquisition of property for the purposes of this Act.

(2) When a tract of land lies partially within and partially outside the boundaries of a component of the National Wild and Scenic Rivers System, the appropriate Secretary may, with the consent of the landowners for the portion outside the boundaries, acquire the entire tract. The land or interest therein so acquired outside the boundaries shall not be counted against the average one-hundred-acre-per-mile fee title limitation of subsection (a)(1). The lands or interests therein outside such boundaries, shall be disposed of, consistent with existing authorities of law, by sale, lease, or exchange.

(b) If 50 per centum or more of the entire acreage outside the ordinary high water mark on both sides of the river within a federally administered wild, scenic or recreational river area is owned in fee title by the United States, by the State or States within which it lies, or by political subdivisions of those States, neither Secretary shall acquire fee title to any lands by condemnation under authority of this Act. Nothing contained in this section, however, shall preclude the use of condemnation when necessary to clear title or to acquire scenic easements or such other easements as are reasonably necessary to give the public access to the river and to permit its members to traverse the length of the area or of selected segments thereof.

(c) Neither the Secretary of the Interior nor the Secretary of Agriculture may acquire lands by condemnation, for the purpose of including such lands in any national wild, scenic or recreational river area, if such lands are located within any incorporated city, village or borough which has in force and applicable to such lands a duly adopted, valid zoning ordinance that conforms with the purposes of this Act. In order to carry out the provisions of this subsection the appropriate Secretary shall issue guidelines, specifying standards for local zoning ordinances, which are consistent with the purposes of this Act. The standards specified in such guidelines shall have the object of (A) prohibiting new commercial or industrial uses other than commercial

or industrial uses which are consistent with the purposes of this Act, and (B) the protection of the bank lands by means of acreage, frontage, and setback requirements on development.

(d) The appropriate Secretary is authorized to accept title to non-Federal property within the authorized boundaries of any federally administered component of the national wild and scenic rivers system designated in section 3 of this Act or hereafter designated for inclusion in the system by Act of Congress and, in exchange therefore, convey to the grantor any federally owned property which is under his jurisdiction within the State in which the component lies and which he classifies as suitable for exchange or other disposal. The values of the properties so exchanged either shall be approximately equal or, if they are not approximately equal, shall be equalized by the payment of cash to the grantor or to the Secretary as the circumstances require.

(e) The head of any Federal department or agency having administrative jurisdiction over any lands or interests in land within the authorized boundaries of any federally administered component of the national wild and scenic rivers system designated in section 3 of this Act or hereafter designated for inclusion in the system by Act of Congress is authorized to transfer to the appropriate Secretary jurisdiction over such lands for administration in accordance with the provisions of this Act. Lands acquired by or transferred to the Secretary of Agriculture for the purposes of this Act within or adjacent to a national forest shall upon such acquisition or transfer become national forest lands.

(f) The appropriate Secretary is authorized to accept donations of lands and interests in land, funds, and other property for use in connection with his administration of the national wild and scenic rivers system.

(g)

(1) Any owner or owners (hereinafter in this subsection referred to as "owner") of improved property on the date of its acquisition, may retain for themselves and their successors or assigns a right of use and occupancy of the improved property for noncommercial residential purposes for a definite term not to exceed twenty-five years, or in lieu thereof, for a term ending at the death of the owner, or the death of his spouse, or the death of either or both of them. The owner shall elect the term to be reserved. The appropriate Secretary shall pay to the owner the fair market value of the property on the date of such acquisition less the fair market value on such a date retained by the owner.

(2) A right of use and occupancy retained pursuant to this subsection shall be subject to termination whenever the appropriate Secretary is given reasonable cause to find that such use and occupancy is being exercised in a manner which conflicts with the purposes of this Act. In the event of such a finding, the Secretary shall tender to the holder of that right an amount equal to the fair market value of that portion of the right which remains unexpired on the date of termination. Such right of use or occupancy shall terminate by operation of law upon tender of the fair market price.

(3) The term "improved property," as used in this Act, means a detached, one-family dwelling (hereinafter referred to as "dwelling"), the construction of which was begun before January 1, 1967, (except where a different date is specifically provided by law with respect to any particular river), together with so much of the land on which the dwelling is situated, the said land being in the same ownership as the dwelling, as the appropriate Secretary shall designate to be reasonably necessary for the enjoyment of the dwelling for the sole purpose of noncommercial residential use, together with any structures accessory to the dwelling which are situated on the land so designated.

SECTION 7.

(a) The Federal Power Commission shall not license the construction of any dam, water conduit, reservoir, powerhouse, transmission line, or other project works under the Federal Power Act (41 Stat. 1063), as amended (16 U.S.C. 791a et seq.), on or directly affecting any river which is designated in section 3 of this Act as a component of the national wild and scenic rivers system or which is hereafter designated for inclusion in that system, and no department or agency of the United States shall assist by loan, grant, license, or otherwise in the construction of any water resources project that would have a direct and adverse effect on the values for which such river was established, as determined by the Secretary charged with its administration. Nothing contained in the foregoing sentence, however, shall preclude licensing of, or assistance to, developments below or above a wild, scenic or recreational river area or on any stream tributary thereto which will not invade the area or unreasonably diminish the scenic, recreational, and fish and wildlife values present in the area on the date of designation of a river as a component of the National Wild and Scenic Rivers System. No department or agency of the United States shall recommend authorization of any water resources project that would have a direct and adverse effect on the values for which such river was established, as determined by the Secretary charged with its administration, or request appropriations to begin construction of any such project, whether heretofore or hereafter authorized, without advising the Secretary of the Interior or the Secretary of Agriculture, as the case may be, in writing of its intention so to do at least sixty days in advance, and without specifically reporting to the Congress in writing at the time it makes its recommendation or request in what respect construction of such project would be in conflict with the purposes of this Act and would effect the component and the values to be protected by it under this Act. Any license heretofore or hereafter issued by the Federal Power Commission affecting the New River of North Carolina shall continue to be effective only for that portion of the river which is not included in the National Wild and Scenic Rivers System pursuant to section 2 of this Act and no project or undertaking so licensed shall be permitted to invade, inundate or otherwise adversely affect such river segment.

(b) The Federal Power Commission shall not license the construction of any dam, water conduit, reservoir, powerhouse, transmission line, or other project works under the Federal Power Act, as amended, on or directly affecting any river which is listed in section 5, subsection (a), of this Act, and no department or agency of the United States shall assist by loan, grant, license, or otherwise in the construction of any water resources project that would have a direct and adverse effect on the values for which such river might be designated, as determined by the Secretary responsible for its study or approval –

(i) during the ten-year period following enactment of this Act or for a three complete fiscal year period following any Act of Congress designating any river for potential addition to the national wild and scenic rivers system, whichever is later, unless, prior to the expiration of the relevant period, the Secretary of the Interior and where national forest lands are involved, the Secretary of Agriculture, on the basis of study, determine that such river should not be included in the national wild and scenic rivers system and notify the Committees on Interior and Insular Affairs of the United States Congress, in writing, including a copy of the study upon which the determination was made, at least one hundred and eighty days while Congress is in session prior to publishing notice to that effect in the Federal Register: *Provided*, That if any Act designating any river or rivers for potential addition to the national wild and scenic rivers system provides a period for the study or studies which exceeds such three complete fiscal year period the period provided for in such Act shall be substituted for the three complete fiscal year period in the provisions of this clause (i); and

(ii) during such interim period from the date a report is due and the time a report is actually submitted to the Congress; and

(iii) during such additional period thereafter as, in the case of any river the report for which is submitted to the President and the Congress for inclusion in the national wild and scenic rivers system, is necessary for congressional consideration thereof or, in the case of any river recommended to the Secretary of the Interior under section 2(a)(ii) of this Act, is necessary for the secretary's consideration thereof, which additional period, however, shall not exceed three years in the first case and one year in the second. Nothing contained in the foregoing sentence, however, shall preclude licensing of, or assistance to, developments below or above a potential wild, scenic or recreational river area or on any stream tributary thereto which will not invade the area or diminish the scenic, recreational, and fish and wildlife values present in the potential wild, scenic or recreational river area on the date of designation of a river for study as provided in section 5 of this Act. No department or agency of the United States shall, during the periods hereinbefore specified, recommend authorization of any water resources project on any such river or request appropriations to begin construction of any such project, whether heretofore or hereafter authorized, without advising the Secretary of the Interior and, where national forest lands are involved, the Secretary of Agriculture in writing of its intention so to do at least sixty days in advance of doing so and without specifically reporting to the Congress in writing at the time it makes its recommendation or request in what respect construction of such project would be in conflict with the purposes of this Act and would affect the component and the values to be protected by it under this Act.

(c) The Federal Power Commission and all other Federal agencies shall, promptly upon enactment of this Act, inform the Secretary of the Interior and, where national forest lands are involved, the Secretary of Agriculture, of any proceedings, studies, or other activities within their jurisdiction which are now in progress and which affect or may affect any of the rivers specified in section 5, subsection (a), of this Act. They shall likewise inform him of any such proceedings, studies, or other activities which are hereafter commenced or resumed before they are commenced or resumed.

(d) Nothing in this section with respect to the making of a loan or grant shall apply to grants made under the Land and Water Conservation Fund Act of 1965 (78 Stat. 897; 16 U.S.C. 4601-5 et seq.).

SECTION 8.

(a) All public lands within the authorized boundaries of any component of the national wild and scenic rivers system which is designated in section 3 of this Act or which is hereafter designated for inclusion in that system are hereby withdrawn from entry, sale, or other disposition under the public land laws of the United States. This subsection shall not be construed to limit the authorities granted in section 6(d) or section 14A of this Act.

(b) All public lands which constitute the bed or bank, or are within one-quarter mile of the bank, of any river which is listed in section 5, subsection (a), of this Act are hereby withdrawn from entry, sale, or other disposition under the public land laws of the United States for the periods specified in section 7, subsection (b), of this Act. Notwithstanding the foregoing provisions of this subsection or any other provision of this Act, subject only to valid existing rights, including valid Native selection rights under the Alaska Native Claims Settlement Act, all public lands which constitute the bed or bank, or are within an area extending two miles from the bank of the river channel on both sides of the river segments referred to in paragraphs (77) through (88) of section 5(a) are hereby withdrawn from entry, sale, State selection or other disposition under the public land laws of the Unites States for the periods specified in section 7(b) of this Act.

SECTION 9.

(a) Nothing in this Act shall affect the applicability of the United States mining and mineral leasing laws within components of the national wild and scenic rivers system except that –

(i) all prospecting, mining operations, and other activities on mining claims which, in the case of a component of the system designated in section 3 of this Act, have not heretofore been perfected or which, in the case of a component hereafter designated pursuant to this Act or any other Act of Congress, are not perfected before its inclusion in the system and all mining operations and other activities under a mineral lease, license, or permit issued or renewed after inclusion of a component in the system shall be subject to such regulations as the Secretary of the Interior or, in the case of national forest lands, the Secretary of Agriculture may prescribe to effectuate the purposes of this Act;

(ii) subject to valid existing rights, the perfection of, or issuance of a patent to, any mining claim affecting lands within the system shall confer or convey a right or title only to the mineral deposits and such rights only to the use of the surface and the surface resources as are reasonably required to carrying on prospecting or mining operations and are consistent with such regulations as may be prescribed by the Secretary of the Interior, or in the case of national forest lands, by the Secretary of Agriculture; and

(iii) subject to valid existing rights, the minerals in Federal lands which are part of the system and constitute the bed or bank or are situated within one-quarter mile of the

bank of any river designated a wild river under this Act or any subsequent Act are hereby withdrawn from all forms of appropriation under the mining laws and from operation of the mineral leasing laws including, in both cases, amendments thereto.

Regulations issued pursuant to paragraphs (i) and (ii) of this subsection shall, among other things, provide safeguards against pollution of the river involved and unnecessary impairment of the scenery within the components in question.

(b) The minerals in any Federal lands which constitute the bed or bank or are situated within one-quarter mile of the bank of any river which is listed in section 5, subsection (a) of this Act are hereby withdrawn from all forms of appropriation under the mining laws during the periods specified in section 7, subsection (b) of this Act. Nothing contained in this subsection shall be construed to forbid prospecting or the issuance of leases, licenses, and permits under the mineral leasing laws subject to such conditions as the Secretary of the Interior and, in the case of national forest lands, the Secretary of Agriculture find appropriate to safeguard the area in the event it is subsequently included in the system. Notwithstanding the foregoing provisions of this subsection or any other provision of this Act, all public lands which constitute the bed or bank, or are within an area extending two miles from the bank of the river channel on both sides of the river segments referred to in paragraphs (77) through (88) of section 5(a), are hereby withdrawn, subject to valid existing rights, from all forms of appropriation under the mining laws and from operation of the mineral leasing laws including, in both cases, amendments thereto, during the periods specified in section 7(b) of this Act.

SECTION 10.

(a) Each component of the national wild and scenic rivers system shall be administered in such manner as to protect and enhance the values which caused it to be included in said system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of these values. In such administration primary emphasis shall be given to protecting its esthetic, scenic, historic, archaeologic, and scientific features. Management plans for any such component may establish varying degrees of intensity for its protection and development, based on the special attributes of the area.

(b) Any portion of a component of the national wild and scenic rivers system that is within the national wilderness preservation system, as established by or pursuant to the Act of September 3, 1964 (78 Stat. 890; 16 U.S.C., ch. 23), shall be subject to the provisions of both the Wilderness Act and this Act with respect to preservation of such river and its immediate environment, and in case of conflict between the provisions of these Acts the more restrictive provisions shall apply.

(c) Any component of the national wild and scenic rivers system that is administered by the Secretary of the Interior through the National Park Service shall become a part of the national park system, and any such component that is administered by the Secretary through the Fish and Wildlife Service shall become a part of the national wildlife refuge system. The lands involved shall be subject to the provisions of this Act and the Acts under which the national park system

or national wildlife refuge system, as the case may be, is administered, and in case of conflict between the provisions of these Acts, the more restrictive provisions shall apply. The Secretary of the Interior, in his administration of any component of the national wild and scenic rivers system, may utilize such general statutory authorities relating to areas of the national park system and such general statutory authorities otherwise available to him for recreation and preservation purposes and for the conservation and management of natural resources as he deems appropriate to carry out the purposes of this Act.

(d) The Secretary of Agriculture, in his administration of any component of the national wild and scenic rivers system area, may utilize the general statutory authorities relating to the national forests in such manner as he deems appropriate to carry out the purposes of this Act.

(e) The Federal agency charged with the administration of any component of the national wild and scenic rivers system may enter into written cooperative agreements with the Governor of a State, the head of any State agency, or the appropriate official of a political subdivision of a State for State or local governmental participation in the administration of the component. The States and their political subdivisions shall be encouraged to cooperate in the planning and administration of components of the system which include or adjoin State-or county-owned lands.

SECTION 11.

(a) The Secretary of the Interior shall encourage and assist the states to consider, in formulating and carrying out their comprehensive statewide outdoor recreation plans and proposals for financing assistance for State and local projects submitted pursuant to the Land and Water Conservation Fund Act of 1965 (78 Stat. 897), needs and opportunities for establishing State and local wild, scenic and recreational river areas.

(b) (1) The Secretary of the Interior, the Secretary of Agriculture, or the head of any other Federal agency, shall assist, advise, and cooperate with States or their political subdivisions, landowners, private organizations, or individuals to plan, protect, and manage river resources. Such assistance, advice and cooperation may be through written agreements or otherwise. This authority applies within or outside a federally administered area and applies to rivers which are components of the National Wild and Scenic Rivers System and to other rivers. Any agreement under this subsection may include provisions for limited financial or other assistance to encourage participation in the acquisition, protection, and management of river resources.

(2) Wherever appropriate in furtherance of this Act, the Secretary of Agriculture and the Secretary of the Interior are authorized and encouraged to utilize the following:

(A) For activities on federally owned land, the Volunteers in the Parks Act of 1969 (16 U.S.C. 18g-j) and the Volunteers in the Forest Act of 1972 (16 U.S.C. 558a-558d).

(B) For activities on all other lands, section 6 of the Land and Water Conservation Fund Act of 1965 (relating to the development of statewide comprehensive outdoor recreation plans).

(3) For purposes of this subsection, the appropriate Secretary or the head of any Federal agency may utilize and make available Federal facilities, equipment, tools and technical assistance to volunteers and volunteer organizations, subject to such limitations and restrictions as the appropriate Secretary or the head of any Federal agency deems necessary or desirable.

(4) No permit or other authorization provided for under provision of any other Federal law shall be conditioned on the existence of any agreement provided for in this section.

SECTION 12.

(a) The Secretary of the Interior, the Secretary of Agriculture, and the head of any other Federal department or agency having jurisdiction over any lands which include, border upon, or are adjacent to, any river included within the National Wild and Scenic Rivers System or under consideration for such inclusion, in accordance with section 2(a)(ii), 3(a), or 5(a), shall take such action respecting management policies, regulations, contracts, plans, affecting such lands, following the date of enactment of this sentence, as may be necessary to protect such rivers in accordance with the purposes of this Act. Such Secretary or other department or agency head shall, where appropriate, enter into written cooperative agreements with the appropriate State or local official for the planning, administration, and management of Federal lands which are within the boundaries of any rivers for which approval has been granted under section 2(a)(ii). Particular attention shall be given to scheduled timber harvesting, road construction, and similar activities which might be contrary to the purposes of this Act.

(b) Nothing in this section shall be construed to abrogate any existing rights, privileges, or contracts affecting Federal lands held by any private party without the consent of said party.

(c) The head of any agency administering a component of the national wild and scenic rivers system shall cooperate with the Administrator, Environmental Protection Agency and with the appropriate State water pollution control agencies for the purpose of eliminating or diminishing the pollution of waters of the river.

SECTION 13.

(a) Nothing in this Act shall affect the jurisdiction or responsibilities of the States with respect to fish and wildlife. Hunting and fishing shall be permitted on lands and waters administered as parts of the system under applicable State and Federal laws and regulations unless, in the case of hunting, those lands or waters are within a national park or monument. The administering Secretary may, however, designate zones where, and establish periods when, no hunting is permitted for reasons of public safety, administration, or public use and enjoyment and shall issue appropriate regulations after consultation with the wildlife agency of the State or States affected.

(b) The jurisdiction of the States and the United States over waters of any stream include in the national wild, scenic or recreational river area shall be determined by established principles of law. Under the provisions of this Act, any taking by the United States of a water

right which is vested under either State or Federal law at the time such river is included in the national wild and scenic rivers system shall entitle the owner thereof to just compensation. Nothing in this Act shall constitute an express or implied claim or denial on the part of the Federal Government as to exemption from State water laws.

(c) Designation of any stream or portion thereof as a national wild, scenic or recreational river area shall not be construed as a reservation of the waters of such streams for purposes other than those specified in this Act, or in quantities greater than necessary to accomplish these purposes.

(d) The jurisdiction of the States over waters of any stream included in a national wild, scenic or recreational river area shall be unaffected by this Act to the extent that such jurisdiction may be exercised without impairing the purposes of this Act or its administration.

(e) Nothing contained in this Act shall be construed to alter, amend, repeal, interpret, modify, or be in conflict with any interstate compact made by any States which contain any portion of the national wild and scenic rivers system.

(f) Nothing in this Act shall affect existing rights of any State, including the right of access, with respect to the beds of navigable streams, tributaries, or rivers (or segments thereof) located in a national wild, scenic or recreational river area.

(g) The Secretary of the Interior or the Secretary of Agriculture, as the case may be, may grant easements and rights-of-way upon, over, under, across, or through any component of the national wild and scenic rivers system in accordance with the laws applicable to the national park system and the national forest system, respectively: *Provided*, That any conditions precedent to granting such easements and rights-of-way shall be related to the policy and purpose of this Act.

SECTION 14.

The claim and allowance of the value of an easement as a charitable contribution under section 170 of title 26, United States Code, or as a gift under section 2522 of said title shall constitute an agreement by the donor on behalf of himself, his heirs, and assigns that, if the terms of the instrument creating the easement are violated, the donee or the United States may acquire the servient estate at its fair market value as of the time the easement was donated minus the value of the easement claimed and allowed as a charitable contribution or gift.

SECTION 14A.

(a) Where appropriate in the discretion of the Secretary, he may lease federally owned land (or any interest therein) which is within the boundaries of any component of the National Wild and Scenic Rivers system and which has been acquired by the Secretary under this Act. Such lease shall be subject to such restrictive covenants as may be necessary to carry out the purposes of this Act.

(b) Any land to be leased by the Secretary under this section shall be offered first for such lease to the person who owned such land immediately before its acquisition by the United States.

SECTION 15.

Notwithstanding any other provision to the contrary in sections 3 and 9 of this Act, with respect to components of the National Wild and Scenic Rivers System in Alaska designated by paragraphs (38) through (50) of section 3(a) of this Act –

(1) the boundary of each such river shall include an average of not more than six hundred and forty acres per mile on both sides of the river. Such boundary shall not include any lands owned by the State or a political subdivision of the State nor shall such boundary extend around any private lands adjoining the river in such manner as to surround or effectively surround such private lands; and

(2) the withdrawal made by paragraph (iii) of section 9(a) shall apply to the minerals in Federal lands which constitute the bed or bank or are situated within one-half mile of the bank of any river designated a wild river by the Alaska National Interest Lands Conservation Act.

SECTION 16.

As used in this Act, the term –

(a) "River" means a flowing body of water or estuary or a section, portion, or tributary thereof, including rivers, streams, creeks, runs, kills, rills, and small lakes.

(b) "Free-flowing," as applied to any river or section of a river, means existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway. The existence, however, of low dams, diversion works, and other minor structures at the time any river is proposed for inclusion in the national wild and scenic rivers system shall not automatically bar its consideration for such inclusion: *Provided*, That this shall not be construed to authorize, intend, or encourage future construction of such structures within components of the national wild and scenic rivers system.

(c) "Scenic easement" means the right to control the use of land (including the air space above such land) within the authorized boundaries of a component of the wild and scenic rivers system, for the purpose of protecting the natural qualities of a designated wild, scenic or recreational river area, but such control shall not affect, without the owner's consent, any regular use exercised prior to the acquisition of the easement. For any designated wild and scenic river, the appropriate Secretary shall treat the acquisition of fee title with the reservation of regular existing uses to the owner as a scenic easement for purposes of this Act. Such an acquisition shall not constitute fee title ownership for purposes of section 6(b).

SECTION 17.

There are hereby authorized to be appropriated, including such sums as have heretofore been appropriated, the following amounts for land acquisition for each of the rivers described in section 3(a) of this Act:

Clearwater, Middle Fork, Idaho, $2,909,800;
Eleven Point, Missouri, $10,407,000;
Feather, Middle Fork, California, $3,935,700;
Rio Grande, New Mexico, $253,000;
Rogue, Oregon, $15,147,000
St. Croix, Minnesota and Wisconsin, $21,769,000;
Salmon, Middle Fork Idaho, $1,837,000; and
Wolf Wisconsin, $142,150.

Addendum 2

Chapter 83-358, Laws of Florida

CHAPTER 83-358, Laws of Florida

Committee Substitute for Senate bill No. 459

An act relating to the Loxahatchee River; creating the Loxahatchee River Wild and Scenic Designation and Preservation Act; providing legislative declarations and intent; providing definitions; designating a portion of the river as a wild and scenic river; providing for development of a management plan; providing for a coordinating council; authorizing the Governor to apply for inclusion of the designated portion of the river in the National Wild and Scenic Rivers System; providing for preservation of existing governmental authority; providing for rules; specifying regulatory and permitting authority; providing for enforcement; providing for injunctions; specifying violations and penalties; providing for repeal; providing an effective date.

Be It Enacted by the Legislature of the State of Florida.

Section 1. Short title.--Sections 1 through 12 of this act may be cited as the "Loxahatchee River Wild and Scenic Designation and Preservation Act."

Section 2. Legislative declaration.--The Legislature finds and declares that a certain segment of the Loxahatchee River in Palm Beach and Martin Counties possesses outstandingly remarkable ecological, fish and wildlife, and recreational values which are unique in the United States. These values give national significance to the river as one which should be permanently preserved and enhanced, not only for the citizens of the State of Florida, but for the citizens of the United States, of present and future generations. The permanent management and administration of the river, however, involves a complex interaction of national, state, regional, and local interests which require balancing, coordination of purpose and continuing participation by and access to the public, through its elected representatives. It is the intention of the Legislature to provide for the permanent preservation of the designated segment of the Loxahatchee River by way of development of a plan for permanent administration by agencies of the state and local government which will ensure the degree of protection necessary for inclusion of that segment of the river in the National Wild and Scenic Rivers System but retaining that degree of flexibility, responsiveness, and expertise which will accommodate all of the diverse interests involved in a manner best calculated to be in the public interest.

Section 3. Definitions.--As used in this act:

(1) "Activity" means the doing of any act or the failing to do any act, whether by a natural person or a corporation.

(2) "Board" means the governing board of the South Florida Water Management District.

(3) "Coordination Council" means the council created by s.5(3)(o).

(4) "Department" means the Division of Recreation and Parks of the Department of Natural Resources.

(5) "Division" means the Division of Recreation and Parks of the Department of Natural Resources.

(6) "Executive Board" means the Governor and Cabinet sitting as the head of the Department of Natural Resources.

(7) "Resource value" means any one or more of the specific scenic, recreational, geologic, fish and wildlife, historic, cultural, or ecological features identified by the National Park Service, Department of the Interior, in its Draft Wild and Scenic Rivers Study/Draft Environmental Impact Statement as being outstandingly remarkable or worthy of note.

(8) "River area" means that portion of the Northwest Fork of the Loxahatchee River from river mile 6 to river mile 13.5, together with such abutting uplands as determined in the permanent management plan to form the corridor having visual impact on the river user, and which may be necessary to maintain the natural and scenic appeal of the river.

Section 4. Designation of wild and scenic river.--The Northwest Fork of the Loxahatchee River between river mile 6 and river mile 13.5 is hereby designated as a wild and scenic river for the purposes of this act and subject to all of the provisions of this act. Such designated portion is more particularly described as that portion of the Northwest Fork downstream of the southern boundary of Riverbend County Park located in Palm Beach County and upstream of an east-west line passing through a point where the southern boundary of Jonathan Dickinson State Park intersects the eastern shoreline of the river.

Section 5. Development of management plan.--

(1) The department and the South Florida Water Management District shall jointly develop a proposed management plan for the designated segment of the Loxahatchee River, which management plan, subject to and consistent with the provisions of this act, will be designed to qualify the designated segment of the river for inclusion in the national Wild and Scenic rivers System.

(2) The development of the proposed management plan shall include participation by the National Park Service, by all appropriate state agencies, by all appropriate or interested local governments, including but not limited to Palm Beach County, Martin County, the Jupiter Inlet District, the Town of Jupiter, the Loxahatchee River Environmental Control District, the South Indian River Water Control District, and the Northern Palm Beach County Water Control District, the Palm Beach County Farm Bureau, and by any others deemed advisable by the department or board. To the extent not inconsistent with the provisions of this act, the plan shall include such conditions as the United State Secretary of the Interior may require.

(3) The proposed management plan shall include provision for:

(a) Permanent protection and enhancement of the ecological, fish and wildlife, and recreational values identified by the National Park Service in its draft study of the river and for which the river was chosen for inclusion in the system without, insofar as is consistent therewith, limiting other uses that do not substantially interfere with public use and enjoyment of those values; primary emphasis being given to protecting esthetic, scenic, historic, archaeologic, and scientific features;

(b) Continuation of land uses and developments on private lands within the river area which are in existence on the effective date of this act which are not incompatible with the purposes of designation;

(c) Periodic studies to determine the quantity and mixture of recreation and other public uses which can be permitted without adverse impact on the resource values of the river area;

(d) Regulation and distribution of public access where necessary to protect and enhance the resource values of the river area;

(e) Basic facilities to absorb user impact on the river area, including necessary toilet refuse containers, but located in order to minimize their intrusive impact;

(f) Location of major facilities such as developed campgrounds, visitor centers, and administrative headquarters outside the river area;

(g) Restriction of motorized travel by land vehicle or boat where necessary to protect the resource values in the river area;

(h) Agricultural and forestry practices similar in nature and intensity or less intensive than those present in the river area on the effective date of this act;

(i) Limitation of resource management practices to those necessary for protection, conservation, rehabilitation, or enhancement of river area resource values;

(j) Maintenance of existing water quality;

(k) Whenever alternative routes are unavailable, location and construction of new public utility or road, rights-of-way in a way which minimizes adverse effects on scenic, recreational, fish and wildlife, and other resource values in the river area;

(l) Continuance of existing drainage and water management practices, unless such existing practices will degrade or diminish existing water quality or existing practices will degrade or diminish existing water quality or existing resource values in the river area, and allowances of new water resource management practices which will not have a substantial adverse impact on resource values in the river area;

(m) Review and regulation of all activities conducted or proposed to be conducted which will or may have a substantial adverse impact on any of the resource values in the river area as provided n this act;

(n) Continuation of activities or developments below or above the designated segment which will not invade the river area or substantially diminish the scenic, recreational, and fish and wildlife resource values present in the river area on the effective date of this act; and

(o) A permanent management coordinating council composed of one representative from each of the participants provided for in subsection (2). The coordinating council shall review and make recommendations, in the first instance, on all applications for permits required by this act, as well as all proposals for amendments or modifications to the permanent management plan, and render its nonbinding advisory opinion to the board and the department. Each participant shall appoint one member to the coordinating council. The coordinating council shall elect a chairman, vice chairman, and secretary to serve for a term of one year. The coordinating council shall adopt bylaws to provide for such other officers as it may deem necessary, election of officers, removal of officers for just cause, meetings, quorum, procedures for the conduct of its business, and such other matters as the membership may deem advisable in the conduct of its business. Such professional staff as the coordinating council may require shall be provided by the South Florida Water Management District.

(4) To the extent not inconsistent with this act, the proposed management plan may also include any other provisions deemed by the department and the board to be necessary or advisable for the permanent protection of the river as a component of the National Wild and Scenic Rivers System.

Section 6. Authority for application for inclusion in National Wild and Scenic Rivers System.--Upon completion of the development of a proposed management plan, the executive director of the department shall forward the proposed management plan to the executive board. After the executive board has received, reviewed and accepted a proposed management plan, the Governor may apply to the United States Secretary of the Interior for inclusion of the designated segment of the Loxahatchee River into the National Wild and Scenic Rivers System.

Section 7. Preservation of existing governmental authority.--

(1) Nothing contained in this act shall operate to divest any agency, water management district, municipality, county, or special district of any authority or jurisdiction in existence on the effective date of this act.

(2) Construction and maintenance of improvements at the Jupiter Inlet and in the Loxahatchee River downstream from the designator segment for purposes of navigation, waterway flushing, or upland drainage, including creation or preservation of channels, maintenance dredging, jetty improvements, riprapping, construction of groins and similar improvements, and removal of sand or dead oyster shall bare when deemed to have a potential for substantial adverse impact on the resource values of the river area shall be undertaken using techniques which minimize adverse effects on scenic, recreational, fish and wildlife and other values of the river area.

Section 8. Rulemaking authority.--After approval by the Secretary of the Interior of an application by the Governor under this act for inclusion of the Loxahatchee River in the National Wild and Scenic Rivers System, the board and the department shall each have full authority under their separate jurisdictions as provided in s.9 to adopt rules deemed necessary for the discharge of the respective duties of each as provided herein, including the adoption of the proposed management plan as the permanent management plan, and including the power to adopt rules modifying or amending the management plan in accordance with the provisions of this act and rules providing for permanent management of the designated segment as a component of the National Wild and Scenic Rivers System.

Section 9. Separation of regulatory authority.--

(1) The department shall have full and exclusive authority to adopt rules concerning and to regulate activities within the river area having a direct and substantial adverse effect on any resource value within the river area.

(2) The board shall have full and exclusive authority to adopt rules concerning and to regulate activities outside the river area having substantial adverse impact on resource values within the river area.

(3) The department and the board shall coordinate all activities related to rule adoption and enforcement in order to avoid to the maximum extent possible any conflicts or duplication arising therefrom.

Section 10. Permitting authority.--

(1) No person or entity shall conduct any activity or do anything which will or may have an adverse impact on any resource value in the river area without first having received a permit from the board or the department, as appropriate.

(2) Any applicant for a permit shall file an application for a permit with the board or the department, whichever has regulatory authority, upon such forms and in such manner as the board or the department shall by rule require. The board and the department may require, with or in addition to such applications, the furnishing of any information deemed necessary or desirable for full and complete consideration of all factors relevant to informed decisions on the applications.

(3) A permit may be granted only after a finding by the board or the department, whichever has regulatory authority, that the activity for which a permit has been requested will not have a substantial adverse impact on resource values in the river area.

(4) the board and the department may adopt an application fee schedule providing for payment of reasonable fees to defray the cost of processing applications.

(5) the provisions of Chapter 120, Florida Statutes, shall apply to the board and to the department, but not to the coordinating council, in carrying out the functions and duties prescribed for each by this act.

Section 11. Enforcement.--

(1) Officers of the division shall have full authority to enforce any rule adopted under this act with the same police powers given them by law to enforce the rules of state parks.

(2) The board shall have full power to enforce this act or any rule adopted under this act by action for injunctive relief or by any other method available for enforcement of rules adopted under Chapter 373.

Section 12. Penalties.--Violation of any rule adopted under this act constitutes a misdemeanor of the second degree, punishable as provided in s.775.082 or s.775.083, Florida Statues. Continuing violation after notice constitutes a separate violation for each day so continued.

Section 13. This act is repealed on a date two years after the effective date of this act, unless the portion of the Loxahatchee River designated by this act as a wild and scenic river is included in the National Wild and Scenic Rivers System on or before that date.

Section 14. This act shall take effect upon becoming a law.

Approved by the Governor June 24, 1983.

Filed in Office Secretary of State June 24, 1983.

Addendum 3

Resolution by Florida Cabinet - January 11, 1983

RESOLUTION

WHEREAS the Governor and Cabinet sitting as Head of the Department of Natural Resources have considered a Loxahatchee River Wild and Scenic Rivers Study and draft Environmental Impact Statement prepared by the United States Department of the Interior; and

WHEREAS the Department of the Interior has concluded that a 7.5-mile segment of the Loxahatchee River in Palm Beach and Martin Counties meets the criteria for inclusion in the National Wild and Scenic Rivers System; and

WHEREAS it would be in the best interest of the State to preserve and, to the maximum degree possible, enhance this exceptional resource:

NOW, THEREFORE, BE IT RESOLVED that the Governor and Cabinet sitting as Head of the State of Florida Department of Natural Resources do hereby endorse in concept the inclusion of the identified 7.5-mile segment of the Loxahatchee River in the National Wild and Scenic Rivers System, and do direct the Department of Natural Resources staff, in concert with affected state, federal, regional, and local agencies, to develop a management plan which satisfies federal requirements for including the Loxahatchee River in the National Wild and Scenic Rivers System. The principal goals of the plan will be to preserve and enhance the river's unique natural values, restore the river's historical hydrologic regime, and reverse deleterious saltwater intrusion into the river. The staff is further directed to submit the plan to the Board for final consideration.

Adopted this 11th day of January, 1983, by the Governor and the Cabinet of the State of Florida as Head of the State of Florida Department of Natural Resources.

Governor

Secretary of State

Attorney General

Comptroller

Treasurer

Commissioner of Agriculture

Commissioner of Education

Addendum 4

Completed Restoration Projects

Palm Beach County Completed Restoration Projects

The *Loxahatchee Slough-Luckey Tract Restoration and Public Use* project completed in 2007 includes 1,194 acres of pine flatwoods, freshwater marshes, wet prairies, cypress and hammock within the 12,836-acre Loxahatchee Slough Natural Area. It is located north of the west leg of the C-18 canal, east of Wind in the Pines and south of Jupiter Farms. The site was impacted by exotic vegetation such as Australian pine, melaleuca, Brazilian pepper, old world climbing fern and downy rose myrtle. The site was initially treated in 2006 with annual treatments thereafter. The SFWMD replaced a series of dilapidated culverts along the C-18 canal which improved the hydrology. Four miles of multi-use trails were constructed that can be accessed by nearby residents.

The *South Loxahatchee Slough Restoration* project completed in 2007 was a five-year project located within the 12,836-acre Loxahatchee Slough Natural Area. The 780-acre project area is located south of PGA Boulevard, north of the Bee Line Highway and west of the eastern leg of the C-18 Canal. The intent of the South Loxahatchee Slough Restoration Project was to restore a major portion of the historic Loxahatchee Slough, over drained by the C-18 Canal and impacted by invasive exotic vegetation including melaleuca, Brazilian pepper, Australian pine and old world climbing fern. This multi-phase project consisted of the following components for an integrated pest management and restoration approach:

Biological Control Of Melaleuca - The melaleuca weevil and melaleuca psyllid were released into the project area prior the majority of the work effort. Both adults and young (larvae and nymphs) damage melaleuca disrupting the plant's normal growth processes which helps to reduce seed production and prevent further spread of this invasive plant.

Mechanical Treatment Of Exotic Vegetation - Machinery and heavy equipment were used to remove large monocultures of Australian pine (26 acres), Brazilian pepper (15 acres), and Melaleuca (214 acres) from old deposits of spoil, and areas that are adjacent to these disturbed sites. Both complete removal of trees and mulching in place were utilized.

Ground Control Treatment Of Exotic Vegetation - Ground crews treated with herbicides, exotic vegetation infestations not mechanically treated, primarily melaleuca, Brazilian pepper and old world climbing fern. The site was treated initially in 2006, then annually thereafter.

Berm And Ditch Removal - In the early 1960s a canal was dug from the Beeline Highway to the C-18 Canal to drain the property, south of PGA Boulevard and a shell pit area just south of this canal and west of the C-18 Canal was also dug. After the Australian pines growing on these spoil areas were mechanically removed, the spoil piles (46 acres) were scraped down to the original wetland elevation using heavy equipment and deposited back into the adjacent shell pits, canal or ditches.

The *Hungryland Slough Natural Area Restoration Project* is a 2,944 acre natural area that was acquired by Palm Beach County in several phases starting in August 1997. The site was hydrologically altered due to the construction of dirt roads and canals over nearly 1,770 acres in the Unit 11 Tract in the mid-1970's. The site was also drained by 10 culverts along the southern and eastern property boundaries into the western leg of the C-18 canal. The altered hydrology allowed melaleuca and other non-native invasive vegetation species to invade onsite wetlands.

Hungryland Slough historically flowed northeastward, joining with the Loxahatchee Slough and River. In order to improve site hydrology and native species recovery, a comprehensive restoration of the site was conducted between 2002 and 2007 which included removal of roads, canals, berms and ditches, as well as culvert removal/replacements. Five of the original 10 culverts draining the site were removed, and the remaining 5 were either repaired or replaced, and control elevations were raised to restore the onsite historic slough.

An extensive 4-year restoration project to restore hydrology in the Unit 11 Tract was completed in 2007. The following was accomplished: 38 miles of dirt roads removed, 12 miles of canals removed, 3.5 miles of perimeter berm and ditch removed, and the control elevation of site wetlands was raised 1.6 feet to re-establish historic seasonal water levels.

A non-native plant species eradication program was initiated in portions of the site in 1998. The entire site is now swept annually, maintaining exotic plant species at less than 1% coverage.

Since the completion of restoration activities, utilization of the mitigation area by listed and other wildlife species such as the Everglades snail kite, bald eagle, wild turkey, wood stork, American alligator, river otter, bobcat, and white-tailed deer has increased significantly.

The *Limestone Creek Natural Area Restoration Project* includes remnants of the old Limestone Creek located near the S-46 structure on the south fork of the Loxahatchee River, just east of I-95. Two remnant blackwater tributaries drain into the South Fork of the Loxahatchee River through an approximately 52.5-acre property managed by Palm Beach County as the Limestone Creek Natural Area. The natural area is primarily composed of pine flatwoods, small amounts of scrubby flatwoods, and mesic oak hammock vegetation communities that occur along the blackwater stream channels. Exotic vegetation has been removed from the site to enhance and maintain the native habitats.

To restore a more natural water flow through the blackwater stream channels, two weirs were installed within the stream channels to slow the water, curb erosion, and rehydrate the adjacent hammock communities. Additionally, three oxbows were constructed along the south fork whereby the existing canal bank was excavated and regraded to create intertidal mangrove wetlands and associated transitional and upland areas. These oxbows help to reduce sedimentation into the river, improve tidal flushing of mangrove wetlands, enhance estuarine habitat along the south fork of the River and help to improve the overall water quality. The

restoration areas provide essential wildlife habitat, including habitat for fish as well as listed migratory bird species and manatees.

Finally, public use facilities, including a small parking area, accessible nature trail, observation platform and fishing pier were constructed to provide passive recreational use for the local community.

Martin County Completed Restoration Projects

The *Oyster Reef Restoration Project* expands on existing restoration efforts in the Loxahatchee River. In 2009, Martin County received a grant from the National Oceanic and Atmospheric Administration (NOAA) to restore oyster reef habitat in the Loxahatchee River. Oysters help to improve water quality and provide habitat for over 300 species. The project, conducted in partnership with the LRECD and Palm Beach County, was constructed in July and August 2010, and resulted in the creation of 5.84 acres of oyster habitat in the Northwest Fork of the Loxahatchee River. As this oyster habitat matures it will filter huge volumes of water and provide habitat for countless numbers of organisms.

Addendum 5

Restoration Projects in Planning/Construction Phase

PBC Restoration Projects Underway

The *Pine Glades Natural Area Restoration Project* is composed of almost 6,500 acres of high quality pine flatwoods and wetland ecosystems. There are currently two restoration projects underway called Pine Glades North and Pine Glades South. Both areas are immediately west of Jupiter Farms, east of Pratt Whitney Road and south of Indiantown Road. Since the early 1950's, the 1,280-acre eastern portion of the Natural Area has been heavily impacted by agricultural practices and the construction of berms. These impacts have allowed melaleuca and other non-native invasive vegetation species to flourish in this portion of the site. An extensive restoration project was planned for the area to improve site hydrology and native plant biodiversity. Due to the extremely wet nature of the project area, restoration activities can only be conducted during the annual dry season each spring. Restoration activities began at Pine Glades with exotic vegetation removal in spring 2006 and have continued through spring 2010. A total of 576 acres of melaleuca were mechanically removed and 2,100 acres of exotic vegetation were chemically treated using ground crews. Three prescribed burns totaling 992 acres were completed in 2009 and 2010 within the restoration areas. The burns will assist in reducing levels of exotic vegetation and will encourage seeding by native species.

Geo-technical studies were completed in 2007 and 2009 to evaluate ways to improve the hydrology within the project area. A 36-inch culvert was installed at Pine Glades South in spring 2008 to divert excess water during the rainy season that had frequently flooded the project area since the 1950's. In spring 2009, a 150-foot section of berm was removed to restore a more natural water flow over 340 acres.

Through 2010, initial exotic removal was 100% complete and wetland restoration was 75% complete. These restoration efforts have already resulted in increased wildlife usage of the site by nesting wading and shore birds. In the spring of 2011 through 2013, restoration activities will occur in the northern portion of the restoration project area and will include: continued follow-up chemical treatment of non-native invasive vegetation; creation of 35 acres of wetlands and 40 acres of uplands; removal of over 3 miles of berms and 1½ miles of asphalt roads; and installation of 3 miles of seepage barrier to help restore a natural hydrological cycle.

The *Loxahatchee Slough Sandhill Crane East Restoration* project has been under construction since 2008 and is scheduled for completion in 2010. The area includes 3,184 acres of upland shrub/brushland, freshwater marshes, wet prairies, pine flatwoods, hammock and cypress. The Sandhill Crane site is in the western portion of the Loxahatchee Slough that was ditched and drained, primarily in the 1950s and 1960s for agriculture purposes. The intent of the project is to restore the wetlands east of that project area by removing exotic vegetation and filling or plugging the drainage ditches running through the property. Phase I of the project involved mechanical removal of exotic vegetation, primarily Australian pine, from the spoil piles that were excavated along two parallel ditches, approximately 2.7 miles in length. Phase II will involve filling these ditches, once the Australian pines have been removed, as well as filling up to 8.5 miles of additional, smaller perimeter ditches. Additionally, Phase II will include ground control

treatment of exotic vegetation, primarily Brazilian pepper, melaleuca, Australian pine and old world climbing fern.

The *Delaware Scrub Restoration* project has been under construction since 2007 and is scheduled for completion in 2010. The Delaware Scrub Natural Area is adjacent to the Loxahatchee River and the area's most traveled highway, Indiantown Road (SR 992). The natural communities are mostly undisturbed except for the invasion of exotic vegetation. The scrub consists of approximately 13 acres of upland and two acres of wetland areas. The wetland areas make up the shoreline to Jones Creek, a tributary to the Southwest Fork of the Loxahatchee River.

Phase I of the Delaware Scrub Restoration Project includes the removal of exotic vegetative species on the site for the restoration of the uplands, wetland and scrubby flatwoods communities of the site. Restoring these ecosystems to their natural state will provide a more natural hydrology to the site and adjoining Jones Creek and improve the habitat for the native and listed species known to use the site. Phase II of the project will include the construction of public use and educational facilities. These would include a five car, one bus parking lot, a 1,500-foot accessible trail, 200-foot boardwalk over the site's wetlands, an observation deck with canoe tie up on Jones Creek and informational kiosks stationed at both the trail entrance and the observation deck. These facilities would allow the public access to the site and its diverse habitats.

Martin County Restoration Projects Underway

The *Moonshine Creek Tributary and Hobe Grove Ditch Study* is an examination of restorative benefits of reconnecting the natural Moonshine Creek tributary to the surrounding lands within the sub-basin that are now under public ownership. Hobe Grove Ditch was excavated through uplands in the 1960s to drain flood waters from newly planted citrus groves into the Northwest Fork of the Loxahatchee River. With the creation of the ditch, runoff from the surrounding groves was directed to Hobe Grove Ditch. The groves have been purchased by the SFWMD and Martin County. These agencies are planning to restore the area back to its natural condition of pine flatwoods and wet prairies. The hydroperiod of the floodplain forest community on Moonshine Creek will be restored and more treatment of the surface waters will be provided prior to its entry into the Loxahatchee River. Before upstream restoration can be completed, an engineering study is needed to examine the best structural methods to reconnect Moonshine Creek, maintain or reduce existing drainage levels, and fill in Hobe Grove Ditch. As part of this engineering study, the quantity and quality (nutrient loads) of water within Moonshine Creek and Hobe Grove Ditch will be monitored to obtain baseline information. The measured data will then be analyzed to quantify improvements to water quantity and quality resulting from creek and upstream restoration activities.

The *Cypress Creek Restoration Project* area covers approximately 4,000 acres and is equally divided between Martin and Palm Beach Counties as the county line bisects the property. The

area provides approximately one-third of the historic flow to the Wild and Scenic Northwest Fork of the Loxahatchee River. This area is important because it has a direct drainage connection to the Northwest Fork of the Loxahatchee River through Cypress Creek. The area is interspersed with numerous marshes, cypress swamps and wet prairies. The protection and restoration of the wetlands in the Cypress Creek area will be extremely beneficial in improving the supply of fresh water to the Northwest Fork. These actions will assist in reducing saltwater intrusion up the river, which is a threat, especially during periods of drought. Other benefits include floodwater attenuation, protection of fish and wildlife habitat, and enhancement of water quality.

The project area has been heavily impacted by agricultural practices and development. Construction of drainage ditches in the early 1950s impacted the sites hydrology, creating favorable conditions for non-native invasive species to flourish. Restoration activities to eradicate non-native invasive vegetation began in 1999. To date, over 4,500 acres have been treated within the project area. Hydrologic restoration activities began in spring 2007 and have resulted in over six miles of ditch filling and plugging.

The *Cypress Creek Restoration Project* is part of the Loxahatchee River Preservation Initiative. The project entails construction that will provide for redistribution, storage and timed delivery of basin stormwater. It is anticipated that existing conveyances and the creation of a large stormwater treatment area on land currently owned by Martin County and SFWMD will provide the needed facilities. Flows from the Pal Mar basin will be treated and delivered to the Northwest Fork of the Loxahatchee River to assist in ecosystem restoration.

The *Kitching Creek Restoration Project* is designed to reconnect the historic flows to Kitching Creek, which provided major freshwater contributions to the Northwest Fork of the Loxahatchee River. Urban development of the upper watershed has diverted and affected the timely distribution of these flows to Jonathan Dickinson State Park and the Northwest Fork. The *Kitching Creek Phase IV Restoration Project* entails the restoration of the historical discharges of the headwaters of the Kitching Creek watershed.

The project area is located south of Bridge Road, in between I-95 and U.S. Highway 1 in southern Martin County. The project is designed to improve water quality and quantity by enhancing surface water deliveries to Kitching Creek and restore up to 1,000 acres of habitat in the upper Kitching Creek watershed. Rehydration of this watershed will increase nesting and roosting by wading birds, improve habitat for fish, invertebrates and other riverine-dependent species, and lead to improved water quality.

Palm Beach County Restoration Projects in Planning Phase

The *Hatcher/Jupiter Indiantown Venture* project is located in northeast Palm Beach County, and includes 231 acres just southeast of the intersection of Indiantown Road and Jupiter Farms Road. The Project site contains a portion of a historic fork of the Loxahatchee River and its adjacent flood plain, 135 acres of environmentally sensitive lands which will be preserved in their native state, as well as other lands that will be used for recreational and water resource

purposes. The Historic Indiantown Road Grade and a portion of the Loxahatchee Battlefield will also be preserved. Native habitats within the project site include good quality mesic pine flatwoods, intermixed with cypress domes and strands, a few depressional wetlands and oak hammock.

Planned activities include the removal of invasive exotic plant species, restoration of several small shell pits in the natural area portion of the site, hydrologic restoration of the wetlands within the natural area portion of the site, creation of an approximate 64-acre water resource/stormwater storage and treatment area, addition of about 31 acres of land to the adjacent Riverbend Park, hydrologic restoration of a historic river fork and its associated flood plain and installation of public use facilities and a multi-use trail system.

The hydrologically restored wetlands and new lake will be controlled at 15.25 feet NAVD, with the intention of operating the new lake in the future to provide base flows to the Loxahatchee River during the dry season. After all restoration is complete, the project site will be included in the County's Cypress Creek Natural Area and will be managed in perpetuity in accordance with the Cypress Creek Natural Area Management Plan (Management Plan).

The *Cypress Creek East Restoration* (2009 – 2011) project area is 251 acres within the 2,083-acre Cypress Creek Natural Area, primarily composed of wetland herbaceous and cypress sloughs, hydric pine flatwoods and oak hammock vegetation communities that occur along this tributary of the Loxahatchee River. This parcel was purchased by Palm Beach County in 1995 and was known as the Loxahatchee River Natural Area and is now managed as a part of the Cypress Creek Natural Area. Cypress Creek is a major tributary to the Wild and Scenic Northwest Fork of the Loxahatchee River and historically has contributed approximately one-third of the flow to the River. The Cypress Creek East site is a portion of Cypress Creek basin in Palm Beach County, north of Indiantown Road and east of Gulfstream Road that was partially cleared and drained, primarily for agriculture purposes, the most recent of which was cattle ranching. The intent of the project is to remove exotic vegetation from the project area, restore and create wetlands from areas that have been mined for shell rock and replant areas that have been cleared. The project will involve mechanical removal of exotic vegetation, primarily Australian pine, from the spoil piles that were left from the shell mining. This will be followed by ground control treatment of exotic vegetation, primarily Brazilian pepper, melaleuca, Australian pine, and Old World climbing fern in the project area. Additionally, approximately 65 acres of wetlands will be restored and/or created from the shell pit areas that will then be re-sculptured to more natural contours. Replanting will occur primarily in uplands that were cleared for cattle grazing. It is anticipated that the majority of the 65 acres of wetlands will re-vegetate naturally, though some of the wetland edges will be planted.

The *North Jupiter Flatwoods Restoration* (2010-2011) project is situated strategically between the Northwest and Southwest Forks of the Loxahatchee River, within the Loxahatchee River Watershed. The Loxahatchee River Corridor is one-half mile to the west. The natural area consists of approximately 151 acres of land and contains a portion of the buffer lands along the Loxahatchee River. Four natural communities are present on site, including mesic flatwoods,

wet flatwoods, depression marsh and dome swamp. There is a hydrological connection between North Jupiter Flatwoods and the Northwest Fork of Loxahatchee River through an area known as the No Name Slough, which is located north and east of the site. Past anthropogenic activities such as farming and development have significantly altered the hydrology of the natural area as well as the historic connection to the river.

Phase I of the *North Jupiter Flatwoods Restoration Plan* includes the construction of public use facilities for the site, exotic vegetation removal and control and completion of a groundwater seepage analysis and surface water model for a future hydrological restoration project. Phase II of the project will include the construction of the improvements necessary to restore the hydrology of North Jupiter Flatwoods.

The *Mecca Farms Wetland Restoration Project* is a 578-acre project located in north-central Palm Beach County in Sections 1-12, Township 42 South, Range 41 East; Sections 19, 30, and 31, Township 42 South, Range 41 East; and Sections 12, 13, 19, 30, and 31, Township 42 South, Range 40 East. The project site is directly adjacent to a large interconnected system of publicly owned conservation lands. The site was historically an upland/wetland mosaic comprised of pine flatwoods, depression marsh, and wet prairie that has been highly impacted by agriculture. The proposed project will result in the creation and restoration of 36 acres of deep water refugia, 18 acres of upland islands, 60 acres of upland buffer area, 33 acres of forested wetlands, and 154 acres of herbaceous.

This project, which has already been permitted as part of the Scripps Research project (Scripps has since been relocated), is part of the Comprehensive Everglades Restoration Project II (CERP) North Palm Beach County, Part 1. This project has the potential to positively affect restoration of the Northwest Fork of the Loxahatchee River (NWFLR) by improving water quality to the NWFLR. The previous permit will be modified and renewed to enlarge the wetland restoration portion of the project and remove the Scripps development portion. It is anticipated that the permit revisions will be going before the South Florida Water Management District Board on August 10, 2010. The engineering and design work for the proposed wetland restoration project has already been completed as a part of the Scripps project.

Prior to its conversion to citrus, this site likely contained extensive wetlands and low-lying pine flatwoods similar to presently surrounding areas to the north, east, and west. Palm Beach County's (County) Hungryland Slough Natural Area is located north of the project site, separated from the project site by the C-18 Canal. This area is comprised of County-owned and managed land, including an area known as Unit 11, which has undergone extensive restoration by the County's Department of Environmental Resources Management. To the west is the J.W. Corbett Wildlife Management Area (CWMA), owned and managed by the Florida Fish and Wildlife Conservation Commission. The majority of the wetlands within the CWMA are of high quality. To the east, a large area of low-intensity agricultural land exists under the ownership of Charles Vavrus, within the City of Palm beach Gardens. These lands contain extensive wetlands that are adjacent to the County's Loxahatchee Slough Natural Area to the east which forms the headwaters of the Loxahatchee River, a National Wild and Scenic River.

The project site discharges to the west leg of the C-18 Canal, a Class I water body, and eventually into the NWFLR. This wetland restoration project will restore historic wetland functions, improve water quality, and also act as a flow-way (CERP Flow-way II) to move water from the storage reservoir at the Palm Beach Aggregates site (Figure 4) to the NWFLR via the west leg of the C-18 Canal.

The project site as proposed will contain habitat for the American Alligator as well as foraging habitat for wading birds, birds of prey (woodstorks, sandhill cranes, herons, and ospreys), otters, and bobcats. After completion of the wetland creation/restoration, public-use facilities can be constructed to allow for visitor use of a fully accessible nature trail, unimproved hiking trail, elevated boardwalk, opportunities to observe wildlife, and other passive recreational uses.