3/1/04 FINAL DRAFT

Proposed Scope
for the
Kissimmee Chain of Lakes Long-Term Management Plan

Project Charter and Management Goals

South Florida Water Management District
Florida Fish and Wildlife Conservation Commission
Florida Department of Environmental Protection
Florida Department of Agriculture and Consumer Services
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
U.S. Environmental Protection Agency

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EXECUTIVE SUMMARY

Introduction

On April 10, 2003, the South Florida Water Management District's (SFWMD) Governing Board adopted resolution number 2003-468 (Appendix A). The recommendations in this resolution were adopted by the Water Resources Advisory Commission (WRAC) on April 3, 2003. This resolution directs SFWMD staff to work with the U.S. Army Corps of Engineers and stakeholders to develop a long-term management plan for the Kissimmee Chain of Lakes.

Over the past year, SFWMD staff have conducted fact finding meetings with federal and state agencies to define a scope for the plan. Along with this scope, these agency staff have drafted a project charter which defines a process and strategy for plan development.

This document presents the final draft versions of this project charter (Appendix B) and goal document (Appendix C). The goal document was developed to supplement the charter and further define the plan's scope. A mandate reference document (Appendix D) and tables (Appendix E and F) were developed as part of the goal document to clarify the statutes, rules, regulations, and other policies and authorities that govern the activities of the partner agencies. This information was compiled during the fact-finding phase to clarify interests and ensure the proposed scope was within agency mandates.

The seven partner agencies that have been involved to date are:

- South Florida Water Management District (SFWMD);
- Florida Fish and Wildlife Conservation Commission (FWC);
- Florida Department of Environmental Protection (FDEP);
- Florida Department of Agriculture and Consumer Services (FDACS);
- U.S. Army Corps of Engineers (USACE);
- U.S. Fish and Wildlife Service (USFWS); and
- U.S. Environmental Protection Agency (USEPA).

The next phase, which begins with the release of this document for local government, community leader, and other stakeholder review, is intended to expand the list of participants to ensure involvement from all interested parties.

Background

The proposed scope of the Kissimmee Chain of Lakes (KCOL) Long-Term Management Plan (LTMP) was driven by known water resource issues in the Upper Kissimmee Basin. After identifying these issues and current initiatives, the partner agencies identified five goals to address concerns that fell outside other initiative scopes and aligned with the mission defined by the SFWMD resolution. Those goals are:

- Hydrologic management;
- Habitat preservation and enhancement;
- Aquatic plant management;
- Water quality improvement; and
- Recreation and public use.

The project charter defines the steps that will be used in plan development. These steps include:

- Identify partner agency water resource management issues and mandates within the basin;
- Determine broad water resource management goals related to these responsibilities;
- Develop reference conditions and performance measures;
- Where data are available, assess baseline conditions relative to performance measures;
- Where data are not available, identify data collection and monitoring needs;
- Identify approaches to address water resource management issues in areas where baseline conditions are not meeting performance measures;
- For approaches, identify points of interaction or overlap, including compatible or conflicting interests, among partners; and
- Develop a management plan recommending changes to current water resource management within the basin.

The goal document provides goal definitions and background information including historical perspective, rationale, funding, and current approach. The goal definitions define the criteria partner agencies identified as important to lake management. The background information is intended to provide perspective on the system before construction of the Central and South Florida (C&SF) Flood Control Project and the current situation.

The mandate document has three parts: mandate description, mandate-to-agency matrix, and mandate-to-goal matrix. This portion of the document is provided for reference purposes.

Project Objectives

The KCOL LTMP's purpose is to create a coordinated, multi-disciplinary framework for resolving water management issues in the Kissimmee Chain of Lakes. This plan is intended to be different from management plans that are routinely updated. Through this planning process, we want to develop a partner forum where issues can be addressed as they arise. The plan is intended to be a process for identifying issues and developing initiatives to address those issues. Success will depend on partnerships and our ability to reach concensus and understanding on the issues. It will also depend on building a sound scientific foundation that can be used to evaluate management alternatives. The science will help us define what it means for an ecosystem to be healthy. The evaluation of management alternatives will allow us to see what positive or negative impact a given decision may have on health status. Nine products will be produced from this initiative. Those products are: Goal Document, Reference Conditions, Performance Measures, Baseline Conditions, Data Collection / Monitoring Plan, Integrated Surface and Ground Water Model, Economic Value Study, Long Term Management Plan, and a Federal Study.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

RESOLUTION NO. 2003-468

A RESOLUTION OF THE GOVERNING BOARD OF THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT ACCEPTING THE KISSIMMEE CHAIN OF LAKES RECOMMENDATIONS DEVELOPED BY THE WATER RESOURCES ADVISORY COMMISSION; PROVIDING AN EFFECTIVE DATE

WHEREAS, the South Florida Water Management District Governing Board ("Governing Board") adopted Resolution 01-22 creating the South Florida Water Management District Governing Board's Water Resources Advisory Commission ("Commission"); and

WHEREAS, On January 16, 2002, by consensus of the South Florida Ecosystem Restoration Task Force members, the Commission, became a Task Force Advisory Body pursuant to section 528(f)(2)(E) of the Water Resources Development Act of 1996, Public Law 104-303; and

WHEREAS, The Commission had information on the Kissimmee Chain of Lakes drawdown presented to them on January 16, 2003 and on March 6, 2003; and

WHEREAS, the Commission provided the opportunity for written or verbal comments from the public and Commission members between the initial presentation on January 16, 2003 and the subsequent meetings in February 6, 2003, March 6, 2003 and April 3, 2003; and

WHEREAS, the Commission provided ample notice to Commission Members that voting would occur on April 3, 2003 so that Commission members could arrange to be present for the vote; and

BE IT RESOLVED BY THE GOVERNING BOARD OF THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT:

Section 1. The Governing Board of the South Florida Water Management District accepts and endorses the Kissimmee Chain of Lakes recommendations adopted by the Water Resources Advisory Commission on April 3, 2003; and directs staff to:

Section 2. Work in conjunction with United States Army Corp of Engineers and other interested parties to ensure that the ongoing Kissimmee Upper Chain of Lakes Comprehensive Environmental Impact Statement is of sufficient scope to develop a Kissimmee Upper Chain of Lakes Long Term Management Plan; and

Section 3. Ensure that to the extent of the authority of the Comprehensive Environmental Impact Statement, it develops alternative management scenarios that address stressors that cause environmental harm to the lakes, including but not limited to, restricted lake regulation schedules, nuisance and invasive aquatic plants, and nutrient impacts; and

Section 4. In addition to improving the health and stability of the Upper Chain of Lakes, lake schedules should consider incorporating adaptive protocols that consider long range weather forecasts and downstream conditions in the

Kissimmee River, Lake Okeechobee, the Estuaries, and the Everglades, to provide windows of opportunity for lake drawdowns that optimize water related benefits, such as water supply and flood protection, opportunities for the restoration of threatened and endangered species, increased opportunities for recreational uses and minimize adverse effects while maximizing positive effects of drawdowns; and

Section 5. Develop a Kissimmee Upper Chain of Lakes Long Term Management Plan that builds on the ~~May~~ 1997 Draft Management Plan for the Kissimmee Chain of Lakes prepared by the South Florida Water Management District, Florida Fish and Wildlife Conservation Commission, U.S. Army Corps of Engineers, and the Florida Department of Environmental Protection, by incorporating information from the Upper Chain of Lakes Comprehensive Environmental Impact Statement, and the input of other interested parties. Once the study alternatives are completed, they should be brought before the Commission for further consideration.

Section 6. Request that permits and/or funding for activities recommended by the Kissimmee Chain of Lakes Comprehensive Environmental Impact Statement, associated with the purpose of Lake drawdowns, be multi-year and consistent with the adaptive protocols proposed in the Kissimmee Upper Chain of Lakes Long Term Management Plan; and

Section 7. Work with the interested parties to facilitate plans for the Lake Toho Drawdowns and ensure the appropriate monitoring plans and research are carefully conducted so that results can be used in the development of the Kissimmee Upper Chain of Lakes Long Term Management Plan; and

Section 8. Directs the District Clerk to forward the resolution to the South Florida Ecosystem Restoration Task Force;

Section 9. This resolution shall take effect immediately upon adoption ~~[or such other date as is appropriate].~~

PASSED and **ADOPTED** this 10th day of Apr. 1, 2003.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT, BY ITS GOVERNING BOARD

By: _____
Chairman

ATTEST:

_____
Assistant Secretary

Approved as to form:

BY: _____
Office of Counsel

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Project Charter

Project Title: Development of a Long-Term Management Plan for the Kissimmee Chain of Lakes

Project Managers: Brad Jones and Chris Carlson

Project Sponsor: South Florida Water Management District

Mandate: SFWMD Governing Board Resolution 2003-468

Level of Empowerment:

This project charter has been initiated by the South Florida Water Management District and authorizes the project manager to recommend expenditure of funds and assignment of human resources budgeted by the SFWMD Kissimmee Division to complete a Long-Term Management Plan for the Kissimmee Chain of Lakes.

Approval:

_____ _____

Project Sponsor Date

Project Location:

Lakes and lands in the Upper Kissimmee Basin regulated or influenced by the C & SF Flood Control System (Figure 1).

Project Scope:

In April 2003, the Water Resources Advisory Commission (WRAC) and the SFWMD Governing Board adopted a resolution directing SFWMD staff to coordinate with the U.S. Army Corps of Engineers and other interested parties to develop a Kissimmee Chain of Lakes Long-Term Management Plan (KCOL LTMP). A copy of this resolution is provided in Appendix A.

The SFWMD is the lead agency responsible for coordinating interagency activities and producing the plan. Other cooperating agencies include:

- Florida Fish and Wildlife Conservation Commission (FWC);
- Florida Department of Environmental Protection (FDEP);
- Florida Department of Agriculture and Consumer Services (FDACS);
- U.S. Army Corps of Engineers (USACE);
- U.S. Fish and Wildlife Service (USFWS);
- U.S. Environmental Protection Agency (USEPA);
- Local governments and community leaders; and
- Other stakeholders.

The scope of the KCOL LTMP is driven by water resource issues in the Upper Kissimmee Basin pursuant to mandates of the participating federal, state, and local agencies. These agencies manage the basin's resources under statutes, regulations, and other policies and authorities that encompass flood control, water supply, fish and wildlife habitat protection, land use management, water quality, navigation, and recreation and public use.

The following steps will be used to develop the plan:

- Identify water resource management issues and agency mandates within the basin;
- Determine broad water resource management goals related to these responsibilities;
- Develop reference conditions and performance measures;
- Where data are available, assess baseline conditions relative to performance measures;
- Where data are not available, identify data collection and monitoring needs;
- Identify approaches to address water resource management issues in areas where baseline conditions are not meeting performance measures;
- For approaches, identify points of interaction or overlap, including compatible or conflicting interests, among partners; and
- Develop a management plan recommending changes to current water resource management within the basin.

The process associated with these steps is shown in Figure 2. The purpose for the plan was identified in the WRAC resolution adopted by the SFWMD Governing Board. That purpose is to improve the health and stability (sustainability) of the Kissimmee Chain of Lakes ecosystem.

Five water resource management goals have been identified. These goals cover: 1) hydrologic management, 2) habitat preservation and enhancement, 3) aquatic plant management, 4) water quality improvement, and 5) recreation and public use. Documents provided with this Charter describe these goals (Appendix C) and associated mandates (Appendices D, E, and F).

Representatives from the participating agencies also identified the need to coordinate other agency efforts to ensure that they complement the KCOL LTMP and assist in positioning agencies to respond to plan recommendations. In particular, three activities need to run concurrently with KCOL LTMP development: USACE federal study authorization, hydrologic modeling, and an economic value study. Figure 3 shows a schedule for these concurrent projects relative to KCOL LTMP development. A USACE federal study is included because such studies are required to modify regulation schedules or

evaluate structural changes to the C &SF Flood Control System. The USACE funding process is approximately two years. The type of federal study has not been identified but is a high priority to ensure that the USACE can act on KCOL LTMP recommendations.

The concurrent project approach is designed to provide the USACE with the data and tools necessary to perform its study. The performance measures developed during plan development will provide USACE with a means to evaluate study alternatives. The FDEP/FWC Economic Value Study will provide USACE with the necessary economic information for preparation of an Environmental Impact Statement (EIS). Expansion of the existing hydrologic model for the basin will provide the tool for evaluation of hydrologic alternatives. Figure 4 shows the geographic extent of the existing model relative to the study area. Model functionality also will need to be expanded to accommodate needs associated with the evaluation of hydrologic alternatives.

The following efforts are not be included in KCOL LTMP development. KCOL LTMP efforts will integrate work from these efforts and/or coordinate with these efforts were appropriate.

- **Environmental Impact Statement (EIS) development for modification of lake regulation schedules:** Performance measures developed as part of the KCOL LTMP can be used by USACE in evaluating regulation schedule alternatives and preparing an EIS, but the federal study and any associated EIS will not be included in plan development.
- **Local flood control project evaluation and improvements:** These are local projects that are managed by SFWMD Operations and Maintenance in collaboration with local governments.
- **Lake Okeechobee Protection Plan (LOPP):** This is a separate, concurrent effort. Staff will work to prepare the KCOL LTMP and LOPP in accord with each other.
- **Total Maximum Daily Loads (TMDLs):** The FDEP is the lead agency for TMDL development in Florida and is independently mandated to develop TMDLs.
- **Extreme Lake Drawdowns:** The KCOL LTMP will address issues associated with extreme lake drawdowns and environmental enhancement projects, but will not develop specific designs for any planned or future drawdown.
- **Water Supply Plan Development:** This is a separate, concurrent effort of the SFWMD. Staff will work to prepare the KCOL LTMP and Water Supply Plan in accord with each other.
- **Aquatic Plant Management:** These activities are planned on an ongoing basis by the FDEP and other agencies. The KCOL LTMP will address issues associated with aquatic plant management, but will not specifically address any planned or future activities.
- **Land Management**: While the KCOL LTMP will address land management issues with respect to the waters of the Upper Kissimmee Basin, comprehensive land management planning is the responsibility of the FWC, FDEP, and Land Stewardship Division of the SFWMD, and is accomplished separately for public lands they manage.

Project Objectives:

The KCOL LTMP's purpose is to create a coordinated, multi-disciplinary framework for resolving water management issues in the Upper Kissimmee Basin. The plan's success will depend on its ability to: 1) build partnerships and obtain resource commitments from federal, state, and local partners, and (2) create scientifically-based criteria for evaluating water management strategies.

Justification:

The Kissimmee Chain of Lakes has been substantially altered from its historic condition through the dredging of canals, installation of water control structures, increased development, and proliferation of problematic plant and animal species. Many of these alterations have contributed to the degradation of native fish and wildlife habitat.

The most dramatic change is reduced water level fluctuations. Historically, lake levels fluctuated from two to ten feet annually. Under regulation, the range of fluctuation has been reduced to about two to three feet annually. The historic, pre-regulated pattern of seasonal fluctuations provided periods of flooding and drying that played a critical role in maintaining the

ecosystem's health and supported biological communities adapted to and dependent upon these fluctuations. Reducing the range of fluctuations has eliminated this natural cycle and promoted growth of dense vegetation that has resulted in the accumulation of organic material in littoral zones of these lakes. Smaller fluctuations also have allowed agricultural, residential, and commercial land uses to encroach upon historic flood zones surrounding the lakes, resulting in significant loss of wildlife habitat and in higher nutrient inputs to the lakes.

In addition to habitat loss, habitat has been degraded by dense growth of problematic, native and exotic plant species, primarily cattail (*Typha* spp.), pickerelweed (*Pontedaria cordata*), tussock communities, hydrilla (*Hydrilla verticillata*), water hyacinth (*Eichhornia crassipes*), and water lettuce (*Pistia stratiotes*). These dense concentrations of undesirable vegetation not only cause accumulation of organic sediment, but also negatively impact organisms dependent upon healthy littoral communities. The end result is loss of desirable native species and reduction in overall plant and animal diversity and abundance.

Dense growths of hydrilla are capable of filling water columns and covering surfaces of all lakes in the Kissimmee Chain. Hydrilla was not introduced into the Kissimmee Chain of Lakes until the late 1970s. Hydrilla was not a significant problem in Lakes Kissimmee, Hatchineha and Cypress during the development of the Kissimmee River Restoration Headwaters Revitalization Project and regulatory operations required to treat hydrilla were not considered as part of that study. However, it now infests more than 80% of Lakes Tohopekaliga, Cypress, and Hatchineha and has covered more than half of Lake Kissimmee. Hydrilla control costs between $11-13 million annually for these four lakes alone. If hydrilla is not successfully managed each year, the function and integrity of these lakes will be substantially diminished. Hydrilla limits water movement and can impact flood control, water supply, navigation, recreation, and water quality (oxygen, pH, water temperature). In addition, aquatic habitats are lost and sedimentation is accelerated.

The FDEP, FWC, USACE, and SFWMD are addressing vegetation problems by cooperatively funding and conducting aquatic plant control and environmental enhancement projects. The biggest challenge to implementing these projects is working within current regulation schedules. The FDEP needs low water levels and no to low flow conditions during winter and early spring months. The FDEP currently works with water managers to obtain the best possible conditions for treatment of aquatic plants, but usually must apply significantly more herbicide at a much higher cost due to high water levels during treatment periods, or to compensate for herbicide loss to required discharge rates. The FWC needs extremely low water levels to remove organic sediments. The FWC must request temporary deviations to regulation schedules to carry out habitat enhancement projects. These temporary deviations require environmental impact statements that may take years to prepare and often result in significant project delays.

The downstream ecosystems of the Kissimmee River, Lake Okeechobee, the estuaries, and the Everglades also can be impacted by management of the Kissimmee Chain of Lakes. Restoration of the Kissimmee River requires specific quantities and timing of flows to mimic the natural hydrologic regime. These flows depend on regulation of the headwater lakes. Discharges from these lakes also affect Lake Okeechobee water levels and can contribute to higher than desired levels that impact the lake's littoral zone. At times when Lake Okeechobee is at or above regulation schedule, discharges from the Chain of Lakes can result in additional releases of fresh water to the estuaries, potentially causing lower salinity levels and impacting oyster populations and seagrass beds. Upper Basin discharges also may increase releases to the Everglades that may result in higher than desired water levels and phosphorus inputs. However, discharges to Lake Okeechobee do not necessarily result in releases from Lake Okeechobee.

The development of stage regulation schedules for the Kissimmee Chain of Lakes should consider both local issues and potential downstream impacts. Regulation schedules with adaptive protocols that consider both local needs and downstream conditions could enhance the ability to manage south Florida's ecosystems.

The KCOL LTMP will develop performance measures that will be used to assess the state of the Kissimmee Chain of Lakes. It will make recommendations on how to address stressors that cause harm, including restricted lake regulation schedules, nuisance and invasive aquatic plants, and nutrient impacts. The performance measures will support evaluation of alternative lake schedules and support the development of adaptive protocols that consider long-range weather forecasts and downstream conditions in the Kissimmee River, Lake Okeechobee, the estuaries, and the Everglades. The KCOL LTMP will build upon the SFWMD's Lake Management Plan for the Kissimmee Chain of Lakes, drafted in 1997, that covered hydrilla management and lake drawdowns for habitat enhancement.

Schedule:

The proposed strategy and schedule for developing the scope and resources for the plan are:

3/9/04	Kickoff meeting with local agencies, community leaders and other stakeholders to present proposed scope of KCOL LTMP.
3/17/04	WRAC Issues Workshop – General Overview of Project
4/2/04	Public comments due on KCOL LTMP scope.
4/9/04	Distribute final versions of Project Charter and Goal Document to participating agencies for review, comment, and sign-off. Include addendum summarizing public comment.
4/12/04	WRAC Issues Workshop – Presentation and Discussion on Project Charter and Goals
4/21/04	Secure cooperating agency approval of Project Charter.
5/6/04	Obtain WRAC approval.
5/7/04	Initiate authorization for federal study. Develop project schedule based on resource availability. Procure modeling services.
6/30/05	Complete reference conditions.
9/30/05	Complete performance measures and significant harm levels. Complete model calibration.
12/30/05	Complete baseline conditions and data collection/monitoring plan. Complete economic value study.
1/30/06	Complete first draft of KCOL LTMP.
3/1/06	Complete final draft of KCOL LTMP.
3/15/06	Distribute draft KCOL LTMP for comment.
4/15/06	Public meeting – present draft and receive comments.
5/15/06	Public and agency comments due.
6/30/06	Complete draft final KCOL LTMP.
7/30/06	Comments due.
9/30/06	Final KCOL LTMP to SFWMD WRAC.

Methodology:

Cooperating agencies will be expected to:

- Identify key technical personnel for participation in interagency meetings and assisting with development of the KCOL LTMP;
- Commit to allocating resources to the KCOL LTMP, consistent with agency mandates, missions, and goals;
- Agree to meet product review schedules as defined in the project plan; and
- Produce mutually agreed-upon deliverables.

Funding/Costs/Resources:

Participating agencies will support development of this plan through commitment of funds and/or staff. Table 1 lists estimates of resource commitments from each agency over the next three years. Some agencies, such as the SFMWD, FWC, and FDEP, are committing significant FTEs to continue on-going monitoring of key ecosystem parameters, review documents, and create the nine products that will come out of plan development. Those products will be:

- Goal Document;
- Reference conditions;
- Performance measures;
- Baseline conditions;
- Data collection / monitoring plans;
- Integrated surface and ground water model;
- Economic value study;
- USACE appropriation to conduct a study; and
- KCOL LTMP final document with recommendations.

The expected length of participation is approximately 2.5 years.

Table 1. Estimates of resource commitments from participating federal and state agencies.

Agency	2003-04		2004-05		2005-06	
	FTE	Funding	FTE	Funding	FTE	Funding
USEPA[1]	0.3	$0	0.3	$0	0.3	$0
USACE[1]	1.0		1.0*		1.0*	
USFWS[1]	0.3	$0	0.3	$0	0.3	$0
SFWMD[1]	3.0	$385,000	5.0**	TBD**	5.0**	TBD**
FWC[2]	0.1	$0	1.0	$480,281**	1.0	TBD**
FDEP[2]	1.0	$0	1.0	$60,000**	1.0	$0
FDACS[2]	0.1	$0	0.1	$0	0.1	$0

1 – October-September fiscal year
2 – July-June fiscal year
* – To be revised when scope is further defined.
** – Contingent on governing agency approval of budgeted funds
TBD – To be determined

Assumptions:

All partner agencies agree with the need to develop a water resource management plan for the Kissimmee Chain of Lakes.

Personnel and other resources will be made available to support tasks associated with developing the plan.

Sufficient data and literature exist to develop required performance measures.

Expertise exists among agencies and stakeholders to establish appropriate performance measures.

Scientific, engineering, and other relevant technical approaches will be used to distill information and develop recommendations for managing water resources within the basin.

The plan will result in long-term interagency partnerships and coordination to implement recommendations.

Constraints:

Water quality performance measures should be completed in time to support Group 4 TMDL evaluation and development (9/05).

Minimum flow and level technical criteria should be completed in time to support development of technical criteria (9/05).

Staff must be available to manage contracts and develop scientific and technical products.

Project Team:

FDACS:	Clegg Hooks – Lake Okeechobee Protection Plan, BMP Implementation
FDEP:	Barbara Bess – Total Maximum Daily Loads
	Pat Fricano – Total Maximum Daily Loads
	Kim Shugar - Lake Okeechobee Protection Plan, Project Management and Support
	Jeff Schardt – Aquatic Plant Management
	Judy Ludlow – Aquatic Plant Management
FWC:	Marty Mann – Upper Kissimmee Chain of Lakes and Fisheries Expertise
	Mike Hulon – Upper Kissimmee Chain of Lakes and Fisheries Expertise
	Steve Glass – Wildlife Expertise
	Chris Harnden – Watershed issues
	Duke Hammond – Wildlife Expertise
	Ann Forstchen – St. Lucie and Caloosahatchee Estuary Expertise
	Don Fox – Lake Okeechobee and Fisheries Expertise
SFWMD:	Christine Carlson – Project Management and Coordination
	Brad Jones – Technical Lead
	Ernie Feller – Aquatic Plant Management
	Rick Conover – Land Management
	Steve Lin – Hydrology
	Jose Valdes – Hydrogeology
	Lawrence Glenn – Fisheries Ecologist
	Nellie Morales – Water Quality Expertise/Ecologist
	Gary Williams – Avian Ecologist
	Laura Carnal – Aquatic and Wetland Botany
	David Anderson – Ecologist/Hydrologist

USACE:	Kerry Luisi – Project Management
	Adam Stuart – Water Management and Meteorology
	Esteban Jimenez – Environmental Assessment
	Jon Lane – Aquatic Plant Management
	Tim Gysan – Hydrologic Investigations
USEPA:	Eric Nelson – Wetlands and Water Quality
	Ron Miedema – Wetlands and Water Quality
USFWS:	Gina Ralph – Fish and Wildlife Biologist
	Bob Pace – Supervisory Fish and Wildlife Biologist
	Roger Congdon – Hydrologic Modeling
	Margaret Wilson – Hydrologic Modeling

Project Management Oversight Team:

FDACS:	Charles Aller, Director, Office of Agricultural Water Policy
FDEP:	Eric Livingston – Chief, Watershed Management
	William Torres – Chief, Bureau of Invasive Plant Management
FWC:	Lawson Snyder – Chief, Freshwater Fisheries Management
	Mike Brooks – Chief, Wildlife Management
	Brian S. Barnett – Interim Director, Office of Environmental Services
SFWMD:	Jennifer Jorge – Director, Kissimmee Division
	Lawrence Gerry– Director, CERP Planning and Federal Projects
	Kenneth Ammon – Director, Ecosystem Restoration Department
USACE:	Kimberly Brooks-Hall – Chief, Central Restoration Branch
	Dennis R. Duke – Program Manager, Everglades Restoration
USEPA:	Richard Harvey – Director, South Florida Office
USFWS:	James Slack – Field Supervisor, South Florida Ecological Services Field Office

Roles and Responsibilities:

The ***project sponsor*** is responsible for:
- Initiating project.
- Approving Project Charter.
- Being project advocate.

The ***management oversight team*** is responsible for:
- Providing organizational support for Project Charter.
- Allocating agency resources to the project.
- Ensuring interagency cooperation and participation.
- Resolving issues.
- Providing oversight and guidance to project managers.
- Monitoring project progress and performance.

The ***project managers*** are responsible for:
- Overall project performance and success.
- Being focal point for all communication.
- Escalating to management oversight team issues that cannot be resolved at project level.
- Coordinating with agency leadership teams to identify agency resources to allocate to project.
- Communicating project status to executive management and other governing authorities.
- Creating interagency cooperation and participation.
- Providing oversight and guidance to project team members on schedule, costs, and scope.

- Gaining approval, as required, for changes in project scope.
- Documenting project progress and performance.
- Developing and maintaining project plan and schedule.

The ***project team*** is responsible for:

- Developing strategies to deliver project.
- Documenting project plan elements.
- Participating in development of schedules.
- Developing resource estimates.
- Producing deliverables.

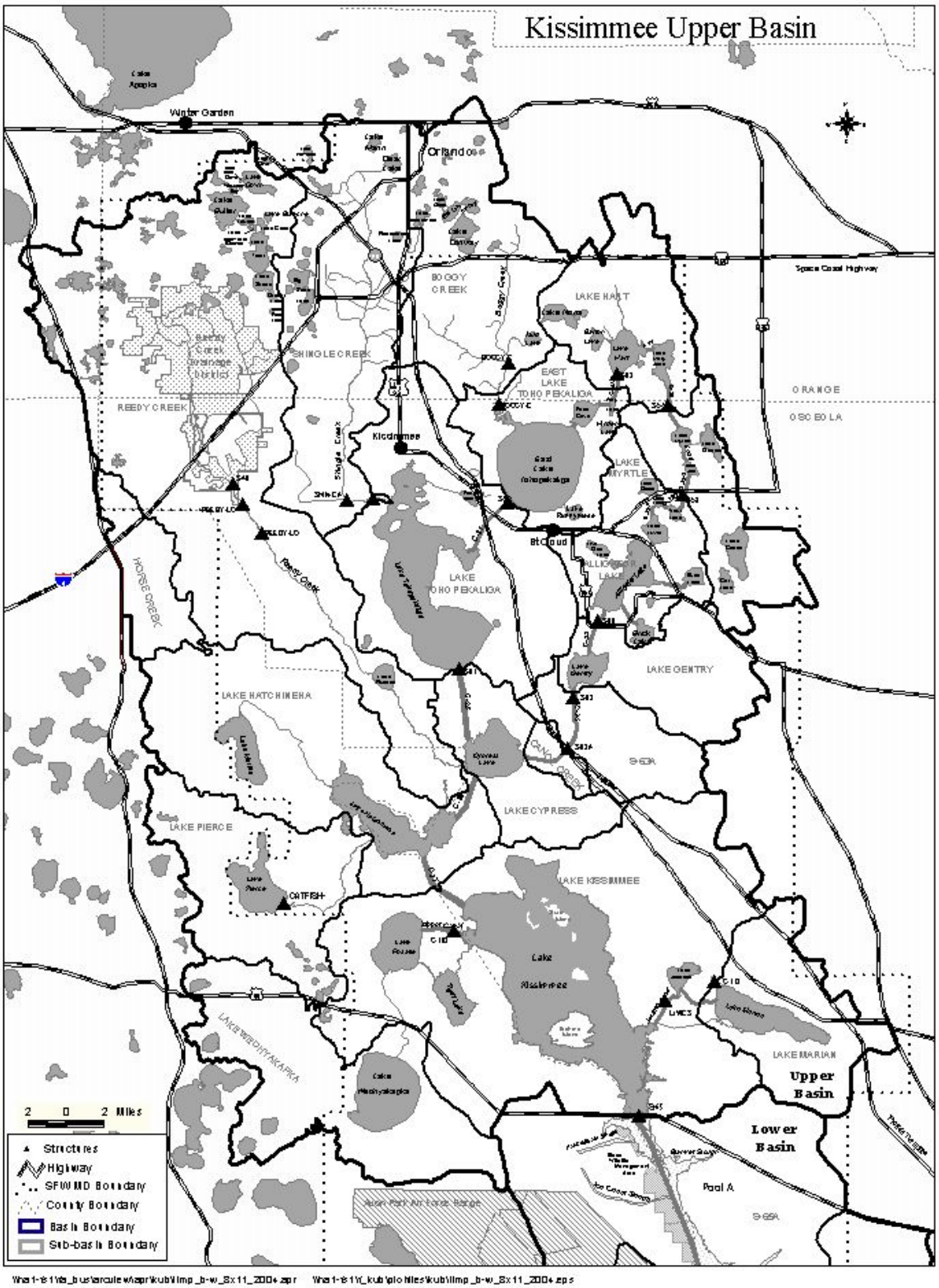


Figure 1: Project Location

Figure 2: KCOL LTMP Development Process

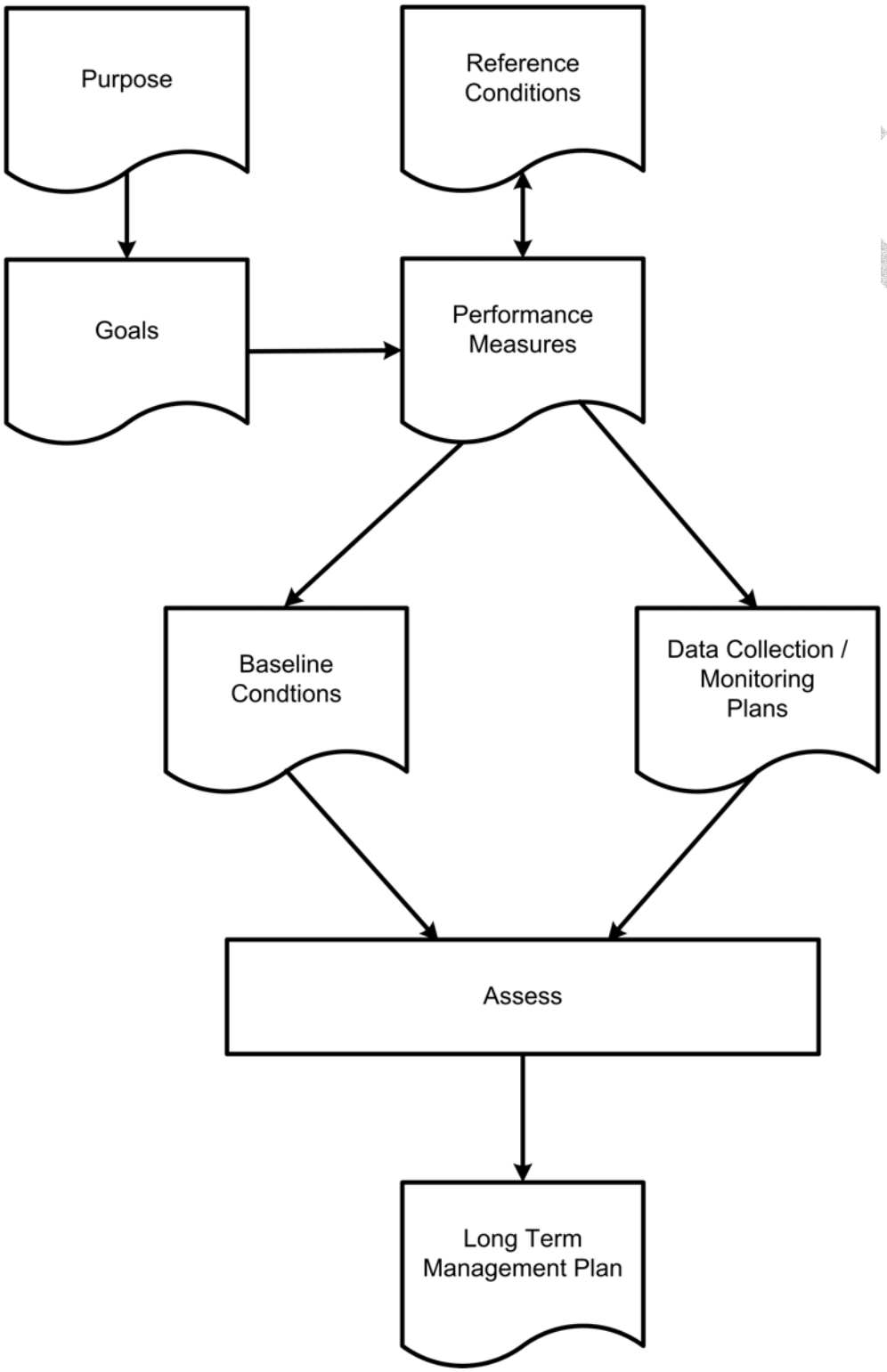
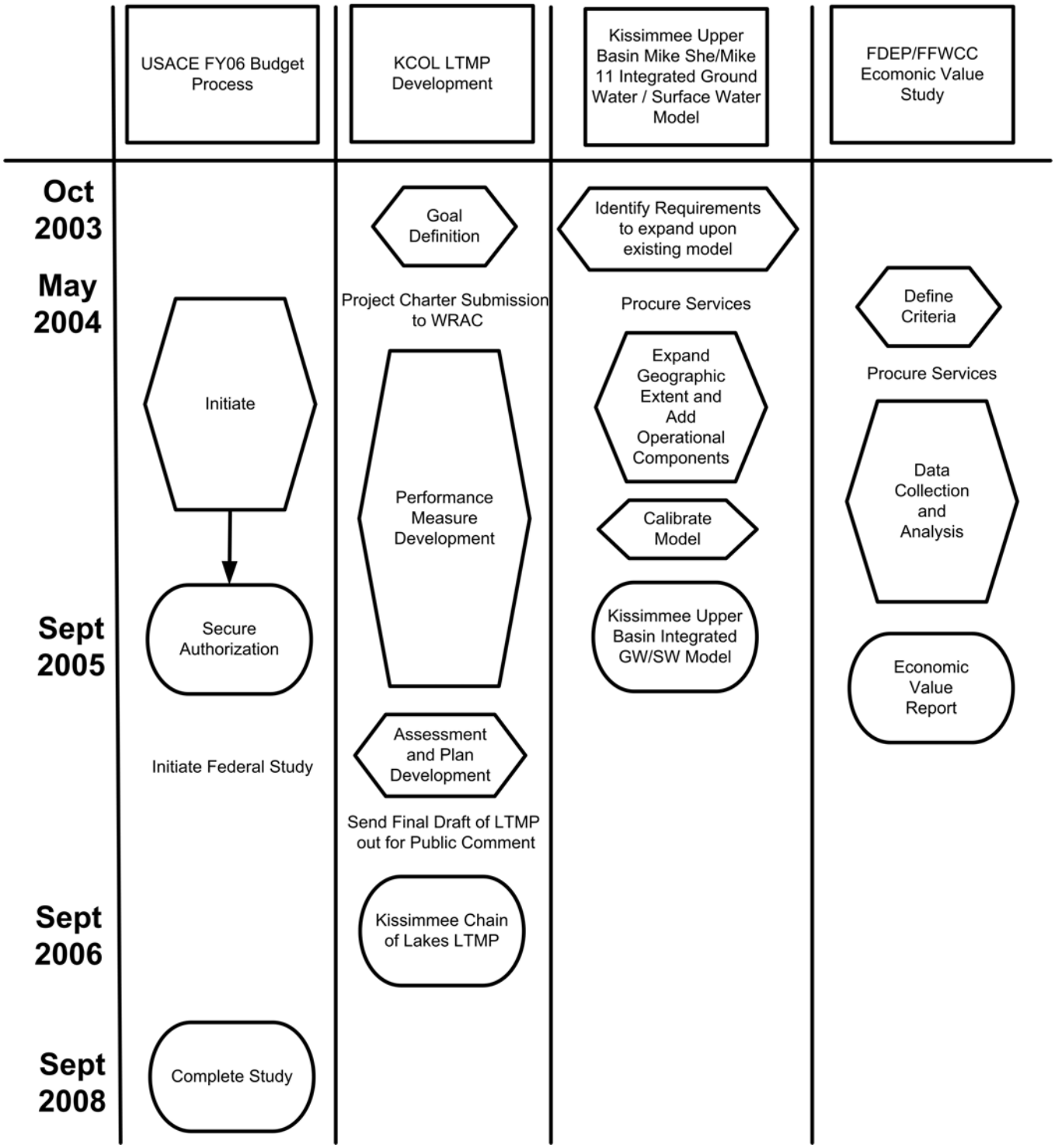


Figure 3: Concurrent Initiatives



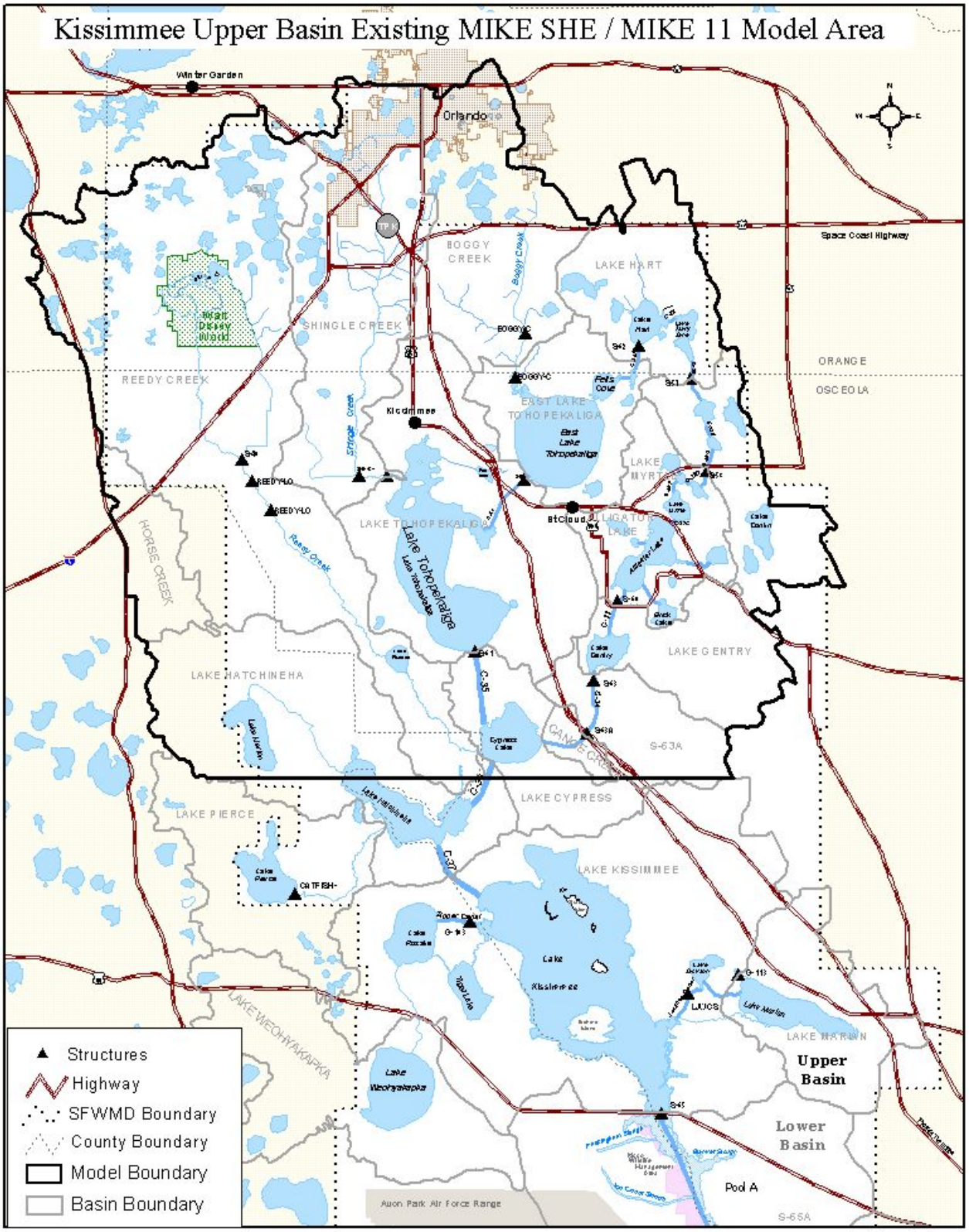


Figure 4: Kissimmee Upper Basin Existing MIKE SHE / MIKE 11 Model Area

Project Management Oversight Agreement for Development of the Kissimmee Chain of Lakes Long-Term Management Plan

South Florida Water Management District
Florida Fish and Wildlife Conservation Commission
Florida Department of Environmental Protection
Florida Department of Agricultural and Consumer Services
U.S. Fish and Wildlife Service
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency

Project Management Oversight team members are responsible for:

- Providing organizational support for the Project Charter;
- Allocating agency resources to the project;
- Ensuring interagency cooperation and participation;
- Resolving issues and removing obstacles to project progress;
- Providing oversight and guidance to the project managers; and
- Monitoring project progress and performance.

Level of Commitment

This project charter has been initiated by staff of the South Florida Water Management District, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Florida Fish and Wildlife Conservation Commission, U.S. Environmental Protection Agency, Florida Department of Environmental Protection, and Florida Department of Agriculture and Consumer Services.

The management oversight team of the ***South Florida Water Management District*** has reviewed the Project Charter and project goals for the Kissimmee Chain of Lakes Long-Term Management Plan and supports the expenditure of funds and/or assignment of human resources to participate in the development and/or review of the Plan's products and recommendations.

Approvals:

Jennifer Jorge, Director, Kissimmee Division	Date
Lawrence Gerry, Director, CERP Planning and Federal Projects	Date
Kenneth Ammon, Director, Ecosystem Restoration Department	Date

Project Management Oversight Agreement for Development of the Kissimmee Chain of Lakes Long-Term Management Plan

South Florida Water Management District
Florida Fish and Wildlife Conservation Commission
Florida Department of Environmental Protection
Florida Department of Agricultural and Consumer Services
U.S. Fish and Wildlife Service
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency

Project Management Oversight team members are responsible for:

- Providing organizational support for the Project Charter;
- Allocating agency resources to the project;
- Ensuring interagency cooperation and participation;
- Resolving issues and removing obstacles to project progress;
- Providing oversight and guidance to the project managers; and
- Monitoring project progress and performance.

Level of Commitment

This project charter has been initiated by staff of the South Florida Water Management District, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Florida Fish and Wildlife Conservation Commission, U.S. Environmental Protection Agency, Florida Department of Environmental Protection, and Florida Department of Agriculture and Consumer Services.

The management oversight team of the ***Florida Fish and Wildlife Conservation Commission*** has reviewed the Project Charter and project goals for the Kissimmee Chain of Lakes Long-Term Management Plan and supports the expenditure of funds (contingent upon approval by the Commission and the Legislature) and/or assignment of human resources to participate in the development and/or review of the Plan's products and recommendations.

Approvals:

Lawson Snyder, Chief, Freshwater Fisheries Management	Date
Mike Brooks, Chief, Wildlife Management	Date
Brian S. Barnett, Interim Director, Office of Environmental Services	Date

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Level of Commitment

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The management oversight team of the ***Florida Department of Environmental Protection*** has reviewed the Project Charter and project goals for the Kissimmee Chain of Lakes Long-Term Management Plan and supports the expenditure of funds and/or assignment of human resources to participate in the development and/or review of the Plan's products and recommendations.

Approvals:

_____ _____
Eric Livingston, Chief, Watershed Management Date

_____ _____
William Torres, Chief, Bureau of Invasive Plant Management Date

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Level of Commitment

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The management oversight team of the ***Florida Department of Agriculture and Consumer Services*** has reviewed the Project Charter and project goals for the Kissimmee Chain of Lakes Long-Term Management Plan and supports the expenditure of funds and/or assignment of human resources to participate in the development and/or review of the Plan's products and recommendations.

Approval:

_____ _____
Charles C. Aller, Director, Office of Agricultural Water Policy Date

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The management oversight team of the ***U.S. Fish and Wildlife Service*** has reviewed the Project Charter and project goals for the Kissimmee Chain of Lakes Long-Term Management Plan and supports the expenditure of funds and/or assignment of human resources to participate in the development and/or review of the Plan's products and recommendations.

Approval:

_____ _____
James Slack, Field Supervisor, South Florida Ecological Services Field Office Date

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The management oversight team of the ***U.S. Army Corps of Engineers*** has reviewed the Project Charter and project goals for the Kissimmee Chain of Lakes Long-Term Management Plan and supports the expenditure of funds and/or assignment of human resources to participate in the development and/or review of the Plan's products and recommendations.

Approvals:

_____ _____
Kimberly Brooks-Hall, P.E., Chief, Central Restoration Branch — Date

_____ _____
Dennis R. Duke, P.E. Program Manager, Everglades Restoration — Date

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The management oversight team of the ***U.S. Environmental Protection Agency*** has reviewed the Project Charter and project goals for the Kissimmee Chain of Lakes Long-Term Management Plan and supports the expenditure of funds and/or assignment of human resources to participate in the development and/or review of the Plan's products and recommendations.

Approval:

_____ _____
Richard Harvey, Director, South Florida Office Date

Goals for the Kissimmee Chain of Lakes Long-Term Management Plan

Introduction

Authority and Direction

On April 10, 2003, the South Florida Water Management District's (SFWMD) Governing Board adopted resolution number 2003-468 presented by the Water Resources Advisory Commission (WRAC). This resolution directs SFWMD staff to work with the U.S. Army Corps of Engineers and stakeholders to develop a long-term management plan for the Kissimmee Chain of Lakes. Appendix 1 contains a copy of the resolution.

Since adoption of the resolution, SFWMD staff have coordinated fact finding meetings with the Florida Fish and Wildlife Conservation Commission (FWC), the Florida Department of Environmental Protection (FDEP), the Florida Department of Agricultural and Consumer Services (FDACS), the U.S. Army Corps of Engineers (USACE), the U.S. Fish and Wildlife Service (USFWS), and the U.S. Environmental Protection Agency (USEPA) to define a scope for the plan. A project charter has been drafted to define a process, a schedule and a set of products. This goal document has been developed to provide a general scope for meeting the expectations defined in the WRAC resolution for a Kissimmee Chain of Lakes Long-Term Management Plan.

Background

The Kissimmee Watershed covers approximately 3,000 square miles of south-central Florida and is the largest watershed draining to Lake Okeechobee. It includes the drainage areas of Lake Istokpoga (approximately 620 sq. miles), the Kissimmee River (approximately 760 sq. miles), and the Upper Kissimmee Basin (1620 sq. miles). The Upper Kissimmee Basin is located in the northern half of the watershed and is referred to as the "Headwaters" of the Kissimmee River. The headwater system is comprised of numerous lakes that were historically connected by streams and sloughs.

The major lakes of the Upper Kissimmee Basin are now connected by canals. They are included in the Central and Southern Florida (C&SF) Flood Control Project authorized by Congress in 1948 and constructed by the United States Army Corps of Engineers (USACE). The SFWMD became project owner in 1972. Under an agreement between the USACE and the SFWMD, the SFWMD is required to operate and maintain all completed portions of the C&SF project pursuant to regulations prescribed by the Secretary of the Army.

The Kissimmee River Basin flood control works were authorized by the Federal Rivers and Harbors Act of 1954 as an addition to the C&SF Flood Control Project. The primary project purposes were to relieve flooding and minimize flood damages within the Kissimmee Basin and

to improve navigation opportunities originally provided in the Congressional Act of 1902. The project was constructed between 1960 and 1971. The Upper Basin portion was constructed between 1964 and 1970. The Upper Basin portion included dredging of canals between lakes and construction of water control structures to regulate lake water levels and outflows. The Kissimmee River portion included channelization of the Kissimmee River (by digging a new canal, C-38) and construction of five water control structures.

Prior to building the C&SF project works, the meandering connections between the major Upper Basin lakes were dredged for drainage, land reclamation, and navigational purposes. The first of these projects took place between 1881 and 1894 as part of the Disston Construction Project. This project dredged canals between the lakes that currently make up the Kissimmee Chain of Lakes. The Kissimmee River Navigation Project, authorized in 1902, extended from the town of Kissimmee 109 miles downstream to Fort Basinger. The project dredged a navigation channel with a required depth of 3 feet and a width of 30 feet and included a side channel through Istokpoga Creek (USACE 1996; Section 1.7).

Lake Water Level Regulation

Historically, lake levels within the Kissimmee Chain of Lakes fluctuated within a range of two to ten feet. The lakes had limited outflow capacities and functioned as natural detention reservoirs, allowing for storage of water in the wet season and continual release of water throughout the year. Under these natural conditions, lake levels would rise in the wet season and overflow to adjoining lands, creating broad, marshy connections between the lakes. These marshes were used by fish and wildlife for spawning and foraging. Flows would peak in October and November and then decrease through the dry season. During dry periods and low water levels, connections between the lakes would disappear and bottom sediments would oxidize, preventing accumulation of organic material along the lake edge.

The C&SF Project dramatically altered these fluctuations and the amount and timing of discharges. Now, water levels in the Kissimmee Chain of Lakes are controlled by nine structures. Seven stage regulation schedules control the operations of eight of these structures. Each regulation schedule defines operational criteria for use in managing lake levels. The regulation schedules present seasonal and monthly stage limits needed to provide the designed level of flood protection. The present regulation schedules limit water level fluctuations to within two to three feet.

Restoration of the Kissimmee River Ecosystem

Congress jointly authorized the Kissimmee River Restoration Project and the Kissimmee River Headwaters Revitalization Project in the 1992 Water Resources Development Act. The goal of river restoration is to restore ecological integrity to the Kissimmee River ecosystem by reestablishing an estimated 40 square miles of river and floodplain habitat, 27,000 acres of wetland, and 43 continuous miles of meandering river channel. Authorization of the Headwaters Revitalization component was justified as a prerequisite for successful restoration of the river

ecosystem. Its purpose is to provide the necessary storage and regulation schedule modifications to approximate historical flow characteristics required for river restoration and to increase the quantity and quality of lake littoral zone habitat to benefit fish and wildlife (USACE 1996; Section 1.3.2). Both project purposes must be accomplished while maintaining existing levels of flood protection and navigation.

Restoration of the Kissimmee River requires continuous but varied flows in the river channel, and floodplain inundation frequencies and recession rates comparable to pre-channelization periods. The Headwaters Revitalization Project includes both structural and nonstructural modifications to attain this goal. Structural modifications include widening two canals (C-36, C-37) between the lakes and increasing the discharge capacity of the structure (S-65) at the Lake Kissimmee outlet. Non-structural components consist of modifying the S-65 regulation schedule and increasing the storage capacities of Lakes Kissimmee, Hatchineha, Cypress, and Tiger (USACE 1996). The greater storage capacity will be achieved by reestablishing the historic frequency of lake stage fluctuations above 52.5 ft NGVD (the current maximum regulated stage in the four lakes controlled by S-65) and allowing these lakes to rise to 54.0 ft NGVD. In addition to permitting a more natural flow regime for the river, this change in high pool elevation will increase wetlands around the lakes by about 34,000 acres and will improve the quality of littoral zone habitat.

River restoration began in 1994 with completion of a backfilling test. This test project filled a 1,000-ft stretch of C-38 in the southern end of Pool B. Large-scale backfilling began in June 1999. By March 2001, Phase I of the project had filled 7.5 miles of C-38, reconnected 15 miles of historic river channel, and reclaimed 11,000 acres of wetlands. In the headwaters, modifications of C-36 and S-65 have been completed and most of the lands adjacent to lakes Kissimmee, Hatchineha, Cypress, and Tiger have been acquired. Land acquisition in the Upper Basin is expected to be completed by the end of 2005. Widening of C-37 should be completed sometime in 2006–2007.

The proposed Headwaters Revitalization regulation schedule cannot be implemented until Upper Basin land acquisitions and structural modifications are complete. The new schedule should be implemented sometime in 2006–2007. An interim operation schedule for S-65 (USACE 1996) was developed by the SFWMD and was implemented after Phase I backfilling was complete. This interim schedule provides a strategy for meeting the river restoration project needs for continuous flow by allocating water from Zone B (the zone below the existing regulation schedule line that allows discretionary releases). The interim schedule will guide Zone B operations until the new schedule is implemented. Although partially beneficial to the river, this schedule does not raise the high pool stage and thus does not allow the expected natural river flows and benefits to headwater littoral zones and wetlands.

Temporary Deviations to Regulation Schedules

Reduced water level fluctuations have caused the build-up of tussock communities and organic berms along lake shorelines that block navigation and water movement and degrade littoral habitat. Infestation by hydrilla and other invasive exotic plants also impair navigation,

recreational use, and ecological integrity. To address these problems, the FDEP, FWC, SFWMD, and USACE work cooperatively to fund and implement aquatic plant management and environmental enhancement projects. The biggest challenge to project success is working within current lake regulation schedules. To perform their work, the FDEP and FWC request temporary deviations to regulation schedules. To obtain more efficient aquatic plant control, the FDEP needs low water levels and no to low flow conditions during winter and early spring months. The FDEP works with water managers to obtain the best possible conditions for treatment, but usually must apply significantly more herbicide at significantly higher cost due to high water levels during treatment periods or to compensate for herbicide lost to required discharge rates. The FWC needs extremely low water levels to consolidate and mechanically remove organic sediments. These extreme drawdowns require environmental impact statements that may take years to complete and often result in significant project delays.

Aquatic Plant Management

Although native plants occasionally present problems for lakes, more than 90% of the FDEP's aquatic plant management expenditures are for the control of invasive exotic plants, especially water hyacinth, water lettuce, and hydrilla. Problems associated with native plants are usually related to access, navigation, or flood control. Examples include cattails overgrowing boat ramps and trails, or rafts of littoral vegetation breaking loose and jamming against bridges and flood control or navigation structures. In cases of lakes with reduced water level fluctuations, native plants require periodic thinning to preserve or restore diverse habitat and associated animal communities.

Hydrilla is the most abundant invasive aquatic plant in waters of the Kissimmee Chain of Lakes, infesting about 45,000 acres (approximately 70%) in four of the major lakes in the Kissimmee Chain of Lakes. While hydrilla may provide some fish and wildlife benefits such as shelter and food early after introduction, the negative, long-term environmental and economic detriments associated with hydrilla quickly surpass any benefits. In addition, hydrilla significantly impedes water flow by filling the water column and by jamming against bridges and water control structures.

Using current techniques, hydrilla can be controlled but not eliminated in the Kissimmee Chain of Lakes. The most cost-effective and environmentally compatible method for controlling large areas of hydrilla is application of the USEPA-registered herbicide "Fluridone". Fluridone is a slow-acting systemic compound that is selective for hydrilla control. Large-scale applications are made in winter and early spring for several reasons: 1) oxygen levels are at their highest, 2) hydrilla is actively growing and therefore susceptible to the herbicide, while native plants are mostly dormant, 3) hydrilla has not yet formed mats at the water surface, 4) rainfall and runoff that could flush herbicide concentrations are at seasonal lows, and 5) fluridone is degraded by sunlight and microbial activity, both of which are at their lowest intensities during winter and early spring.

Hydrilla was not introduced into the Kissimmee Chain of Lakes until the late 1970s. Hydrilla was not a significant problem in Lakes Kissimmee, Hatchineha and Cypress during the

development of the Kissimmee River Restoration Headwaters Revitalization Project and regulatory operations required to treat hydrilla were not considered as part of that study. Current management is complicated by regulation schedules that require continuous releases or high water levels during the most effective hydrilla treatment season. This contradiction increases the costs for hydrilla treatment. For example, the fluridone treatment cost for Lake Tohopekaliga in FY02-03 would have been about $2.7 million at the drawdown level of 49 feet NGVD or $9.1 million at the maximum regulated stage of 55 ft NGVD. Managers reached a compromise level of 53 ft NGVD, at which the hydrilla treatment cost $6.7 million. Minimum flow requirements increase hydrilla treatment costs and limit treatment success. A discharge rate of 250 cfs removed about $6,900 of fluridone-treated water per day from Lake Tohopekaliga during the 2003 treatment season. A rate of 1,000 cfs would have removed $27,650 of fluridone per day. For treatment to be successful, adequate fluridone concentrations must be present throughout the treatment period.

Extreme Lake Drawdown and Habitat Enhancement Projects

To address problems associated with degraded habitat, the Florida Game and Freshwater Fish Commission (now FWC) implemented an extreme lake drawdown program in 1971. Environmental enhancement projects conducted under this program were designed to consolidate bottom sediments and restore desirable aquatic plant communities by dewatering lakes to extreme lows. The FWC has performed several extreme drawdowns and muck removal projects in the Kissimmee Chain of Lakes, including Lakes Kissimmee, Tohopekaliga, Jackson, East Tohopekaliga, and the Alligator Chain of Lakes (Table 1). Extreme drawdowns mimic the historical low water conditions that occurred prior to the C&SF project. Historically, natural drawdowns caused by drought occurred about every seven years in the Kissimmee Chain of Lakes.

Table 1: Extreme drawdowns in the Kissimmee Chain of Lakes.

Lake	Year
Tohopekaliga	1971
Kissimmee	1977
Tohopekaliga	1979
Tohopekaliga	1987
East Tohopekaliga	1990
Kissimmee	1996
Alligator	2000

Herbicide applications, prescribed burning, and mechanical removal to control nuisance and exotic aquatic plants are performed concurrently with extreme drawdowns and muck removal projects. (Refer to the Aquatic Plant Management Goal for further details.)

Downstream Ecosystems

Water management decisions in the Kissimmee Chain of Lakes have the potential to impact downstream ecosystems. Restoration of the Kissimmee River requires specific amounts and timing of discharges to emulate natural conditions. When Lake Okeechobee is at or above its regulation schedule, additional inputs from the Kissimmee Chain of Lakes may result in prolonged high-water events and/or additional releases of fresh water to the estuaries. Both situations can potentially impact salinity levels and thus oyster populations and seagrass beds. Additional releases from Lake Okeechobee to the Everglades may also cause higher than desired water levels and phosphorus inputs. Future lake regulation schedules need to consider these downstream systems so that they will complement management of these ecosystems and avoid potential impacts.

Federal and State Activities Mandated within the Basin

The seven participating agencies are mandated to address a wide variety of water resource issues in the Kissimmee Chain of Lakes including flood control, water supply, fish and wildlife management, water quality, navigation, and recreation and public use. These mandates include federal and state statutes, rules regulations, and other policies and authorities that govern state and federal management of the basin's resources.

Brief descriptions of the mandates directly related to the goals defined in this document have been compiled and are provided as Appendix 4.1. Appendix 4.2 lists the mandates and associates them with their respective agencies. Appendix 4.3 lists the mandates and relates them to the five goals in this document.

Other On-going Initiatives

There are several on-going planning and management initiatives in the basin. The goals of the KCOL LTMP are not currently addressed by these other initiatives. Those initiatives are:

- Local Flood Control Project Evaluation and Improvements: These are local projects are managed by SFWMD Operations and Maintenance in collaboration with local governments.
- Lake Okeechobee Protection Plan (LOPP): This is a concurrent effort mandated by the Lake Okeechobee Protection Act (LOPA). Staff will make sure the KCOL LTMP is consistent with the LOPA and LOPP.
- Total Maximum Daily Loads (TMDLs): FDEP is the lead agency for TMDL development in Florida and is independently mandated to develop TMDLs.
- Extreme Lake Drawdowns: The KCOL LTMP will address issues associated with extreme lake drawdowns and environmental enhancement projects, but will not specifically address any planned or future drawdown.
- Water Supply Plan Development: This is a separate, concurrent effort. Staff will work to prepare the KCOL LTMP and Water Supply Plan in accord with each other.

- Aquatic Plant Management: The KCOL LTMP will address issues associated with aquatic plant management, but will not specifically address any planned or future activities.
- Land Management: Comprehensive land management planning is the responsibility of the FWC, FDEP, and SFWMD Land Stewardship Division.

Goal development

The primary purpose of the plan development process is to create a coordinated, multi-disciplinary framework for addressing and resolving water management issues. As a starting point for plan development, water resource issues identified in interagency meetings were synthesized into five goals. The scope of these goals was constrained by the direction given in Resolution No. 2003-468, other mandates of the participating agencies, and planning and management activities already established or in progress. These goals are discussed in detail in the following sections of this document. The five goals are as follows:

1) Hydrologic management: Manage water levels in the Kissimmee Chain of Lakes for flood protection, aquatic habitat enhancement, recreational use (navigation), water supply, aquatic weed control, and protection of downstream water resources.
2) Habitat preservation and enhancement: Manage the Kissimmee Chain of Lakes and adjacent state lands to preserve and enhance habitat, maintain or restore fish and wildlife resources, maintain healthy sportfish populations, and protect threatened and endangered wildlife species.
3) Aquatic plant management: Control aquatic plants in the Kissimmee Chain of Lakes to maintain navigation, reduce risk of damage to in-lake structures, and improve aquatic habitat and ecological integrity.
4) Water quality improvement: Achieve state water quality standards.
5) Recreation and public use: Manage public lakes and state lands for multiple recreational purposes and maintain healthy fish and wildlife communities.

Geographic Extent

The goals listed above are specific to lakes regulated by the C&SF Project and adjacent lands with water tables that are hydrologically influenced by changes in lake levels. A map of the project area is provided as Figure 1 in the Project Charter. Work related to the plan will generally be confined to these areas of the basin with the exception of hydrologic modeling. Modeling tasks will need to consider the entire Upper Kissimmee Basin, including other lakes, wetlands, and tributaries that are hydrologically connected to the Kissimmee Chain of Lakes.

The following lakes are regulated by established regulation schedules and are the primary lakes considered in this plan:

1) Lakes Kissimmee, Hatchineha, and Cypress
2) Lake Tohopekaliga

3) East Lake Tohopekaliga, Fell's Cove, and Lake Ajay
4) Lakes Hart and Mary Jane
5) Lakes Joel, Myrtle, and Preston
6) Alligator Chain of Lakes (Alligator, Brick, Lizzie, Coon, Center, and Trout)
7) Lake Gentry

Goal #1 – Hydrologic Management

Goal Definition

Manage regulated lake water levels to meet the following objectives:

1. Provide same level of flood protection as defined in the original C&SF project.
2. Maintain, enhance, or restore aquatic habitats to sustain life histories of fish and wildlife, including sportfish populations in designated Fish Management Areas.
3. Maintain and promote recreational use.
4. Protect downstream water bodies from environmental degradation.
5. Balance environmental and human demands on water supply.
6. Accommodate cost-effective aquatic herbicide applications.
7. Protect existing legal consumptive use of water by municipalities, agriculture, aquaculture, commerce, and industry.

Historical Perspective

Prior to the C&SF project, the Kissimmee Chain of Lakes fluctuated from two to ten feet annually. These natural fluctuations, provided periods of flooding and drying, and played an important role in maintaining healthy ecosystems. Climatic conditions were the major driving forces that caused these fluctuations. During periods of heavy rainfall, the lakes overflowed through wide, shallow marshes. Floods were characterized by slow changes in stage, low flow velocities, and long periods of recession.

The C&SF project significantly reduced the risk of flood damage in the Upper Kissimmee Basin by facilitating watershed runoff, controlling fluctuations in lake levels, and increasing the discharge capacity of lake outlets. The project fulfilled its objectives of providing flood control, improving navigation in the Kissimmee Chain of Lakes, and supplying additional water for agriculture and downstream minimum flow requirements.

However, reduced lake level fluctuations and greater variability in watershed runoff have caused a number of unintended consequences that have been detrimental to littoral habitats and downstream ecosystems. Lake level regulation has reduced water level fluctuations to about two to three feet annually and shortened the duration of low water events. The reduced water level fluctuations allow accumulation of thick littoral vegetation, build-up of organic berms, and formation of tussock communities along lake shorelines that block navigation and water movement. The current regulation schedules shorten drawdown periods for wading bird feeding and reduce the time available for seeds to germinate. Improvements in drainage, including channelization and ditching of streams and sloughs that have accompanied agricultural and urban development, have increased runoff rates. Consequently, runoff volumes surge more rapidly during storms and during the wet season, and inflow to the lakes is lower during the dry season. This increase in runoff variability has complicated management of downstream water resources,

including the Kissimmee River, Lake Okeechobee, and the Caloosahatchee and St. Lucie Estuaries.

Rationale

There are many competing demands on the regulated waters of the Kissimmee Chain of Lakes. The intent of the long-term hydrologic management goal is to develop criteria for the revision of regulation schedules to allow for a more balanced approach to water management within the basin. Since project implementation, regulation schedules for the Kissimmee Chain of Lakes have been continually modified or deviated from to accommodate these competing demands. Establishing new regulation schedules that can accommodate the goal criteria will have many benefits. Lake habitats and fisheries will improve. Recreational use and sportfishing will thrive. Aquatic plant management costs will decrease and be more effective. Water supply for both environmental and consumptive uses will be met. Downstream ecosystems will be minimally impacted. Finally, the need for and number of temporary deviations and associated environmental assessments and impact studies will be decreased, resulting in significant taxpayer savings.

Funding

Several federal study alternatives exist to evaluate both structural and regulation schedule modifications to the Kissimmee Upper Chain of Lakes. Two of these alternatives are presented here but others may also be considered. The U.S. Army Corps of Engineers has the authority to restudy the water control plans containing regulation schedules for the Kissimmee Chain of Lakes under Engineer Regulation 1110-2-240: 33 CFR 222.5. This authority allows for operational modifications to water control plans and is 100% federally funded. Operations and Maintenance funds are used for operational modifications and require approximately 20 months implementing.

A second alternative is to conduct a General Reevaluation Study of the S-64 structure that was never built. This structure was originally authorized under the Rivers and Harbors Act of 1954, but was eliminated from the project in 1961. The S-64 structure was intended to separate Lake Kissimmee operations from Lake Hatchineha and Lake Cypress operations. Reevaluation of the structure should be done to determine the benefits gained by increasing water management flexibility within this portion of the lake system. A General Reevaluation Study would allow the restudy of S-64 and associated plans. A General Reevaluation Study is cost-shared 50/50 with a non-Federal sponsor. One constraint of the S-64 reevaluation is that water levels cannot be managed above 54 ft NGVD.

Current Approach

Water levels in the Kissimmee Chain of Lakes are controlled by seven regulation schedules managed by the SFWMD in accordance with regulations prescribed by the Secretary of the Army. Since implementation of these schedules, temporary deviations from one or more of

them have been conducted for a variety of purposes. These modifications have included water level and timing changes, but the general approach has remained the same with the exception of the schedule for S-65.

Continuous flow from the headwater lakes is a critical part of meeting the needs of the Kissimmee River. To address that need, an interim operational schedule for S-65 was developed by the SFWMD for the regulation of Lakes Kissimmee, Hatchineha, and Cypress. That schedule was implemented after Kissimmee River Restoration Phase I backfilling was completed in March 2001. This schedule will continue to guide S-65 operations until the new Headwaters Revitalization schedule is implemented sometime in 2006-2007. This interim schedule provides a strategy for meeting the river restoration project needs for continuous flow by allocating water from Zone B (the zone below the existing regulation schedule line that allows discretionary releases).

Temporary deviations to regulation schedules can be requested for a variety of purposes including extreme lake drawdowns, organic sediment removal, and aquatic plant management, but they currently require extensive coordination among agencies and other interested groups that often include environmental assessments or impact statements.

Goal #2 – Habitat Preservation and Enhancement

Goal Definition

The Kissimmee Chain of Lakes and lands hydrologically influenced by changes in water levels on those lakes will be managed to:

1. Preserve and enhance a mosaic of upland, wetland, and aquatic habitats.
2. Maintain and/or restore associated fish and wildlife resources.
3. Maintain healthy sportfish populations.
4. Protect native wildlife, especially endangered species such as the Everglades snail kite, and food sources.

Historical Perspective

The Kissimmee Chain of Lakes has been substantially altered from its historical condition through the dredging of canals, installation of water control structures, increased development, and invasion by problematic, native and exotic plant and animal species. These alterations have contributed to the degradation of fish and wildlife habitat.

The most dramatic alteration is change in the timing and magnitude of water level fluctuations. Historically, lake level fluctuations ranged from between two to ten feet annually. Further, the lakes formerly exhibited declining water levels for about eight months in most years, as compared to less than five months now. Under regulation, the range of fluctuation is between two and three feet. The historic pattern of seasonal fluctuations provided periods of flooding and drying that played a critical role in maintaining the ecosystem's health and supported biological communities adapted to and dependent upon these fluctuations. Reducing the range of fluctuations and the time of sediment exposure has eliminated this natural cycle and promoted growth of dense vegetation resulting in the accumulation of organic material in littoral zones of the lakes. Reduced fluctuations also have allowed agricultural, residential, and commercial land uses to encroach upon the historic flood zones surrounding the lakes, causing significant loss of wildlife habitat and increased nutrient inputs into the lakes.

In addition to habitat loss, habitat has been degraded by growth of dense concentrations of problematic, native and exotic plant species, primarily cattail (*Typha* spp.), pickerelweed (*Pontedaria cordata*), tussock communities, hydrilla (*Hydrilla verticillata*), water hyacinth (*Eichhornia crassipes*), and water lettuce (*Pistia stratiotes*). These dense concentrations of undesirable vegetation, combined with shorter sediment exposure times, not only cause accumulation of organic sediments, but also negatively impact organisms dependent on diverse littoral plant communities. The end result is loss of desirable native species and reduction in overall plant and animal diversity and abundance.

Rationale

Lakes in the Kissimmee Chain of Lakes provide substantial economic benefits to Osceola, Orange, and Polk counties. Residents and visitors enjoy a diverse array of recreational opportunities, including some of the best sport fishing and wildlife viewing in the world. These activities ultimately depend upon a healthy ecosystem. Thus, ecosystem enhancement and restoration projects are necessary to ensure the long-term economic viability of the area.

In addition to economic benefits, the Kissimmee Chain of Lakes provide habitat for a diverse array of fish and wildlife species, including threatened and endangered species. These species depend on a healthy, functional ecosystem for all aspects of their life histories. The endangered Everglades snail kite (*Rostrhamus sociabilis plumbeus*) is a common inhabitant of the Kissimmee Chain of Lakes, occurring at Lake Pierce, Lake Tohopekaliga, East Lake Tohopekaliga, Cypress Lake, Lake Hatchineha, Lake Marion, Lake Marian, Lake Kissimmee, Tiger Lake, Lake Arbuckle, and Lake Istokpoga. The combination of a range restricted to the watersheds of the Everglades, Lake Okeechobee, Kissimmee Chain of Lakes, and upper St. John's River, and a highly specialized diet composed almost entirely of apple snails (*Pomacea paludosa*), makes the snail kite's survival directly dependent upon the hydrology and water quality of these waters.

Finally, there are substantial costs associated with extreme drawdowns and muck removal activities intended to maintain and enhance the regulated lake ecosystems. The 2003-2004 Lake Tohopekaliga Extreme Drawdown and Habitat Enhancement Project is estimated to cost $8,000,000. The number of lakes within the Kissimmee Chain of Lakes in need of restoration and enhancement projects further increases the costs. To ensure that public funds are used cost-effectively and provide the greatest benefits to the Kissimmee Chain of Lakes ecosystem, a scientifically-based long-term management plan should be developed and implemented.

Enhancement, restoration and maintenance of lake-dependent habitat are necessary to maintain plant and animal diversity and promote the long-term recovery of the snail kite and other listed species. Through recognition and understanding of the relationships between ecosystem components, a management plan will assist in ensuring the long-term health and sustainability of these lake ecosystems.

Funding

The FWC Aquatic Resource Enhancement Section (ARES) is given spending authority from the state legislature of approximately $1.5 million annually, which is derived from sales of fishing and hunting licenses. Funds are withdrawn from the State Game Trust Fund. In addition, upon annual legislative approval, the FWC-ARES receives approximately $6.4 million from documentary stamp fees via the Florida Forever legislation. The amount appropriated from Florida Forever funding can vary from year to year depending on funds generated from land transactions and refinancing of loans during that given year.

The FDEP Bureau of Invasive Plant Management (BIPM) receives annual aquatic plant management funding from documentary stamps, fuel tax, motorboat registration, and the USACE. (See Goal #3 – Aquatic Plant Management for further details.)

The USEPA provides grant funding to state and local governments, community organizations, or non-governmental organizations for water quality protection, pollution control, materials recycling, wetland creation, or environmental education. The USFWS also provides grant funding to state and local governments, non-governmental organizations, and private landowners for restoration, enhancement, and protection of fish and wildlife.

Current Approach

The FDEP, FWC and SFWMD are the lead agencies currently engaged in habitat preservation and enhancement projects in the Kissimmee Chain of Lakes. The FDEP-BIPM is the lead agency directing the control of aquatic plants in Florida's waters. The FWC conducts extreme lake drawdowns and habitat enhancement projects. The SFWMD acquires and manages lands necessary for water management, water supply, and conservation and protection of water resources.

FDEP – Aquatic Plant Management Activities

Hydrilla is the most abundant of the invasive aquatic plants in waters of the Kissimmee Chain of Lakes, infesting about 45,000 acres (~70%) in four of the major lakes in the chain alone. While hydrilla may provide some fish and wildlife attributes such as shelter and food sources early after introduction, the preponderance of evidence demonstrates that the negative, long-term environmental and economic detriments associated with hydrilla quickly surpass any benefits. With current techniques, hydrilla can only be controlled, but not eliminated from the Kissimmee Chain.

The FDEP is mandated to control hydrilla to the lowest feasible level. Agency representatives meet annually to reach consensus on how to achieve the target level of control for each hydrilla-infested water body. Environmental parameters such as fish and wildlife, water depth, volume, temperature, oxygen content, light penetration, sediment types, plant growth stage, and weather are considered along with human use and safety issues like recreation, navigation, irrigation, and flood control to develop management plans that reduce invasive exotic plants while conserving or enhancing native plant habitat. The FDEP also works cooperatively with the FWC to identify and implement vegetation management in support of lake habitat enhancement projects.

FWC – Extreme Lake Drawdown and Habitat Enhancement Projects

In 1971, the Florida Game and Freshwater Fish Commission (now FWC) implemented the first extreme drawdown program to address problems associated with degraded lake habitat. The enhancement projects were designed to consolidate bottom sediments and expand desirable aquatic plant communities by dewatering lakes to extreme lows. This process was designed to mimic the historical seasonal lows experienced prior to the C&SF project.

More recently, more intensive in-lake restoration activities have been performed in conjunction with the extreme drawdowns to achieve desired results (i.e., restoration of habitat for desirable fish and wildlife species, reduction of dense vegetation, removal of floating mats of vegetation [tussocks] and organic buildup on lake bottoms). Such activities include burning, discing, herbicide applications, and mechanical removal. Scraping of muck from littoral zones frequently includes the creation of in-lake disposal islands.

The most recent example is the 2003/2004 Lake Tohopekaliga Extreme Drawdown. This drawdown started in November 2003 and will continue to June 1, 2004. Water levels are being lowered by 5.8 feet to expose approximately 8,000 acres of lake bottom. Beginning in February 2004, a combination of heavy equipment, including bulldozers, front-end loaders, trackhoes, graders, and dump trucks, has been employed to excavate muck and vegetation from approximately 3,000 acres of littoral zone. This debris is being disposed of at suitable upland or in-lake sites. Up to 29 upland and 50 in-lake disposal sites (spoil islands) will be utilized.

There are many unanswered questions surrounding the current approach to lake enhancement projects, namely long-term benefits to wildlife, effects of drawing down and scraping multiple lakes, and the effects of these massive scraping projects on entire ecosystems. At present, multiple lakes in the chain need to be drawn down to enable muck scraping in a single lake. This has broad implications on the ecology of the entire chain of lakes. In particular, the ability to control water levels in Lake Kissimmee separately from the lakes upstream appears to be worthy of further study.

Previous studies have shown that benefits to sportfish populations are time-limited, with vegetation densities reaching pre-drawdown levels the third year after a scraping project has been completed, unless follow-up scraping and post management activities are employed. There is also very limited information detailing the benefits or adverse impacts on threatened, endangered, and other wildlife species and their food resources. Finally, long-term management questions remain regarding the in-lake spoil islands. Concerns include the conversion of wetland littoral habitat to upland habitat, erosion, leaching of toxins and contaminants from the spoil, wildlife usage of the spoil islands, and exotic plant control. To alleviate some of these concerns, potential beneficial uses for the excavated muck need further exploration.

To address many of these unanswered questions, the FWC has contracted three scientific studies that include pre- and post-drawdown assessments. The FWC has contracted with the University of Florida Wildlife Cooperative Unit to assess the effects of the Lake Tohopekaliga Extreme Drawdown and Habitat Enhancement Project on wildlife, including Everglades snail kites, amphibians, reptiles, aquatic-oriented birds, and vegetation. The FWC has contracted with the

University of West Florida to assess impacts of the Lake Tohopekaliga project on the apple snail population. This study is also addressing long-term effects on apple snail population dynamics in Lake Kissimmee following the 1996 Lake Kissimmee Extreme Drawdown and Habitat Enhancement Project. The FWC also has contracted with the University of Florida Department of Fisheries and Aquatic Sciences to assess in-lake disposal islands and their potential impacts to water quality and availability of heavy metals and pesticides to fish once sediments are mechanically manipulated. This study also will address muck accumulation and oxidation/reduction of organics in the islands over time.

In addition to these contracted studies, FWC fisheries personnel will investigate the effects of the Lake Tohopekaliga drawdown on largemouth bass (*Micropterus salmoides*) by implementing a radio-telemetry project. Population dynamics of largemouth bass, bluegill (*Lepomis macrochirus*), and redear sunfish (*Lepomis microlophus*) will be studied to assess the impacts of the project on these important fisheries. Finally, the FWC plans on funding a study during fiscal year 2004-2005 to investigate possible uses of organic material from lake bottoms. This study is still in the planning stage, but may help determine possible uses of organics to alleviate future disposal issues.

SFWMD – Land Management Activities

The Florida Legislature enacted the Save Our Rivers (SOR) program in 1981 to address problems associated with degraded habitat. This program enabled the SFWMD to acquire lands necessary for water management, water supply, and the conservation and protection of water resources around the chain of lakes. The SFWMD has grouped the lands it manages in the Upper Kissimmee Basin into six regions: 1) the Kissimmee Chain of Lakes, 2) Lake Marion Creek, 3) Reedy Creek, 4) Lake Walk-in-Water, 5) Shingle Creek, and 6) the Tibet Butler Preserve. The program's major goals are to restore acquired lands to their original condition and manage them in an environmentally acceptable manner. These goals are reached through hydrologic/habitat restoration and exotic plant control.

Goal #3 – Aquatic Plant Management

Goal Definition

Aquatic plants in the Kissimmee Chain of Lakes will be controlled to:

1) Maintain navigable waterways.
2) Reduce risk of damage to bridges and blockage of structural components of the navigation and flood control system.
3) Prevent accumulation of plant biomass and organic material that can cause littoral zone degradation, depletion of dissolved oxygen, and reduced water storage capacity.
4) Improve aquatic habitat and ecological integrity.
5) Enhance fish and wildlife, including sportfish populations.

Historical Perspective

Several events have occurred within the boundaries of the Kissimmee Chain of Lakes that have necessitated more diligent aquatic plant management. Invasive exotic plants, such as floating water hyacinth, submersed hydrilla, and emergent torpedograss, were introduced to the Kissimmee Chain of Lakes during the last century. Water hyacinth and hydrilla are capable of covering water surfaces in just one or two growing seasons. Hydrilla can fill entire water columns and grow to depths of 35 feet – deeper than all Kissimmee Basin waters. Torpedograss can live on dry land and in water as deep as six feet, and can quickly displace native littoral vegetation. If left unmanaged, invasive aquatic plants can completely disrupt natural processes and human activities within infested waters.

Water levels have been lowered in many of the lakes in the Kissimmee Chain that are now interconnected for navigation and flood control. Lake levels are regulated by water control structures that allow preclusion of the severe lows that permitted drying and compaction of sediments and occasional burning of the littoral zones. Also gone are extreme high water periods that thinned littoral vegetation by covering plants with water or by uprooting and depositing them in the surrounding marshes and uplands. Current water schedules have reversed historic hydroperiods by retaining high water for uses such as irrigation during the typically dry winter months and lowering levels to allow for emergency water storage during the traditional summer flooding season. This has allowed transitional plants such as cattail to encroach far into lakes, forming dense monocultures.

Development in the region has increased nutrient inputs to many of the lakes within the Kissimmee Chain of Lakes. Nutrients usually manifest themselves in phytoplankton blooms. Often overlooked, however, is the increased growth of macrophytes – both vascular plants and filamentous algae such as blue-green *Lyngbya* species.

Rationale

Although native plants occasionally present problems, more than 90% of the FDEP's aquatic plant management expenditures are for the control of invasive exotic plants, especially water hyacinth, water lettuce, and hydrilla. Problems associated with native plants are usually related to access, navigation, or flood control. Examples include cattails overgrowing boat ramps and trails, or rafts of littoral vegetation breaking loose and jamming against bridges and flood control or navigation structures. In cases of lakes with stabilized water levels, native plants require periodic thinning to preserve or restore diverse habitat and associated animal communities.

One of the greatest threats to human uses and ecosystem stability in Kissimmee Basin waters is unmanaged growth of invasive aquatic plants. Invasive plants cover and displace native vegetation, reduce plant and animal diversities, alter water temperature and pH, reduce dissolved oxygen leading to catastrophic fish kills, and accelerate sedimentation. Economic losses are precipitated from declining recreational opportunities and property values, impeded irrigation supplies, and damage to bridges and flood and navigation structures. Hydrilla mats sheer loose in high wind and wave action and in response to rapid water level increases. These mats are then tightly compressed against bridges and other structures or clog narrow passages in rivers or canals. Specialized machinery that is labor-intensive and expensive is required to shred and remove the jams. During the past decade, more than a half-dozen bridges in Florida were damaged by hydrilla mats or closed to remove mats from pilings. However, hydrilla does not need to be compressed in flood control structures to impede water movement. During Hurricane Gordon in 1994, water backed up and caused flooding around East Lake Tohopekaliga, because dense hydrilla growth had filled the water column in Goblets Cove in downstream Lake Tohopekaliga.

Hydrilla was not present in the Kissimmee Chain of Lakes when the current water regulation schedules were developed. Effective water regulation in these waters must now address annual hydrilla maintenance.

Funding

The FDEP-BIPM receives annual aquatic plant management funding from several sources listed below. The BIPM sponsors invasive aquatic and upland plant management programs with this funding as well as permitting programs for the control and possession of aquatic plants. The FDEP receives:

- 2.28% of proceeds from documentary stamps (~$25 million)
- $6.3 million from fuel tax
- motorboat registration:
    - $2 from each recreational boat registration (~$1.9 million)
    - 40% of commercial boat registration (~$0.3 million)
- Funds from the USACE

Funding is provided by the USACE to control aquatic plants in Designated Federal Navigation Projects. Within the Kissimmee Chain of Lakes, a Designated Federal Navigation Project traverses Lakes Kissimmee, Cypress, Hatchineha, and Tohopekaliga. The USACE obligated $200,000 for aquatic plant control in eligible project waters statewide for FY03-04. The FDEP's statewide budget for aquatic plant management in Florida for FY03-04 is $23.7 million of which about $16.3 million (69%) is anticipated to be spent in Kissimmee Chain of Lakes waters.

Current Approach

Aquatic plant management south of Orlando is a year-round endeavor. The peak growing (and therefore management) season for native plants and invasive water hyacinth and water lettuce is April through November. Hydrilla growth slows only in December and January, with optimum management opportunities occurring in February through May. Management teams comprised of members from federal, state, and local agencies with responsibilities in these waters develop integrated aquatic plant control plans, choosing from about 50 available methods, including biological, chemical, mechanical, and physical means. Methods are chosen that provide the most cost-effective ways of controlling target plants while providing the greatest protection to human health and non-target plants and animals. When developing control plans, managers also consider water levels, volumes and flow rates, water chemistry and sediment types, irrigation demands, recreational uses and restrictions, and possible weather patterns that may impact management success.

The BIPM's highest management priority is control of the floating plants, water hyacinth and water lettuce. With prolific seed production, population-doubling rates of as little as two weeks, and ease of transportation by wind and water currents, floating plants must be constantly monitored and managed to prevent them from disrupting the use of public waters. Three host-specific biological controls are active statewide stressing water hyacinth by reducing plant vigor and flowering, but they alone do not control water hyacinth in Florida waters. Two biocontrols that have been researched and released to control water lettuce have been ineffective at controlling or even stressing this plant. One hundred years of research into mechanical controls has failed to produce machinery that can selectively remove or keep pace with the rapid growth and reproduction of floating invasive plants. Harvesters not only remove non-target plants, but also animals that cannot escape from their paths. Drawdowns are difficult to achieve in Florida's wet climate and are generally ineffective at controlling floating plants because dewatering stimulates seed germination and floating plant populations reappear immediately upon reflooding.

Floating plants are easily and inexpensively controlled using specific herbicides or combinations of several herbicides. Various 2,4-D formulations control water hyacinth and cause little lasting impact to commingled vegetation, but 2,4-D does not control water lettuce. Diquat herbicide is less effective and more expensive for water hyacinth control, but controls water lettuce. Therefore, diquat is applied to control water lettuce alone and when it is mixed with water hyacinth or native plants such as bulrush species that are susceptible to 2,4-D. Glyphosate herbicide is occasionally used when controlling water hyacinth mixed with cattail or invasive

grasses like torpedograss or paragrass that are susceptible to glyphosate and are targeted for control.

The BIPM's second management priority, but greatest management expense within the Kissimmee Chain of Lakes, is controlling the submersed invasive plant hydrilla. Hydrilla was introduced into Florida in the early 1950s and has flourished in the Kissimmee Chain of Lakes since the early 1980s. Once established, hydrilla eradication has proven elusive because of its rapid growth (up to four inches per day) and multiple reproductive capabilities. Hydrilla does not produce seeds in Florida, but new plants are generated by fragments, runners, and buds that form in leaf axils as well as in the sediments. While the above-ground portion of the plant can be effectively managed through routine maintenance, no method exists to control the underground buds, called tubers, which form by the millions per acre. Tubers sprout year-round forming new plants capable of producing additional tubers within several weeks after germinating. Therefore, hydrilla maintenance is an ongoing process.

Four insects have been studied and released to control hydrilla, but none has shown any effect on the plant. A sterile grass carp not only eats but also prefers hydrilla. However, it is not selective and consumes most native vegetation after hydrilla is controlled. Many lakes in the Kissimmee Chain are conduits for flood control. Therefore, they are not good candidates for grass carp as the fish cannot be contained during periods of high water levels and discharge. Mechanical harvesters also are not good choices for large-scale hydrilla control for selectivity reasons previously addressed. They fragment hydrilla, increasing its spread and actually select for hydrilla since hydrilla outgrows native plants after cutting and covers them over. Harvesters are also too slow and expensive for large-scale hydrilla management. They are capable of removing only a few acres of hydrilla each day at a conservative cost estimate of about $500/acre. At these rates, the FDEP estimates that more than 100 harvesters would be required to work 10-hour days, seven days per week to keep the 15,000-acre hydrilla population in Lake Tohopekaliga under control, at an annual cost of about $22 million.

Four herbicides are registered with the USEPA and FDACS for use in Florida waters to control hydrilla. Three compounds (endothall, diquat, and copper) are considered to be contact-type herbicides, meaning that they must be applied directly to the target hydrilla. They will kill the plant after only a few hours of contact time. Because it does not dissipate from the environment, copper is rarely used. However, when copper is employed, it is most often used in conjunction with diquat to quickly control new boat ramp hydrilla infestations. This prevents further spread of the plant into the water body and transport to other waters on boat trailers. Liquid and pellet formulations of endothall are applied to control small hydrilla infestations, up to about 100 acres at one time. Because hydrilla dies rapidly after contact-type herbicide applications, there can be localized oxygen depletions in the water column, so treatment areas are usually kept small.

The most cost-effective and environmentally compatible method for controlling large areas of hydrilla is through application of the USEPA-registered herbicide fluridone. Fluridone is a slow-acting systemic compound that is fairly selective at controlling hydrilla. Large-scale applications are made in winter and early spring for several reasons: 1) oxygen levels are at their highest, 2) hydrilla is actively growing and therefore susceptible to the herbicide while native plants are mostly dormant, 3) hydrilla has not yet formed mats at the water surface, and 4) rainfall that

could flush herbicide concentrations is at its seasonal low. Also, fluridone is broken down by sunlight and microbial activity, both of which are at their lowest intensities during winter and early spring months.

Fluridone is applied to the entire hydrilla-infested water column at concentrations of 5-25 parts per billion (ppb) depending on the measured susceptibility of the hydrilla in a particular water body. Fluridone interferes with hydrilla's ability to produce chlorophyll, causing plants to slowly starve to death. While this slow activity is beneficial in that it minimizes oxygen consumption of decomposing plants, fluridone requires from 60-90 days of exposure to hydrilla at these rates for effective control. Compounding the difficulty of hydrilla management is the recent discovery that several hydrilla clones are present in Florida, each susceptible to fluridone at different concentrations. Years of low-dose fluridone applications have essentially selected for more tolerant strains in many waters including the Kissimmee Chain of Lakes. Therefore, while hydrilla still can be controlled with fluridone, increased tolerance has multiplied control costs by 2 to 4 times.

Also increasing the complexity of hydrilla management in the Kissimmee Chain of Lakes is the current regulation schedules that call for water levels to be at their highest points during the most effective season for hydrilla control. For example, the fluridone treatment cost for Lake Tohopekaliga in FY02-03 would have been about $2.7 million at the drawdown level of 49 ft NGVD or $9.1 million at the full pool of 55 ft NGVD. Managers reached a compromise level of 53 ft NGVD, at which the hydrilla treatment cost $6.7 million. New minimum flow requirements from the lakes also play an important role in hydrilla treatment cost and success. A discharge rate of only 250 cfs removed about $6,900 of fluridone-treated water per day from Lake Tohopekaliga during the 2003 treatment. A rate of 1,000 cfs would have removed $27,650 of fluridone per day. If lake outflow draws off enough fluridone-treated water, the entire lake treatment could be compromised.

Goal #4 – Water Quality Improvement

Goal Definition

Meet or maintain state water quality standards in lakes regulated by the C&SF Project and the Lake Okeechobee Protection Act (LOPA).

Historical Perspective

The Kissimmee Chain of Lakes has been substantially altered from its historical condition through water level alterations, nutrient loading and invasion of problematic, native and exotic vegetation. As a result of reduced lake stage fluctuations, wetlands have been drained that once provided wildlife habitat, water storage and nutrient filtration. This drainage has allowed agricultural and urban land uses to encroach on areas surrounding the lakes. Watershed development has led to greater nutrient inputs and acceleration of eutrophication. Nutrients can manifest themselves in phytoplankton blooms. Often overlooked, however, is the increased growth of macrophytes – both vascular plants and filamentous algae such as blue-green *Lyngbya* species.

Rationale

Federal and state laws require water quality to be maintained in all state waters. Beyond this mandate, the Kissimmee Chain of Lakes has both local and regional significance. Locally, these waters provide recreational opportunities (sport fishery, swimming, etc.) and habitat for flora and fauna. Regionally, they form the headwaters for the Greater Okeechobee-Everglades ecosystem and thus influence downstream water quality.

At this time, many lakes in the Kissimmee Chain require restoration of water quality. The extent of this restoration will be defined over the next few years as the FDEP moves to establish TMDLs for waters in the basin. To ensure that public funds are utilized in a cost-effect manner and provide the greatest benefits to the ecosystem, a scientifically-based, water quality management strategy should be developed in cooperation with other on-going initiatives within the basin.

Funding

The FDEP receives annual funding from documentary stamps for statewide water quality improvement projects related to TMDL implementation. The amount varies each year. In the past, the FDEP received approximately $3 million annually. Each year, these funds are distributed to different areas of the state that are implementing TMDLs. FDACS also receives funds from documentary stamp revenues in an amount equal to the FDEP's share to implement Best Management Practices (BMPs) on agricultural lands throughout Florida.

Entities can apply for Section 319 grants, which the FDEP administers, for the implementation of water quality improvement projects to address nonpoint sources. Entities competitively apply for these funds each year.

The USEPA provides funding primarily in the form of grants to state and local governments, community organizations, or non-governmental organizations for projects such as protection of water quality, control or reduction of pollution, recycling of materials, creation of wetlands, or environmental education.

On January 1, 2004, the SFWMD, FDEP, and FDACS completed the Lake Okeechobee Protection Plan (LOPP), authorized under the LOPA, which identifies areas for future legislative support to successfully implement the state's commitment to protect and restore this resource and achieve the Lake Okeechobee TMDL (SFWMD et al. 2004). These three coordinating agencies are currently seeking funding to implement the LOPP. One aspect of this plan addresses the need to fund cost-share BMPs on agricultural lands. The funding needed in the Upper Kissimmee Basin is approximately $5 million. These BMPs are planned to be implemented beginning in 2009.

Current Approach

The Kissimmee Chain of Lakes falls within the geographic jurisdiction of the Lake Okeechobee Protection Act. This Act requires that applicable water quality criteria be achieved and maintained in Lake Okeechobee and its tributary waters. The Act sets forth a series of activities and deliverables for the coordinating agencies.

As the lead agency responsible for TMDL development, the FDEP is approaching water quality improvement in the Upper Kissimmee Basin from a watershed perspective. Working with other state agencies, water management districts, local governments, citizens, and the private sector, the FDEP coordinates the collection, data management, and interpretation of monitoring information to assess the health of water resources, develops watershed-based aquatic resource goals and pollutant loading limits for individual water bodies, and develops and implements management action plans to preserve or restore water bodies. These activities are undertaken using the rotating basin approach to ensure that plans for each Florida watershed are evaluated and updated every five years.

The LOPP presents an innovative protection program that is both comprehensive and phased in its implementation. In the Upper Kissimmee Basin, initial phosphorus reductions and other water quality improvements will be achieved through implementation of agricultural BMPs using a voluntary program coordinated through the FDACS. Information on some of these BMPs is available in a letter report developed for the LOPP (Bottcher and Harper 2003). The FDEP will coordinate implementation of non-agricultural, nonpoint-source BMPs such as septic systems and urban stormwater runoff.

The KCOL LTMP will contribute significantly to development of a watershed plan for the region by providing a scientifically-based, water quality management strategy for the Kissimmee Chain of Lakes. It will be important for addressing specific water quality needs that are not included in the LOPP or TMDL programs.

Goal #5 - Recreation and Public Use

Goal Definition

Public lakes and state lands will be managed for multiple recreational purposes while maintaining healthy fish and wildlife communities. Specifically, this goal seeks to:

1) Control nuisance growths of native aquatic plants and manage invasive exotic plants, especially hydrilla, water hyacinth, and water lettuce at the lowest feasible levels.
2) Minimize adverse effects on public access points to lakes during natural or planned drawdowns.
3) Consistent with SFWMD, FWC, and FDEP land management plans, maintain and improve accessibility of recreational facilities, including boat ramps, piers, parks, picnic areas, boardwalks, and trails.
4) Protect public health by monitoring mercury concentrations in sportfish and wildlife for consumption, and consider possible effects of management actions on mercury bioaccumulation.
5) Identify public use opportunities compatible with protection of natural resources.
6) Establish specific public uses and enforce guidelines and regulations, including regulations pertaining to motorized vehicles and watercraft.

Historical Perspective

The Kissimmee Chain of Lakes is highly used by anglers, hunters and wildlife viewers. Angler creel surveys are conducted annually on Lakes Tohopekaliga and Kissimmee. Fall effort estimates (total angler-hours) for Lake Tohopekaliga between 1997 and 2001 ranged from 43,840 hours to 78,932 hours. The trend in effort has increased steadily. The Lake Tohopekaliga fishery is estimated to be worth about $4 million annually to the local economy. This value, which is probably underestimated, was calculated using angler-hours extrapolated for the year and multiplied by the latest average hourly value of fishing computed by the USFWS economic survey. Winter effort estimates (total angler-hours) for Lake Kissimmee between 1998 and 2002 (excluding the winters of 1999 and 2000 when the creel survey was not run) has ranged from 70,340 hours to 116,035 hours.

Rationale

The Kissimmee Chain of Lakes provides substantial economic benefits to Osceola, Orange, and Polk Counties. Residents and visitors can enjoy a diverse array of recreational opportunities, including some of the best sport fishing and wildlife viewing in the world. These lakes and their fish and wildlife resources will become more used and valued as population in this region increases.

Funding

The FWC receives spending authority of approximately $1.5 million annually from the State Game Trust Fund. These funds are approved by the state legislature and are derived from fishing and hunting license sales. In addition, approximately $6.4 million can be appropriated by the state legislature from funds generated by state documentary stamps through the Florida Forever legislation. These two sources make up the FWC-ARES funds that are intended for enhancement of Florida's fish and wildlife habitat, including publicly-accessible lakes in the Kissimmee Chain. Enhancement of this habitat increases its value for recreation and public use. ARES funds also can be used for recreational improvements such as construction of fishing piers, wildlife viewing towers, and other similar projects. The FWC Division of Wildlife receives funding to conduct wildlife surveys throughout the Kissimmee Chain of Lakes region for waterfowl, alligators, whooping cranes, wading birds, and other wildlife species. In addition, the FWC receives CARL funding to manage the Three Lakes Wildlife Management Area, which is adjacent to Lakes Kissimmee, Jackson, and Marian.

Current Approach

There are 12 county and state public boat ramps and 16 fish camps throughout the Kissimmee Chain of Lakes, one fishing pier on Lake Tohopekaliga, and three wildlife viewing towers at Lakes Kissimmee, Jackson and Marian. A high priority is placed on developing new recreational opportunities and maintaining access to existing areas. The FWC Division of Law Enforcement, in cooperation with local law enforcement agencies, implements and enforces the regulations pertaining to the recreational and commercial use of fish and wildlife resources.

Fish and wildlife management, stocking, plant management, and habitat management have been pursued aggressively to maintain optimal use. Extreme drawdowns, prescribed burning, mechanical harvesting and herbicide applications are conducted annually to maintain fish and wildlife habitat and provide access to natural resources. The FDEP-BIPM continues an aggressive aquatic plant management program to control problematic native and exotic plant species. Surveys are conducted annually for various fish and wildlife species to ensure that they are being managed according to goals established by the FWC. Research by the FWC and university personnel is conducted regularly to direct managers in applying conservation measures for fish and wildlife resources.

The FWC also monitors mercury concentrations within top predators in the Kissimmee Chain of Lakes. Building on this effort, the FWC has initiated testing for other heavy metals and pesticides in fish ranging from top predators such as the largemouth bass to bottom-dwelling omnivores such as the white cat (*Ictalurus catus*) and forage species such as the eastern mosquitofish (*Gambusia affinis*). These data will provide information on potential hazards from consumption by wildlife and humans.

All of these activities will continue so that public use of the Kissimmee Chain of Lakes can be maintained and enhanced.

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Appendix D

Federal and State Mandates Supporting Development of the Kissimmee Chain of Lakes Long Term Management Plan

1. Aquatic Plant Management 2
2. Clean Water Act 4
3. District Water Management Plan 5
4. Dredge and Fill Regulations 6
5. Fish and Wildlife Conservation Act 7
6. Fish and Wildlife Coordination Act 8
7. Florida Fish and Wildlife Management 9
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1. Aquatic Plant Management

Agency

Florida Department of Environmental Protection
U.S. Army Corps of Engineers

Description

State legislation for aquatic plant control

The FDEP is designated by the Florida Legislature as the state's lead agency for aquatic plant control. The FDEP's authorities are addressed in Chapter 369 Part I, Aquatic Plant Control (ss. 369.20 – 369.255, FS). These statutes provide the framework for the Department to direct the control, eradication, and regulation of noxious weeds to protect human health, safety, recreation, and property. Policies to carry out the mandates are codified in Chapters 62C-20, 62C-52, and 62C-54, FAC.

Removal of Aquatic Growth (RAG) Project

The federal Rivers and Harbors Act of 1899 charged the USACE with the "…removal of water hyacinth … in Florida and Louisiana". The Rivers and Harbors Act of 1958 (PL 85-500, Section 104) expanded the USACE authority to include control of "...alligatorweed and other obnoxious aquatic plant growths, from the navigable waters, tributary streams, connecting channels, and other allied waters" in Florida and other southern states, "in the combined interest of navigation, flood control, drainage, agriculture, fish and wildlife conservation, public health and related purposes including continuous research into efficient methods for aquatic plant control."

Collectively, numerous portions of the two federal Rivers and Harbors Acts became known as the Removal of Aquatic Growth (RAG) Project and covered designated federal navigation projects under USACE jurisdiction. Funding under the RAG project has been appropriated annually since 1900. The RAG Project is funded at 100% federal cost for control of aquatic vegetation in eligible federal waters. Eligible Florida waterbodies treated under this program include the St. Johns River, Withlacoochee River, Crystal River, Ocklawaha River, Kissimmee headwaters and River, and Okeechobee Waterway.

The Rivers and Harbors Act has been amended to allow hydrilla control in Federal Navigation Projects as an eligible project to receive 100% federal funding. However, for FY03-04, the RAG program was funded for projects such as hydrilla and water hyacinth control in the Kissimmee Chain of Lakes at a USACE obligation of only $200,000. So, the amount expended under this program is much smaller than the $12 million in FDEP funds that will be spent in controlling invasive aquatic plants in the Kissimmee Chain of Lakes in 2003.

Justification

Section 369.20(4), FS authorizes the FDEP to accept donations and grants, and to enter into contracts with other agencies and companies to control aquatic plants. The FDEP has entered into a Cooperative Agreement with the U.S. Army Corps of Engineers to receive funds for aquatic plant control, and contracts with the SFWMD, and Orange and Polk Counties to control aquatic plants in the Upper Kissimmee Basin.

Section 369.22(3), FS directs that the control of nuisance aquatic plants be carried out under maintenance programs, meaning that invasive plants must be managed at the lowest feasible levels, as determined by the FDEP, to achieve more effective control. One of the greatest impediments to annually achieving hydrilla maintenance levels in regulated Upper Kissimmee Basin waters is high water volumes and discharge rates during optimum hydrilla control periods between January and June. Increased water volumes and discharge rates translate to tons of increased herbicide use and millions of dollars of additional management expenses. Current water level and discharge schedules mandated by the USACE and SFWMD can double or triple hydrilla control costs and make control much more difficult to achieve.

Hydrilla was not a factor when the water regulation schedules were developed, yet successful hydrilla management is now critical to achieving all of the goals described in the proposed Kissimmee Chain of Lakes Long Term Management Plan. The FDEP is seeking long-term alterations to the water regulation schedules that will facilitate hydrilla control while addressing other water-related functions in the Upper Kissimmee Basin and downstream.

2. Clean Water Act

Agency

U.S. Environmental Protection Agency
Florida Department of Environmental Protection
U.S. Army Corps of Engineers

Description

The Clean Water Act (33 U.S.C. ss/1251 et seq. (1977)) is the cornerstone of surface water quality protection in the United States. (The Act does not deal directly with ground water or water quantity issues.) The statute employs a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters so that they can support "the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water."

> Sections 101-121 address Research and Related Programs.
> Sections 201-221 address Grants for Construction of Treatment Works.
> Sections 301-320 address Standards and Enforcement (Total Maximum Daily Load (TMDL), Narrative & Numeric Water Quality Requirements).
> Sections 401-406 address Permits and Licenses (National Pollution Discharge Elimination System, Permits, Wetland Regulation, Mitigation Banks).
> Sections 501-519 address General Provisions.
> Sections 601-607 address State Water Pollution Control Revolving Funds (storm water control, non-point source control, environmental enhancement grants).

Many of the responsibilities in this Act have been delegated to the FDEP.

Justification

The Clean Water Act establishes standards that need to be met under Goal #2 – Habitat Preservation and Enhancement, and Goal #4 – Water Quality Improvement. Section 404 addresses the regulation of dredge or fill material in waters including littoral lake habitats. Sections 301-320 address the amount of pollution allowed within waters of the United States, and includes the TMDL program that establishes pollution level standards that states must achieve. This Act also provides programs and funding mechanisms (grants) for state and local governments, communities, and organizations to achieve those standards. (For related mandates, see Dredge and Fill Regulations, Florida Watershed Restoration Act, Lake Okeechobee Protection Act, Public Health and Welfare, and Surface Water Improvement and Management Act.)

3. District Water Management Plan

Agency

South Florida Water Management District

Description

Section 373.036 (2a), FS and the Water Resource Implementation Rule (Chapter 62-40 FAC) require each of Florida's five regional water management districts to prepare a District Water Management Plan (DWMP) that addresses flood control, floodplain management, water supply, water quality, and natural resources (Section 62-40.520(1)).

The SFWMD has written its DWMP, which its Governing Board approved in August, 2000. The two core objectives of flood protection and floodplain management are to: 1) minimize damage from flooding, and 2) promote nonstructural approaches to achieve flood protection, and to protect and restore the natural features and functions of the 100-year floodplain.

Justification

Chapter 62-40, FAC directs water management districts to consider Chapter 62-40 in the development of their plans and programs. The Kissimmee Chain of Lakes Long Term Management Plan must be prepared in agreement with the SFWMD's DWMP, which was written in compliance with Chapter 373, FS and Chapter 62-40, FAC to protect water resources and coordinate the management of water and land related resources.

4. Dredge and Fill Regulations

Agency

Florida Department of Environmental Protection
South Florida Water Management District

Description

Section 373.414, FS designates the FDEP and the SFWMD as the agencies responsible for processing applications for dredging, filling and construction activities in wetlands or surface waters of south Florida.

Under Section 373.414, FS, as part of an applicant's demonstration that an activity will not be harmful to water resources or be inconsistent with the overall objectives of the Water Management District, applicants must demonstrate that the proposed activity will not adversely affect water flow or impede navigation.

Section 373.414, FS, 18.21 FS (if SSL) 18-20 FS (if AP) and Section 267.061, FS concern dredging of natural waterways and regulation of wetlands. In determining whether an activity is in the public interest, the FDEP must consider whether the activity will: 1) adversely affect the public health, safety, or welfare or the property of others, 2) adversely affect the conservation of fish and wildlife, including endangered or threatened species, or their habitats; 3) adversely affect navigation or the flow of water or cause harmful erosion or shoaling, 4) adversely affect the fishing or recreational values in the vicinity, 5) be of a temporary or permanent nature, 6) adversely affect or enhance significant historical and archaeological resources under the provisions of s. 267.061. The FDEP also must consider the current condition and relative value of functions being performed by areas affected by the proposed activity.

Sections 373.414 and 267.061, FS address impacts from aquatic plant beds, tussocks, and muck berms on dissolved oxygen. Also, Sections 373.414 and 403.031(13), FS require that water quality impacts be considered in project design. As part of an applicant's demonstration that an activity will not be harmful to water resources, the FDEP requires the applicant to provide reasonable assurance that state water quality standards applicable to waters as defined in s. 403.031(13) will not be violated.

Justification

To the extent that the Kissimmee Chain of Lakes Long Term Management Plan considers dredging and filling activities as part of structural solutions or to maintain habitat or navigation, these mandates govern the process by which these activities would be carried out and require the participation of the agencies held responsible.

5. Fish and Wildlife Conservation Act

Agency

U.S. Fish and Wildlife Service
Florida Fish and Wildlife Conservation Commission

Description

The Fish and Wildlife Conservation Act (16 U.S.C. 2901-2911; 94 Stat. 1322, as amended), or Nongame Act, provides for the conservation of migratory nongame birds.

> Public Law 100-653 (102 Stat. 3825), approved November 14, 1988, amended the Act to require the Fish & Wildlife Service to monitor and assess migratory nongame birds, determine the effects of environmental changes and human activities, identify those likely to be candidates for endangered species listing, identify appropriate actions, and report to Congress one year from enactment. It also requires the Fish & Wildlife Service to report at 5 year intervals on actions taken.
>
> Public Law 101-233, signed into law on December 13, 1989 (103 Stat. 1977) amended the Act to require the Fish & Wildlife Service to identify lands and waters in the United States and other nations in the Western Hemisphere whose protection, management, or acquisition will foster the conservation of migratory nongame birds.

Justification

Ecosystems in the Upper Kissimmee Basin provide important feeding, nesting, roosting and wintering areas for a variety of nongame migratory bird species. Modifications of water regulation schedules, water quality issues and habitat enhancement projects will directly impact (adversely or beneficially) migratory nongame birds and their habitats. The Nongame Act provides for the conservation of migratory nongame birds.

6. Fish and Wildlife Coordination Act

Agency

U.S. Fish and Wildlife Service
Florida Fish and Wildlife Conservation Commission

Description

The Fish and Wildlife Coordination Act (FWCA) of 1934 (P.L. 85-624, August 12, 1958, 72 Stat. 563; and P.L. 89-72, 79 Stat. 216, July 9, 1965) provides that fish and wildlife conservation receives equal consideration as other project features and makes consultation with wildlife (Federal and State) agencies mandatory.

> The amendments enacted in 1946 require consultation with the Fish and Wildlife Service and the fish and wildlife agencies of States where the "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted . . . or otherwise controlled or modified" by any agency under a Federal permit or license. Consultation is to be undertaken for the purpose of "preventing loss of and damage to wildlife resources."
>
> The 1958 amendments added provisions to recognize the vital contribution of wildlife resources to the Nation and to require equal consideration and coordination of wildlife conservation with other water resources development programs.

Justification

Water bodies within the Upper Kissimmee Basin C&SF project footprint were regulated for flood control purposes under the Flood Control Act of 1948. Any water bodies that are impounded, diverted or otherwise controlled or modified under a Federal permit are subject to the terms of the FWCA. This act provides that fish and wildlife conservation receives equal consideration as other project features and makes consultation with wildlife (Federal and State) agencies mandatory. Modifications of water regulation schedules, habitat enhancement projects, and projects that impact water quality require federal permits and therefore must comply with the FWCA.

7. Florida Fish and Wildlife Management

Agency

Florida Fish and Wildlife Conservation Commission

Description

The Florida Constitution, Article IV, Section 9, Florida Statutes, Chapter 372 and Florida Administrative Code, Chapter 68A mandates the Florida Fish and Wildlife Conservation Commission (FWC) to manage, conserve and regulate all fish and wildlife within the State of Florida including fish and wildlife within the boundaries of the Upper Kissimmee Basin.

Justification

The Kissimmee Chain of Lakes and adjacent lands are within the jurisdiction of the FWC. Accordingly, the FWC manages and regulates the fish and wildlife resources for multiple recreational purposes, while maintaining healthy fish and wildlife communities. In addition, the FWC monitors water quality, controls aquatic plants, enhances degraded habitats, and manages the plant communities of the waters and adjacent lands for the benefit of fish and wildlife.

8. Florida Watershed Restoration Act

Agency

Florida Department of Environmental Protection
Florida Department of Agriculture and Consumer Services

Description

The Florida Watershed Restoration Act, enacted in 1999 as 403.067, FS, provides a process for listing impaired waters and developing, adopting and implementing TMDLs. This Act provides guidance for the implementation of TMDLs using non-regulatory, incentive-based BMP programs.

Justification

This mandate is related to Goal #4 – Water Quality Improvement. Waters within the Upper Kissimmee Basin are subject to this Act, which requires that all waterbodies meet their designated uses. Currently, several waterbodies in the Upper Kissimmee Basin are listed on the 303(d) list as impaired, and TMDLs will be developed in the next few years. Also, these waterbodies drain to Lake Okeechobee, which has a TMDL for phosphorus. Efforts are underway to reduce phosphorus loading in this Basin, including BMP implementation as described in the Lake Okeechobee Protection Plan. Additional efforts will be needed. Actions identified in the Upper Kissimmee Basin Long-Term Plan need to be consistent with these ongoing water quality restoration efforts.

9. General Reevaluation Study

Agency

U.S. Army Corps of Engineers

Description

General Reevaluation Studies are done to affirm, reformulate, or modify a plan or portions of a plan, under current planning criteria. General reevaluation studies are frequently similar to feasibility studies in scope and detail. General reevaluation studies require a non-Federal sponsor to participate in the 50/50 cost-share of the project.

Justification

A structure, S-64, was originally proposed for construction on C-37 between Lake Kissimmee and Lake Hatchineha as part of the Central and Southern Florida Project, but that structure was not built. A General Reevaluation Study allows for the restudy of this plan and can include the restudy of the water control plan containing regulation schedules for the Kissimmee Chain of Lakes (Goal #1 – Hydrologic Management).

10. Kissimmee River Restoration Project

Agency

U.S. Army Corps of Engineers
South Florida Water Management District

Description

The Kissimmee River Restoration Project was authorized by Congress in the 1992 Water Resources Development Act. The project will restore over 40 square miles of river/floodplain ecosystem, including 43 miles of meandering river channel and 27,000 acres of wetlands. The restoration project is a joint partnership with the SFWMD and USACE. To accomplish this restoration, 88,000 acres of land were acquired under the Save Our Rivers program. These properties included land surrounding the lower lakes of the Kissimmee Chain of Lakes as well as land along the river. Land around the lakes was acquired to allow raising the maximum stage to 54 ft NGVD, which will permit additional storage in these lakes and continuous, year-round flow to the restored river.

Justification

The Kissimmee River Restoration Project, authorized by the 1992 Water Resources Development Act, requires continuous, year-round flow from the river's headwater lakes. Proposed management actions that affect flows and levels in these headwater lakes must consider the effect of these actions on flows to the river.

11. Lake Okeechobee Protection Act

Agency

Florida Department of Environmental Protection
Florida Department of Agriculture and Consumer Services
South Florida Water Management District

Description

The Lake Okeechobee Protection Act (Section 373.4595, FS) establishes a program to restore and protect Lake Okeechobee by achieving and maintaining compliance with State water quality standards in Lake Okeechobee and its tributary waters, through a watershed-based, phased, comprehensive and innovative protection program designed to reduce phosphorus loads and implement long-term solutions, based on the Lake's phosphorus Total Maximum Daily Load or TMDL (Chapter 62-304.700, F.A.C.). The Act sets forth a series of activities and deliverables for the three coordinating agencies (FDEP, FDACS, and SFWMD). This legislation specifically requires the development of the Lake Okeechobee Protection Plan to address all phosphorus sources within the Lake Okeechobee watershed, which includes the Upper Kissimmee Basin.

Justification

Restoration activities for the entire Lake Okeechobee watershed are outlined in the Lake Okeechobee Protection Plan. This plan includes management strategies for the Upper Kissimmee Basin. The Upper Kissimmee Basin Long-Term Plan must incorporate these activities and build upon them, so the Lake Okeechobee TMDL will be met and the water quality of tributaries in the watershed will be improved. All waterbodies must meet their designated uses. This mandate is related to Goal #4 – Water Quality Improvement.

12. Land Acquisition and Management

Agency

Florida Fish and Wildlife Conservation Commission
Florida Department of Environmental Protection
South Florida Water Management District

Description

Section 372.12 FS authorizes the FWC to acquire lands and waters suitable for the protection of fish and wildlife and for recreational purposes. In addition, the FWC is authorized to manage these lands for the purposes of fish and wildlife management (Section 372.121 FS).

In 1981, the Florida Legislature created the Save Our Rivers (SOR) program for the water management districts to acquire environmentally sensitive land. The legislation produced Section 373.59, FS, known as the Water Management Lands Trust Fund. The Trust Fund receives revenues from the documentary stamp tax and is administered by the FDEP. The statute enables the water management districts to use the trust fund to acquire fee title or other interest in lands needed to manage, protect, and conserve the state's water resources. Preservation 2000, enacted by the Legislature in 1990, also added land acquisition funds to the SOR program. Preservation 2000 created the Florida Preservation Trust Fund, which the FDEP also administers.

In 1999, the Legislature created the Florida Forever program, which will replace Preservation 2000. Florida Forever will provide the primary funding source for land acquisition when P-2000 terminates. The five year work plan required by the new program will integrate all major water management district projects, including Surface Water Improvement and Management (SWIM) plans, water resource development projects, water body restoration projects, and other projects that meet the goals of the Florida Forever Act. Each project identified in the work plan shall address 14 items of information, including numeric performance measures that reflect the Florida Forever goals. Until P-2000 is concluded and all the funds have been expended or committed, the SOR program will continue to file its five-year plan of acquisition and land management activity by January 15 of each year.

The Florida Resource Rivers Act specifically states that lands acquired with money from the Water Management Lands Trust Fund shall be managed and maintained in an environmentally acceptable manner and, to the extent practicable, in such a way as to restore and protect their natural state and condition and make them available to the public for appropriate recreational purposes.

Justification

The FWC has acquired lands and waters within the Kissimmee Chain of Lakes. These lands and waters have been purchased for the protection and management of the unique plant and animal communities and to provide opportunities for public recreation.

The SOR program has enabled the SFWMD to acquire six land management regions in the Upper Kissimmee Basin. These regions are designated as: Kissimmee Chain of Lakes, Lake Marion Creek, Reedy Creek, Lake Walk-in-Water, Shingle Creek and the Tibet Butler Preserve. These lands include approximately 20,800 acres surrounding the lower lakes of the Kissimmee Chain that were acquired for the purpose of the Kissimmee River Restoration Project. Acquisition of these lands will allow raising of lake levels to a maximum stage to 54 ft NGVD, which will permit additional storage in the lower lakes and continuous, year-round flow to the restored river. The SFWMD's major goals in managing these lands are to restore them to their original condition and manage them in an environmentally acceptable manner. These goals will be reached through hydrologic and habitat restoration and exotic plant control.

13. Migratory Bird Treaty Act

Agency

U.S. Fish and Wildlife Service
Florida Fish and Wildlife Conservation Commission

Description

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703) provides for the protection of migratory birds, including any "part, nest or egg of any such bird."

This Act established a Federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . ."

Justification

Ecosystems within the Upper Kissimmee Basin provide important feeding, nesting, roosting and wintering areas for a variety of migratory bird species. Modifications of water regulation schedules, water quality issues and habitat enhancement projects may directly impact (adversely or beneficially) migratory birds and their habitats. The MBTA provides for the protection of migratory birds, including any “part, nest or egg of any such bird”.

14. Minimum Flows and Levels

Agency

South Florida Water Management District

Description

Section 373.042, FS states that the FDEP or water management district governing boards shall establish the following:

a) Minimum flow for all surface watercourses: The minimum flow for a given watercourse shall be the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area.
b) Minimum water level. The minimum water level shall be the level of groundwater in an aquifer and the level of surface water at which further withdrawals would be significantly harmful to the water resources of the area.

Section 373.0421 (1a), FS establishes that when implementing minimum flows and levels, the FDEP or water management district governing boards shall consider changes to watersheds, surface waters and the effects that such changes had placed on the hydrology of an affected watershed.

Chapter 62-40.473 (1) of the Water Resources Implementation Rule states that consideration shall be given to the protection of water resources, natural seasonal fluctuations in water flows or levels and environmental values associated with coastal, estuarine, aquatic and wetland ecology when establishing minimum flows and levels pursuant to sections 373.042 and 373.0421, FS.

Justification

The SFWMD is the designated agency for developing minimum flows and levels in its district, including the Upper Kissimmee Basin.

15. Pollution Prevention Act

Agency

U.S. Environmental Protection Agency

Description

The Pollution Prevention Act (42 U.S.C. 13101 and 13102, s/s et seq. (1990)) focused industry, government, and public attention on reducing the amount of pollution through cost-effective changes in production, operation, and raw materials use. Opportunities for source reduction are often not realized because of existing regulations, and the industrial resources required for compliance, focus on treatment and disposal. Source reduction is fundamentally different and more desirable than waste management or pollution control. Pollution prevention also includes other practices that increase efficiency in the use of energy, water, or other natural resources, and protect our resource base through conservation. Practices include recycling, source reduction, and sustainable agriculture.

Justification

This mandate provides additional programs and funding mechanisms (grants) for state and local governments, communities, and organizations to achieve the standards established by the Clean Water Act (e.g., Total Maximum Daily Load).

16. Public Health and Welfare (regarding polluted waters)

Agency

Florida Department of Environmental Protection

Description

Section 403.021, FS declares that the pollution of the waters of the state of Florida constitutes a menace to public health and welfare, creates public nuisances; is harmful to wildlife and fish; and impairs recreational and other beneficial uses of the waters.

Section 403.021 (1) The pollution of the air and waters of the State of Florida constitutes a menace to public health and welfare; creates public nuisances; is harmful to wildlife and fish and other aquatic life; and impairs domestic, agricultural, industrial, recreational and other beneficial uses of air and waters.

Section 403.021 (2) It is declared to be the public policy of the State of Florida to conserve the waters of the state and to protect, maintain, and improve the quality thereof for public water supplies, for the propagation of wildlife and fish, and other aquatic life, and for domestic, agricultural, industrial, recreational, and other beneficial uses and to provide that no waste be discharged into any waters of the state without first being given the degree of treatment necessary to protect beneficial uses of such waters.

The Department of Health, in cooperation with the FDEP and the FWC, provides public information about mercury contamination of fish by issuing fish consumption advisories. As mercury can cause impairment of a water body, monitoring is required by the TMDL watershed management approach. The 2003 Florida Fish Consumption Advisories recommend no consumption for areas in the Upper Kissimmee Basin.

Justification

This mandate provides the FDEP with the authority to protect water quality of Florida waterbodies. Watershed plans should include strategies to restore or preserve water quality of waterbodies under the influence of the plan. This mandate is related to Goal #4 – Water Quality Improvement.

17. Safe Drinking Water Act

Agency

U.S. Environmental Protection Agency

Description

The Safe Drinking Water Act (42 U.S.C. s/s 300f et seq. (1974)) was established to protect the quality of drinking water in the U.S. This law focuses on all waters actually or potentially designed for drinking use, whether from above ground or underground sources. The Act authorized EPA to establish safe standards of purity and required all owners or operators of public water systems to comply with primary (health-related) standards. State governments, which assume this power from EPA, also encourage attainment of secondary standards (nuisance-related).

Justification

This mandate establishes water quality standards that must be met for Goal #4 – Water Quality Improvement. More specifically to the Kissimmee Chain of Lakes, it applies to surface waters used as drinking water sources and designated as "Class I" waterbodies, which includes East Lake Tohopekaliga. This mandate provides programs and funding mechanisms (grants) for state and local governments, communities, and organizations to achieve water quality standards (e.g., Total Maximum Daily Loads). For related mandates, see Florida Watershed Restoration Act, Lake Okeechobee Protection Act, Public Health and Welfare, and Surface Water Improvement and Management Act.

18. Surface Water Improvement and Management Act

Agency

South Florida Water Management District

Description

The Surface Water Improvement and Management (SWIM) Act (373.451, FS) recognized that the water quality of many Florida surface waters has been degraded, or is in danger of becoming degraded. Also, the natural systems associated with many surface waters have been altered so that these surface waters no longer function as they once did. These problems can be corrected and prevented through plans and programs designed and implemented by the water management districts and local governments. Therefore, this legislation required each water management district to develop plans and programs for the improvement and management of priority waters within its boundaries.

Justification

The SWIM Act specifically directs the SFWMD to develop a management plan for Lake Okeechobee. The subsequent Lake Okeechobee Protection Act states that the Lake Okeechobee Protection Plan is that management plan.

19. Threatened and Endangered Species

Agency

U.S. Fish and Wildlife Service
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
Florida Fish and Wildlife Conservation Commission

Description

The Endangered Species Act (16 U.S.C. 1531-1544, 87 Stat. 884, as amended -- Public Law 93-205, approved December 28, 1973) provides a means to conserve ecosystems upon which endangered and threatened species rely, and provides a program for the conservation of such threatened and endangered species.

> Section 7(a)(1) requires that Federal agencies shall "utilize their authorities in furtherance of the purposes of this Act" by carrying out programs for the conservation of listed species.
>
> Section 7(a)(2) requires Federal agencies to insure that any action authorized, funded or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat.
>
> Section 10(a)(2)(A) requires applicants seeking permits to "take" listed species to submit a conservation plan specifying impacts to listed species, steps taken to minimize and mitigate impacts to listed species, alternative actions considered and reasons why alternatives were not utilized, and other such measures that the Secretary of the Interior may require as necessary or appropriate for purposes of the conservation plan.

The Florida Endangered and Threatened Species Act (Section 372.072, FS) provides for the means to conserve and wisely manage those species defined by the FWC, FDEP, or the USFWS as being endangered or threatened.

Justification

A number of threatened and endangered plant and animal species directly depend on ecosystems in the Upper Kissimmee Basin. Therefore, changes in water regulation schedules, water quality issues and habitat enhancement projects will have a direct impact (adverse or beneficial) on threatened and endangered species and their habitat. The Endangered Species Act provides a means to conserve these ecosystems and provides a program for the conservation of such threatened and endangered species.

Florida has more endangered species than any other continental state and the FWC is responsible for research and management to conserve and protect these species as a natural resource. Within the Kissimmee Chain of Lakes, the FWC manages both aquatic and terrestrial habitats for the benefit of threatened and endangered species.

20. USACE Engineer Regulation 1110-2-240: 33 CFR 222.5

Agency

U. S. Army Corps of Engineers

Description

Engineer Regulation 1110-2-240: 33 CFR 222.5, Water Control Management prescribes policies and procedures to be followed by the U.S. Army Corps of Engineers in carrying out water control management activities, including establishment of water control plans for Corps and non-Corps projects, as required by Federal laws and directives.

Justification

Engineer Regulation 1110-2-240, 33 CFR 222.5, Water Control Management requires the US Army Corps of Engineers to develop operations and maintenance criteria for water control plans and to continually study and revise the plans as necessary. This Engineer Regulation provides authority for the restudy of the water control plan containing regulation schedules for the Kissimmee Chain of Lakes (Goal #1 – Hydrologic Management).

21. Water Quality Statutes

Agency

Florida Department of Environmental Protection
South Florida Water Management District
U.S. Environmental Protection Agency

Description

Section 403.073, FS assigns the duty of developing and implementing strategies to prevent pollution to the FDEP and other agencies including the SFWMD. Section 403.067 calls for the implementation of TMDLs. Section 403.0891 assigns the responsibility of developing and implementing stormwater management programs. Chapter 62-25 addresses the regulation of stormwater discharge in the state of Florida.

Section 403.073 declares that it is the state's goal that all its agencies, the state university system, the state board of community colleges, and all municipalities, counties, regional agencies, and special districts develop and implement strategies to prevent pollution.

Section 403.067(1) states that, in furtherance of public policy established in s. 403.021, Florida's waters are among its most basic resources and the development of a TMDL program for state waters as required by s. 303(d) of the Clean Water Act will promote improvements in water quality throughout the state.

In Section 403.0891, the Florida Legislature gives the FDEP, water management districts, and local governments the responsibility for developing mutually compatible stormwater management programs. The FDEP shall include goals in the Water Resources Implementation Rule for the proper management of stormwater. Each water management district to which the stormwater management program is delegated shall establish district, and where applicable, watershed or drainage basin stormwater management goals which are consistent with the goals adopted by the state and with plans adopted pursuant to ss 373.451- 373.4595 (the Surface Water Improvement and Management Act). Chapter 62-25 (1) establishes that the discharge of untreated stormwater may be reasonably expected to be a source of pollution of waters and is, therefore, subject to FDEP regulation.

Justification

This mandate gives the FDEP the authority to protect the water quality of Florida waterbodies. The FDEP, SFWMD and local governments are mandated to manage stormwater. Watershed plans should include strategies to restore or preserve the water quality of waterbodies.

22. Water Supply

Agency

Florida Department of Environmental Protection
South Florida Water Management District

Description

Section 373.0831 (2) of the Florida Water Resources Act describes the roles that the water management districts will play in finding a balance on environmental, human and other water supply demands.

Section 373.0831(1a, c), FS states that the proper role of the water management district with regard to water supply is primarily planning and water resource development, but this does not preclude them from providing assistance with water supply development. Water resource development and water supply development must receive priority attention, where needed, to increase availability of sufficient water for all existing and future reasonable-beneficial uses and natural systems.

Section 373.0831.(2a, b), FS states the intent of the Florida Legislature that sufficient water be available for all existing and future reasonable-beneficial uses and natural systems, and that adverse effects of competition for water supplies be avoided. Water management district must take the lead in identifying and implementing water resource development projects, and be responsible for securing necessary funding.

Section 373.0831(2d), FS requires that water supply development be conducted in coordination with water management district regional water supply planning and water resource development.

Following requirements of the Water Resources Act (Chapter 373), the Water Resources Implementation Rule (section 62-40.310) states that the FDEP, in its review of water management programs, rules, and plans, shall seek to:

1) Assure availability of an adequate and affordable supply of water for all reasonable-beneficial uses.
2) Restore and protect the quality of ground and surface water by solving current problems and ensuring high quality treatment for stormwater and wastewater.
3) Identify existing and future public water supply areas and protect them from contamination.
4) Encourage nonstructural solutions to water resource problems and give adequate consideration to nonstructural alternatives whenever structural works are proposed.

5) Manage the construction and operation of facilities which dam, divert, or otherwise alter the flow of surface waters to minimize damage from flooding, soil erosion or excessive drainage.
6) Encourage the management of floodplains and other flood hazard areas to prevent or reduce flood damage, consistent with establishment and maintenance of desirable hydrologic characteristics and associated natural systems.
7) Encourage the development and implementation of a strict floodplain management program by state, regional, and local governments designed to preserve floodplain functions and associated natural systems.
8) Avoid the expenditure of public funds that encourage or subsidize incompatible new development or significant expansion of existing development in high-hazard flood areas.
9) Minimize flood-related emergencies, human disasters, loss of property, and other associated impacts.
10) Establish minimum flows and levels to protect water resources and the environmental values associated with marine, estuarine, freshwater, and wetlands ecology.
11) Mitigate adverse impacts resulting from prior alteration of natural hydrologic patterns and fluctuations in surface and ground water levels.
12) Utilize, preserve, restore, and enhance natural water management systems and discourage the channelization or other alteration of natural rivers, streams and lakes.
13) Protect the water storage and water quality enhancement functions of wetlands, floodplains, and aquifer recharge areas through acquisition, enforcement of laws, and the application of land and water management practices which provide for compatible uses.

Justification

One of the SFWMD's core mission elements, as mandated by the Water Resources Act (Chapter 373, FS) and the Water Resources Implementation Rule (Chapter 62-40, FAC) is the conservation and development of water supply. Although the SFWMD is developing an Upper Kissimmee Basin water supply plan separately from the Kissimmee Chain of Lakes Long Term Management Plan, participation of SFWMD staff involved in water supply is important to the development of the latter plan. As the state's oversight agency, the FDEP has responsibility for overseeing water supply conservation and development in the Upper Kissimmee Basin.

Appendix E: Mandates of Federal and State Agencies Pertaining to Kissimmee Chain of Lakes

Mandate	Agency						
	USACE	FDACS	FDEP	USEPA	FWC	USFWS	SFWMD
Aquatic Plant Management	X		X				
Clean Water Act	X		X	X			
District Water Management Plan							X
Dredge and Fill Regulations			X				X
Fish and Wildlife Conservation Act					X	X	
Fish and Wildlife Coordination Act					X	X	
Florida Fish and Wildlife Management					X		
Florida Watershed Restoration Act		X	X				
General Reevaluation Study	X						
Kissimmee River Restoration Project	X						X
Lake Okeechobee Protection Act		X	X				X
Land Acquisition and Management			X		X		X
Migratory Bird Treaty Act			X		X	X	
Minimum Flows and Levels							X
Pollution Prevention Act				X			
Public Health and Welfare			X				
Safe Drinking Water Act				X			
SWIM Act							X
Threatened and Endangered Species	X			X	X	X	
USACE ER 1110-2-240	X						
Water Quality Statutes			X	X			X
Water Supply			X				X

Appendix F: Relationship of Agency Mandates to Kissimmee Chain of Lakes Goals

Mandate	Goal				
	Hydrology	Habitat	Aquatic Plants	Water Quality	Recreation
Aquatic Plant Management	X	X	X	X	X
Clean Water Act		X		X	
District Water Management Plans	X	X		X	
Dredge and Fill Regulations	X	X		X	X
Fish and Wildlife Conservation Act	X	X		X	
Fish and Wildlife Coordination Act	X	X		X	
Florida Fish and Wildlife Management	X	X			X
Florida Watershed Restoration Act	X				
General Reevaluation Study	X				
Kissimmee River Restoration Project	X				
Lake Okeechobee Protection Act	X			X	
Land Acquisition and Management		X			X
Migratory Bird Treaty Act	X	X			
Minimum Flows and Levels	X				
Pollution Prevention Act		X		X	
Public Health and Welfare				X	
Safe Drinking Water Act		X		X	
SWIM Act	X			X	
Threatened and Endangered Species	X	X		X	
USACE ER 1110-2-240	X				
Water Quality Statutes				X	
Water Supply	X				