

UPPER PEACE RIVER/SADDLE CREEK RESTORATION PROJECT AT THE TENOROC FISH MANAGEMENT AREA

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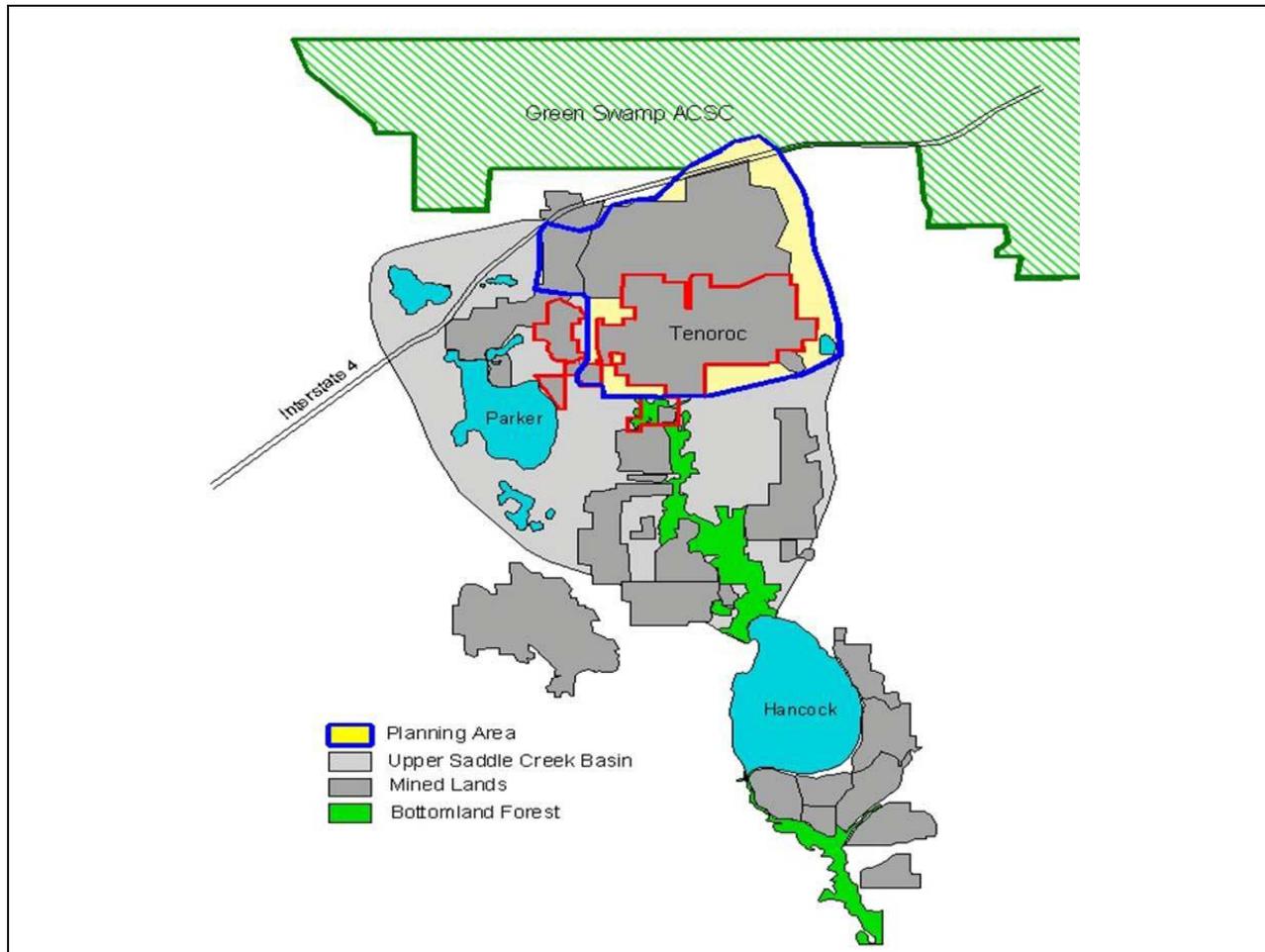
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UPPER PEACE RIVER/SADDLE CREEK RESTORATION PROJECT AT THE TENOROC FISH MANAGEMENT AREA

INTRODUCTION

The Peace River in west central Florida flows from the Green Swamp south to Charlotte Harbor through one of the most fragmented and extensively modified regions of the State. The river serves as a critical environmental connection to numerous isolated habitats along its route and provides habitat for a wide variety of birds, fish, and wildlife. The Peace River is also an important component of the hydrologic system in this portion of the State: it drains a basin of approximately 2,350 square miles, serves as a major source of fresh water for agriculture, industry, and municipalities along its 105-mile length, and plays a vital role in the productivity of the estuarine waters of Charlotte Harbor.



Upper Peace River/Saddle Creek Basin

In its inventory of lands disturbed by phosphate mining prior to July 1, 1975, Zellars-Williams, Inc. (1980) recommended restoration of several sub-basins of the Peace River that had been

heavily impacted by mining. In addition to mining impacts, agriculture, silviculture, and urbanization have also had major impacts in the region. Numerous initiatives to restore and enhance the ecological and hydrological functions of the Peace River watershed have been or are currently being conducted, including several by the Florida Department of Environmental Protection, the Florida Fish and Wildlife Conservation Commission, Southwest Florida Water Management District, the Charlotte Harbor National Estuary Program, and the U.S. Geologic Survey, among others. These programs include: development of the Southern Water Use Caution Area Recovery Strategy, establishment of Minimum Flows and Levels, establishment of Total Maximum Daily Loads, development of Basin Management Action Plans, completion of the Peace River Cumulative Impact Study, development of the Watershed Management Program, and the creation of the Peace River Basin Resource Management Plan. The focus of the Upper Peace River/Saddle Creek Restoration Project is on the Saddle Creek sub-basin at the extreme northern end of the Peace River basin, one of the river's nine sub-basins significantly impacted by phosphate mining and urbanization.

PROJECT SITE

East of the City of Lakeland, water from a large wetland system at the headwaters of Saddle Creek, the northernmost tributary of the Peace River, originally flowed south toward Lake Hancock, the largest lake in the Peace River basin. A second large wetland system west of this drained toward Lake Parker and then on to Saddle Creek and Lake Hancock. From the early 1950s through the late 1970s, three phosphate mines were operated in this portion of the County – the Saddle Creek Mine (Agrico Mining Company), the Orange Park Mine (American Cyanamid Company), and the Tenoroc Mine (Borden, Inc.). Phosphate mining operations severely disrupted the natural drainage patterns in this region by eliminating the original wetlands and streams, then impounding water in settling areas and landlocked pits.

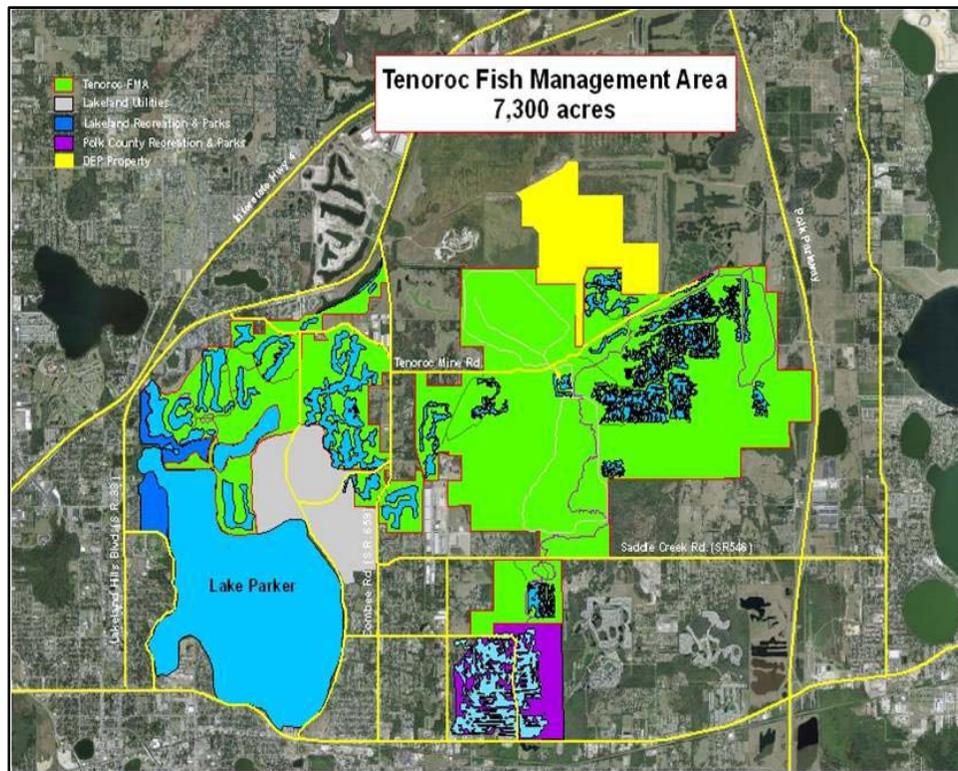


Aerial view of unreclaimed mined out area at the Tenoroc Fish Management Area



Aerial view of unreclaimed clay settling area at the Tenoroc Fish Management Area

In September 1982, Borden, Inc. donated 6,065 acres from its Tenoroc Mine to the State of Florida. The area, originally called the Tenoroc State Reserve and later renamed the Tenoroc Recreation Area, was managed until 1992 by the Division of Recreation and Parks of the Florida Department of Natural Resources (later the Florida Department of Environmental Protection or FDEP). The Florida Game and Fresh Water Fish Commission (now the Florida Fish and Wildlife Conservation Commission or FFWCC) began managing the area in 1992 and the tract was renamed the Tenoroc Fish Management Area (TFMA) to better reflect management objectives for the property. A 341-acre tract of land was purchased from American Cyanamid in 1998 with funds from the Nonmandatory Reclamation Trust Fund and Preservation 2000 and then leased by the State to the TFMA. Another 967-acre parcel, the Bridgewater Tract, was purchased in 2000 with funds from the Preservation 2000 Inholdings and Additions Program for wildlife habitat restoration and public outdoor recreational opportunities. A land trade with the City of Lakeland added another 125 acres in 2006 to the TFMA, while a second trade with the City added another 3 acres to the property in 2010. In 2007, the FDEP-Division of Water Resource Management was named co-lead management agency along with the FFWCC in the management of the TFMA. The entire TFMA, owned by the State of Florida's Board of Trustees of the Internal Improvement Trust Fund, currently occupies approximately 7,300 acres. Other land acquisition transactions are pending that may alter the size of the TFMA in the future.

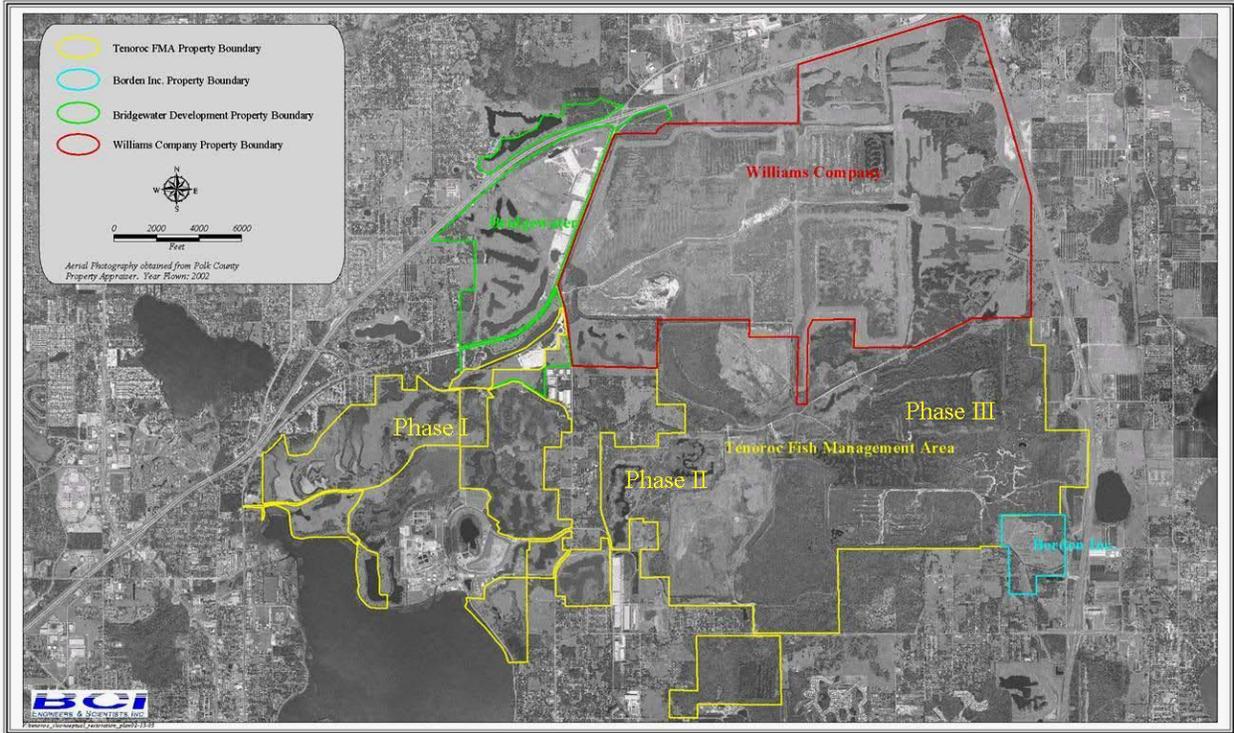


Tenoroc Fish Management Area, Lakeland FL

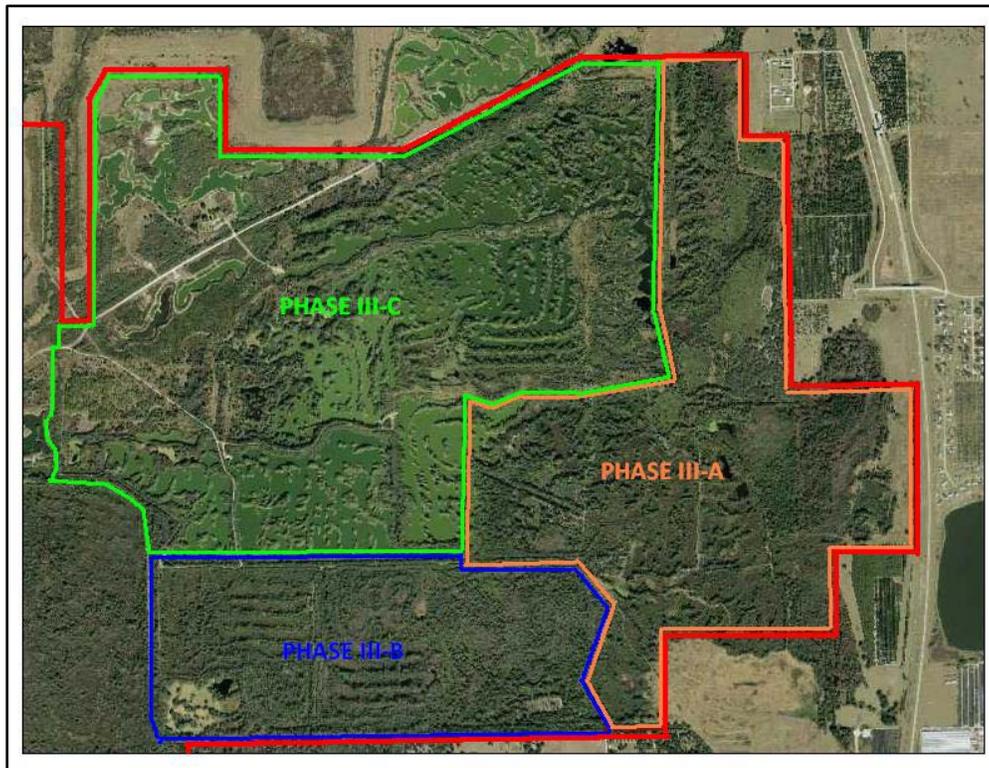
While most of the mined and disturbed lands in northern Polk County have undergone reclamation, nearly all of the TFMA remained as mined-out, unreclaimed landforms dominated by nuisance and exotic vegetation. Restoring these areas to a more natural condition would help the FFWCC and FDEP achieve the three primary management objectives for the TFMA – optimize the area for public use, fish and wildlife habitat, and environmental functions. Achieving these management objectives would simultaneously address the primary goal of the Upper Peace River/Saddle Creek Restoration Project (UPRSCR) – the restoration of the ecological and hydrological functions of the upper portion of the Peace River watershed.

Due to the size and complexity of the UPRSCR, the work at the TFMA was divided into three phases, as described below:

- Phase I: North Lake Parker – A 967-acre tract in the western portion of the TFMA.
- Phase II: Myrtlewood – A 500-acre tract in the central portion of the TFMA.
- Phase III: Chimeria – A 2,128-acre area in the eastern portion of the TFMA. This phase was further divided into three sub-phases:
 - Phase III-A - A 715-acre area on the east side of Phase III;
 - Phase III-B - A 475-acre area on the south side of Phase III; and,
 - Phase III-C - A 938-acre area on the north and west sides of Phase III.

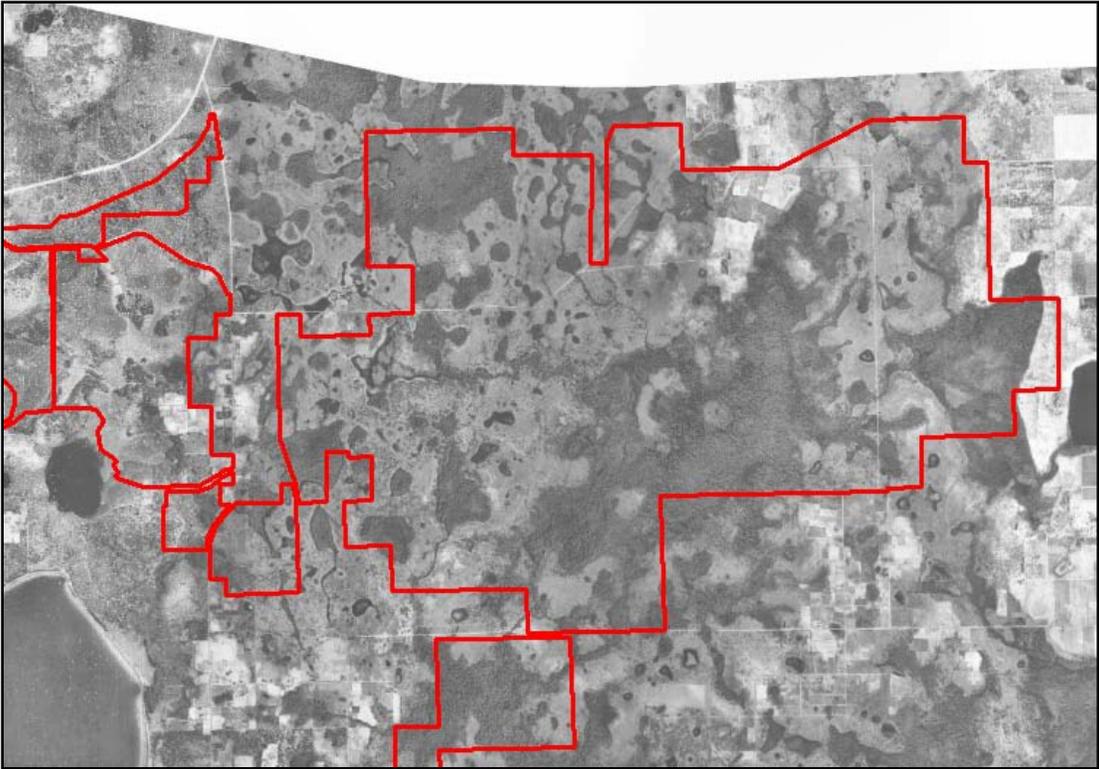


Three phases of Upper Peace River/Saddle Creek Restoration Project at the Tenoroc Fish Management Area

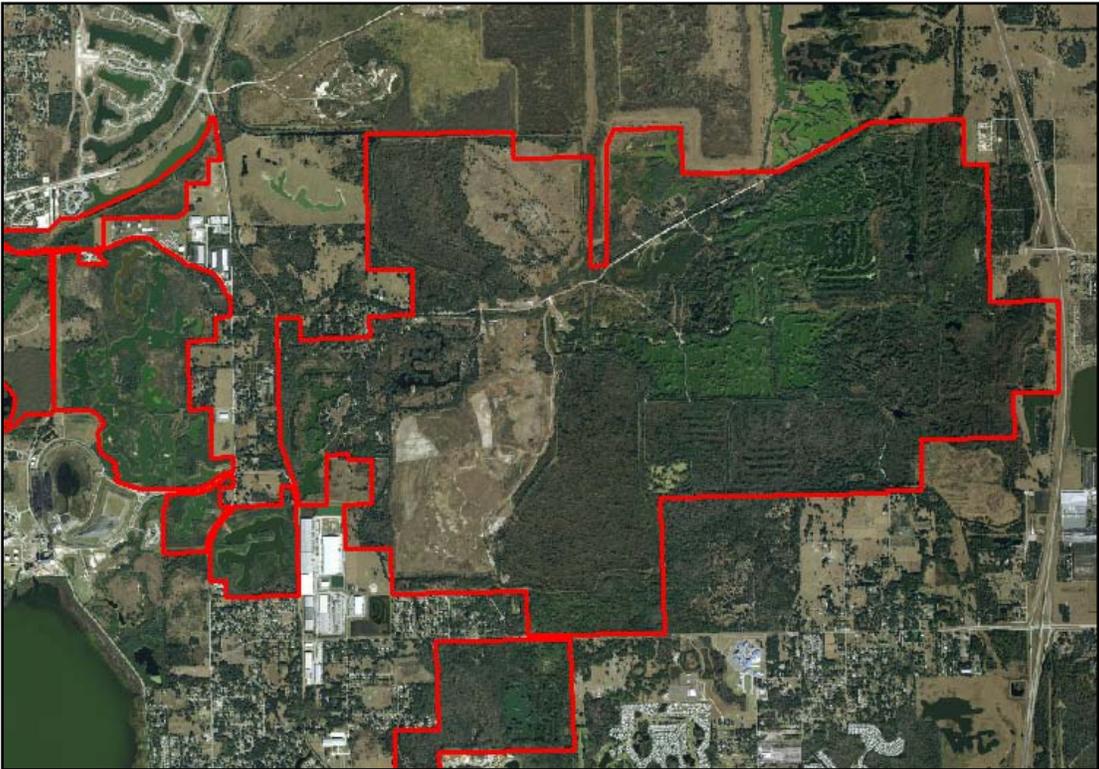


Phases III-A / III-B / III-C of the Upper Peace River/Saddle Creek Restoration Project at the Tenoroc Fish Management Area near Lakeland, FL

AERIAL – 1941



AERIAL – 2010



PROJECT OBJECTIVES

The Upper Peace River/Saddle Creek Restoration Project is an ambitious undertaking that was initiated in 1994 when representatives of the Florida Department of Environmental Protection, the Florida Game and Fresh Water Fish Commission (now the Florida Fish and Wildlife Conservation Commission), and the Florida Department of Transportation (FDOT) began discussions about restoration plans for the northern portion of the Peace River. A Memorandum of Understanding (MOU) that created the framework for the restoration work in this watershed was signed on November 28, 1995 by representatives of the FDEP, FFWCC, FDOT, Southwest Florida Water Management District (SWFWMD), and United States Army Corps of Engineers (USACOE).

The main goal of the UPRSCR is to contribute to the restoration or enhancement of the ecological and hydrological functions of the upper portion of the Peace River watershed that lies within the upper Saddle Creek sub-basin. Several specific objectives described in the MOU are incorporated into this project, including:

- The creation of new mitigation wetlands within the upper Saddle Creek sub-basin to replace wetlands that were disturbed during construction of the Polk Parkway (State Road 570). These new mitigation areas will include at least 84.73 acres of forested wetlands and 37.28 acres of herbaceous wetlands.
- The restoration of the former habitat connection between the Peace River and the Green Swamp that was once served by Saddle Creek, a connection that joined the region's most extensive habitat system with one of its most biologically diverse systems. Plans for this re-connection would include: a) protecting any remaining natural habitat in and around Tenoroc; b) replacing stream forest and wetland habitat lost due to mining; and, c) extending reclaimed forest through the mined area to a potential bridge location at I-4.
- The improvement of water quantity and quality problems in the upper Peace River that resulted from phosphate mining operations, to be accomplished by: a) restoring Saddle Creek and that portion of its floodplain within the former mine area; b) enhancing flow contribution from each sub-basin by draining impoundments in former mine areas and minimizing flows through mine pit lakes; and, c) enhancing water detention and treatment within each sub-basin by directing flows through natural and reclaimed wetlands.
- The reclamation of all or parts of Nonmandatory Reclamation Program areas located in the upper Peace River basin within the Tenoroc Fish Management Area.
- The enhancement of regional opportunities for a variety of outdoor recreational and educational activities.
- The development of collaborative efforts between adjoining property owners and developments to conduct wetland restoration activities.

PROJECT TEAM

The Memorandum of Understanding signed by the five agencies in 1995 defined the organization and responsibilities of two groups – the Selection Committee and the Advisory Committee – that facilitated the implementation of the UPRSCRCP:

- The Selection Committee, consisting of the USACOE, FDEP, and SWFWMD, is responsible for the development of requests for proposals, reviewing and evaluating proposals that are submitted, and selecting contractors for the various project tasks.
- The Advisory Committee, consisting of representatives from each of the five agencies as well as representatives from Polk County, the Central Florida Regional Planning Council, and other parties, provides assistance and makes recommendations regarding the coordination, planning, and implementation of the various restoration projects.

The MOU also defines the specific responsibilities of the five agencies that are party to this agreement:

- The FDEP serves as the Chair for the Selection Committee and Advisory Committee, acts as the Project Manager for the restoration project, and assumes full and sole responsibility for meeting the MOU objectives.
- The USACOE ensures compliance with the conditions of Corps permits needed to conduct the restoration work in the UPRSCRCP at the Tenoroc Fish Management Area.
- The SWFWMD ensures compliance with the conditions of District permits needed to conduct the restoration work the UPRSCRCP at the TFMA.
- The FDOT contributed funds to the FDEP's Pollution Recovery Trust Fund for the purpose of carrying out the mitigation requirements and conditions set forth in the Corps and District permits.
- The FFWCC (previously the FGFWFC) provides management services related to the mitigation projects as specified in amendments to the MOU.

In addition to these five agencies, Polk County and the Florida Department of Agriculture and Consumer Services-Division of Forestry serve as cooperating agencies on various maintenance and management projects at the TFMA.

In July 2007, the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida amended Lease Number 3977 in which the FDEP became co-lead management agency with the FFWCC in the management of the TFMA. Personnel from both agencies now work closely on the UPRSCRCP plan development and construction as well as long-term maintenance and management at the TFMA.

PROJECT FUNDING

The Upper Peace River/Saddle Creek Restoration Project is funded by three sources:

- Approximately \$2.15 million from the FDEP's Nonmandatory Land Reclamation Trust Fund was used for reclamation of five Nonmandatory Programs at TFMA that had not been previously reclaimed: BDN-T-04, BDN-T-05(B), BDN-T-06, BDN-T-07, and BDN-T-E in Phase III.
- Approximately \$4.47 million was provided by the FDOT for mitigation of wetland and surface water impacts resulting from construction of the Polk Parkway in the Peace River and Green Swamp watersheds.
- Approximately \$3.77 million from the FFWCC's Aquatic Habitat Restoration and Enhancement Trust Fund was used for restoration and enhancement activities of selected wetlands and waterbodies within the UPRSCR at the TFMA.



PROJECT DESCRIPTION

Site Conditions in 1941

Originally the lands encompassed by the Tenoroc Fish Management Area existed predominantly as a mosaic of natural upland and wetland communities at the western base of the Winter Haven Ridge. Longleaf pine flatwoods forests and native grasslands covered large portions of the area. A forested wetland/freshwater slough system in the east drained towards the south into a bay swamp while drainage from another forested wetland system in the center of the project site flowed towards the southwest, with all drainage eventually winding up in Saddle Creek and the Peace River.

Existing Site Conditions

Disturbances from phosphate mining, agricultural operations, and silvicultural activities became widespread throughout the area. Prior to the start of the UPRSCR, the TFMA consisted of mined out areas, open mine pits, spoil piles, and storage areas surrounded by constructed embankments that were partially backfilled with waste clays produced in the mining process. An extensive ditch/pit system also existed on the TFMA before reclamation activities were initiated; this system was connected to drainage systems operated by the other two phosphate mines previously in operation in the area and was designed to move water from adjacent lands around or through the TFMA toward Saddle Creek and the Peace River. In general, the project site exhibited varying elevations with respect to adjacent landforms, transitioning steeply along its perimeter at slopes of 3:1 or less along remnant dam walls, open mine pits, and uncontroled spoil piles. Interior landforms were irregular with numerous depressions interspersed with steep-sided spoils. In the 40 to 60 years following the end of mining in this portion of Polk County, vast areas of the TFMA became heavily vegetated by native and invasive shrubs and trees. Upland areas were often dominated by undesirable species such as Brazilian pepper (*Schinus terebinthifolius*), Chinese tallow (*Sapium sebiferum*), camphor (*Cinnamomum camphora*), and cogongrass (*Imperata cylindrica*) while cattail (*Typha latifolia*), primrose willow (*Ludwigia peruviana*), and water hyacinth (*Eichhornia crassipes*) were frequently prevalent in the wetlands. The wetlands also generally had poorly developed soils and unfavorable hydrology.

Agricultural and silvicultural activities also had severe impacts of the area's habitats and landforms, including the conversion of longleaf pine flatwoods into improved pastures and citrus groves. Large acreages were clear-cut for timber or stumped for naval stores. Undesirable nuisance and exotic vegetation dominated both the upland and wetland habitats. Areas also existed on the TFMA that had not been mined but which were impacted by mining operations. Fire apparently was excluded from these areas for at least fifty years. These impacts resulted in habitat conversion to hardwood forests and palmetto monocultures. General community types prior to the restoration and enhancement activities of the UPRSCR included upland and wetland mixed forest, palmetto prairie, pine-bay gall, freshwater slough, bay swamp, herbaceous wetlands, old fields, and borrow pits.

Although reclamation had previously been completed in other portions of the TFMA, previous reclamation efforts on this project site had been limited to dewatering and clearing to allow for

plan development. In its pre-reclamation condition, the area contained a variety of mined and unmined soils, exhibited poor overall drainage, provided minimal wildlife habitat, and offered limited opportunity for outdoor recreation.



Dense vegetation along a perimeter berm



Nuisance and exotic vegetation along the edge of a water-filled mine pit

Plan Development

An integral component of natural wetlands, lakes, and streams is the movement, distribution, and quality of water moving through these systems. In an attempt to re-create the natural hydrology of the upper Peace River watershed, data were collected to determine the hydrologic conditions that existed prior to the severe impacts of urbanization and phosphate mining in this part of Polk County.

Piezometers (small-diameter wells used to measure groundwater pressure in aquifers) were installed to provide accurate determinations of ground water elevations within dewatering areas and/or proposed wetland mitigation sites. Staff gauges were installed to accurately monitor surface water level fluctuations over time, under seasonal weather variations, and under various flow regime and routing scenarios. A water quality monitoring program was implemented to: (a) evaluate the baseline water quality characteristics of surface water and ground water entering, within, and exiting the TFMA; (b) conduct periodic water quality assessment events to assess potential water quality changes that might occur as a result of these activities; and, (c) monitor existing and future inflow and outflow sources for compliance with State water quality standards. Water quality monitoring of five parameters (pH, specific conductivity, temperature, dissolved oxygen, and turbidity) were taken quarterly, with more frequent sampling conducted during actual construction.

Hydrologic computer modeling was used to aid in hydrologic, hydraulic and water quality assessment and to demonstrate that construction impacts would be maintained at acceptable levels; modeling analysis associated with regional scale restoration activities requires that the volume and rate of runoff originating and discharging from a particular basin or watershed does not adversely impact adjacent or downstream properties either through flooding (high flow) or environmental (low flow and flow duration) concerns. In addition, the models dictate that water

quality discharging from the site is improved whenever possible, the level of interaction between the ground and surface water systems is established, and proper flow periodicity, duration and hydroperiod is provided in existing and proposed internal wetland systems. These computer models were developed and analyzed by a diverse group of experts including biologists, ecologists, geologists, hydrologists, engineers, and hydrogeologists from regulatory, environmental management, academic and private consulting areas. These efforts ensured the manageability of lakes and habitat for wildlife and fisheries and the manageability of flows to Saddle Creek were benefited from and were not harmed by the planned reclamation and enhancement activities.

This information was then used to develop preliminary restoration and enhancement plans for the TFMA that would replicate the natural conditions as nearly as possible. The basic concept was to shape the land surface to replicate the natural contours so that surface water inflows and outflows could be managed using passive as well as operational control structures that would re-create the natural hydrologic system of this watershed.

Plan Summary

Plans dictated that existing undesirable vegetative cover be removed prior to the start of earthmoving to reveal existing topographies within the work site. A variety of earthmoving techniques and equipment would be used to create herbaceous and forested wetlands, stream and slough systems, and associated upland components as well as to enhance existing wetlands, uplands, and waterbodies. To create the desired landforms, existing mine cuts were to be filled or partially filled with nearby spoil material and existing mine berms/dams were to be contoured to a variety of gradients ranging from flat to rolling topography with slopes that provide for the safety of the general public. Man-made drainage features and existing water control structures were to be removed and replaced with new structures that would permit active and/or passive control of water levels within the waterbodies and wetlands. After earthmoving activities were completed, the restored and enhanced habitats were to be planted with appropriate native vegetation.

Pre-Construction Activities

During construction, water quality is protected through the installation and maintenance of appropriate Best Management Practices (BMPs) such as perimeter silt fencing, aquatic turbidity barriers, and construction sequencing; these control measures are maintained through the establishment period of the planted vegetation. Weekly turbidity monitoring is performed at several sites within the TFMA routinely and additional monitoring is performed in areas of new activity or following periods of significant rainfall. Weather events and flow status are monitored and personnel are on-call in case emergency measures need to be employed.

Surface water is temporarily re-routed before the start of construction in each of the three phases so that the impounded water can be drained, clayey substrates can be exposed and consolidated, potential fill material can be identified and quantified, potential flow-paths and water levels can be determined along with the identification of logical locations of water control structures.



Drainage ditch used to dewater clay-filled areas

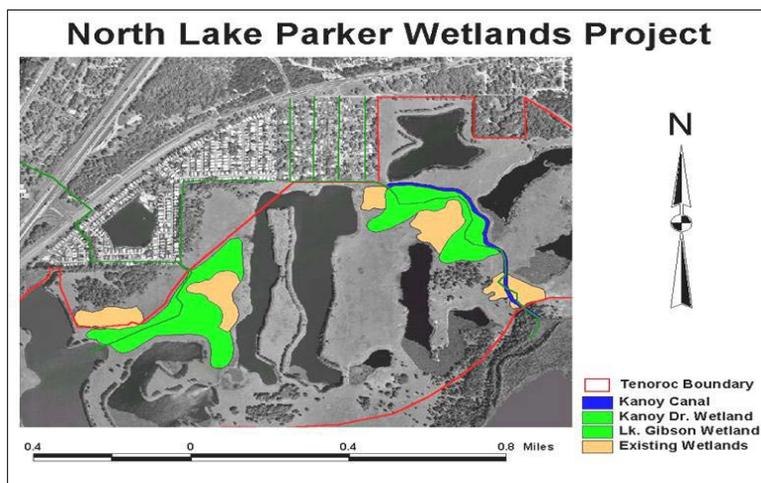


Vegetation clearing prior to earthmoving

Active dewatering of unreclaimed or minimally-reclaimed areas is achieved through construction of new culverts and control structures in combination with ditch and blockage removal; appropriate Stormwater BMPs are used to protect on- and off-site water quality.

Phased Construction Activities

Phase I: North Lake Parker – The North Lake Parker Wetlands project in the Bridgewater Tract is located in western TFMA in Nonmandatory Reclamation Program AC-OP-C. The 967-acre Bridgewater Tract was impacted by phosphate mining operations approximately 50 years ago that left mine cuts and spoil piles behind. The UPRSCR Selection Committee determined mitigation and enhancement activities should be conducted to improve the quality of water leaving wetlands on the property before entering lakes on and near the TFMA. In addition to fulfilling a portion of the wetland mitigation obligations incurred by the FDOT for construction of the Polk Parkway, these mitigation activities would also improve fisheries in several small lakes, improve habitat diversity, and enhance wildlife, waterfowl, and bird habitat at TFMA.



Phase I (North Lake Parker Wetlands Project) of the Upper Peace River/Saddle Creek Restoration Project at the Tenoroc Fish Management Area

Permit approval for Phase I of the Upper Peace River/Saddle Creek Restoration Project was issued in February 2004. As part of the enhancement of two existing low-quality marsh systems in the project site, a total of 39.9 acres of mitigation wetlands were planned for construction - 25.1 acres in the West Wetland (also known as the Gibson Wetland) and 14.8 acre in the East Wetland (or Kanoy Wetland). **SEE SECTION ENTITLED “APPROVED PLANS”**

The West Wetland was designed to conduct flow collected from Lake Gibson, roadway runoff, and stormwater runoff from an adjacent residential area to Lake Parker via a connection at the north end of Lake Crago. Earthmoving in this wetland ended in December 2005 and revegetation was completed in January 2006. Following construction of this mitigation wetland, low flows in this system were diverted and routed through the wetland to the east side of Lake Crago.



West (Gibson) Wetland in Phase I of the Upper Peace River/Saddle Creek Restoration Project at the Tenoroc Fish Management Area

By directing the flow through these created wetlands, some stormwater treatment was provided for Lake Crago and Lake Parker inflows that had not previously received treatment. A diversion weir in the Lake Gibson Outflow Channel was set to an elevation which allows low flows to report primarily to the created wetland but which also permits high flows to divide and follow both the old and new flow paths. The West Wetland also includes two additional drop inlet structures to allow water leaving the wetland to be diverted into two adjacent small lakes – Half Moon Lake and Legs Lake; conversely, during extremely wet conditions, these structures allow these small lakes to discharge to the West Wetland and then on to Lake Crago and Lake Parker. As-built surveys of this mitigation wetland established that 3.7 acres of herbaceous wetlands and 22.8 acres of forested wetlands, or a total of 26.5 acres, were actually constructed in this portion of the project.

The second wetland system, the East (Kanoy) Wetland, is located to the southeast of Kanoy Drive in the eastern portion of the North Lake Parker Wetlands Project. This planned 14.8-acre wetland was designed so that stormwater runoff from portions of the Kanoy Drive subdivision that originally discharged directly to Legs Lake would first enter this created wetland before discharging to Legs Lake and ultimately to Lake Parker via Little Lake Parker. This wetland includes four additional drop inlet structures to allow water from the wetland to be diverted to four adjacent small lakes (Legs Lake, Butterfly Lake, Fishhook Lake, and Horseshoe Lake), but during extremely wet conditions, these same structures allow these small lakes to discharge to the East Wetland, then to Little Lake Parker and eventually Lake Parker. Contouring in the East Wetland took place in August 2005, followed by revegetation in September 2005. As constructed, the East Wetland contains 15.0 acres of mitigation wetlands - 6.2 acres of herbaceous wetlands and 8.8 acres of forested wetlands.



East (Kanoy) Wetland in Phase I of the Upper Peace River/Saddle Creek Restoration Project at the Tenoroc Fish Management Area

Completed in 2006, the North Lake Parker Wetlands Project, the first phase of UPRSCR at the TFMA offers hiking trails and wildlife viewing opportunities for the public.

Phase II: Myrtlewood – Phase II, also known as Myrtlewood, is located in the center of the UPRSCR at the TFMA and contains the Nonmandatory Reclamation Program BDN-T-C. This area has lands that were previously mined for phosphate, with portions subsequently serving as an above-grade storage area for waste clays. Prior to the start of this project, the site contained a variety of mined and unmined soils, had poor drainage overall, provided minimal wildlife habitat due to dense coverage by undesirable nuisance and exotic vegetation, and offered limited opportunity for outdoor recreation.

As with Phase I, the plan for this portion of the UPRSCR entailed the use of best management practices to control erosion and protect water quality; the removal of existing undesirable vegetation; earthmoving to remove existing man-made drainage features and to create several

wetlands, stream systems, and associated upland components; and, revegetation with habitat-appropriate native plant species in the enhanced and restored habitats.

The approximately 500-acre Phase II project, completed in 2007, resulted in the creation of 24.4 acres of herbaceous wetland, 31.4 acres of mixed forest wetland, 7.5 acres of coniferous forest wetland, 3.7 acres of freshwater slough, 12.7 acres of stream channel and hardwood floodplain, and 2.5 acres of drainage swales. These wetland features were surrounded by 20.9 acres of created mixed and coniferous upland forest buffers. Further upslope, the contractor installed an 73.9-acre area of elevated uplands with vegetation appropriate for sandhill community. These initial plantings will be followed over the next several years with additional plantings by FDEP and FFWCC staff, with the ultimate goal of developing a longleaf pine-sandhill community on the site. Another 36.2 acres of the newly created uplands and approximately 400 acres of existing, fallow uplands are being converted by the agency staff during the next several years towards a pine flatwoods community analog.



Phase II (Myrtlewood) of the Upper Peace River/Saddle Creek Restoration Project
at the Tenoroc Fish Management Area

Once the enhancement activities are completed, the FFWCC and FDEP will work with stakeholders to provide increased public hiking and wildlife observation opportunities in this portion of the UPRSCR. **SEE SECTION ENTITLED “APPROVED PLANS”**

Phase III: Chimeria – Most of this phase of the UPRSCR, located in the eastern portion of the TFMA, was mined for phosphate from the 1950s through 1970s. The area consisted primarily of open mine pits, mine spoil piles, and above-grade storage area for waste clays produced during the mining process although there are several hundred acres in this phase that were not mined for phosphate. No reclamation efforts had previously been conducted on this site except for dewatering and limited clearing for plan development. As with the other two phases, in its pre-reclamation condition, Phase III contained a mix of mined and unmined soils, exhibited poor overall drainage, provided minimal wildlife habitat, and offered limited opportunity for outdoor

recreation. Currently under construction, this 2,128-acre phase includes plans for the restoration and enhancement of approximately 310 acres of herbaceous wetlands and 186 acres of forested wetlands, including the creation of two waterfowl areas and a stream system. Once work is completed in Phase III, the FFWCC and FDEP will cooperate with stakeholders to provide increased public opportunities at the TFMA for fishing, hiking, biking, paddling trails, wildlife and bird watching, and horseback riding.

Due to the size and complexity of the existing and planned habitats within Phase III, the earthmoving and revegetation activities in this phase were divided into three sub-phases, as described below:



Phase III (Chimeria) of the Upper Peace River/Saddle Creek Restoration Project
at the Tenoroc Fish Management Area

Phase III-A – This approximately 715-acre area includes four Nonmandatory Reclamation Programs and one Out Parcel (which had been disturbed but not mined):

- BDN-T-05(B-North): Catfish Creek – A 79-acre mined out area containing water-filled mine cuts with adjacent steep-sided spoils up to 40-feet in height.
- Out Parcel: Big Dismal Ditch and Road – Only about 19 acres in this 212-acre area that were impacted by mining operations, including spoil disposal, ditching, and road construction, will be addressed by the UPRSCR. The remainder of the Out Parcel was not mined or disturbed, but the existing native habitats have been impacted to varying degrees by the spread of nuisance and exotic vegetation.
- BDN-T-06(Central): East Waterfowl Area – This portion of the Nonmandatory Reclamation Program BDN-T-06 is a 161-acre area that was mined for phosphate and transformed into a below-grade clay settling area that was only partially filled with clays.

- BDN-T-06(South): Blue Moon – This 88-acre portion of BDN-T-06, which is immediately south of the East Waterfowl Area, was mined for phosphate but did not receive clay wastes.
- BDN-T-06(West): Seminary Ridge – The 121-acre section of BDN-T-06, located to the west of the waterfowl area, was impacted by mining and mining operations but did not receive clay wastes.
- BDN-T-07: Far East – This 44-acre mined out area contains a high wall cut into the sandstone on the eastern side of the program with water-filled cuts in the center; a portion of this parcel is used by the City of Auburndale as a spray field.
- BDN-T-E: Big Dismal Lake – This is an 8.5-acre mined out area bounded on the north and east by a large spoil pile with open water in the center of the parcel.

Plans for Phase III- A areas included the creation or enhancement of 83.2 acres of nonforested wetlands, 173.4 acres of forested uplands, 1.4 acres of streams, 72.7 acres of waterbodies, 123.4 acres of forested uplands, and 68.3 acres of nonforested uplands. Earthmoving will be conducted in previously impacted existing uplands to remove invasive vegetation and recreate more natural drainage patterns; this work was followed by the installation of habitat-appropriate native species.

An additional 192.3 acres of uplands and wetlands that were disturbed but not mined for phosphate are to be enhanced by removing invasive plants and replanting with appropriate native species. Areas that were impacted by agricultural or silvicultural activities will be returned to more natural conditions by enhancing the remnant community types with supplemental vegetation and converting large areas of improved pasture back to longleaf pine forests and native grasslands, thereby recreating the “mosaic” of natural upland and wetland communities that existed in the area prior to disturbance.

Highlights of this phase will be a freshwater slough, longleaf pine forest, and an approximately 161-acre waterfowl area designed primarily as breeding and nesting habitat for wading birds and waterfowl. **SEE SECTION ENTITLED “APPROVED PLANS”**

Phase III-B – As with other areas at the Tenoroc Fish Management Area, Phase III-B was severely impacted by phosphate mining operations; the western and central two-thirds of this area were mined while the eastern one-third was used in mining operations that included dam impoundment, severance from regional drainage, and shallow clay storage. Prior to mining, this area was primarily cypress strand and mixed wetland forest and constituted a significant portion of the main Upper Saddle Creek channel.

The plans for this 475-acre area, completed in August, 2010, call for the creation of a mosaic of wetlands, waterbodies, and uplands, as described below:

- BDN-T-04(East): Lazarus – The eastern portion of Phase III-B is known as Lazarus, an approximately 166-acre area that consists of the remnant upper Saddle Creek cypress

wetland and mesic hardwood forest floodplain complex, with cleared upland mixed forest (a remnant of the Winter Haven Ridge sub-ridge that is adjacent to the original upper Saddle Creek channel) in the southeastern corner.

- BDN-T-04(West): West Waterfowl Area – A 262-acre waterfowl area will be created in the western and central sections of Phase III-B. This area will be a mosaic of wetlands interspersed with open water pockets and vegetated islands, peripheral forests, and crop fields that will be planted with wet and dry seasonal waterfowl food to serve primarily as a feeding and roosting area for wading birds and waterfowl. A large bypass channel designed to carry runoff from this portion of the TFMA runs along the western side of this program.
- BDN-T-04(Southwest): Lake 10 – This 47-acre site contains an existing deepwater lake surrounded by mature trees with the bypass channel on the west side continuing to the south. Plans for this area include the removal of nuisance and exotic vegetation, to be followed by plantings of desirable native species.

The project contractor will conduct preliminary habitat restoration and enhancement (selective clearing of nuisance vegetation) in Phase III-B using a variety of earthmoving equipment. This will be followed by further plantings in the created or enhanced habitats and long-term management appropriate to early-state vegetative communities by FDEP and FFWCC staff immediately following the completion of the contracted work and release of the reclamation contractor from further responsibility. Work on this phase is scheduled to begin in mid-2011 and will be conducted in conjunction with work on Phase III-C, with both phases scheduled for completion by July 2014.

Phase III-C – This 938-acre sub-phase contains the remainder of the eastern portion of the original donation to the State of Florida from the Borden Tenoroc Mine. Phase III-C consists primarily of Lakes 2, 3, 4, and 5, some of the many fishing lakes with the Tenoroc Fish Management Area; three extremely small off-site areas are also part of Phase III-C. The four lakes, totaling approximately 836 acres, are large, phosphate mine pits that were created during previous phosphate mining operations in the area. These unreclaimed lakes are separated by earthen berms which contain areas of significant soil erosion, extremely dangerous slopes, and dense stands of nuisance and exotic vegetation. The primary goals of the work planned in Phase III-C are to: remove nuisance and exotic vegetation and replace it with native species; contour the earthen berms to more natural gradients to reduce erosion and improve public safety; expand and enhance surface water drainage to the fishing lakes; and, improve water circulation within and between the lakes. The off-site areas north and west of the fishing lakes will be contoured and water control structures installed to improve internal drainage in these sections of the TFMA. Overall, these activities will improve water circulation, water quality, and wildlife habitat. Work on this phase is scheduled to begin in mid-2011 and will be conducted in conjunction with that being done in Phase III-B, with both phases scheduled for completion by July 2014.

APPROVED PLANS

This section contains construction plans for all three phases of the Upper Peace River/Saddle Creek Restoration Project, approved by the Nationwide Permit 27 (United States Army Corps of Engineers) and the Notice General Environmental Resource Permit (Southwest Florida Water Management District).

Phase I: North Lake Parker

Phase II: Myrtlewood

Phase III: Chimeria -

Phase III-A

Phase III-B

Phase III-C

PROJECT REPORTS

Reclamation and Mitigation of the Upper Peace River Watershed at the Tenoroc Fish Management Area – Task I: Restoration Approach and Identification of Work Elements (BCI Engineers & Scientists, June 2000)

The overall objective of the Task I Report was to examine the possibilities of restoring the original hydrological and ecological connections that originally existed in the upper Saddle Creek watershed. The Task I report summarizes four potential restoration alternatives for the Tenoroc Fish Management Area. Conceptual restoration plans have been developed and evaluated to determine how well they meet the project objectives. This report represents a cooperative effort by members of the project team, with significant review and input from the FDEP and FFWCC staff.

Hydrologic Investigation of the Phosphate Mined Upper Saddle Creek Watershed, West-Central Florida (University of South Florida, May 2002)

Study performed by the University of South Florida, College of Engineering and funded by the Florida Institute of Phosphate Research and the Florida Department of Transportation, this study includes a far-field model of the upper Peace River system and a near-field model encompassing the Saddle Creek basin. Data collected over a three-year period were used to calibrate the models for the purpose of investigating wetland restoration alternatives at the Tenoroc Fish Management Area.

Restoration Plan Summary for the Reclamation and Mitigation of the Upper Peace River Watershed at the Tenoroc Fish Management Area (BCI Engineers & Scientists, November 2003)

This report contains descriptions of the processes used to evaluate and select restoration alternatives.

Water Quality Monitoring Plan (BCI Engineers & Scientists, January 2004)

The report contains descriptions, sampling parameters, sampling results, and recommendations through 2003. The plan has now been expanded to include additional staff gages, piezometers, flow gages, and sampling points to accommodate the North Lake Parker wetlands, Bridgewater lakes, and inflows to the Tenoroc Fish Management Area from adjacent property to the north.

PROJECT UPDATES

Long-term management and enhancement plans for the restored and enhanced communities in the UPRSCRCP at the Tenoroc Fish Management Area have been or are being developed by the FDEP and FFWCC. During the next several years, a variety of management activities, such as planting additional native trees, shrubs and grasses, controlling exotic and nuisance vegetation, and conducting controlled burns to enhance habitat quality and increase wildlife usage in the area, will be used to help maintain and ensure that these newly created and reclaimed habitats survive and thrive. All management activities will be planned and undertaken in coordination between the FDEP, the FFWCC, and the Florida Division of Forestry (a cooperating agency at the TFMA). Additional details of the management plans and actions for the three phases of the UPRSCRCP are provided below.

Phase I: North Lake Parker –

As part of the ongoing maintenance and management activities in Phase I, the FDEP and FFWCC staff has:

- Herbicided, mowed, conducted prescribed burns, and installed a variety of plants throughout the site, including Eastern gamagrass (*Tripsacum dactyloides*), to displace the invasive cogongrass (*Imperata cylindrica*) and control the spread of nuisance and exotic vegetation.
- Installed a variety of plants throughout the site, including Eastern gamagrass (*Tripsacum dactyloides*), to stabilize slopes along the East and West Wetlands.
- Coordinated with Central Florida Audubon to build and plant wintering sparrow plots to provide forage for several species of birds, primarily the federally endangered Florida grasshopper sparrow (*Ammodramus savannarum floridanus*).
- Monitored the North Lake Parker wetlands for wetland success and hired contractors to treat invasive plant species in the West Wetland.



Herbaceous wetlands in Phase I of the UPRSCRCP



Forested wetlands in Phase I of the UPRSCRCP



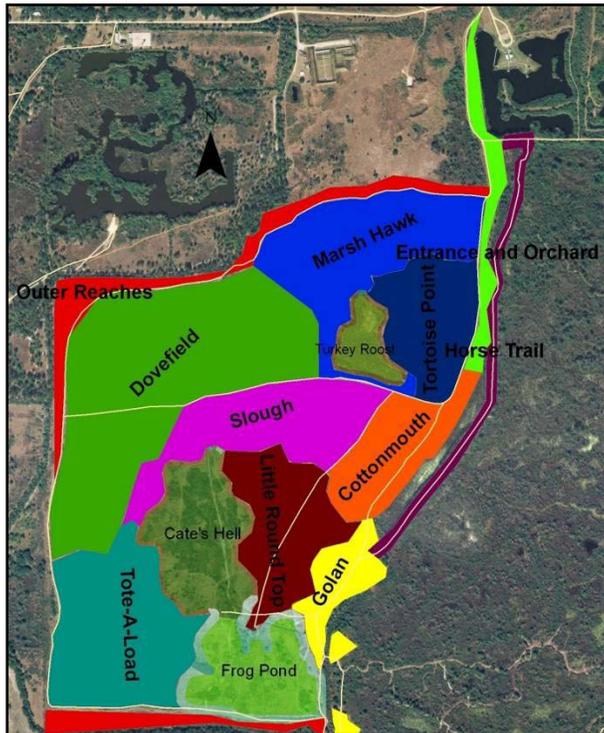
Herbiciding nuisance and exotic vegetation in the reclaimed North Lake Parker wetlands



BMR staff installing plants for slope stabilization at the North Lake Parker wetlands

Phase II: Myrtlewood –

This 500-acre phase was divided into 14 management units with varying goals and objectives for each, as described below:



14 Management Areas in Phase II of the UPRSCR at the TFMA

Four management units were constructed in 2007 by the contractor – “Frog Pond” (the created herbaceous wetland), “Cates’ Hell” (the created forested wetland), “Turkey Roost” (the

enhanced coniferous wetland), and “Little Round Top” (the created sandhill). These areas require only monitoring, maintenance, and some supplemental planting to increase diversity.



Cates’ Hell in Summer 2009



Little Round Top in Summer 2011

The ten remaining management units are being enhanced according to a detailed management plan. The first step in these units is to subdivide them into 5- to 15-acre sections to facilitate the removal of invasive plants, accomplished through prescribed burns, herbicide treatments, and mechanical operations. Keeping the sections small and treating at various times throughout the year creates a “crazy quilt” pattern that is ideal for animals such as bobwhite quail (*Colinus virginianus*) and gopher tortoises (*Gopherus polyphemus*). In addition to improving wildlife habitat, prescribed burning provides better access for herbicide treatments and stimulates invasive plant growth which improves herbicide efficacy. Each of the ten units has already undergone significant reduction in cogongrass, Chinese tallow, Brazilian pepper, and camphor and conversion to desirable habitats with a variety of native trees and shrubs. Habitat enhancement at Myrtlewood also includes the use of brush piles to improve habitat structure and the reintroduction of native plants and vines to attract insects, birds, mammals, and reptiles.



Prescribed fire



Mechanical treatment



Tortoise Point, planted with blazing star in 1988 for a gopher tortoise project, now serves as a seed source

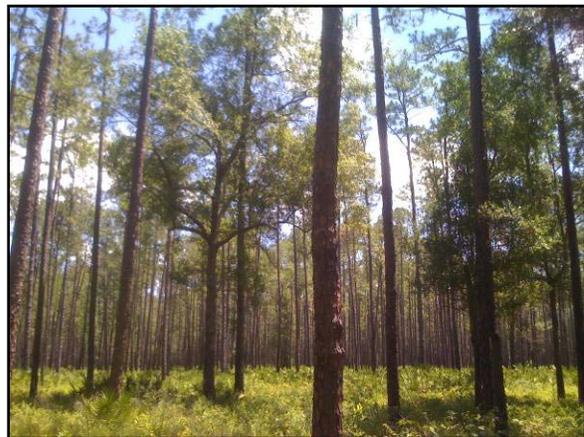


Brushpiles to improve wildlife habitat and reintroduce native vines to Myrtlewood

Most of the land in these ten units will be transformed into pine flatwoods communities using one of two different strategies. The first strategy, being used in the 120-acre “Dove Field”, involves the planting of green manure crops in 20-acre blocks to improve soils, provide temporary food sources for wildlife, and assure that invasive plants are eradicated. The work is staggered through the years to maintain the “crazy quilt” effect in this unit. After two seasons of green manure crops (planted in May of each year), a block undergoes two herbicide treatments to prepare a “clean slate” for native seeding. After the native cover becomes well established, pines are hand-planted randomly throughout the block to mimic a native pine flatwoods. The first 20-acre block is scheduled to undergo native seeding in early 2012.



Green manure planting in Dove Field, Summer 2011



Goal of Phase II – to created pine flatwoods similar to those in Austin Carey Forest near Gainesville FL

The second strategy for converting an area to pine flatwoods is being used in most of the other ten management units. It involves the removal of invasive plant species with prescribed fire and herbicide, followed in August or September by the planting of rows of pine tubelings. The rows allow for continued mowing of ground cover during tree establishment but eventually shade will complete the removal of undesirable ground cover species. At that time, native herbaceous

vegetation appropriate to a pine flatwoods community will be hand-planted and direct-seeded. Approximately 15 acres have already been planted in this fashion with longleaf and slash pines and 10 acres more will be planted in September 2011. There are advantages and disadvantages to each strategy, so careful documentation will be used to determine the best method to use.

The number of FDEP land management staff is small, so volunteers are a key resource for annual tree planting as well as for special projects. Volunteers include Boy Scouts, Campfire USA, FWC Ridge Rangers, and college student interns. In addition to planting thousands of upland and wetland trees, volunteers have monitored burn zones, planted native grasses, and treated nuisance and exotic species.



Student intern treating Chinese tallow with herbicide



Volunteers from Campfire USA plant native trees

Phase III: Chimeria –

Work began in Phase III-A in February 2010 with clearing of nuisance and exotic vegetation from the work areas. For several months, mine cuts, spoils, and dams were graded to create the planned wetland and upland habitats, with earthmoving completed in Phase III-A in late-2010.



Clearing in East Waterfowl Area in Phase III-A



Earthmoving completed in East Waterfowl Area, with inverted tree stumps for bird roosts



Hydroseeding along southern end of Catfish Creek



Planting East Waterfowl Area

Revegetation is complete in most of Phase III-A with the exception of the East Waterfowl Area. While planting in this area is still in progress and not scheduled for completion until late-July 2011, a variety of wading birds and waterfowl have already begun using the area. The establishment stage of Phase III-A is scheduled to be completed by May 2013.



Sandhill cranes (*Grus canadensis*) nesting in East Waterfowl Area prior to revegetation



Ridge Rangers volunteers install boxes for wood ducks (*Aix sponsa*) at Catfish Creek and East Waterfowl Area (Photo by Bill Parken)

Reclamation activities in Phases III-B and III-C are scheduled to begin by mid-2011 and conclude by July 2014.

Note: Ongoing restoration and enhancement activities in Phases I, II, and III will be documented in future Project Updates.

LINKS

Charlotte Harbor National Estuary Program - <http://www.chnep.org/>

City of Auburndale - <http://www.auburndalefl.com/>

City of Lakeland - <http://www.lakelandgov.net/>

Florida Department of Environmental Protection (FDEP) - <http://www.dep.state.fl.us/>

FDEP Bureau of Mining and Minerals Regulation -
<http://www.dep.state.fl.us/water/mines/index.htm>

FDEP Office of Greenways and Trails - <http://www.dep.state.fl.us/gwt/>

Florida Department of State (Florida Administrative Code) - <https://www.flrules.org/Default.asp>

Florida Department of Transportation - <http://www.dot.state.fl.us/>

Florida Fish and Wildlife Conservation Commission - <http://myfwc.com/>

Florida Trail Association - <http://www.floridatrail.org/>

Integrated Habitat Network / Coordinated Development Area Management Plan -
<http://www.dep.state.fl.us/water/mines/ihn/index.htm>

Peace River Audubon Society - <http://www.peaceriveraudubon.org/>

Polk County Board of County Commissioners - <http://www.polk-county.net/>

Sierra Club (Polk Chapter) - <http://florida.sierraclub.org/polk/index.asp>

Sierra Club (Florida Chapter) - <http://florida.sierraclub.org/>

Southwest Florida Water Management District - <http://www.swfwmd.state.fl.us/>

U.S. Army Corps of Engineers - <http://www.usace.army.mil/Pages/default.aspx>

U.S. Environmental Protection Agency (EPA) - <http://www.epa.gov/>

U.S. EPA, Region 4 (Southeast U.S.) - <http://www.epa.gov/aboutepa/region4.html>

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