BEFORE THE GOVERNING BOARD OF THE
SOUTH FLORIDA WATER MANAGEMENT DISTRICT

ORDER NO. SFWMD 2008 - _____ DAO

IN THE MATTER OF:

APPROVAL OF 2008 AMENDMENT
TO APPENDIX H OF THE LOWER
EAST COAST WATER
SUPPLY PLAN

_____/

FINAL ORDER ON 2008 AMENDMENT TO APPENDIX H OF THE LOWER EAST COAST WATER SUPPLY PLAN

This matter, having come before the Governing Board of the South Florida Water Management District ("SFWMD"), at its regular meeting of August 14, 2008, for entry of a Final Order, upon hearing staff's presentation, and being otherwise fully informed, the Governing issues this Final Order containing the following Findings of Fact and Conclusions of Law.

FINDINGS OF FACT

1. In May 2000, the Governing Board of the SFWMD approved the Lower East Coast ("LEC") Water Supply Plan, 2000 – 2020 ("2000 LEC Plan").

2. Section 373.0361, Florida Statutes ("F.S."), requires that each regional water supply plan be based on at least a 20-year planning period and include: a) water supply and water resource development components; b) a funding strategy for water resource development projects; c) minimum flows and levels ("MFLs") established within the planning region; d) a MFL recovery and prevention strategy; and e) technical

data and information supporting the plan. In addition, Section 373.036(2) mandates that each regional water supply plan be updated at least every five years.

3. Pursuant to Section 373.0361, F.S., the District developed a 2005-2006 update to the LEC Plan which included minimum flows and levels ("MFLs") for specified water bodies, and recovery and prevention strategies for those water bodies that are exceeding, or are expected to exceed, the proposed criteria. The 2005-2006 LEC Plan Update was approved by the Governing Board in February, 2007. The 2005-2006 LEC Plan Update superseded and replaced the 2000 LEC Plan.

4. In April, 2008, the U.S. Army Corps of Engineers amended the Lake Okeechobee Regulation Schedule to address public health and safety issues associated with the integrity of the Herbert Hoover Dike. During evaluation of the Lake regulation schedule, modeling was conducted to assess the effect of the schedule on both existing legal users of water in terms of frequency, duration and severity of water shortage cutbacks and the Lake's MFL performance. In summary, it was found that the new schedule was projected to result in both significantly lower level of water supply certainty for existing legal users and violation of the Lake's MFL.

5. To address these issues, the SFWMD Governing Board initiated rule development in July, 2007. SFWMD staff conducted 4 public workshops and presented proposed rule text, including proposed amendments to Appendix H of the LEC Water Supply Plan, to the Water Resources Advisory Committee in April and May, 2008. The proposed rule text was approved for publication by the SFWMD Governing Board at its June, 2008 meeting and considered for adoption at the Board's August, 2008 meeting.

6. The 2008 Amendment to Appendix H of the LEC Water Supply Plan is limited in scope and only addresses the projected violation of the Lake's MFL by establishing a recovery strategy consisting of four components: 1) environmental enhancement projects to be implemented during extreme low Lake stages; 2) regulatory constraints on consumptive uses; 3) water shortage restrictions; and 4) capital projects to improve storage. A copy of the 2008 Amendment to Appendix H of the LEC Water Supply Plan is attached hereto and incorporated herein as Exhibit "A". No other amendments to the LEC Water Supply Plan are proposed at this time.

7. The 2008 Amendment to Appendix H of the LEC Water Supply Plan is not a self-executing document. It is not intended to affect the substantial interest of a party. Future Governing Board action will be required to implement the 2008 Amendment to Appendix H of the LEC Water Supply Plan. When implementing action is taken, the Governing Board shall offer an appropriate point of entry to substantially affected parties, including Section 120.569, F.S., rights. A copy of the Notice of Rights is attached hereto as Exhibit "B". Issues regarding underlying analyses, findings, conclusions or any other portions of the 2008 Amendment to Appendix H of the LEC Water Supply Plan relied upon to support a future Governing Board action may also be raised in challenges of such action.

8. This planning document may be amended or updated as appropriate in light of new technical information and analysis. Updates are required to occur no later than at five year intervals.

9. Notice of this Final Agency Action will be distributed by certified mail to persons who have participated in plan development process. Additional notice will be

published in the *Florida Administrative Weekly* and newspapers of general circulation within the planning region.

CONCLUSIONS OF LAW

10. Section 373.0361, F.S., adopted in 1997, authorizes the governing boards of the water management districts to undertake regional water supply planning efforts, including the updating of existing plans such as the LEC Water Supply Plan. Section 373.0361, F.S., also establishes a framework for the regional water supply plan's scope, analysis, implementation, and process.

11. The Governing Board concludes that the 2008 Amendment to Appendix H of the LEC Water Supply Plan meet the requirements of Section 373.0361, F.S., as related to the limited purpose of this amendment.

12. Subsection 373.0361(4), F.S., establishes the opportunity for administrative review of District approval of a regional water supply plan. This provision states:

> Governing board approval of a regional water supply plan shall not be subject to the rulemaking requirements of Chapter 120. *However, any portion of an approved regional water supply plan which affects the substantial interests of a party shall be subject to s. 120.569*. (Emphasis added.)

Section 120.569, F.S., details the legal provisions that apply in all proceedings in which the substantial interests of a party are determined by an agency. The Notice of Rights included in this Order describes these and other potential remedies which may exist. However, the Notice of Rights shall not cover actions taken by the Governing Board in the future to implement the 2008 Amendment to Appendix H of the LEC Water Supply Plan. When implementing action is taken, the Governing Board shall offer an

appropriate point of entry to substantially affected parties. To the extent the 2008 Amendment to Appendix H of the LEC Water Supply Plan or anything in the 2008 Amendment is relied upon to support a future Governing Board action, a challenge to the implementation action may also challenge the supporting material contained in the 2008 Amendment to Appendix H of the LEC Water Supply Plan.

13. The 2008 Amendment to Appendix H of the LEC Water Supply Plan may be updated or amended as new technical information and analysis becomes available. Updates shall occur in accordance with Section 373.0361, F.S., at intervals no later than five years from the date of entry of the Order on the 2005–2006 LEC Plan Update.

14. This 2008 Amendment to Appendix H of the LEC Water Supply Plan is intended to be restricted in scope to solely incorporate a MFL recovery strategy for Lake Okeechobee pursuant to Subsection 373.0361(2)(c), F.S.

15. This Amendment does not constitute an update of the LEC Plan pursuant to the 5 year update requirements in Subsection 373.0361(2)(a)2., F.S., and does not trigger local government requirements in Subsection 163.3177(6)(c), F.S.

ORDER

Based upon the foregoing Findings of Fact and Conclusions of Law, it is hereby **ORDERED** that the 2008 Amendment to Appendix H of the LEC Water Supply Plan is hereby approved in accordance with Section 373.0361, F.S. Staff is authorized to distribute notice of this Final Agency Action by certified mail to persons who have participated in the 2008 Amendment process. Additional notice shall be published in

the *Florida Administrative Weekly* and newspapers of general circulation within the planning region.

DONE AND SO ORDERED this _____ day of August, 2008, at a public meeting held at 3301 Gun Club Road, West Palm Beach, FL 33406.

SOUTH FLORIDA WATER MANAGEMENT
DISTRICT BY ITS GOVERNING BOARD

BY: _____
Eric Buermann, Chair

ATTEST:

BY: _____
SECRETARY

DATE: _____

(Corporate Seal)

LEGAL FORM APPROVED BY
OFFICE OF COUNSEL

BY: _____

DATE: _____

H

Minimum Flows and Levels Criteria and Recovery and Prevention Strategies

OVERVIEW

Section 373.0361, Florida Statutes (F.S.), requires that each regional water supply plan be based on at least a 20-year planning period and include: a) water supply and water resource development components; b) a funding strategy for water resource development projects; c) minimum flows and levels (MFLs) established within the planning region; d) a MFL recovery and prevention strategy; and, e) technical data and information supporting the plan. In addition, Section 373.036(2) mandates that each regional water supply plan be updated at least every five years.

This appendix provides additional information and updated information since the *2000 Lower East Coast Regional Water Supply Plan* (2000 LEC Plan) (SFWMD 2000b) for the *2005–2006 Lower East Cost Water Supply Plan Update* (2005–2006 LEC Plan Update) regarding the establishment of MFLs and recovery and prevention strategies. This document was prepared to be read within the context of the entire plan update.

During the 2005 legislative session, Florida lawmakers revised state water law, strengthening the link between land use and water supply planning and creating the Water Protection and Sustainability Program. The alternative water supply portion of this program is intended to reduce competition between users and natural systems for available water by encouraging the development of alternative water supplies. Pursuant to Section 373.0361, F.S., the 2005–2006 LEC Plan Update includes MFLs for specified water bodies, and recovery and prevention strategies for those water bodies that are exceeding, or are expected to exceed, the proposed criteria.

As one of the tools for plan implementation, rulemaking to implement the regulatory recommendations of the 2000 LEC Plan constituted a significant effort during the past several years. Rulemaking included changes to consumptive use permitting (CUP) criteria to cumulatively define the availability of water for consumptive uses and water resource protection. As recommended in the 2000 LEC Plan, certain rulemaking efforts were grouped in phases to allow for the cumulative analysis of the water resource and consumptive use implications of the regulatory program. The South Florida Water

Management District (SFWMD or District) may also impose water shortage declarations to curb consumptive use withdrawals pursuant to Section 373.246, F.S. Water shortage declarations are designed to prevent MFL violations.

Another goal of the rulemaking schedule was to adopt rules as the technical information became available. As a result, the 2000 LEC Plan recommended that rulemaking should proceed for concepts that were sufficiently identified and evaluated in the planning process. Since the 2000 LEC Plan, MFLs have been established for the Everglades, Lake Okeechobee, the Biscayne Aquifer (SFWMD 2000c); the Northwest Fork of the Loxahatchee River (SFWMD 2002b); the Caloosahatchee River and Estuary (SFWMD 2000d); the St. Lucie River and Estuary (SFWMD 2002c); and, Florida Bay (SFWMD 2006b).

In addition, uncertainties in the rulemaking process, such as delays for development of supporting technical data or rules, created challenges with the proposed schedule for MFL rule development. The proposed schedule is, therefore, adapted each year to account for delays, while considering the need to develop associated rules through a coordinated rulemaking process. The schedule for development of MFLs is presented in Chapter 6.

In developing MFL recovery and prevention strategies, it is essential that the role of MFLs under Chapter 373, F.S., be identified. The SFWMD developed the 2000 LEC Plan based on a resource protection framework that helps identify the role of MFLs in relation to the other tools implemented under the statute. These concepts provide the basis for the proposed recovery and prevention strategies.

The overall goal of Chapter 373, F.S., is to ensure the sustainability of water resources of the state (Section 373.016, F.S.). Chapter 373, F.S., provides the District with several tools to carry out this responsibility. These tools have various levels of resource protection standards. Water resource protection standards in Chapter 373, F.S., must be applied together as a whole to meet this goal. Pursuant to Parts II and IV of Chapter 373, F.S., surface water management and CUP regulatory programs must prevent harm to the water resource. Minimum flows and levels must be set at the point at which further withdrawals could cause significant harm to the water resources or ecology of the area. Water shortage statutes, on the other hand, dictate that permitted water supplies must be restricted in a manner that prevents serious harm from occurring to the water resources. Other protection tools include reservations of water for fish and wildlife, or health and safety (Section 373.223(3), F.S.), and aquifer zoning to prevent undesirable uses of the groundwater (Section 373.036, F.S.).

The levels of impacts—harm, significant harm and serious harm—are relative resource protection terms. Each plays a role to help achieve the ultimate goal—to achieve a sustainable water resource. The role of MFLs is shown conceptually in Figure 1.

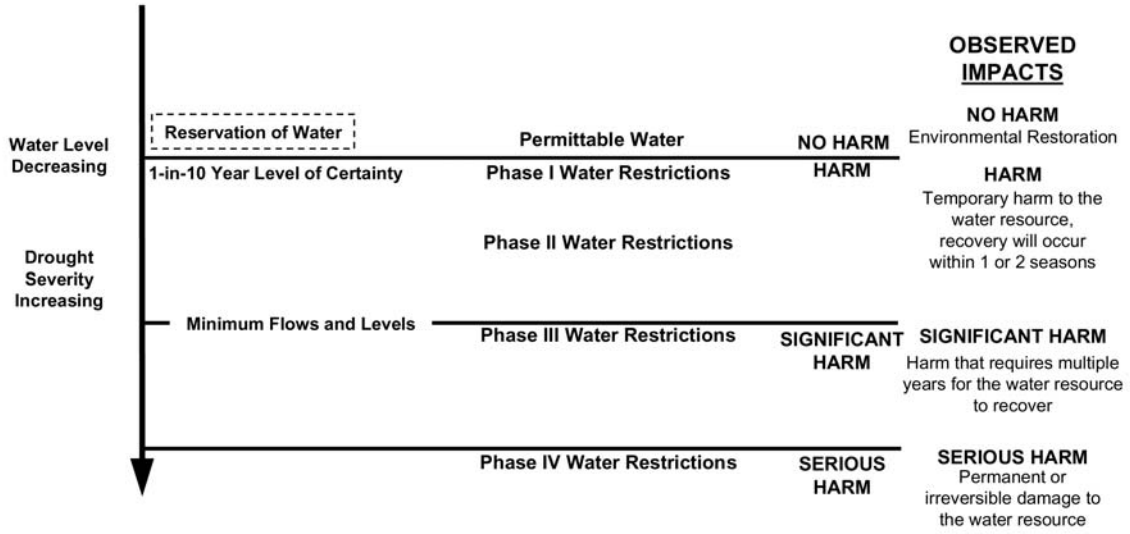

Figure 1. Conceptual Relationship among the Harm, Serious Harm and Significant Harm Standards.

Section 373.0421, F.S., requires that once the MFL technical criteria have been established, the water management districts must develop and expeditiously implement a recovery and prevention strategy for those water bodies that are currently exceeding, or are expected to exceed, the MFL criteria. Section 373.0421(2), F.S., provides the following in relevant part:

> The recovery or prevention strategy shall include phasing or a timetable which will allow for the provision of sufficient water supplies for all existing and projected reasonable-beneficial uses, including development of additional water supplies and implementation of conservation and other efficiency measures concurrent with, to the extent practical, and to offset, reductions in permitted withdrawals, consistent with the provisions of this chapter.

It is possible that the proposed MFL criteria cannot be achieved immediately, because of the lack of adequate regional storage and/or ineffective water distribution infrastructure. These storage and infrastructure shortfalls will be resolved through water resource development and water supply development projects, construction of facilities, and improved operational strategies that will increase the region's storage capacity and improve the existing delivery system. Planning and regulatory efforts, therefore, will include a programmed recovery process that will be implemented over time to improve water supply and distribution to protect water resources and functions. The recovery process includes the following:

- A list of projects will be provided, which includes the structural solutions for the recovery plan and prevention strategy, as well as the timing and funding requirements for each project. Table 1 provides a list of the various water resource development projects identified in this plan update that will provide water to meet the proposed MFL targets and water reservations. These projects include projects associated with the Comprehensive Everglades Restoration Plan

(CERP), as well as the District's Acceler8 initiative and programs. Table 1 also includes anticipated completion dates of these projects and the estimated amounts of water to be delivered to each area by components to meet the proposed MFLs and other water needs.

- If necessary to prevent the MFL criteria from being exceeded, demand management cutbacks for recovery during drought conditions will also be identified (e.g., phased water shortage restrictions to prevent significant or serious harm). This LEC Plan Update does not propose the use of the Water Shortage Plan [Chapter 40E-21, Florida Administrative Code (F.A.C.)] as a MFL recovery strategy. However, when a drought occurs, the District will rely on the Water Shortage Plan, as needed, to address regional system water availability.
- To the extent practicable, the District attempts to implement water deliveries to reduce or prevent the MFL criteria from being exceeded. For example, operational guidelines needed for implementation of water supply deliveries to avoid MFL exceedances, in concert with meeting other required water demands, are identified in the document, entitled *Adaptive Protocols for Lake Okeechobee Operations* (SFWMD *et al.* 2003).
- Before considering reduction in permitted withdrawals in a recovery and prevention strategy, all practical means to prevent reductions in available water supplies for consumptive use will be explored and implemented. When determining whether reductions in existing legal uses are required, the following factors shall be considered:
  - The extent of MFL shortfall directly caused by existing legal uses.
  - The practicality of avoiding the need for reductions in permitted supplies, including structural and operational measures, by maximizing the beneficial uses of the existing water source.
  - The risk of significant harm resulting from the existing legal use in the interim period before the recovery strategy is fully implemented.

Table 1. Water Resource Development Projects in the CERP, Acceler8 and District Programs That Provide Water Supplies Associated with MFL Recovery Plans and Prevention Strategies [d].

MFL Water Body	Water Resource Development Projects	Program	Finish date [a]	Est. cost ($ mil.)
Everglades (including WCAs and ENP) – projects needed for MFL Recovery	Modified Water Deliveries to Everglades National Park	SFWMD/ USACE	2010	398.0
	C-111 Spreader Canal/Operational Modifications [b] (diverts 360,000 acre-ft per year [ac-ft/yr])	Acceler8	2010	46.8
	WCA-3A/3B Seep. Management (70,000 ac-ft/yr)	Acceler8	2009	30.3
	EAA Storage Reservoir - Phase 1 (190,000 ac-ft)	Acceler8	2010	536.6
	Acme Basin B (1,028 ac-ft; diverts 32,000 ac-ft/yr)	Acceler8	2008	36.9
	Fran Reich Preserve (42,000 ac-ft/yr)	Acceler8	2009	41.3
	C-11 Impoundment (4,800 ac-ft)	Acceler8	2009	85.5
	C-9 Impoundment (6,600 ac-ft)	Acceler8	2009	58.2
	Decompartmentalize WCA-3A	CERP	2015-2020	290.1
	EAA Storage Reservoir (120,000 ac-ft)	CERP	2015-2020	184.5
Lake Okeechobee – projects needed for MFL Recovery	Lake Okeechobee Storage (250,000 ac-ft)	CERP	2010-2015	338.4
	Taylor Creek/Nubbin Slough Reservoir (50,000 ac-ft)	CERP	2010-2015	94.1
	Herbert Hoover Dike Repair	USACE	2030[e]	856[e]
St. Lucie Estuary – projects needed for MFL Prevention	Ten Mile Creek Reservoir (6,100 ac-ft)	SFWMD	2008	32.0
	C-44 Reservoir/STA (50,600 ac-ft)	Acceler8	2009	339.8
Caloosahatchee Estuary – projects needed for MFL Recovery	C-43 West Reservoir (170,000 ac-ft)	Acceler8	2010	334.0
	C-43 Basin ASR (220 MGD)	CERP	2015-2020	213.0
Loxahatchee River – projects needed for MFL Recovery	C-51 and Southern L-8 Reservoir (47,000 ac-ft)	CERP	2015-2020	306.5
	G-160, 161 Structures	CERP	2006	2.3
	West Palm Beach Water Catchment Area ASR[c]	CERP	2015-2020	49.9
Florida Bay – projects needed for MFL Prevention	Florida Bay/Florida Keys Feasibility Study	CERP	2010	6.0
	WCA-3A/3B Seep. Management (70,000 ac-ft/yr)	Acceler8	2009	30.3

a. Dates to complete projects are taken from CERP 2005 MISP Status report and the Acceler8 October 2006 Project Status report. Finish dates are for completed construction. Specific years are not provided for CERP projects scheduled for completion beyond 2010; ranges are identified in five-year increments.
b. C-111 Operational Modifications are part of the Modification to South Dade Conveyance System in Southern Portion of L-31N and C-111 canals component.
c. The West Palm Beach Water Catchment Area ASR is part of the L-8 Project.
d. MFL rules identify the general programs that will be used to develop and implement prevention or recovery, rather than specific projects. The potential role of specific projects to address MFL water needs is generally considered in the respective MFL technical supporting documentation.
e. Time and costs shown here are for complete dike repair. Partial repairs estimated to occur between 2009 and 2020 may be sufficient to allow additional storage in the Lake necessary to prevent MFL violations

Minimum flows and levels are the point at which further withdrawals would cause significant harm to water resources. Significant harm is defined as the level of harm that requires multiple years for the water resource to recover. This is considered to be more severe than the harm standard imposed in the CUP process, which relates to impacts that would occur during a 1-in-10 year drought. Therefore, MFLs in a recovered natural system would not be exceeded until conditions had already exceeded the 1-in-10 year drought level of certainty criteria. Serious harm, the ultimate harm to the water resources contemplated under Chapter 373, F.S., can be interpreted as long-term, irreversible or permanent impacts to the water resource. Minimum flows and levels are associated with significant harm, which is considered to be less severe than serious harm, and therefore, may act as triggers to impose water shortages.

The District has implemented its water shortage authority by restricting consumptive uses based on the concept of shared adversity between users and the water resources (Chapter 40E-21, F.A.C., Amended August 14, 2003). Under this program, different levels or phases of water shortage restrictions with varying levels of severity are imposed relative to the severity of drought conditions. The four phases of current water shortage restrictions are based on progressively increasing resource impacts leading up to serious harm. Under the District's program, Phase I and II water shortages primarily reduce water use through conservation techniques and minor use restrictions, such as restrictions on car washing and lawn watering. Phases III and IV, however, require use cutbacks that are associated with some level of economic impact to the users, such as the potential for crop damage due to agricultural irrigation restrictions. Established MFLs are considered in the evaluation of current water conditions (Rule 40E-21.221(3)(d), F.A.C.), and as a basis for establishing water use restrictions (Rule 40E-21-271(3)(d), F.A.C.).

MFLS FOR SPECIFIC WATER BODIES

MFL Criteria for Lake Okeechobee

The MFL criteria for Lake Okeechobee were established in 2001. Significant harm criteria (SFWMD 2000c) were based on the relationship between water levels in the lake and the ability to: a) protect the coastal aquifer against saltwater intrusion; b) supply water to Everglades National Park; c) provide littoral zone habitat for fish and wildlife; and, d) ensure navigational and recreational access. Consideration was also given to the lake's function as a storage area for supplying water to adjacent areas, such as the Everglades Agricultural Area (EAA), the Seminole Indian Tribe, the Caloosahatchee and St. Lucie basins, and the Lake Okeechobee Service Area. The MFL criteria for Lake Okeechobee are defined as follows: "An MFL violation occurs in Lake Okeechobee when an exceedance, as defined herein, occurs more than once every six years. An "exceedance" is a decline below 11 feet NGVD for more than 80, non-consecutive or consecutive, days, during an eighteen month period. The eighteen month period shall be initiated following the first day Lake Okeechobee falls below 11 feet NGVD, and shall not include more than one wet season, defined as May 31st through October 31st of any given calendar year" (Chapter 40E-8.221).

Effects of the revised Lake Okeechobee Regulation Schedule (LORSS)

In the year 2000, in order to determine whether the proposed Lake MFL criteria could be expected to be violated over the next 20 years (which would determine if a prevention or recovery plan would be needed for Lake Okeechobee), the South Florida Water Management Model was used to evaluate the proposed MFL criteria in five year increments through the year 2020. The analysis considered projected growth in consumptive use demands on the Lake, the scheduled delivery and performance of the Restudy project components, and the WSE (Water Supply and Environment) regulation schedule proposed for the Lake. Details regarding the modeling analysis are available in the LEC Regional Water Supply Plan (May, 2000).

Under these assumptions, it was found that the proposed Lake MFL criteria would not be violated and existing /projected users would have a 1 in 10 level of certainty providing the water shortage trigger line for Lake Okeechobee that existed in 2000 (40E-22 F.A.C..) would be lowered 0.5 feet. The proposed WSE regulation schedule was adopted by the USACE in July, 2000, the District modified the water shortage trigger line by rule and adopted the Lake Okeechobee MFL criteria with the associated prevention plan in 2001.

However, in response to a series of several high Lake stage events and the associated harmful discharges to the Caloosahatchee and St. Lucie estuaries during 2004 and 2005, the USACE initiated a process to revise the WSE regulation schedule to improve management of the Lake during high water conditions. The goals of the regulation schedule modification process (known as LORSS; Lake Okeechobee Regulation Schedule Study) were later amended to address public health and safety concerns related to the efficacy of the Herbert Hoover Dike. In July 2007, after extensive public participation, the USACE published the draft environmental impact statement for a revised Lake regulation schedule that would effectively reduce Lake stages until the earlier of: (1) implementation of a new Lake Okeechobee schedule as a component of the system-wide operating plan to accommodate the Comprehensive Everglades Restoration Plan (CERP Band 1 projects) and the State of Florida's fast track Acceler8 projects, or (2) completion of Herbert Hoover Dike seepage berm construction or equivalent dike repairs for reaches 1, 2, and 3.

The District, working with the USACE, conducted modeling to evaluate the impact of the proposed LORSS regulation schedule on, among other things, existing legal users, in terms of frequency, duration and severity of water shortage cutbacks, and the Lake's MFL performance for inclusion in the draft EIS. It was found that while LORSS would effectively provide protection for public health and safety, the Lake Okeechobee MFL criteria was projected to be violated and existing legal uses were projected to experience significantly greater water shortage cutbacks. Analysis of the proposed revisions to the Lake regulation schedule shows performance improved slightly in meeting the Caloosahatchee River MFL as a result of greater dry season discharges to the estuary.

Attempts to mitigate the impacts to existing legal users of Lake water under LORSS were evaluated, including the use of temporary water supply pumps (to access Lake water at lower stages) and dropping the water shortage trigger line an additional foot. While lowering the water shortage trigger line would reduce the duration and severity of water shortage cutbacks associated with the proposed schedule, it was found that lowering the Lake water shortage trigger was inconsistent with the Lake Okeechobee MFL criteria. Discussions regarding the modeling and results are found in the USACE Final Environmental Impact Statement (November, 2007). As a result, lowering of the Lake water shortage trigger line was rejected as an option by the District. Despite the increase water shortage impacts to existing legal users, the protection of public safety as related to the structural integrity of the Herbert Hoobert Dike was the overarching factor. The USACE issued its Record of Decision approving the revised Lake regulation schedule on April 28, 2008.

The USACE, as explained above, acknowledges the newly approved Lake Okeechobee regulation schedule is temporary; however, due to uncertainties with the Dike repair schedule and, alternatively, implementation of a new system-wide operating schedule, it is unclear when a revision will be implemented or what the next regulation schedule will entail. As a result, the original MFL prevention plan included in the LEC Plan of 2000 and in District rule (Chapter 40E-8, F.A.C.) is revised to a recovery plan until such a time as necessary to re-establish a schedule for the Lake that prevents MFL violations.

MFL Criteria for the Everglades

Technical relationships considered for developing MFL criteria for the Everglades included the effects of water levels on hydric soils and plant and wildlife communities, and frequency and severity of fires (SFWMD 2000c). Impacts associated with significant harm include increased peat oxidation, frequency of severe fires, soil subsidence, loss of aquatic refugia, loss of tree islands, and long-term changes in vegetation or wildlife habitat. The proposed minimum water level criteria for the Everglades were based on protecting the two dominant soil types found within the ecosystem—peat-forming wetlands and marl-forming wetlands

Water levels within wetlands overlying organic peat soils within the Water Conservation Areas (WCAs), Rotenberger and Holey Land wildlife management areas, and Shark River Slough (Everglades National Park) shall not fall below ground surface for more than 30 days and shall not fall below 1.0 foot below ground for one day or more of that 30-day period, at specific return frequencies for different areas. Rule 40E-8.221(3), F.A.C., identifies these water levels as shown in Table 2.

Table 2. Minimum Water Level, Duration and Return Frequency Performance Measures for Selected Water Management Gauges Located within the Everglades (SFWMD 2000c and Rule 40E-8.221(3), F.A.C.).

Area	Key Gauge	Soil Type	Minimum Depth (ft) and Duration (days)	Return Frequency (years)

Loxahatchee National Wildlife Refuge (WCA-1)	1-7	Peat	-1.0 ft > 30 days	1-in-4
WCA-2A	2A-17	Peat	-1.0 ft > 30 days	1-in-4
WCA-2B	2B-21	Peat	-1.0 ft > 30 days	1-in-3
Holey Land WMA	HoleyG	Peat	-1.0 ft > 30 days	1-in-3
Rotenberger WMA	Rotts	Peat	-1.0 ft > 30 days	1-in-2
Northwest corner of WCA-3A	3A-NW	Peat	-1.0 ft > 30 days	1-in-4
Northwest WCA-3A	3A-2	Peat	-1.0 ft > 30 days	1-in-4
Northeast corner of WCA-3A	3A-3	Peat	-1.0 ft > 30 days	1-in-3
Northeast WCA-3A	3A-NE	Peat	-1.0 ft > 30 days	1-in-2
Central WCA-3A	3A-4	Peat	-1.0 ft > 30 days	1-in-4
Southern WCA-3A	3A-28	Peat	-1.0 ft > 30 days	1-in-4
WCA-3B	3B-SE	Peat	-1.0 ft > 30 days	1-in-7
Northeast Shark River Slough	NESRS-2	Peat	-1.0 ft > 30 days	1-in-10
Central Shark River Slough	NP-33	Peat	-1.0 ft > 30 days	1-in-10
Southwest Shark River Slough	NP 36	Peat	-1.0 ft > 30 days	1-in-7
Marl wetlands east of Shark River Slough	NP-38	Marl	-1.5 ft > 90 days	1-in-3
Marl wetlands west of Shark River Slough	NP-201 G-620	Marl	-1.5 ft > 90 days	1-in-5
Rockland Marl Marsh	G-1502	Marl	-1.5 ft > 90 days	1-in-2
Taylor Slough	NP-67	Marl	-1.5 ft > 90 days	1-in-2

Water levels within marl-forming wetlands, which are located east and west of Shark River Slough, the Rocky Glades and Taylor Slough within Everglades National Park, shall not fall below ground surface for more than 90 days and shall not fall below 1.5 feet belowground for one day or more of that 90-day period at specific return frequencies for different areas, as identified in Table 2.

Two general types of impacts (direct and indirect) can occur within the Everglades that can be attributed to consumptive use withdrawals (SFWMD 2000c). Indirect impacts occur as a result of making regional water deliveries to areas other than the Everglades. Direct impacts result from pumping of adjacent wellfields that lower the water table along the eastern edge of the Everglades, affecting wetlands located directly west of the north-south perimeter levee. The District's current CUP criteria prohibit the issuance of permits that would cause harm to water resources. As a result, in areas where the MFL criteria are being exceeded (significant harm occurring), no consumptive use permits could be issued that would cause an additional drawdown under the 1-in-10 year level of certainty.

MFL Criteria for the Biscayne Aquifer

Criteria for the Biscayne Aquifer were developed based on analysis of technical relationships among groundwater levels and canal water levels, and the potential for saltwater intrusion (SFWMD 2000c). Harm occurs when the saltwater interface moves farther inland than has occurred historically due to seasonal water level fluctuations, up to and including a 1-in-10 year drought. Significant harm occurs when saline groundwater moves inland to an extent that it limits the ability of users to obtain fresh groundwater in the amounts specified in their permits and will require several years for the freshwater source to recover. The proposed criteria do not address the groundwater base flows to Biscayne Bay. Data are currently being collected to define MFLs for this water body and a MFL for Biscayne Bay – South is slated for completion in 2008.

The term minimum level for the Biscayne Aquifer refers to water levels associated with movement of the saltwater interface landward to the extent that groundwater quality at the withdrawal point is insufficient to serve as a water supply source for a period of several years before recovering. For evaluation of model simulations, operational criteria are applied to the coastal canals that receive regional water. Table 3 provides the minimum canal operational levels for 11 primary water management structures. To meet the operational criteria, the canal stage cannot fall below the levels for more than 180 days, and the average annual stage must be sufficient to allow levels and chloride concentrations in the aquifer to recover to levels that existed before a drought or discharge event occurred.

Table 3. Minimum Canal Operation Levels of Coastal Canals (SFWMD 2000c).

Canal/Structure	Minimum Canal Operation Levels to Protect Against MFL Violations (ft NGVD)
C-51/S-155	7.80
C-16/S-41	7.80
C-15/S-40	7.80
Hillsboro/G-56	6.75
C-14/S-37B	6.50
C-13/S-36	4.00
North New River/G-54	3.50
C-9/S-29	2.00
C-6/S-26	2.50
C-4/S-25B	2.50
C-2/S-22	2.50

MFL Criteria for the Caloosahatchee River and Estuary

The Caloosahatchee Estuary MFL criteria are based on maintaining freshwater base flows to the upper reaches of the Caloosahatchee Estuary, which will prevent excessive salinity levels in the estuary from causing significant harm to submerged aquatic vegetation and fish and invertebrate communities (SFWMD 2000d). Research data were used to relate freshwater flow rates to salinity distributions along the Caloosahatchee River and to correlate biological community responses to varying salinity conditions. These relationships were established for submerged aquatic vegetation, fish and invertebrates, with major emphasis on the salinity requirements of the freshwater grass *Vallisneria* (commonly known as tape grass or eel grass). It was determined that the distribution and abundance of *Vallisneria* at a location 30 kilometers upstream of Shell Point is the best biological indicator for addressing freshwater flow needs for the restoration of the Caloosahatchee Estuary. The magnitude of die-off, combined with the frequencies of die-off events, and the resulting impact to fisheries resulting from the loss of *Vallisneria* habitat formed the basis of the proposed MFL criteria.

Low freshwater flows, when sustained, cause an increase in salinity, which result in die-off of *Vallisneria* to less than 20 shoots per square meter, as measured at a monitoring station located 30 kilometers upstream of Shell Point during the months of February through April. Significant harm to the Caloosahatchee Estuary is considered to occur when these freshwater grasses die back due to high salinity from low freshwater inflows for three years in succession. Harm to the Caloosahatchee Estuary is considered to occur

when freshwater grasses die back due to high salinity from low freshwater inflows, for two consecutive years. The freshwater inflow needed to prevent harm or significant harm is an average of 300 cubic feet per second (cfs) per day at the S-79 Structure during the months of February through April.

The MFL Rule 40E-8.011(3), F.A.C., stated that the minimum flow criteria for the Caloosahatchee River and Estuary should be reviewed and amended as needed within one year of the effective date of the rule. The purpose of this review is to re-examine the technical and scientific basis of the Caloosahatchee MFLs based on review comments and results from field observations, laboratory experiments and model development. The status update document (SFWMD 2003) specifically evaluated the ability of the 300 cfs discharge at the S-79 Structure to protect the submerged aquatic vegetation.

MFL Criteria for the St. Lucie River and Estuary

The MFL Rule 40E-8.341, F.A.C., for the St. Lucie River and Estuary states that mean monthly flows to the St. Lucie Estuary should not fall below 28 cfs from the Gordy Road Structure to the St. Lucie River North Fork for two consecutive months during a 365-day period, for two consecutive years. The proposed MFLs criteria for the St. Lucie River and Estuary were based on the determination that significant harm occurs to the oligohaline zone when net freshwater flows (sum of surface and groundwater inflows minus evaporation) to the estuary are at or below zero for a period of two consecutive months for two or more years in succession (SFWMD 2002c).

MFL Criteria for Florida Bay

The MFL criteria for Florida Bay were formally adopted by the District's Governing Board in November 2006. Pursuant to the MFL Rule 40E-8.221(5), F.A.C., a MFL violation occurs in northeastern Florida Bay when a MFL exceedance occurs during two successive years, more than once in a 10-year period. An exceedance of the minimum flow criteria will be deemed to occur when the average salinity over 30 or more consecutive days exceeds 30 parts per thousand (ppt) at the Taylor River salinity monitoring station, located at 25° 13' 29" north and 80° 39' 10" west (SFWMD 2006b). Multiple events of 30 or more day periods with salinity greater than 30 ppt, occurring within a single calendar year, are considered as a single exceedance.

MFL Criteria for the Northwest Fork of the Loxahatchee River

Pursuant to the MFL Rule 40E-8.221(1), F.A.C., a MFL violation occurs in the Northwest Fork of the Loxahatchee River when a MFL exceedance occurs more than once in a six-year period. A MFL exceedance occurs in the Northwest Fork of the Loxahatchee River when flows over the Lainhart Dam, located in the Northwest Fork of the Loxahatchee River, decline below 35 cfs for more than 20 consecutive days, or the average daily salinity concentration expressed as a 20-day rolling average exceeds two

parts per thousand. The average daily salinity will be representative of mid-depth in the water column at River Mile 9.2 (SFWMD 2002b).

MFL RECOVERY AND PREVENTION STRATEGIES FOR SPECIFIC WATER BODIES

Pursuant to the requirements of the MFL statute, analyses of current and future conditions were conducted for each of the priority water bodies for which MFLs had been defined. When the evaluation showed that MFLs were not being achieved or will not be met in the future, MFL recovery strategies were developed. When evaluations demonstrated that the MFL criteria would not be expected to be violated for the next 20 years, an MFL prevention strategy was developed. Following are the MFL recovery strategies for Lake Okeechobee, the Everglades, Caloosahatchee River and Estuary, and the Northwest Fork of the Loxahatchee River. Also included are the MFL prevention strategies for the Biscayne Aquifer, St. Lucie River and Estuary, and Florida Bay.

Lake Okeechobee

As discussed above, implementation of the new Lake Okeechobee (LORS) regulation schedule is projected to result in MFL violations. As a result, the following MFL recovery strategy will be used to: 1) moderate the impacts of an MFL violation during drought condition, 2) mitigate the impacts of MFL violations during drought conditions, and 3) ultimately prevent MFL violations. To achieve these goals, the Lake MFL recovery strategy is comprised of three elements: 1) capital project construction, 2) regulatory strategies (permit and water shortage criteria) and 3) habitat enhancements implemented during a Lake MFL exceedance/violation.

Capital Project Construction Element: The capital projects, timelines for completion and cost are shown in Table 1 above. These projects include the construction of reservoirs north of the Lake, within the EAA and within the C-43 and C-44 basins (listed under the Caloosahatchee and St Lucie Estuary MFL in Table 1). These projects will provide for storage of wet season flows that would otherwise have to be discharged to tide under LORS. The other capital component is the repair of the Herbert Hoover Dike. While the USACE estimates the full repair will take 30 years (predicated on funding), they have prioritized the repairs such that more storage could be safely held in the Lake many years before the full repairs are completed. It is anticipated that with the partial completion of these capital projects and associated modifications to the USACE Lake regulation schedule, sufficient additional storage will be available to prevent Lake MFL violations in the future.

Regulatory Element: Until such time that the structural projects have provided sufficient storage and an associated revised regulation schedule has been adopted that prevents MFL violations, the District shall implement interim regulatory strategies for consumptive uses of the Lake. Since the new Lake Okeechobee regulation schedule (LORS) effectively reduces water availability for existing users to less than the 1 in 10 level of certainty and is projected to contribute to MFL violations, interim modifications

to the consumptive use permit application rules affecting users of Lake water are necessary. In summary, these interim rule modifications will protect existing legal users of Lake water but prevent increases in total demands. Increased demands over the base condition water use within LOSA may be accomodated through reallocation of retired permits, use of alternative sources (such as groundwater), and implementation of offsets to recharge volumes equal to increased withdrawals in accordance with the rule's provisions. The rules also prevent expansion of public water supply uses which exceed a specified threshold as these uses are determined incompatible with the operations, reliability, and limited availability of Lake water. Temporary increases in public water supply user's base condition water use are allowable for limited periods of time as related to development of alternative water supply projects. Compliance with these rules will assure that such uses are consistent with Everglades restoration implementation. The new regulation schedule will also result in more frequent and severe Lake based water shortages. In order to address this, the District made changes to the Water Shortage rule (40E-21 F.A.C.) in November 2007 to clarify how cutbacks would be calculated and applied to agricultural uses within the Lake Okeechobee Basin.

Lake Habitat Enhancement Element: Several lake management options can be implemented to improve the Lake and mitigate impacts as a result of extreme low levels associated with droughts. Periods of low water conditions will allow the District to conduct native aquatic and tree plantings, as well as sediment scraping and other habitat enhancements, and potentially include efforts to supplement natural apple snail populations. Table 4 identifies some of the stage-dependent initiatives that will be undertaken by the District and other agencies to offset the significant harm, which would otherwise be caused by low Lake Okeechobee water levels that exceed MFL criteria.

Table 4. Components of the Lake Okeechobee Recovery Plan.

Lake Level	Recovery Component	Benefits
At 11' NGVD and the stage is falling	Sediment scraping and other habitat enhancements, including removal of tussocks and other aggregations of organic material, such as the western berm.	Promote natural compaction, removal and/or oxidation of accumulated organic muck sediments. Removes barriers to fish migration in and out of the western littoral zone.
At or below 11' NGVD	Conduct controlled burns if fuel load and weather conditions permit.	Facilitate the removal of exotic species, such as torpedograss.
Below 11' NGVD	Allow maintenance and repair work on public boat ramps, and docking and marina facilities.	Restore original design depth of the waterways and provide navigable access.
At 10.5' NGVD and the stage is falling	Plant native terrestrial and emergent vegetation, such as bulrush (if a method for re-establishment proves to be feasible), native pond apples (*Anona galbra*), and cypress trees on the southern shore islands and on rim canal spoil islands.	Re-establish native trees on the islands to help prevent expansion of exotic and invasive vegetation and provide essential habitat for wading birds, raptors and endangered species, such as the snail kite and Okeechobee gourd.
Between 10' and 11' NGVD and the stage is rising	Plant native vegetation species, such as submerged aquatic vegetation (SAV) and emergent vegetation, such as bulrush.	Re-establish native plant species, which can prevent the expansion of exotic and invasive vegetation; assist in restoring fish and wildlife habitats; prevent uprooting of emergent and submerged plants; and, reduce turbidity, which in turn promotes and maintains SAV growth
At 11' NGVD and the stage is rising	Assess the feasibility of introducing apple snail populations via an apple snail hatchery or other techniques.	Supplement native apple snail populations for the endangered snail kite.
Non-lake stage dependent components	Investigate sediment management strategies in the tributaries and the pelagic zone of the Lake.	Remove phosphorus-laden sediment that has the potential to re-suspend, and thus, reduce light transparency, which discourages growth of SAV and encourages phytoplankton bloom activity.

Everglades National Park and the Water Conservation Areas

This section discusses the water supply issues related to the Water Conservation Areas (WCAs) and Everglades National Park; the urban areas in Palm Beach, Broward and Miami-Dade counties and the Florida Keys portion of Monroe County; and, three adjacent regional ecosystems—the Northwest Fork of the Loxahatchee River, Biscayne Bay and Florida Bay. Although it is located in the Upper East Coast (UEC) Planning Area, Martin County is considered to the degree that future water supply may be affected by rulemaking related to the Northwest Fork of the Loxahatchee River.

As described in Chapter 3, the Everglades and the three adjacent ecosystems were naturally interconnected by sloughs and rivers prior to man's creation of drainage and other features, and the ecosystem components are still connected by water management facilities. Extensive efforts are under way to restore more natural water movement to and between the areas, while addressing the needs of a growing population.

In the 2000 LEC Plan, the Governing Board recommended development of a rule to identify the water available from the Everglades ecosystem (WCAs, Everglades National Park, and Holey Land and Rotenberger wildlife management areas) for allocation to consumptive uses. The 2000 LEC Plan recognized there were several tools to do this, including reservations, MFLs and consumptive use permit (CUP) rules. Prior to 2000, the District did not have any rules in place to analyze the cumulative regional effect of consumptive uses on the Everglades systems. The modeling conducted in the 2000 LEC Plan to estimate the additional water available from the Everglades assumed that the Comprehensive Everglades Restoration Plan (CERP) would be implemented as scheduled, growth would increase as projected and that operations of major regional sources, such as Lake Okeechobee, would not change.

A MFL for the Everglades was adopted in 2001, which found that significant harm was occurring to the ecosystem, and a recovery strategy for achieving the MFL was adopted. This recovery plan did not propose to place strict limits on projected increases from the regional system; however, it assumed that if growth occurred in the projected time frames and the CERP was implemented as scheduled, increases in allocations depending on the Everglades source for recharge could continue at a measured pace. This approach was implemented for the next several years. Also in 2003, along with the B-List rules, a permit duration rule was adopted that identified the Central and Southern Florida Flood Control Project (C&SF Project) and dependent groundwater sources as a "source of limited availability." This meant that only historically used demands would receive a 20-year duration at permit renewal, and increases over that amount would only be authorized for a five-year period. In 2004, as a next step to respond to requests for additional water from sources dependent on Everglades recharge greater than the volume contemplated in the 2000 LEC Plan, the District developed the Consumptive Use Permit/CERP (CUP/CERP) Guiding Principles. Under these principles, the District continued to authorize measured increases in allocations even over those

projected in the 2000 LEC Plan, as long as no impact from such allocations were projected to occur on water availability from the Everglades.

During the next two years, however, these assumptions relied on implementing the MFL recovery plan, and the consumptive use permitting process did not bear out as planned. As a result, in the consumptive use permitting process (even as early as 2002), the Governing Board continued to develop policies to address the increasing requests for water from the Everglades ecosystem. In these permits, increased demands over historic use were authorized only for a temporary time period, during which alternative sources or offsets to replace the increased reliance on the Everglades were required to be developed. These policies continued to be developed on a permit-by-permit basis until April 2006 when the Governing Board authorized staff to initiate rule development on a Regional System Water Availability Rule to limit increased dependence on the Everglades system. This rulemaking effort is also addressing withdrawals that require increased water from the Loxahatchee River Watershed water bodies.

In February 2007, the SFWMD Governing Board authorized the adoption of the Regional System Water Availability Rule. This rule limits allocations on permit renewal or modification to conditions or pumpage, depending on the specific use class, that existed prior to April 1, 2006, known as the "base condition water use." The rule only allows allocations over the "base condition water use" if additional impacts to the Everglades are avoided through alternative source development, or eliminated through the implementation of offsets (recharge barriers, recharge trenches), or terminated or reduced water uses that existed as of April 1, 2006. Wet-season water can also be allocated if the permit applicant demonstrates that such flows are not needed for restoration of the Everglades pursuant to the CERP, Acceler8 or the *Northern Palm Beach County Water Management Plan* (for the Loxahatchee River Watershed water bodies) (SFWMD 2002a). This rule also becomes a part of the MFL recovery plan for both the Everglades and the Northwest Fork of the Loxahatchee River.

Biscayne Aquifer

Measures to prevent the MFL criteria from being exceeded for the Biscayne Aquifer are as follows: 1) maintain coastal canal stages at the minimum operation levels specified in the MFL rule; 2) implement CUP conditions for issuance to prevent harmful movement of saltwater intrusion up to a 1-in-10 year level of certainty; 3) maintain a groundwater monitoring network and use data to initiate water shortage cutbacks should the threat of saline water movement become imminent; and, 4) conduct research in high risk areas to identify where the position of the saltwater front is adjacent to existing and future potable water sources (SFWMD 2000c). In addition, the District is conducting studies and providing incentives to local governments to use highly treated reclaimed water to provide aquifer recharge, combat saltwater intrusion, reduce the potential for MFL exceedances in the Biscayne Aquifer, and reduce conflicts between urban water uses and water needed for protection of natural systems.

Caloosahatchee River and Estuary

The MFL update study (SFWMD 2003) concluded that the 300 cubic feet per second (cfs) target for flows across the S-79 Structure, by itself, does not provide sufficient flow to fully protect water resources from significant harm. Additional or improved storage facilities may need to be provided in the watershed, including downstream of the S-79 Structure. The MFL should incorporate local basin runoff west of the S-79 Structure. Flows higher and lower than the average of 300 cfs should be considered based on the downstream impact. However, before any decisions are made to modify the CERP projects or the MFL criteria, estuarine and biological models need to be completed and fully calibrated, and improved flow measurements need to be obtained, especially for downstream tidal basin inflows.

Since establishing the MFL criteria for the Caloosahatchee River, the criteria have been exceeded during three of four years, resulting in one MFL violation (two consecutive years). The expectation is that periodic to frequent exceedances and violations of these criteria will continue to occur until the recovery plan is implemented. The recovery plan includes such projects as the Acceler8 C-43 West Reservoir Project (see Table 1), which, when completed and operational, will provide additional flow to the estuary during dry periods. Despite difficulties in meeting the MFL, high-volume flows during 2004, 2005 and 2006 were a much greater concern.

The SFWMD adopted revisions to the manner in which water is released from Lake Okeechobee, as described in the document, entitled *Adaptive Protocols for Lake Okeechobee Operation*s (SFWMD *et al.* 2003). These protocols, among other features, establish criteria for releasing water from the lake to alleviate problems that arise from low-flow conditions in the Caloosahatchee River, including the upstream migration of salt water. Water managers are allowed to release water to the estuary as needed when the lake is within Zone D, without obtaining prior permission from the Governing Board. When the lake is in lower zones, releases can be made to the estuary to alleviate salinity problems and prevent exceedances of the MFL criteria, with Governing Board

concurrence. Such releases have been made several times during recent years and have proven to be helpful in reducing the magnitude and frequency of MFL exceedances.

Analyses of both the 1995 and 2020 base cases, as presented in the 2000 LEC Plan (SFWMD 2000b), showed that the proposed MFL criteria for the Caloosahatchee Estuary would be exceeded. Therefore, a recovery plan was needed. Quantities of water in Lake Okeechobee seem to be insufficient to avoid significant harm to the Caloosahatchee Estuary until the proposed long-term regional storage facilities that comprise the recovery plan are built. These regional storage facilities, including aquifer storage and recovery (ASR) and regional surface water reservoirs, were recommended in the 2000 LEC Plan and the *Caloosahatchee Water Management Plan* (CWMP) (SFWMD 2000a).

Long-term evaluations conducted for both the *Central and Southern Florida Project Comprehensive Review Study* (Restudy) (USACE and SFWMD 1999) and the CWMP (SFWMD 2000a) indicated that both MFLs and minimum restoration flows (300 cfs during the spring) can be met through a combination of constructed reservoirs and limited deliveries from Lake Okeechobee and ASR systems located within the basin. Over the next five years, activities for construction of regional facilities include: a) implementation of the Caloosahatchee River (C-43) ASR Pilot Project; b) development of the Project Implementation Report (PIR) for the C-43 West Reservoir; and, c) completion of the Southwest Florida Feasibility Study. The reservoir and ASR projects are scheduled for completion in 2010 and 2015, respectively (Table 1).

St. Lucie River and Estuary

Although the St. Lucie River and Estuary currently receive an adequate supply of fresh water, and are expected to continue to do so as the CERP is implemented, a prevention strategy may be required to protect this resource (SFWMD 2002c). The ability to better manage water in the watershed may also make it possible to capture and retain water from the watershed for allocation to other users (e.g., urban and agricultural water supply).

The primary prevention strategy component is to manage discharges into the North Fork within the operational protocols of the Ten Mile Creek Project, construction of which was completed in 2006, with the exception of storm damage repairs and improvements. These projects are expected to be completed in 2008. In addition, research and monitoring efforts for the North and South Forks of the St. Lucie River are being developed and implemented by the SFWMD Watershed Management Department to determine long-term water needs in the river and estuary

Northwest Fork of the Loxahatchee River

The MFL study indicated that the proposed criteria for the Loxahatchee River will be exceeded on a regular and continuing basis, and therefore, recovery and prevention strategies are needed to protect water resources in the river from significant harm. Analysis of historical information shows that over the past 10 years, the proposed

minimum flow level of 35 cfs is exceeded approximately 25 percent of the time under current conditions (SFWMD 2002b). These low-flow conditions occurred frequently, such that an exceedance of the MFL criteria (flow less than 35 cfs for 20 consecutive days duration) occurred 34 times in 31 years or approximately once each year. The proposed criteria cannot be met because of a lack of sufficient water conveyance infrastructure and regional storage facilities. To address these issues, the MFL document identified specific projects that will be built in coming years to provide additional water to supplement the river and continue monitoring efforts to track the effects of these changes on water resources.

The structural and operational features of the recovery plan will be implemented through ongoing SFWMD water supply development efforts, including projects identified in the 2000 LEC Plan (SFWMD 2000b), many features of the *Northern Palm Beach County Comprehensive Water Management Plan* (SFWMD 2002a), and the Restudy (USACE and SFWMD 1999). The CERP projects will also provide the additional water needed to achieve restoration for the river (USACE and SFWMD 2005).

While the various projects are being built, a key component for the river's management is to continuously monitor salinity at River Mile 9.2, flow across Lainhart Dam and periodically assess vegetation communities in the floodplain. This information will be used as a basis to operate water control facilities to deliver a flow of 50 cfs to the river whenever sufficient water is available from the regional system as a means to reduce the upstream migration of salt water in the Northwest Fork.

Although sufficient water needed to meet the MFL recovery plan was provided by projects within the 2000 LEC Plan (SFWMD 2000b), the additional water needed to meet the restoration goals will need to be provided by the CERP North Palm Beach County Project – Part 1. The CERP includes features that will increase storage in the L-8 Basin through the construction of a reservoir and ASR wells (USACE and SFWMD 1999). Modeling studies using discharge scenarios, which included the CERP and 2000 LEC Plan projects, indicate that the MFLs and the restoration plan targets will be met when these facilities are completed and fully operational. As noted previously, the Regional System Water Availability Rule addresses the Loxahatchee River Watershed and will become part of the MFL Recovery Plan.

Florida Bay

Data analysis and modeling studies provided in the report, entitled *Technical Documentation to Support Development of Minimum Flows and Levels for Florida Bay* (Florida Bay MFL Technical Support Document) (SFWMD 2006b), indicated that the MFL criteria were not likely to be exceeded under recent historic climatic conditions (represented by 36 years of historical rainfall records from 1965 to 2000) and current operational policies and procedures. Therefore, a recovery strategy was not required for the northeastern Florida Bay MFL. However, a prevention strategy is provided to minimize the likelihood that a violation of the MFL criteria will occur.

Technical studies conducted by the District and described in the *Technical Documentation to Support Development of Minimum Flows and Levels for Florida Bay* indicate that prevention of future significant harm to water resources and functions in northeastern Florida Bay can be achieved by continuing to provide sufficient freshwater flow to maintain monthly average salinities of less than 30 practical salinity units (psu) at the Taylor River monitoring site. Modeling studies indicated that high salinities (greater than 30 psu) generally occurred in the salinity transition zone (saline wetland adjacent to Florida Bay) during periods when salinities at the Taylor River site were elevated (19 psu or higher) at the beginning of the calendar year, local rainfall was below normal, and total freshwater flows to northeastern Florida Bay were below normal.

As part of a continuing adaptive management program for this region, upstream and downstream flows, water levels and salinity at the Taylor River site, and submerged aquatic vegetation (SAV) resources along the transect should be continually monitored. Within the framework of the Combined Structural and Operational Plan (CSOP) for the Modified Water Deliveries to Everglades National Park and C-111 Project, freshwater flows through the transition zone can potentially be managed prior to dry periods to prevent high salinity conditions by providing water from the regional system. Analyses for the MFL did not determine whether regional water would be available under such dry conditions, if the quality would be acceptable, or if any other portions of the Everglades ecosystem would be impacted. As noted previously, the Everglades ecosystem is a MFL water body in recovery. Any proposal for increased withdrawals, whether for consumptive use or environmental enhancement of another ecosystem, must be considered in that light.

Analyses needed to guide any potential operational modifications for improved management of freshwater discharges to the headwaters of Taylor Slough and the southeast Everglades will be done with full consideration of the Everglades MFL and in coordination with the CSOP and other ongoing projects and planning efforts, most notably the C-111 Spreader Canal Acceler8 and CERP projects; the CERP Florida Bay and Florida Keys Feasibility Study; and, any associated operational and construction plans pursuant to these projects.

Results presented in the Florida Bay MFL technical report did indicate that total annual freshwater flows into northeastern Florida Bay above 105,000 acre-feet and/or three-month total flows in the early dry season above 7,000 acre-feet are generally sufficient to avoid exceedances of the MFL salinity criterion and severe ecological impacts, such as loss of SAV habitat and associated organisms within the transition zone and northeastern Florida Bay. These estimates provide an initial guide toward successful MFL adaptive management. Such an adaptive approach was also recommended by the independent peer review panel that reviewed the Florida Bay MFL Technical Support Document (SFWMD 2006b).

If water demands on the regional system increase in the future, or water is diverted away from Taylor River to meet demands elsewhere within the Everglades, then future planning efforts and field tests may be required at that time to evaluate the feasibility of

providing additional regional storage, which may be needed to meet MFL requirements for the protection of the Florida Bay ecosystem.

Florida Bay Monitoring and Research Needs

The adopted MFL rule calls for the District to "continue field monitoring and research to assess salinity, water level and flow conditions and biological resource response in the region… ." Monitoring and research are necessary to: 1) assess the state of the Florida Bay ecosystem relevant to the documentation and prevention of MFL exceedances, and 2) to assess the validity of adopted MFL criteria to prevent significant harm and improve the scientific basis for any future revision of the Florida Bay MFL criteria. The adopted Florida Bay MFL rule specifies that a review and potential revision of the rule will be done within five years of adoption of the original rule. The scientific peer review of the Florida Bay MFL technical documentation generally supported the approach, concept and conclusions used to define the MFL criteria, but also identified a number of areas where additional information or research is needed to further support the results and conclusions. Actions recommended by the peer review panel are summarized in Section 2, which follows.

1) Monitoring for MFL Rule Documentation and Prevention of Exceedances.

The Florida Bay MFL Rule specifies that the salinity criterion be based on measurements at a single indicator site, the Taylor River site. Salinity is currently measured at this site by Everglades National Park (ENP) with support from the District. It is essential that this monitoring continue. Furthermore, the MFL rule specifies the minimum flow estimated to be needed to prevent an exceedance and specifies a set of five stations where this flow is measured. These flow meter stations are at the mouths of major creeks flowing into Florida Bay and are operated by the U.S. Geological Survey (USGS). It is also essential that monitoring of freshwater discharge at these sites continue. The MFL technical report also noted that stages at the Craighead Pond site in lower Taylor Slough are a promising indicator of MFL exceedances. Continued stage monitoring at this site (by ENP) is strongly recommended. Information from this monitoring is essential for the success of any adaptive operational efforts to prevent exceedances.

2) Monitoring and Research to Assess the Validity of MFL Criteria to Prevent Significant Harm and Improve Future Florida Bay MFL Criteria.

An independent scientific peer review panel reviewed the Florida Bay MFL Technical Support Document (SFWMD 2006b) and found it to be a sound initial effort to quantify the relationship between hydrologic and biological resources, provide a basis for the definition of significant harm, and provide a basis for MFL criteria. However, the peer review report (*Overall Review and Responses to Technical Questions "Technical Documentation to Support Development of Minimum Flows and Levels (MFL) for Florida Bay"*) did identify many shortcomings of the technical analysis, and the panel's recommendations helped guide the development of these important monitoring and research plans for MFL technical

improvement within the next five years (SFWMD 2006a). Key recommendations include:

- Broaden the geographic domain of the MFL.
- Improve hydrologic modeling.
- Continue monitoring *Ruppia maritima* and initiate *Ruppia* research.
- Initiate *Ruppia* modeling.
- Consider other submerged aquatic vegetation in the salinity transition zone as MFL indicators.
- Increase information and analysis of the relationship of salinity, habitat (e.g., with *Ruppia*), and animal species.

Continuation of existing hydrologic monitoring (see previous Section 1) should provide sufficient information for assessment and improvement of the Florida Bay MFL. However, improved modeling over a broader scale, as recommended by the peer review panel, should soon be possible, because of model development within the CERP's Florida Bay and Florida Keys Feasibility Study (FBFKFS). On an independent, but parallel path, this project is exploring relationships between structural operations, water levels, flows and salinity in Florida Bay. The development and application of TIME (watershed) and EFDC (hydrodynamic) models will provide tools that can better characterize the hydrologic-salinity relationships in the northeastern Florida Bay subregion and the bay as a whole. The FBFKFS presents an opportunity to evaluate these hydrologic-salinity relationships and provides either additional support for, or a basis to, modify the current MFL Rule. These models may need to be further modified or refined in order to provide sufficient spatial or temporal resolution to determine the influence of managed flows or operational effects on salinity. Within the span of two years, a decision point is expected to be reached to determine whether an independent project is needed to support the MFL effort through supplemental data collection or model modification.

Based on the peer review report, it is clear that improved information is needed on the status and trends, and cause and effect relationships of several submerged aquatic vegetation species that comprise critical habitat of Florida Bay and its salinity transition zone. Foremost is the need to better document the distribution and seasonality of *Ruppia* in relationship to salinity change and test the adequacy of the species as the MFL indicator. Expanding the geographic extent of monitoring along the northern edge of Florida Bay, including waters from Long Sound to near Garfield Bight (and, if possible, Whitewater Bay), will provide a wider range of salinity and conditions than were considered in the initial MFL technical report. This will also provide the ability to test the variability of *Ruppia* response patterns and assumptions associated with the MFL criteria. Other associated submerged aquatic vegetation species (including more salinity sensitive species, such as *Najas, Chara, Utricularia*) should also be monitored. Research of *Ruppia* should, as recommended by the review panel, include experiments on salinity and other interacting factors that affect the growth, survivorship and reproductive success of

the species. Finally, the Florida Bay Seagrass Community Model should be expanded to include *Ruppia*.

While the initial Florida Bay MFL did include the analysis of forage fish and other animals within Florida Bay proper, it did not include the analysis of information about the animal community of the salinity transition zone. Furthermore, analyses that were included were relatively crude and indicated high uncertainty regarding the effects of salinity and water management on these resources. Thus, the peer review panel strongly recommended new monitoring and research to assess the status of fish and macroinvertebrates, their sensitivity to salinity levels, and dependence of habitat quantity and quality. The greatest need is within the salinity transition zone, and initiating monitoring and research to assess relationships with salinity and habitat in coastal ponds will greatly advance the ability to improve the scientific basis of the MFL. Complex modeling is not practical within the next five years, and numerical analyses will likely be done using statistical approaches.

REFERENCES CITED

South Florida Water Management District. 2000a. *Caloosahatchee Water Management Plan.* Water Supply Department, SFWMD, West Palm Beach, FL.

South Florida Water Management District. 2000b. *Lower East Coast Regional Water Supply Plan.* Water Supply Department, SFWMD, West Palm Beach, FL.

South Florida Water Management District. 2000c. *Minimum Flows and Levels for Lake Okeechobee, the Everglades, and the Biscayne Aquifer.* Water Supply Department, SFWMD, West Palm Beach, FL.

South Florida Water Management District. 2000d. *Technical Documentation to Support Development of Minimum Flows and Levels for the Caloosahatchee River and Estuary.* Water Supply Department, SFWMD, West Palm Beach, FL. 86 pp.

South Florida Water Management District. 2002a. *Northern Palm Beach County Comprehensive Water Management Plan.* Water Supply Department, SFWMD, West Palm Beach, FL. 2 vols.

South Florida Water Management District. 2002b. *Technical Documentation to Support Development of Minimum Flows and Levels for the Northwest Fork of the Loxahatchee River.* Water Supply Department, SFWMD, West Palm Beach, FL. 3 vols.

South Florida Water Management District. 2002c. *Technical Documentation to Support Development of Minimum Flows for the St. Lucie River and Estuary.* Water Supply Department, SFWMD, West Palm Beach, FL. 2 vols.

South Florida Water Management District. 2003. *Technical Documentation to Support Development of Minimum Flows for the Caloosahatchee River and Estuary. Draft Status Update Report.* January 2003. Southern District Research Department and Water Supply Department, SFWMD, West Palm Beach, FL.

South Florida Water Management District, U.S. Army Corps of Engineers and Florida Department of Environmental Protection. 2003. *Adaptive Protocols for Lake Okeechobee Operations.* SFWMD, West Palm Beach, FL. vari. pag.

South Florida Water Management District. 2006a. *Overall Review and Responses to Technical Questions "Technical Documentation to Support Development of Minimum Flows and Levels (MFL) for Florida Bay."* SFWMD, West Palm Beach, FL. Available from: https://my.sfwmd.gov/portal/page?_pageid=1874,4165910,1874_4167211&_dad=portal&_schema=PORTAL

South Florida Water Management District. 2006b. *Technical Documentation to Support Development of Minimum Flows for Florida Bay.* Watershed Management and Water Supply Departments, SFWMD, West Palm Beach, FL. 202 pp.

United States Army Corps of Engineers and South Florida Water Management District. 1999. *Central and Southern Florida Flood Control Project Comprehensive Review Study Final Integrated Feasibility Report and Programmatic Environmental Impact Statement.* USACE, Jacksonville District, Jacksonville, FL, and SFWMD, West Palm Beach, FL.

United States Army Corps of Engineers and South Florida Water Management District. 2005. *Central and Southern Florida Project Comprehensive Everglades Restoration Plan. Project Management Plan, North Palm Beach County – Part 1.* USACE, Jacksonville District, Jacksonville, FL, and SFWMD, West Palm Beach, FL. 57 pp.

NOTICE OF RIGHTS

As required by Sections 120.569(1), and 120.60(3), Fla. Stat., following is notice of the opportunities which may be available for administrative hearing or judicial review when the substantial interests of a party are determined by an agency. Please note that this Notice of Rights is not intended to provide legal advice. Not all the legal proceedings detailed below may be an applicable or appropriate remedy. You may wish to consult an attorney regarding your legal rights.

RIGHT TO REQUEST ADMINISTRATIVE HEARING

A person whose substantial interests are or may be affected by the South Florida Water Management District's (SFWMD or District) action has the right to request an administrative hearing on that action pursuant to Sections 120.569 and 120.57, Fla. Stat. Persons seeking a hearing on a District decision which does or may determine their substantial interests shall file a petition for hearing with the District Clerk within 21 days of receipt of written notice of the decision, unless one of the following shorter time periods apply: 1) within 14 days of the notice of consolidated intent to grant or deny concurrently reviewed applications for environmental resource permits and use of sovereign submerged lands pursuant to Section 373.427, Fla. Stat.; or 2) within 14 days of service of an Administrative Order pursuant to Subsection 373.119(1), Fla. Stat. "Receipt of written notice of agency decision" means receipt of either written notice through mail, or electronic mail, or posting that the District has or intends to take final agency action, or publication of notice that the District has or intends to take final agency action. Any person who receives written notice of a SFWMD decision and fails to file a written request for hearing within the timeframe described above waives the right to request a hearing on that decision.

Filing Instructions

The Petition must be filed with the Office of the District Clerk of the SFWMD. Filings with the District Clerk may be made by mail, hand-delivery or facsimile. **Filings by e-mail will not be accepted.** Any person wishing to receive a clerked copy with the date and time stamped must provide an additional copy. A petition for administrative hearing is deemed filed upon receipt during normal business hours by the District Clerk at SFWMD headquarters in West Palm Beach, Florida. Any document received by the office of the SFWMD Clerk after 5:00 p.m. shall be filed as of 8:00 a.m. on the next regular business day. Additional filing instructions are as follows:

- Filings by mail must be addressed to the Office of the SFWMD Clerk, P.O. Box 24680, West Palm Beach, Florida 33416.
- Filings by hand-delivery must be delivered to the Office of the SFWMD Clerk. **Delivery of a petition to the SFWMD's security desk does <u>not</u> constitute filing. To ensure proper filing, it will be necessary to request the SFWMD's security officer to contact the Clerk's office.** An employee of the SFWMD's Clerk's office will receive and file the petition.
- Filings by facsimile must be transmitted to the SFWMD Clerk's Office at (561) 682-6010. Pursuant to Subsections 28-106.104(7), (8) and (9), Fla. Admin. Code, a party who files a document by facsimile represents that the original physically signed document will be retained by that party for the duration of that proceeding and of any subsequent appeal or subsequent proceeding in that cause. Any party who elects to file any document by facsimile shall be responsible for any delay,

disruption, or interruption of the electronic signals and accepts the full risk that the document may not be properly filed with the clerk as a result. The filing date for a document filed by facsimile shall be the date the SFWMD Clerk receives the complete document.

Initiation of an Administrative Hearing

Pursuant to Rules 28-106.201 and 28-106.301, Fla. Admin. Code, initiation of an administrative hearing shall be made by written petition to the SFWMD in legible form and on 8 and 1/2 by 11 inch white paper. All petitions shall contain:

1. Identification of the action being contested, including the permit number, application number, District file number or any other SFWMD identification number, if known.
2. The name, address and telephone number of the petitioner and petitioner's representative, if any.
3. An explanation of how the petitioner's substantial interests will be affected by the agency determination.
4. A statement of when and how the petitioner received notice of the SFWMD's decision.
5. A statement of all disputed issues of material fact. If there are none, the petition must so indicate.
6. A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the SFWMD's proposed action.
7. A statement of the specific rules or statutes the petitioner contends require reversal or modification of the SFWMD's proposed action.
8. If disputed issues of material fact exist, the statement must also include an explanation of how the alleged facts relate to the specific rules or statutes.
9. A statement of the relief sought by the petitioner, stating precisely the action the petitioner wishes the SFWMD to take with respect to the SFWMD's proposed action.

A person may file a request for an extension of time for filing a petition. The SFWMD may, for good cause, grant the request. Requests for extension of time must be filed with the SFWMD prior to the deadline for filing a petition for hearing. Such requests for extension shall contain a certificate that the moving party has consulted with all other parties concerning the extension and that the SFWMD and any other parties agree to or oppose the extension. A timely request for extension of time shall toll the running of the time period for filing a petition until the request is acted upon.

If the District's Governing Board takes action with substantially different impacts on water resources from the notice of intended agency decision, the persons who may be substantially affected shall have an additional point of entry pursuant to Rule 28-106.111, Fla. Admin. Code, unless otherwise provided by law.

Mediation

The procedures for pursuing mediation are set forth in Section 120.573, Fla. Stat., and Rules 28-106.111 and 28-106.401-.405, Fla. Admin. Code. The SFWMD is not proposing mediation for this agency action under Section 120.573, Fla. Stat., at this time.

RIGHT TO SEEK JUDICIAL REVIEW

Pursuant to Sections 120.60(3) and 120.68, Fla. Stat., a party who is adversely affected by final SFWMD action may seek judicial review of the SFWMD's final decision by filing a notice of appeal pursuant to Florida Rule of Appellate Procedure 9.110 in the Fourth District Court of Appeal or in the appellate district where a party

resides and filing a second copy of the notice with the SFWMD Clerk within 30 days of rendering of the final SFWMD action.