5.0 Addressing Cumulative Impacts - Recommendations

In 2000, the population of the watershed was roughly 366,000 people; by 2020, it is projected to increase to approximately 480,000. Major urban areas in the watershed currently include Lakeland, Auburndale, Haines City, Winter Haven, and Bartow to the north, as well as unincorporated Port Charlotte at the southern end. Although the major urban centers are currently confined to the northernmost and southernmost sub-basins in the watershed, the impacts of residential, commercial, and industrial development are spreading slowly, but surely, throughout the entire Peace River basin. As urbanization extends throughout the basin, the impacts of the infrastructure needed to support these populations also increase—more stormwater runoff from impervious surfaces, increased demand for public water supply, clearing of native lands for development, among other impacts.

Since a minimal amount of the watershed is currently in some form of conservation, the need remains for efforts to continue to preserve, protect, and restore other areas in an attempt to counteract the effects of previous adverse, although often well intentioned, development in the Peace River basin. The *Peace River Cumulative Impact Study* graphically illustrates the causes of decline in the Peace River basin. This resource management plan sets forth actions necessary to reverse the decline and preserve this critical ecological area for future generations.

5.1 Summary of Recommendations

The following recommendations were developed to directly confront the causes of decline in the Peace River basin established in the *Cumulative Impact Study*, reverse that decline, restore damaged resources, and promote measures to protect area water resources in the future. Among the most important of these recommendations are those to expand or expedite critical existing programs, like the aquifer recovery strategies in the Southern Water Use Caution Area and for minimum flows and levels in the basin. Others call for new actions that the DEP and Southwest Florida Water Management District can undertake immediately under their existing authorities. Several recommendations call for significant, multi-agency policy shifts. The complete list of recommendations is set forth in Table 5.1. Of these recommendations, five priorities for new efforts stand out:

1. Develop an acquisition plan and funding strategy for the Peace River Basin through collaboration of local, state, and regional conservation land acquisition entities to assure a coordinated and equitable approach.
2. Develop a proposal to ensure adequate funding for the Nonmandatory Mine Reclamation Program to fund reclamation targeted at specific water resource benefits in the basin.
3. Jointly review DEP and Southwest Florida Water Management District environmental resource permitting in the basin to determine whether permitting criteria, special basin rules, or other regulatory strategies should be enhanced to minimize cumulative impacts more effectively.
4. Consider combining the Environmental Resource Permit and Conceptual Reclamation Plan approval processes into a streamlined and more protective, comprehensive phosphate mining authorization to enhance environmental protection and restoration.
5. Work with the Southwest Florida Water Management District and area local governments to evaluate, plan and initiate financing for the necessary environmental infrastructure to assure sustainable water supplies and improved water quality in the Peace River basin.

Table 5.1 Summary of Recommendations

Recommendation	Implementing Agency			
	DEP	SWFWMD	DACS	Other
General				
Develop an acquisition plan and funding strategy for the Peace River basin through collaboration of local, state, and regional conservation land acquisition entities to assure a coordinated and equitable approach	*	*		
Determine value of formal Peace River Coordinating Committee	Multiple agencies/ stakeholders			
Stopping Wetland and Stream Losses				
Evaluate environmental resource permitting to determine whether enhanced permitting criteria, special basin rules, or other regulatory strategies should be implemented to minimize cumulative impacts more effectively	*	*		
Floodplain Protection				
Provide incentives to direct development away from the 100-year floodplain, review Florida's Uniform Mitigation Assessment Methodology (wetlands) to determine whether preservation of the floodplain would serve as appropriate mitigation offset for development activities	*	*		
Revise, update and secure funding for Integrated Habitat Network plan and accelerate floodplain mapping modernization	*	*		
Phosphate Industry Regulation and Reclamation				
Develop a proposal to ensure adequate funding for the Nonmandatory Reclamation Program to fund reclamation targeted at specific water resource benefits	*			
Evaluate combining Environmental Resource Permit and Conceptual Reclamation Plan approval into single phosphate mining authorization	*			
Assist Agricultural Industry				
Promote greater participation in Facilitating Agricultural Resource Management Systems program		*	*	
Promote greater use of Mobile Irrigation Laboratory program		*	*	
Develop incentives to increase use of agricultural Best Management Practices			*	
Research and Studies				
Update land use change analysis with 2005 aerial photography and conduct similar analyses every 5 years	*	*		
Accelerate development of Peace River integrated ground and surface water model		*		
Protecting and Enhancing Basin Hydrology, Water Quality and Quantity, and Public Water Supplies				
Adopt and implement Total Maximum Daily Load determinations and Basin Management Action Plans for impaired surface waters in basin	*			
Develop minimum flows and levels and recovery strategies where needed		*		
Implement Southern Water Use Caution Area recovery strategies		*		
Accelerate and secure funding for Upper Peace River/ Saddle Creek Restoration Project	*	*		FWC
Monitor Shell Creek and Prairie Creek Watersheds Management Plan to ensure protection of Punta Gorda's water supply; develop similar plans in other Peace River sub-basins		*		
Work with the Southwest Florida Water Management District and area local governments to improve the use of zoning, land use and comprehensive planning tools to protect water resources in the basin; provide technical assistance to evaluate, plan and initiate financing for environmental infrastructure necessary to assure sustainable water supplies and improved water quality	*	*		

5.2 Recommendations – Detail

Develop an acquisition plan and funding strategy for the Peace River Basin through collaboration of local, state, and regional conservation land acquisition entities to assure a coordinated and equitable approach

The Florida Legislature in 1999 established the Florida Forever program as the successor to earlier land acquisition programs. The Conservation and Recreation Lands (CARL) Trust Fund, under the Florida Forever umbrella, now receives the first $10 million of revenue collected annually from the severance tax on the phosphate mining industry, a substantial portion of which comes from the Peace River basin. The total amount of severance tax revenues that has been distributed to the CARL Trust Fund is approximately $535 million (SWFWMD, 2004c).

With the exception of Charlotte Harbor proper and the Payne Creek historic site, there is a void in statewide conservation lands essentially corresponding to the Peace River basin. No formal, coordinated acquisition plan for the Peace River basin has been developed to date. It is essential, then, to develop such an acquisition plan along with a funding strategy in collaboration with all local, state, and regional conservation land acquisition entities.

Determine value of formal Peace River Coordinating Committee

Because preserving the Peace River basin and minimizing cumulative impacts will require the participation of state, federal and local agencies as well as many other stakeholders, a coordinating committee could prove useful in facilitating communications among responsible parties, continuously evaluate and monitor progress on implementation of the recommendations, help refine existing recommendations or develop new ones as information is gathered. Such a cooperative venture would help make the Peace River Resource Management Plan an active, adaptive document.

Evaluate environmental resource permitting to determine whether enhanced permitting criteria, special basin rules, or other regulatory strategies should be implemented to minimize cumulative impacts more effectively

The Peace River basin has sustained significant losses of water resources. Impacts resulting from fundamental, often permanent land use changes—loss of 343 miles of natural stream channels, loss of some 38.5% of the original wetlands since the 1940s—argue for considering enhanced permitting criteria, special basin rules targeted to the area's unique systems, improved mitigation measures, and other strategies to protect the remaining wetland and other surface water resources. These natural features are important unto themselves and essential in protecting the area's public water supply and the Charlotte Harbor estuary.

Impacts to surface water resources are reviewed and permitted under the Environmental Resource Permitting (ERP) program. The resource losses documented in the *Peace River Cumulative Impact Study* suggest the need for enhancements to the ERP program to better protect remaining water resources of the Peace River. The timeframe from completion of the *Peace River Cumulative Impact Study* (January 2007) to the deadline for this management plan did not provide adequate opportunity for an evaluation of the pros and cons of such program revisions, which the DEP and Southwest Water Management District propose to undertake now.

Because current regulations require mitigation for wetlands to be evaluated based on effects to wetland functions rather than mere amount of affected acreage, it is impossible to discern or adequately evaluate historical impacts simply through aerial photography. For this reason, a detailed evaluation of historical permitting data must be combined with the information from the *Cumulative Impact Study* for an adequate assessment of the most effective strategies and enhancements.

To provide an incentive to direct development away from the 100-year floodplain, review Florida's Uniform Mitigation Assessment Methodology (wetlands) to determine whether preservation of the floodplain would serve as appropriate mitigation offset for development activities

As discussed in the *Cumulative Impact Study* and this plan, local government urban and suburban expansion presents a continuing risk to basin resources. Developing incentives to direct development away from sensitive areas like the 100-year floodplain is essential. Florida's Uniform Mitigation Assessment Method (chapter 62-345, Florida Administrative Code) provides a standardized procedure for assessing the functions provided by wetlands and other surface waters and the amount of mitigation necessary to offset that loss when authorizing an activity. Mitigation "credits" are awarded based upon the increase in ecological value provided by the restoration, enhancement, preservation, or creation of wetland, upland or surface water habitats. The ecological value of the mitigation site (wetland, upland, or surface water) is the value of the abundance, diversity, and fish and wildlife habitats functions provided by the site. These functions may include providing cover and refuge; breeding, nesting, denning, or nursery areas; corridors for wildlife movement; food chain support; natural water storage; natural flow attenuation; and water quality improvement; and other similar benefits.

Given the documented cumulative impacts in the Peace River basin, the Uniform Mitigation Assessment Method will be reviewed to determine whether greater emphasis on preservation of the 100-year floodplain as a mitigation offset within the basin is warranted and can serve as an effective incentive.

Revise, update and secure funding for Integrated Habitat Network plan and accelerate floodplain mapping modernization

The DEP outlined the Integrated Habitat Network (IHN) in 1992 in *A Regional Conceptual Reclamation Plan for the Southern Phosphate District of Florida* (Cates, 1992). Undisturbed lands in the riverine floodplains represent the core lands of the IHN, while a Coordinated Development Area encompasses lands outside the IHN that are planned for intensive or semi-intensive development and use. The IHN is intended as a connected series of natural and reclaimed wetlands and uplands surrounding or abutting a preserved or protected nucleus of unmined or reclaimed riparian habitats. Its main goal is to maximize habitat replacement, protection, connection, and run-off buffering capacity (Figure 5.1). The main goal of the Coordinated Development Area is to encourage the use of areas for more intensive, compatible human use while simultaneously providing areas for the construction, management, and protection of water resources.

The IHN was developed to consider the reclamation of mined lands within phosphate mine boundaries; it did not consider lands within the entire Peace River basin. The DEP proposes secure funding to update and improve the IHN map for the Peace River basin as a template for strategic

and prioritized floodplain and floodplain buffer land acquisition by the State, the water management district, and local governments. Consideration will be given to promoting conservation lands dedicated to environmental stewardship.

Develop a proposal to ensure adequate funding for the Nonmandatory Mine Reclamation Program to fund reclamation targeted at specific water resource benefits

The Nonmandatory Land Reclamation Trust Fund was created in 1978 to promote the reclamation of lands mined before July 1, 1975, when reclamation by mine owners became mandatory. An inventory of 149,130 acres of pre-1975 disturbed phosphate lands was established in three Florida counties (Figure 5.2). There have been various adjustments to that inventory based on subsequent evaluations of the acreage and the possibility or value of reclamation. Since its inception, the "Nonmandatory Program" has reimbursed $108.4 million for reclamation of approximately 41,600 acres (ZWI, 1980; DEP-BMR, 2006a). In 2003, the Legislature amended section 378.035, Florida Statutes, to establish a deadline of January 1, 2005 for applications for nonmandatory land reclamation.

Applications to reclaim approximately 8,200 acres were received before the January 1, 2005 deadline, leaving an estimated 15,000 additional acres of nonmandatory lands that could benefit from reclamation to minimize adverse impacts to water resources of the Peace River basin. The current Trust Fund balance is insufficient to fund all applications received by the January 1, 2005 statutory application deadline, let alone fund reclamation of any of the remaining 15,000 acres. Since February 2001, Trust Fund moneys and supplementary other funds totaling more than $130 million have been diverted in order for DEP to fund emergency response and ongoing obligations at the Piney Point and Mulberry phosphogypsum stack systems, including construction, site maintenance, and management operations to reduce enormous volumes of acidic process water to safely close the two facilities.

The DEP proposes to develop funding options to enable the completion of remaining critical reclamation. In conjunction with the funding plan, DEP will develop a specific methodology to identify those parcels that have the highest potential to benefit basin water resources and a plan to coordinate acquisition and reclamation

Evaluate combining Environmental Resource Permit and Conceptual Reclamation Plan approval into single phosphate mining authorization for better environmental protection

Under Chapter 373, Part IV, F.S., phosphate mining operations must obtain an Environmental Resource Permit (ERP). The ERP authorizes activities across an entire mine or a portion of a mine that involve the management and storage of surface waters (stormwater), with additional criteria to protect wetlands and other surface waters. Mining cannot begin without an ERP and any wetland mitigation and reclamation activities must be consistent with the ERP.

Under Chapter 378, Part III, F.S., phosphate mining operations must also obtain approval of a Conceptual Reclamation Plan for the entire mine (Figures 5.3 and 5.4). The conceptual plan is a general description of reclamation activities to be undertaken across the whole mine, and plan approval must be secured from DEP before the mine begins reclamation activities (not mining). Reclamation must be consistent with the DEP approval. Once mining operations have ceased in an

area, reclamation must begin in accordance with specified time constraints and be consistent with the requirements of Chapters 373 and 378, F.S.

The DEP processes the Environmental Resource Permit and Conceptual Reclamation Plan simultaneously, but the different standards for the two actions are not integrated and require constant changes to approved reclamation. This lack of integration results in gaps in environmental protection and an unnecessarily bureaucratic relationship between DEP and the mining operation. Thus DEP proposes to determine whether the two actions can effectively be streamlined into a more effective, comprehensive and environmentally protective phosphate mining authorization.

Promote greater participation in Facilitating Agricultural Resource Management Systems program

The Facilitating Agricultural Resource Management Systems program is a joint effort between the Southwest Florida Water Management District and the Florida Department of Agriculture and Consumer Services developed to implement agricultural Best Management Practices (BMPs) in the Southern Water Use Caution Area. The specific purposes of the BMPs are to improve water quality, reduce Floridan aquifer withdrawals and conserve, restore or augment the area's water resources and ecology. Projects must be consistent with the Southern Water Use Caution Area Recovery Strategy, the Regional Water Supply Plan and *Water Management Plan*, and the *Shell and Prairie Creek Watersheds Management Plan–Reasonable Assurance Documentation*, along with furthering the District's mission to manage and protect water and water-related resources (SWFWMD, 2005; SWFWMD, 2006).

DEP proposes to work with the other two agencies to increase Facilitating Agricultural Resource Management Systems participation and otherwise work with the agricultural industry to reduce water use by 40 million gallons per day within the Southern Water Use Caution Area by the year 2025.

Promote greater use of Mobile Irrigation Laboratory program

The Florida Legislature in 2001 created section 570.085, Florida Statutes, which directed that Florida Department of Agriculture and Consumer Services to establish an agricultural water conservation program. The program involves water conservation BMPs, cost-share for implementing agricultural water conservation programs, and expansion of the Mobile Irrigation Laboratory program. DEP will work with Florida Department of Agriculture and Consumer Services to seek stable funding for the Mobile Irrigation Laboratory program and expand implementation of water conservation BMPs.

Develop incentives to increase use of agricultural Best Management Practices

The Florida Department of Agriculture and Consumer Services, Office of Agricultural Water Policy was established in 1995 to facilitate governmental and agricultural industry cooperation on water quantity and quality issues. The office works with agricultural producers and industry groups, state agencies, the university system, the water management districts, and other interested parties to develop and implement economically and technically feasible BMPs. These practices are designed to address water quality and conservation on a site-specific, regional, or watershed basis (DACS, 2003).

BMPs are a preferred means of environmental protection within the agricultural community because they also provide benefits to agricultural producers. For example, improving irrigation efficiency results in lower water use, improved crop yields, reduced runoff, improved water quality, and

reduced expenditures (DACS, et al., 2006). The DEP will work with Florida Department of Agriculture and Consumer Services to promote these benefits, and related cost-sharing, to growers throughout the basin, where participation has been lacking in the past. The DEP will also help explore additional incentives to further encourage the development and use of BMPs.

Update land use change analysis with 2005 aerial photography and conduct similar analyses every 5 years

Wetland regulations were largely developed and implemented after 1979. That year and 1999 are the dates of the aerial photography sets used in the *Peace River Cumulative Impact Study* to compare land use covers. Losses of wetlands during that time were unexpectedly large and raise questions about the effectiveness of the regulations, especially because the losses cannot definitively be determined to have occurred after isolated wetlands protections were developed. The limitations of aerial photography interpretation in the early stages of reclamation and restoration, the delayed effects of drainage not previously regulated, or illegal activities not detected by enforcement are other factors that may have contributed to the wetland acreage losses.

In addition to the historical permit evaluation the DEP and Southwest Florida Water Management District will conduct, DEP will analyze land use differences between 1999 and the 2005 aerial coverage and will conduct land use comparisons every five years as new aerials are produced. These analyses will enable an assessment of the effectiveness of the *Resource Management Plan* over time and help prevent continuing losses that are not effectively offset by successful mitigation.

Accelerate development of Peace River integrated ground and surface water model

The *Peace River Cumulative Impact Study* has documented a history of impairment to the water resources in the Peace River basin. Agriculture, public supply, and mining activities within the basin have altered the hydrology of the river and groundwater withdrawals for these activities have reduced dry-season base flow in the upper basin.

The Peace River Integrated Model project will develop an integrated surface water and groundwater model for the entire Peace River basin. The model will be used to understand the effects of historical changes in the basin on river flows and to simulate the effects of future resource management decisions. The objective is a model that can simulate recent and future conditions and, using best available data, separate the effects of various land uses and climate changes on river flows. The estimated completion date for the Peace River Integrated Model is December 31, 2010 (SWFWMD, 2006).

DEP will promote the development and implementation of research on the hydraulic characteristics of mining operation landforms, reclaimed landforms, and disturbed soils to factor into the integrated computer model.

Adopt and implement Total Maximum Daily Load determinations and Basin Management Action Plans for impaired surface waters in basin

Total Maximum Daily Loads (TMDLs) are quantitative analyses of surface waters where one or more water quality standards are not being met, resulting in "impairment" of their beneficial uses, whether as drinking water sources or for fishing and shellfish harvesting or recreation. A TMDL represents the maximum amount of a given pollutant that a waterbody can assimilate and still remain healthy so that all its designated uses are met. In doing so, the TMDL sets the pollutant reductions necessary to clean up the surface water. A TMDL takes into account all sources of the problem pollutants, including industrial plants and wastewater treatment facilities as well as stormwater runoff from farms, forests, urban areas, decaying organic matter, nutrients in the soil, and more. (See Figure 5.5.) The DEP also accounts for future growth and development, to the extent possible, when establishing a TMDL.

Multiple TMDLs have been developed for waters in the Peace River basin and will be adopted in the near future. A TMDL sets pollutant reduction objectives that must be implemented to clean up impaired waterways. DEP proposes to adopt the pending TMDLs and work with local stakeholders to finalize and implement the Basin Management Action Plans necessary to minimizing existing and future adverse cumulative impacts to surface water resources. These plans identify specific infrastructure projects, both local and regional; land acquisition efforts; best management practices; financial options; and other critical components of a restoration program. Progress has already been made in addressing the water quality impairments identified in the Peace River basin. Some projects are underway, in advance of TMDL implementation, including:

- Lake Hancock lake level modification and outfall treatment projects, including major land acquisitions;
- Restoration projects in the Lake Hancock watershed, including lakes Parker and Hollingsworth and Banana Lake and canal;
- Restoration projects in the Winter Haven Chain of Lakes, including lakes Howard, Conine, and Smart; and
- The Peace Creek Drainage Canal watershed restoration plan, which will lead to the acquisition of up to 3,000 acres of conservation lands.

Develop minimum flows and levels and recovery strategies where needed

Florida's five water management districts establish "Minimum Flows and Levels" for surface waters and aquifers in their jurisdictions pursuant to section 373.042, F.S. A "minimum flow" is the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area; a "minimum level" is the level of groundwater in an aquifer or the level of a surface water at which further withdrawals would be significantly harmful to the water and ecological resources of the area (SWFWMD, 2002). Consideration is given to the protection of water resources, natural seasonal fluctuations in water flows or levels, and environmental values associated with coastal, estuarine, aquatic and wetlands ecology. Minimum flows and levels are critical both to the hydrologic requirements of natural systems, to assure they are not jeopardized by excessive withdrawals, and to water supply planning and regulation because they affect how much water is available for withdrawal (SWFWMD, 2002).

The Southwest Florida Water Management District adopted "low" minimum flows and levels for the upper segment of the Peace River and minimum flows and levels for the middle segment of the Peace River in 2005. It is crucial that the recovery strategies for these areas remain on schedule or

are expedited. Recovery strategies include the Lake Hancock lake level modification and water quality treatment projects, Peace Creek restoration project, and the resource development and containment of flow losses through karst features projects upper Peace River.

The DEP will support the Southwest Florida Water Management District as it develops the minimum flows and levels for Lake Hancock and the lower Peace River estuary system, scheduled for adoption in 2007 and development of "middle" and "high" minimum flows for the upper Peace River, scheduled for adoption by 2011.

Implement Southern Water Use Caution Area recovery strategies

In response to growing demands from public supply, agriculture, mining, power generation and recreational uses, groundwater withdrawals within the Southwest Florida Water Management District steadily increased before peaking in the mid-1970s. These withdrawals resulted in declines in aquifer levels, in some areas exceeding 50 feet. Depressed aquifer levels caused saltwater intrusion, contributed to reduced flows in the upper Peace River, and lowered water levels of some lakes in the upland areas of Polk and Highlands counties.

The Water Management District Governing Board established the Southern Water Use Caution Area (SWUCA) in 1992. The SWUCA Recovery Strategy was designed to restore minimum flows to the upper Peace River and minimum levels to lakes in Highlands and Polk counties as soon as practical. It is also designed to slow the inland movement of saltwater intrusion to minimize water quality deterioration over the next century and to assure water supply for all existing and projected reasonable and beneficial uses in the eight-county area. (SWFWMD, 2006.)

The DEP will support the Southwest Florida Water Management District in its annual assessment of water resource criteria and cumulative impacts and its review of the recovery strategy at least every five years (most recently completed in March 2006). By promoting this adaptive management strategy, recovery actions can be tailored to meet the recovery objectives.

Accelerate and secure funding for Upper Peace River/Saddle Creek Restoration Project

The Saddle Creek watershed, in northern Polk County, is the uppermost watershed in the Peace River at Bartow sub-basin. The upper portion of the Saddle Creek watershed was heavily affected by phosphate mining operations from the early 1950s through the early 1970s. In an evaluation of lands disturbed by phosphate mining before July 1, 1975, Zellars-Williams, Inc. (ZWI, 1980) published a report recommending restoration of several watersheds impacted by mining, including the upper Saddle Creek. The restoration project comprises several parcels of publicly- and privately-owned lands, including the 7,300-acre Tenoroc Fish Management Area (Tenoroc), a fisheries research and recreation area owned by the State and managed by the Florida Fish and Wildlife Conservation Commission.

Situated near the headwaters of the Peace River, the Upper Peace River/Saddle Creek Restoration Project is the linchpin on which other projects depend (Figure 5.6). For all projects to be successful, the Upper Peace River/Saddle Creek Restoration Project must first be successful in restoring the water resources in this portion of the Peace River. Tenoroc is located just south of the Interstate 4 corridor between Lakeland and Auburndale. Rapidly expanding urban and suburban development will soon completely surround the watershed and recreation area. Teneroc is situated such that

stormwater from adjacent existing and planned housing and commercial development, golf courses, and a university campus must pass through it before entering Lake Parker, Saddle Creek, Lake Hancock, and eventually the Peace River. Thus, water quality and water quantity improvements in this portion of the upper Peace River basin are dependent on the upland, wetland, and drainage improvements to be completed within Teneroc.

Because of its importance, the DEP will pursue acquisition funds, grants, sale of on-site resources, and other potential sources to acquire adjacent properties and enhance and manage lands within the Teneroc to restore flows to the upper basin. DEP will also work with the Florida Fish and Wildlife Conservation Commission to accelerate the amount of work being done and streamline interagency coordination.

Monitor Shell Creek and Prairie Creek Watershed Management Plan to ensure protection of Punta Gorda's water supply; develop similar plans in other Peace River sub-basins

The Shell-Prairie and Joshua Creek sub-basins, in the southern region of the Peace River basin, comprise approximately 487 square miles or about 20% of the basin. Land use is predominantly agriculture and is composed largely of citrus, improved and semi-improved pasture, row crops, and sod operations. About 89% of the current permitted water use is for agriculture. Surface water quality is currently impaired dues to elevated levels of chlorides, total dissolved solids, and specific conductance as a result of the use of mineralized groundwater for irrigation (SWFWMD, 2004b). Punta Gorda obtains its drinking water supply from the Shell Creek in-stream reservoir and is currently authorized to withdraw up to 5.38 million gallons per day of surface water on an annual average daily basis (SWFWMD, 2004b).

A stakeholders group was formed in 2001 and helped develop the *Shell Creek and Prairie Creek Watersheds Management Plan* to address water quality conditions upstream of the Hendrickson Dam at the reservoir. The plan is comprehensive and includes management plans, practices and projects to address water quality conditions in Shell Creek, Prairie Creek and Joshua Creek watersheds (SWFWMD, 2004b).

The DEP will promote progress of the *Shell Creek and Prairie Creek Watersheds Management Plan* throughout its full implementation through 2014 to assure protection of Punta Gorda's water supply and area compliance with water quality standards. The DEP also will assess the value of similar plans for other areas within the Peace River basin.

Work with the Southwest Florida Water Management District and area local governments to improve the use of zoning, land use and comprehensive planning tools to protect water resources in the basin; provide technical assistance to evaluate, plan and initiate financing for environmental infrastructure necessary to assure sustainable water supplies and improved water quality

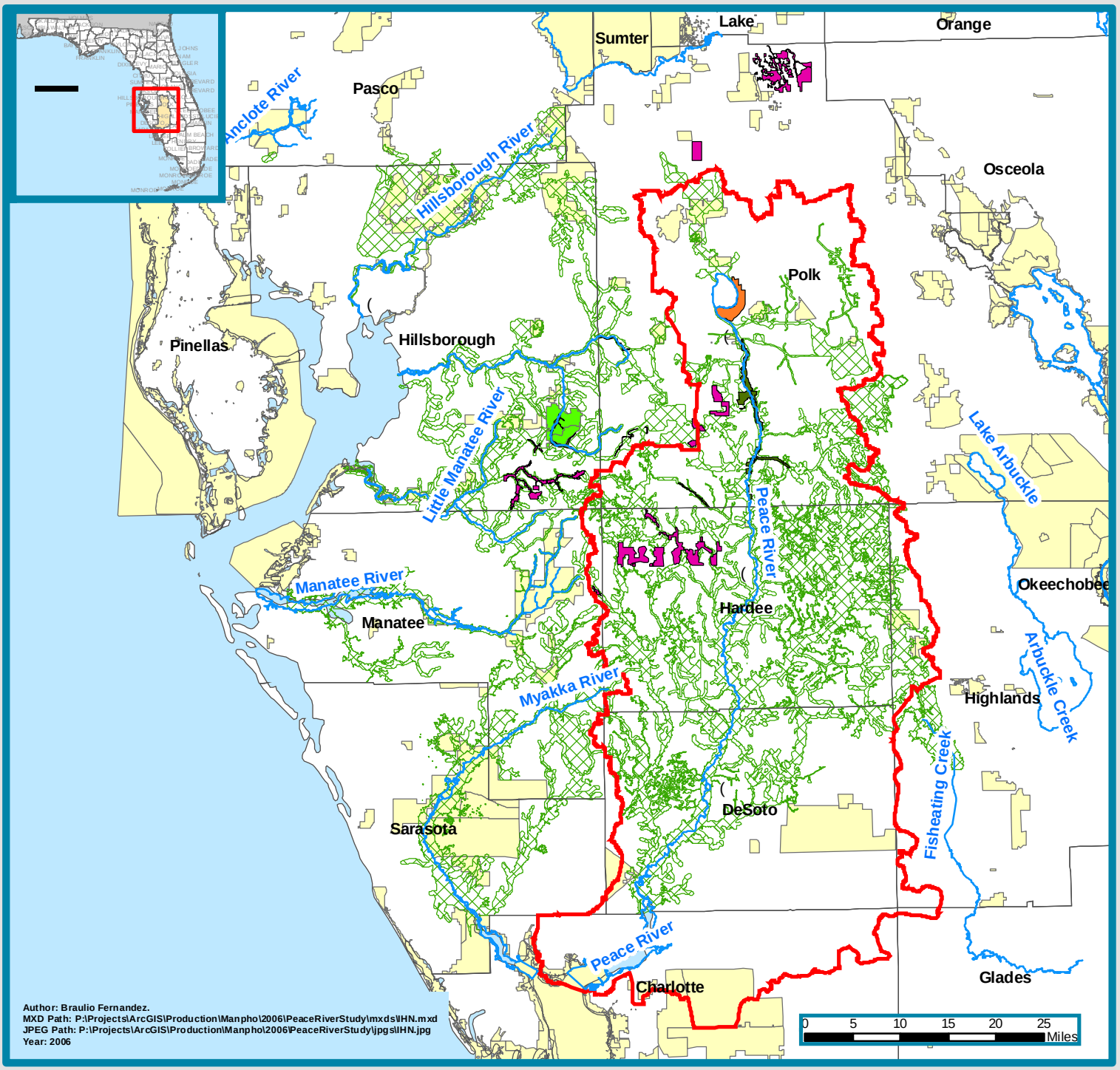
As documented throughout the *Cumulative Impact Study* and this report, urbanization is one of the four primary causes of the Peace River basin's decline. The urban centers of Lakeland, Auburndale, Haines City, Winter Haven, Bartow and unincorporated Port Charlotte lie in the northernmost and southernmost parts of the watershed. These areas are growing. Equally significant, residential, commercial, and industrial development is spreading further in the basin, including into the areas of Fort Meade, Zolfo Springs, Bowling Green, and Arcadia.

The infrastructure required to support this development is bringing with it more stormwater runoff from roads and parking lots, additional wastewater treatment and discharge or reuse flows, higher demand for public water supply, large-scale clearing of native lands, and other consequences of growth that threaten the basin's water resources. Major east-west and north-south transportation corridors are being planned that could bisect the basin.

If local zoning, land use planning and overall comprehensive planning are not undertaken carefully, the situation will be exacerbated. The opportunity exists to exploit these tools more effectively to assure that development is directed away from the most sensitive environmental resources and that future quality of life for area residents can be preserved. Critical to this effort is the planning, engineering and financing of the infrastructure necessary to promote sustainable public water supplies, provide high-quality centralized wastewater treatment and reuse or disposal, and develop low-impact design stormwater systems that ensure that development impacts are minimized.
The DEP and Water Management District will work with area local governments to provide technical assistance and, where possible, grants and low-interest loans to combine with local rates, fees and other charges to help finance the necessary infrastructure.

INTEGRATED HABITAT NETWORK

Department of Environmental Protection
Bureau of Mine Reclamation



Author: Braulio Fernandez.
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Year: 2006

- Peace River Basin Modified by BOMR

IHN Land Management Areas

- Acquisition
- Coastal Settlement
- Conservation Easement
- Donation
- IHN Corridors
- Existing Conservation Lands
- Counties
- Rivers and Streams

Figure 5.1

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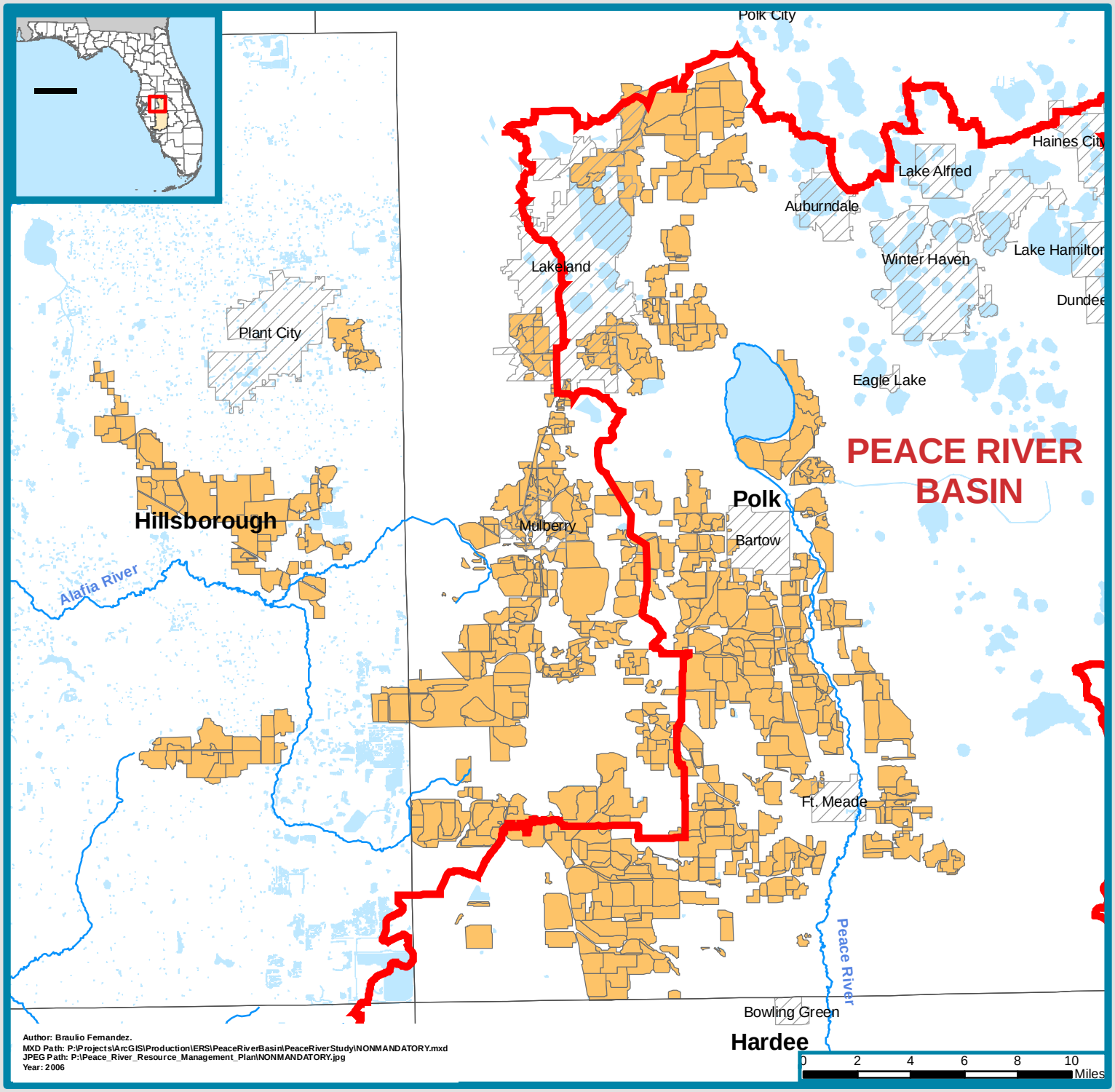
NONMANDATORY PHOSPHATE ZELLARS-WILLIAMS PARCELS

Department of Environmental Protection
Bureau of Mine Reclamation



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Year: 2006

- Peace River Basin
- Zellars-Williams Parcels
- Counties
- Cities
- Rivers and Streams
- Lakes

Figure 5.2

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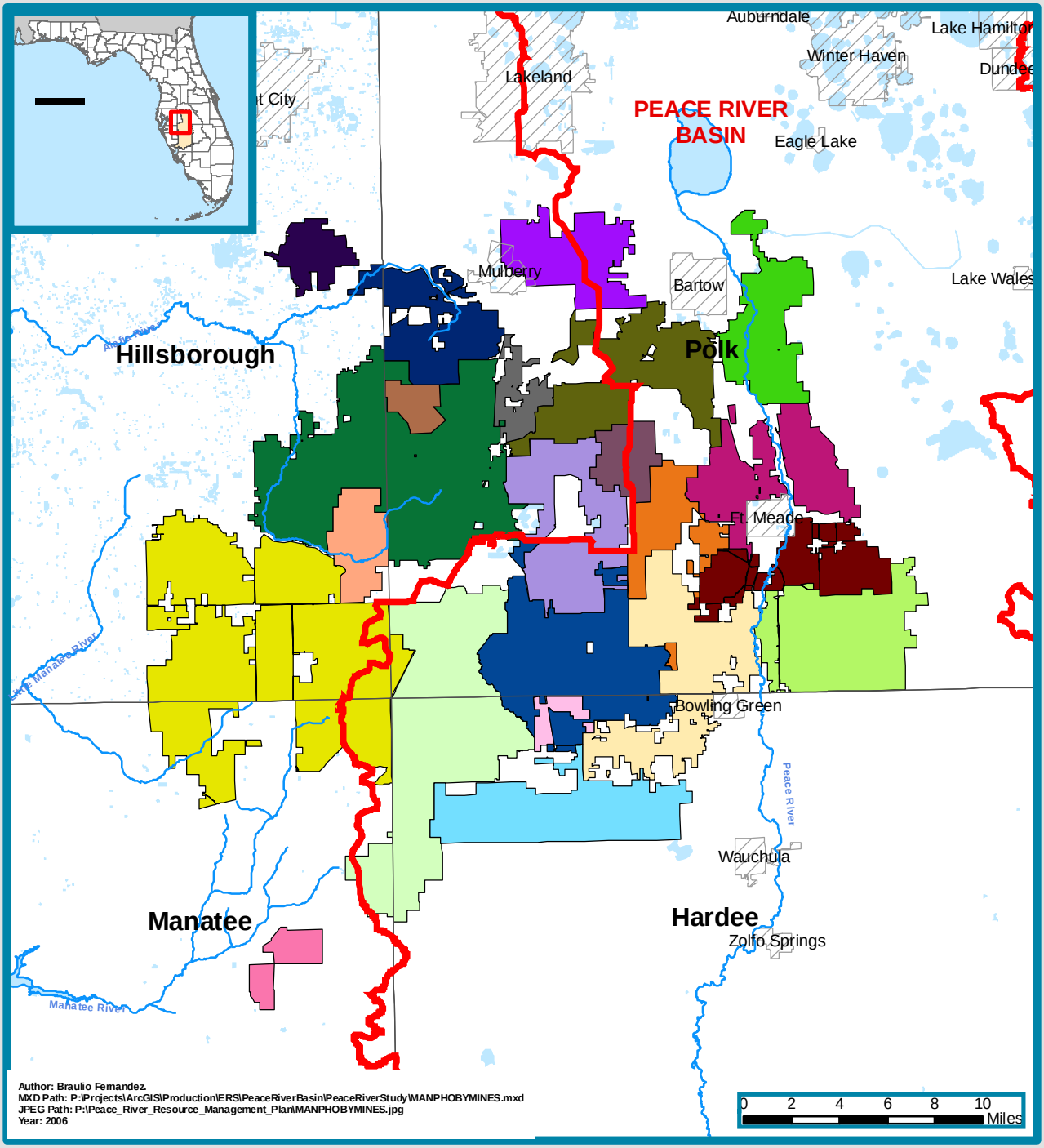
MANDATORY PHOSPHATE MINES BY MINE

Department of Environmental Protection
Bureau of Mine Reclamation



Peace River Basin
Mandatory Phosphate Mines

- Big Four
- Bonny Lake
- Clear Springs
- Fort Green
- Four Corners Lonesome
- Hookers Prairie
- Hopewell
- Kingsford Complex
- Mobil Fort Meade
- Mosaic Fort Meade
- New Wales
- Nichols
- Noralyn Phosphoria
- North Pasture
- Payne Creek
- Pebbledale
- Rockland
- Silver City
- South Fort Meade
- South Pasture
- Watson Mine
- Wingate Creek

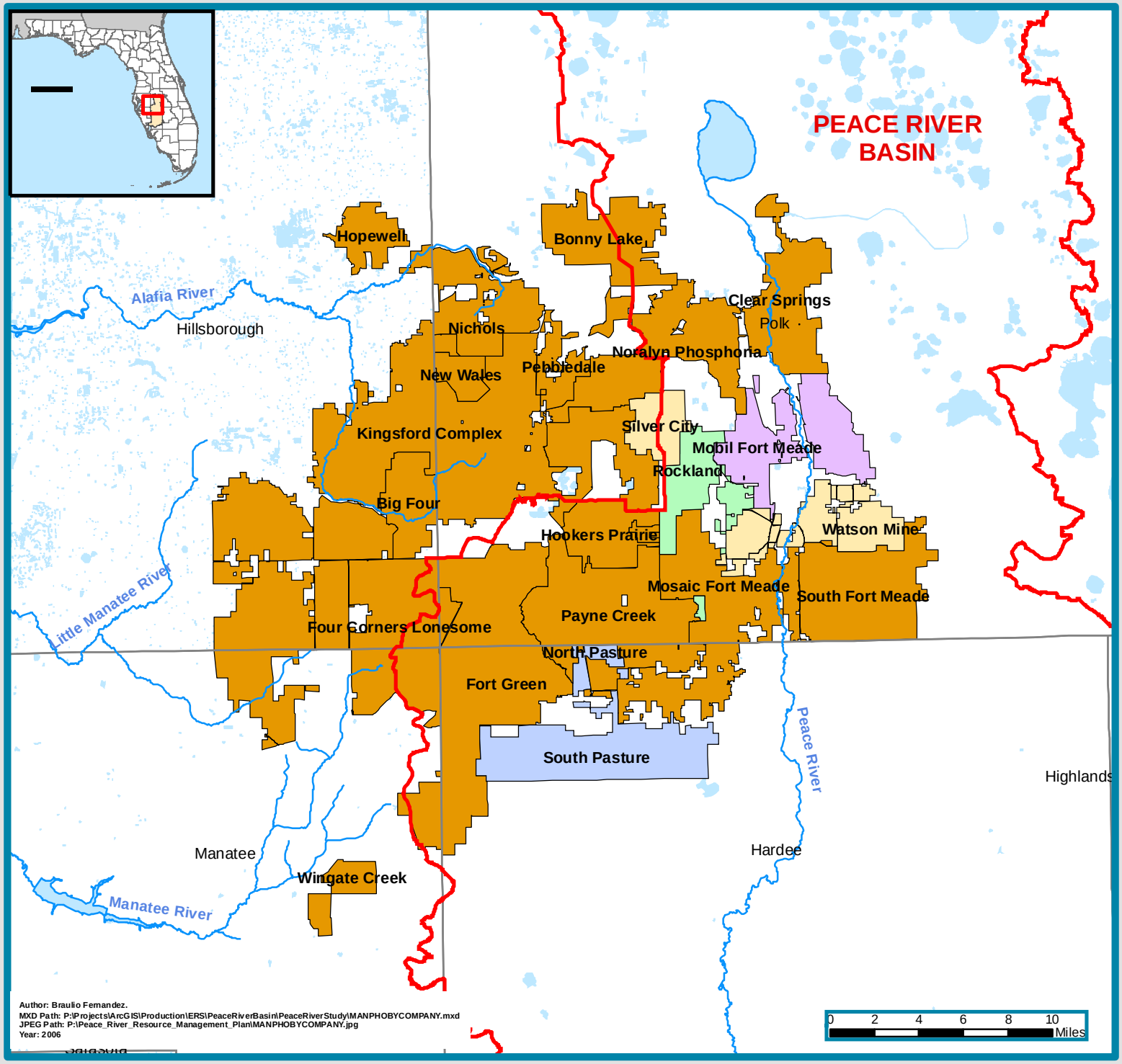
Counties
Cities
Rivers and Streams
Lakes

"Mandatory Phosphate Mines" does not indicate that the area is required to be mined for phosphate; 'Mandatory' refers to the regulatory status of the land. Land mined for phosphate since July 1, 1975 is 'Mandatory,' and is required by Florida law to be reclaimed (contoured and revegetated). Land mined prior to July 1, 1975 was not required to be reclaimed. Information contained herein is provided for informational purposes only. The State of Florida, Department of Environmental Protection, Bureau of Mine Reclamation, provides geographic information systems (GIS) data and metadata with no claim as to the completeness, usefulness, or accuracy of its content, positional or otherwise. The State and its officials and employees make no warranty, express or implied, and assume no legal liability or responsibility for the ability of users to fulfill their intended purposes in accessing or using GIS data or metadata or for omissions in content regarding such data. The data could include technical inaccuracies and typographical errors. The data is presented "as is," without warranty of any kind, including, but not limited to, the implied warranties of merchantability, fitness for a particular purpose, or non-infringement. Your use of the information provided is at your own risk. In providing this data or access to it, the State assumes no obligation to assist the user in the use of such data or in the development, use, or maintenance of any applications applied to or associated with the data or metadata.

Figure 5.3

MANDATORY PHOSPHATE MINES BY COMPANY

Department of Environmental Protection
Bureau of Mine Reclamation



Peace River Basin

Mandatory Phosphate Mines by Company

- CF Industries Inc
- Estech Inc
- MobilExxon
- Mosaic
- US Agri Chemicals
- Rivers and Streams

Counties

Lakes

Figure 5.4

"Mandatory Phosphate Mines" does not indicate that the area is required to be mined for phosphate; 'Mandatory' refers to the regulatory status of the land. Land mined for phosphate since July 1, 1975 is 'Mandatory,' and is required by Florida law to be reclaimed (contoured and revegetated). Land mined prior to July 1, 1975 was not required to be reclaimed. Information contained herein is provided for informational purposes only. The State of Florida, Department of Environmental Protection, Bureau of Mine Reclamation, provides geographic information systems (GIS) data and metadata with no claim as to the completeness, usefulness, or accuracy of its content, positional or otherwise. The State and its officials and employees make no warranty, express or implied, and assume no legal liability or responsibility for the ability of users to fulfill their intended purposes in accessing or using GIS data or metadata or for omissions in content regarding such data. The data could include technical inaccuracies and typographical errors. The data is presented "as is," without warranty of any kind, including, but not limited to, the implied warranties of merchantability, fitness for a particular purpose, or non-infringement. Your use of the information provided is at your own risk. In providing this data or access to it, the State assumes no obligation to assist the user in the use of such data or in the development, use, or maintenance of any applications applied to or associated with the data or metadata.

Southwest District Group 3 TMDL Waters
Upper Peace River

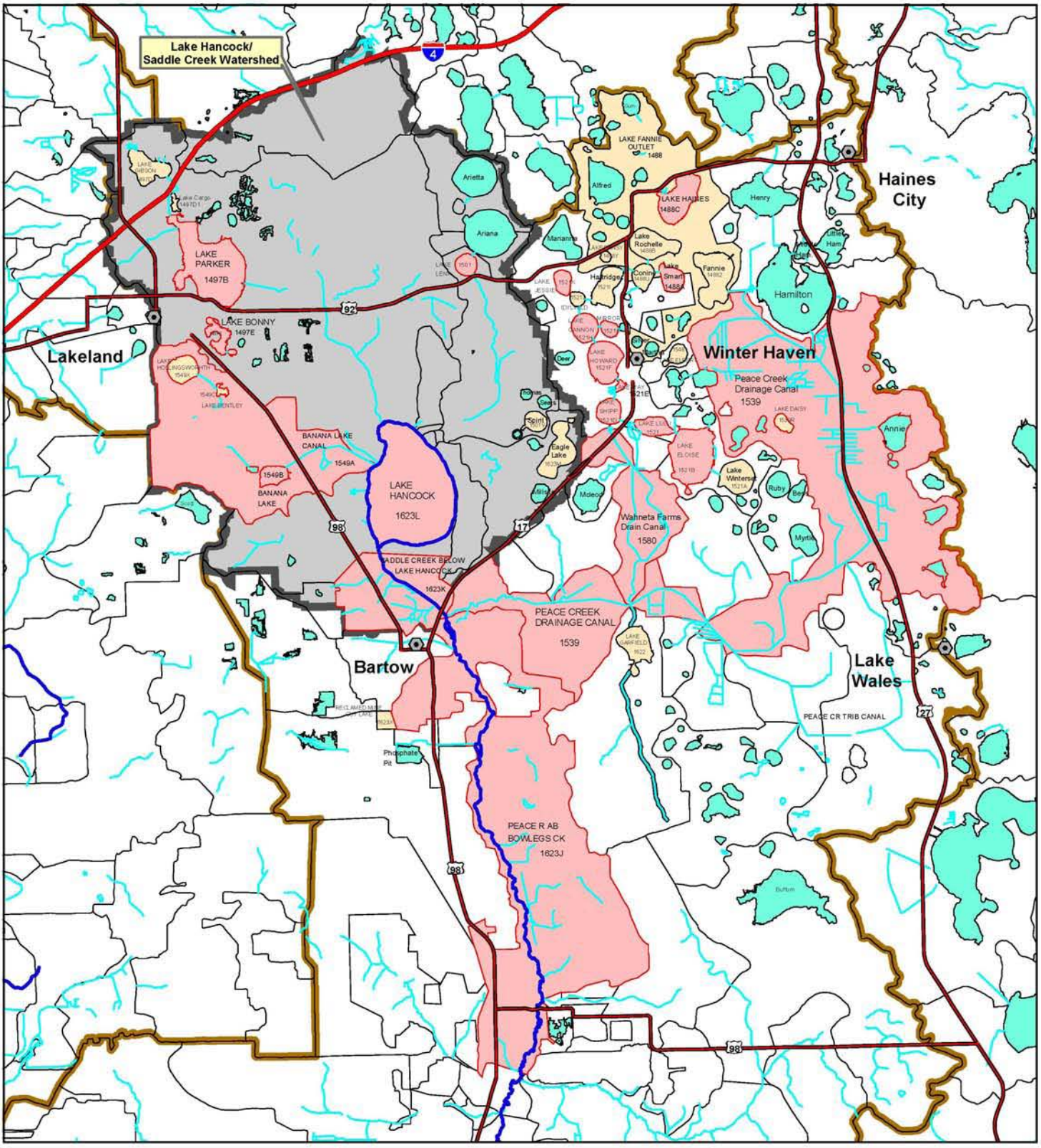
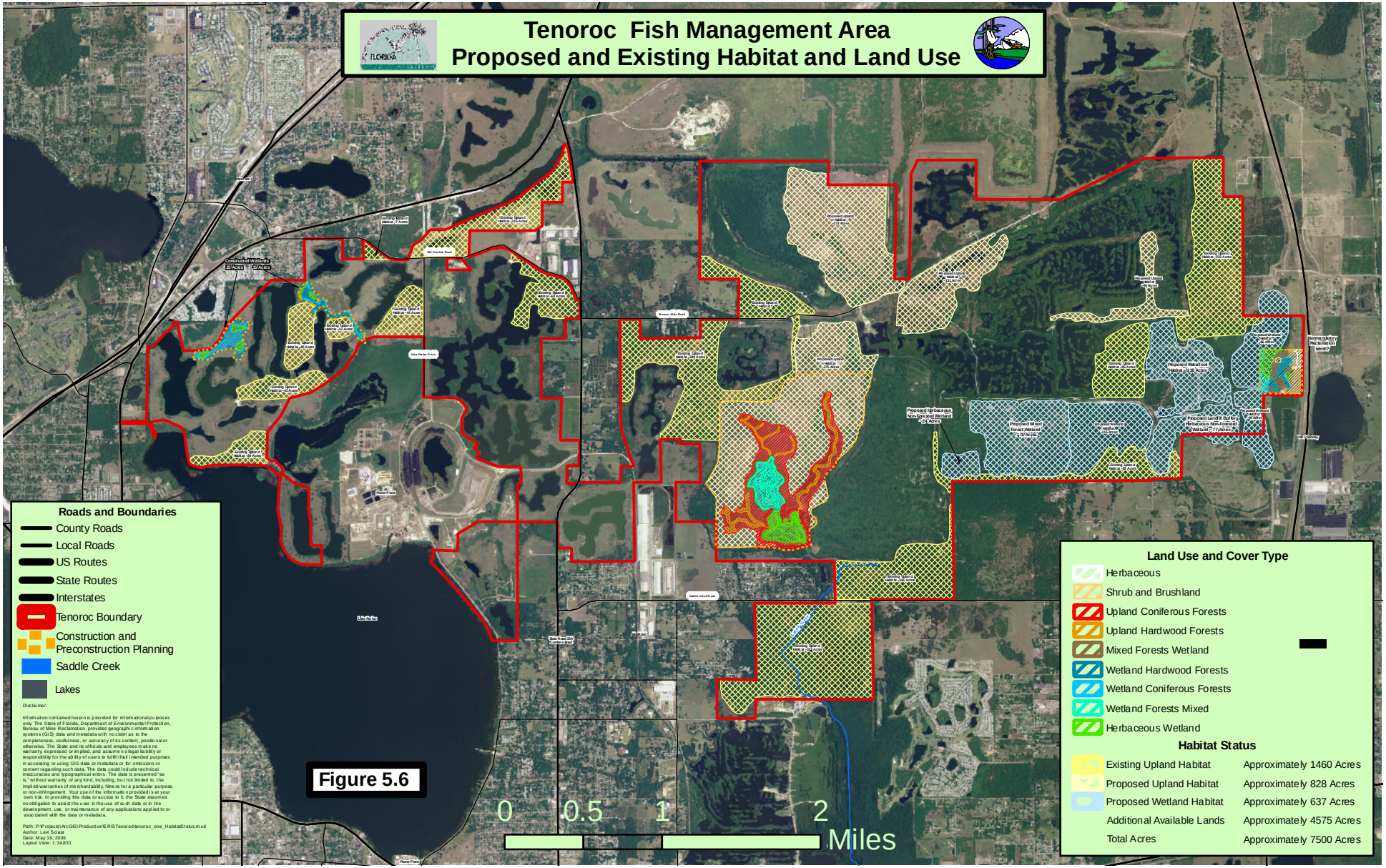


Figure 5.5


Tenoroc Fish Management Area
Proposed and Existing Habitat and Land Use
Roads and Boundaries
County Roads
Local Roads
US Routes
State Routes
Interstates
Tenoroc Boundary
Construction and Preconstruction Planning
Saddle Creek
Lakes
Land Use and Cover Type
Herbaceous
Shrub and Brushland
Upland Coniferous Forests
Upland Hardwood Forests
Mixed Forests Wetland
Wetland Hardwood Forests
Wetland Coniferous Forests
Wetland Forests Mixed
Herbaceous Wetland
Habitat Status
Existing Upland Habitat Approximately 1460 Acres
Proposed Upland Habitat Approximately 828 Acres
Proposed Wetland Habitat Approximately 637 Acres
Additional Available Lands Approximately 4575 Acres
Total Acres Approximately 7500 Acres
0 0.5 1 2
Miles
Figure 5.6