EXECUTIVE SUMMARY

The long-term Everglades water quality goal is to achieve the phosphorus criterion in the Everglades Protection Area. This document sets forth the initial phase of a plan to ultimately achieve that goal, and to permit the State of Florida and the South Florida Water Management District (District) to proceed to fulfillment of their obligations under both the Everglades Forever Act (EFA, F.S. 373.4592) and the federal Everglades Settlement Agreement (Case No. 88-1886-CIV-MORENO). Implementation of this Plan shall achieve water quality standards relating to the phosphorus criterion in the Everglades Protection Area by December 31, 2006. This plan consists of an optimal combination of source controls, Stormwater Treatment Areas (STAs), Advanced Treatment Technologies (ATTs), regulatory programs and integration with CERP projects for achieving water quality standards. In addition, this plan continues the strong science base and adaptive implementation philosophy to allow continuous improvement until the long-term water quality goal is achieved.

Substantial progress towards reducing phosphorus levels discharged into the EPA has been made by the State of Florida and other stakeholders. The combined performance of the regulatory program in the Everglades Agricultural Area (EAA) and the STAs constructed under the 1994 Everglades Construction Project (ECP), both mandated by the EFA, has exceeded expectations. Current projections suggest that, once all STAs are operational, the best estimate of the long-term flow-weighted mean TP concentrations in discharges from the ECP to the EPA is approximately 35 ppb (with a potential range of 25-45 ppb), as compared to the interim goal of 50 ppb established in the EFA. In addition, some source control measures have been implemented in urban and other tributary basins included in the Everglades Stormwater Program. Nonetheless, additional measures are necessary to ensure that all discharges to the Everglades achieve and maintain compliance with the phosphorus criterion established in Rule 62-302.540, F.A.C.

The EFA as amended in 2003 requires that:

(10) LONG-TERM COMPLIANCE PERMITS.—*By December 31, 2006, the department and the district shall take such action as may be necessary to implement the pre-2006 projects and strategies of the Long-Term Plan so that water delivered to the Everglades Protection Area achieves in all parts of the Everglades Protection Area state water quality standards, including the phosphorus criterion and moderating provisions.*
(a) By December 31, 2003, the district shall submit to the department an application for permit modification to incorporate proposed changes to the Everglades Construction Project and other

district works delivering water to the Everglades Protection Area as needed to implement the pre-2006 projects and strategies of the Long-Term Plan in all permits issued by the department, including the permits issued pursuant to subsection (9). These changes shall be designed to achieve state water quality standards, including the phosphorus criterion and moderating provisions. During the implementation of the initial phase of the Long-Term Plan, permits issued by the department shall be based on BAPRT, and shall include technology-based effluent limitations consistent with the Long-Term Plan, as provided in subparagraph (4)(e)3.
(b) If the Everglades Construction Project or other discharges to the Everglades Protection Area are in compliance with state water quality standards, including the phosphorus criterion, the permit application shall include:
1. A plan for maintaining compliance with the phosphorus criterion in the Everglades Protection Area.
2. A plan for maintaining compliance in the Everglades Protection Area with state water quality standards other than the phosphorus criterion.

This Long-Term Plan is intended to accompany and support the District's application for permit modification. This document updates and modifies the March 17, 2003 *Everglades Protection Area Tributary Basins, Conceptual Plan for Achieving Long-Term Water Quality Goals*, Burns & McDonnell, to reflect the Legislature's guidance as expressed in the EFA as amended, which states:

***(3) EVERGLADES LONG-TERM PLAN**.*
(b) The Legislature finds that the most reliable means of optimizing the performance of STAs and achieving reasonable further progress in reducing phosphorus entering the Everglades Protection Area is to utilize a long-term planning process. The Legislature finds that the Long-Term Plan provides the best available phosphorus reduction technology based upon a combination of the BMPs and STAs described in the Plan provided that the Plan shall seek to achieve the phosphorus criterion in the Everglades Protection Area. The pre-2006 projects identified in the Long-Term Plan shall be implemented by the district without delay, and revised with the planning goal and objective of achieving the phosphorus criterion to be adopted pursuant to subparagraph (4)(e)2. in the Everglades Protection Area, and not based on any planning goal or objective in the Plan that is inconsistent with this section. Revisions to the Long-Term Plan shall be incorporated through an adaptive management approach including a process development and engineering component to identify and implement incremental optimization measures for further phosphorus reductions. Revisions to the Long-Term Plan shall be approved by the department. In addition, the department may propose changes to the Long-Term Plan as science and environmental conditions warrant.
(c) It is the intent of the Legislature that implementation of the Long-Term Plan shall be integrated and consistent with the implementation of the projects and activities in the Congressionally authorized components of the CERP so that unnecessary and duplicative costs will be avoided. Nothing in this section shall modify any existing cost share or responsibility provided for projects listed in s. 528 of the Water Resources Development Act of 1996 (110 Stat. 3769) or provided for projects listed in section 601 of the Water Resources Development Act of 2000 (114 Stat. 2572). The Legislature does not intend for the provisions of this section to diminish commitments made by the State of Florida to restore and maintain water quality in the Everglades Protection Area, including the federal lands in the settlement agreement referenced in paragraph (4)(e).

(d) The Legislature recognizes that the Long-Term Plan contains an initial phase and a 10-year second phase. The Legislature intends that a review of this act at least 10 years after implementation of the initial phase is appropriate and necessary to the public interest. The review is the best way to ensure that the Everglades Protection Area is achieving state water quality standards, including phosphorus reduction, and the Long-Term Plan is using the best technology available. A 10-year second phase of the Long-Term Plan must be approved by the Legislature and codified in this act prior to implementation of projects, but not prior to development, review, and approval of projects by the department.
(e) The Long-Term Plan shall be implemented for a initial 13-year phase (2003-2016) and shall achieve water quality standards relating to the phosphorus criterion in the Everglades Protection Area as determined by a network of monitoring stations established for this purpose. Not later than December 31, 2008, and each 5 years thereafter, the department shall review and approve incremental phosphorus reduction measures.

A summary listing of the basins addressed in this Long-Term Plan is presented in Table ES-1; they are organized into two primary groupings:

- Those basins for which an interim water quality improvement strategy has been implemented through the 1994 Everglades Construction Project (the ECP Basins)
- Urban and other tributary basins not addressed by the 1994 ECP (the Everglades Stormwater Program, or ESP, Basins). Two other basins (C-111 Basin and Boynton Farms Basin) will be addressed by other District and Federal programs, and are not further discussed herein.

Table ES.1 Summary of Hydrologic Basins Addressed in This Long-Term Plan

Everglades Construction Project (ECP) Basins	
Hydrologic Basin	**Receiving Stormwater Treatment Area (STA)**
S-5A	STA-1W, STA-1E
S-6	STA-2
S-7/S-2	STA-3/4
S-8/S-3	STA-3/4, STA-6
Note: The above basins are referred to conjunctly as the Everglades Agricultural Area (EAA) Basin	
C-51 West	STA-1E
C-139	STA-5, STA-3/4
C-139 Annex	STA-6
Everglades Stormwater Program (ESP) Basins	
Acme Improvement District, Basin B (Acme B)	
North Springs Improvement District (NSID)	
North New River Canal (NNRC)	
C-11 West	
L-28	
Feeder Canal	

The location of the basins is shown in Figure ES-1.

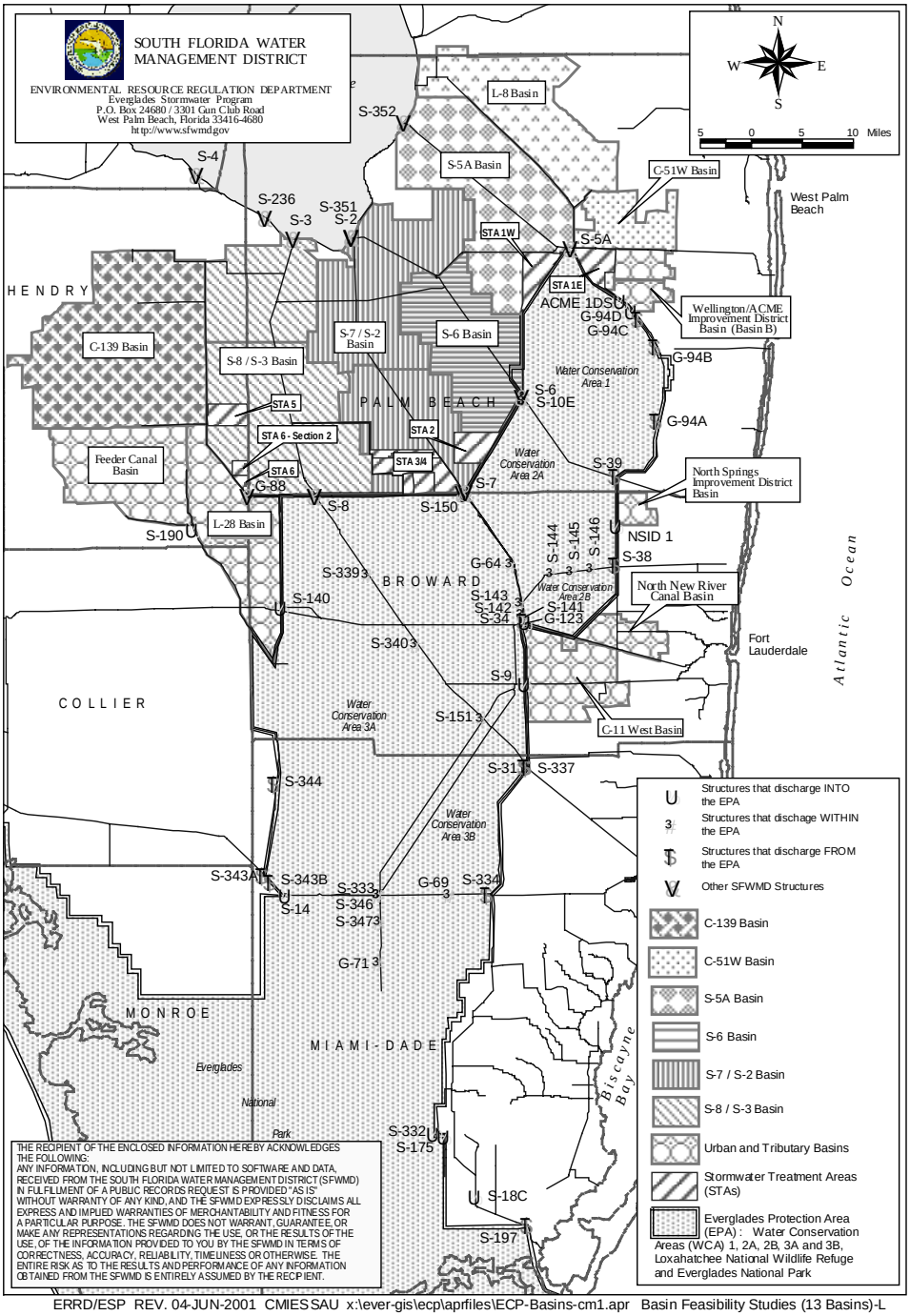

Figure ES-1. Overview of the Everglades Protection Area and Tributary Basins

(This Figure includes only SFWMD permit structures, and excludes structures operated by the USACE)

As an important step towards development of the Long-Term Compliance Permit application required under the EFA, the District recently completed *Basin-Specific Feasibility Studies* for the thirteen basins referenced above, all of which presently discharge to the EPA (Burns & McDonnell, October 23, 2002; Brown & Caldwell, October 23, 2002). The following conclusions may be taken from those studies:

1) The total estimated capital cost to implement treatment measures to achieve the mandates of the EFA, if developed independent of the Comprehensive Everglades Restoration Plan (CERP) and other regional initiatives, could aggregate to hundreds of millions of dollars. Analyses presented in Part 6 of this Long-Term Plan suggest a total of approximately $578 million in the ESP basins, and an additional $88 million in the ECP basins (both figures are in FY 2003 dollars) might be added to the estimated expenditures under this Long-Term Plan.
2) Several of the more costly measures, particularly those in the C-11 West, North New River Canal, North Springs Improvement District, and L-28 basins, are directed at discharges which contribute a small percentage of the phosphorus delivered to the EPA.
3) Many of those measures would be unnecessary, or greatly reduced in required scope, once presently scheduled CERP projects come on-line, as:
    - Many CERP projects call for diversion of water away from the EPA.
    - Several CERP projects as presently structured specifically incorporate water quality improvement measures.

Based on those conclusions, considerable economic benefits may be realized by synchronizing EFA mandates with the CERP projects. The majority of phosphorus reduction associated with CERP projects is not due to the addition of water quality treatment measures, but rather, diversion away from the Everglades, consistent with the authorized scope of the CERP projects. This will result in significant cost avoidance, and not cost increases to CERP projects to achieve significant water quality benefits to the Everglades.

The potential benefits of synchronizing Florida's efforts to achieve the phosphorus criterion with CERP were recognized by the Legislature in the EFA:

> *(c) It is the intent of the Legislature that implementation of the Long-Term Plan shall be integrated and consistent with the implementation of the projects and activities in the*

> *Congressionally authorized components of the CERP so that unnecessary and duplicative costs will be avoided. Nothing in this section shall modify any existing cost share or responsibility provided for projects listed in s. 528 of the Water Resources Development Act of 1996 (110 Stat. 3769) or provided for projects listed in section 601 of the Water Resources Development Act of 2000 (114 Stat. 2572). The Legislature does not intend for the provisions of this section to diminish commitments made by the State of Florida to restore and maintain water quality in the Everglades Protection Area, including the federal lands in the settlement agreement referenced in paragraph (4)(e).*

The Florida Department of Environmental Protection Environmental Regulation Commission has adopted by rule (Rule 62-302.540, F.A.C.) a numeric phosphorus criterion for the EPA. The planning objective for phosphorus levels in discharges to the EPA considered in the *Basin Specific Feasibility Studies* was based on guidance contained in the 1994 Everglades Forever Act, which stated that:

> *The phosphorus criterion shall be 10 parts per billion (ppb) in the Everglades Protection Area in the event the department does not adopt by rule such criterion by December 31, 2003,* and
>
> *Compliance with the phosphorus criterion shall be based upon a long-term geometric mean of concentration levels to be measured at sampling stations recognized from the research to be reasonably representative of receiving waters in the Everglades Protection Area.*

The objective adopted in the development and evaluation of alternatives for the *Basin-Specific Feasibility Studies* was to obtain a predicted long-term geometric mean total phosphorus concentration of 10 ppb in discharges to the EPA. For the purposes of the *Basin-Specific Feasibility Studies*, and as carried forward herein, "long-term" is taken as that represented by a 31-year geometric mean based on model simulations. The Basin-Specific studies were a fact-finding exercise, and not intended to define the final arrangement, location and character of water quality improvement strategies in the various basins; no specific recommendations were made for alternatives to be selected and carried forward to implementation.

Technical representatives of the District, the Florida Department of Environmental Protection, the Everglades Agricultural Area Environmental Protection District, and other stakeholders have reviewed the results of the Basin Specific Feasibility Studies. Those technical representatives used those results to formulate a consensus approach to achieving the long-term water quality goals of the Everglades Forever Act. That recommended approach was set forth in the March 17, 2003 *Everglades Protection Area Tributary Basins, Conceptual Plan for Achieving Long-Term*

Water Quality Goals, Burns & McDonnell. This document consists of an update to that *Conceptual Plan* to reflect additional guidance received from the Legislature, as expressed in the newly amended EFA; respond to comments received from a variety of stakeholders; and refine (and in some instances expand) the definition of proposed actions and activities.

This Long-Term Plan is embodied in three primary components:

- **Pre-2006 Projects:** Structural and operational modifications that can be supported by the current scientific and engineering knowledge base, to be implemented where feasible by December 31, 2006, as well as operation, maintenance and monitoring of the STAs. The pre-2006 recommended improvements and strategies are considered to be the maximum scientifically defensible steps that have been identified at this time. There is a possibility that these steps will meet a planning target of a long-term geometric mean total phosphorus concentration of 10 ppb in discharges from the various basins. However, it is also possible that these improvements and strategies will not, in and of themselves, provide adequate assurance of an ability to consistently meet that objective on a long-term basis. Therefore, the Post-2006 Strategy discussed below is included in this Plan.
- **Process Development and Engineering (PDE):** Activities designed to:
  - Further understanding and optimize water quality performance in existing and proposed facilities
  - Facilitate integration with the Comprehensive Everglades Restoration Plan (CERP)
  - Maintain and improve upon the contribution of source controls to overall water quality improvement goals.
  - Investigate ways to accelerate the recovery of previously impacted areas in the EPA.
- **Post-2006 Strategy:** Identification and adaptive implementation of additional water quality improvement measures that may be considered necessary to comply with water quality standards following completion of the pre-2006 activities based on ongoing analysis of the PDE effort. Also includes implementation of steps identified that are capable of accelerating the recovery of previously impacted areas in the EPA, including final implementation of the hydropattern restoration activities directed by the EFA once water quality standards, including the phosphorus criterion, are achieved.

The Long-Term Plan summarized herein has been developed as an integrated, comprehensive strategy for achieving water quality standards and goals for discharges to the Everglades Protection Area, including the phosphorus criterion established in Rule 62-302.540, F.A.C. Substantial modification or adjustment of any part of the Plan would jeopardize its intended overall performance.

This Long-Term Plan is developed in recognition that:

- Achieving water quality standards, including the numeric phosphorus criterion (Rule 62-302.540, F.A.C.) will involve an adaptive management approach, whereby the best available information is used to develop and expeditiously implement incremental improvement measures consistent with informed and prudent expenditure of public and private funds.
- Continued investigations are necessary to further improve the overall operation and performance of integrated water quality improvement strategies.
- Significant performance and economic benefits can be realized by integrating Everglades water quality improvement measures with CERP projects, even to the extent that existing schedules should be re-evaluated in some basins and synchronized with CERP project schedules, and modifications to the design and operation of planned CERP projects should be considered.

Specific measures included in the **Pre-2006 Projects** are discussed in detail in Part 2 (for the ECP Basins) and Part 3 (for the ESP Basins) of this Long-Term Plan. A brief summary of those recommended measures is presented in Table ES.2. The projected impact of those measures on the average annual volumes and total phosphorus loads discharged to the EPA and other receiving waters is summarized in Table ES.3.

As indicated in Table ES.2, substantial reliance is placed on source controls (BMPs) and full integration with the Comprehensive Everglades Restoration Plan (CERP) in some of the basins, most notably the Everglades Stormwater Program Basins. Part 3 of this Long-Term Plan presents certain technical recommendations for water-quality improvement strategies in those basins; it is intended that those recommendations be given full consideration in the CERP planning process.

Table ES.2 Pre-2006 Strategies

Basin	Strategies and Activities	Schedule (1)	
		Construct. Complete	Full Operation
STA-1E	Convert Downstream Cells to SAV	10/01/2005	12/31/2006
STA-1W	Additional Compartmentalization; Improved Flow Control; Convert Additional Areas to SAV; Identify and Implement Cost-Effective BMPs	05/01/2006	12/31/2006
STA-2	Additional Compartmentalization; Convert Additional Areas to SAV; Identify and Implement Cost-Effective BMPs	05/01/2006	12/31/2006
STA-3/4	Additional Compartmentalization; Convert Additional Areas to SAV; Identify and Implement Cost-Effective BMPs	05/01/2006	12/31/2006
STA-5	Improved Flow Control; Convert Additional Areas to SAV; Improved Management and Control of Seepage; Identify and Implement Cost-Effective BMPs	10/01/2006	12/31/2006
STA-6	Additional Compartmentalization; Improved Flow Control; Convert Additional Areas to SAV; Add Water Supply Capability; Identify and Implement Cost-Effective BMPs	10/01/2006	12/31/2006
Acme B	The CERP process will make the final determination of the appropriate strategy and be responsible for implementation. The most promising alternative appears to be diversion to STA-1E for treatment; Develop, evaluate and implement source controls.	10/01/2006	12/31/2006
NSID	Assist Local Communities in Developing & Evaluating Urban BMPs; CERP Diversion & Elimination of Direct Discharge to EPA (Hillsboro Site 1 Project)	12/31/2007 (Note 2)	12/31/2007 (Note 2)
NNRC	CERP Diversion & Elimination of Direct Discharge to EPA (Component YY4); Discontinue Use of G-123 if No Adverse Flooding Impacts	12/31/2006	2018 (Note 2)
C-11 West	Assist Local Communities in Developing & Evaluating Urban BMPs; CERP Diversion & Substantial Elimination of Direct Discharge to EPA (Western C-11, North Lake Belt Storage); Fund Add'l Analyses to Modify Project for Increased Reliability of Diversion	12/31/2006 (Note 2, Western C-11) 2036 (Note 2, North Lake)	2036 (Full complete) Majority of Diversion Complete in 2006
L-28	The CERP process will make the final determination of the appropriate strategy and be responsible for implementation. The most promising alternative appears to be construction of Miccosukee and Seminole Tribal STAs.	10/01/2008 (Note 3)	10/01/2010
Feeder Canal	Seminole Water Control Plan; McDaniel Ranch Property Owners Agreement; Additional BMPs in West Feeder Basin for Target TP Conc. of 50 ppb; Accelerate Completion of CERP Project for Diversion of L-28 Interceptor	12/31/2006 (Source controls)	10/01/2009 (Note 3)

Notes: (1) Anticipated earliest completion schedule for construction and full operation
(2) Actual completion schedule controlled by CERP; schedule taken from latest CERP documents.
(3) Actual completion schedule controlled by CERP; schedule shown is accelerated from that shown in latest CERP planning documents.

Table ES.3 Estimated Performance of Pre-2006 Projects

Period		Estimated Average Annual Discharges									
From	Thru	All ECP Basins				All ESP Basins			All Basins		
		Volume (ac-ft)	Load (metric tons)	TP Conc. (ppb) F.W. Mean	TP Conc. (ppb) Geo. Mean	Volume (ac-ft)	TP Load (metric tons)	FW TP Conc (ppb)	Volume (ac-ft)	Load (metric tons)	FW TP Conc (ppb)
2004	12/30/06	1,344,700	57.9 - 59.4	35 - 36	20 - 36	395,100	26.0	53	1,739,800	83.9 - 85.4	39 - 40
12/31/06	12/31/07	1,362,700	25.8 - 34.4	15 - 20	10 - 14	186,100	9.5	42	1,548,800	35.3 - 44.0	18 - 23
2008	2010	1,362,700	25.8 - 34.4	15 - 20	10 - 14	179,300	9.2	42	1,542,000	35.0 - 43.7	18 - 23
2011	2014	1,362,700	25.8 - 34.4	15 - 20	10 - 14	102,300	1.9	15	1,465,000	27.7 - 36.4	15 - 20
2015	2036	1,327,500	24.4 - 33.0	15 - 20	10 - 15	102,300	1.9	15	1,429,800	26.3 - 34.9	15 - 20
2037	2056	1,327,500	24.4 - 33.0	15 - 20	10 - 15	84,900	1.5	14	1,412,400	25.9 - 34.4	15 - 20

TP concentrations are simulated 31-year means applied to the intermediate periods indicated. These estimates assume all pre-2006 projects are operational and fully stabilized for projection of long-term performance. Long-term geometric mean outflow concentrations below 15 ppb have not been demonstrated in large-scale systems.

There exists a range of estimated performance of the recommended projects. The single variant considered in the narrow range shown in Table ES.3 is the uncertainty in performance of Submerged Aquatic Vegetation (SAV), which is a principal component in the recommended strategy for the ECP Basins. If optimal performance of that vegetative community is confirmed, the pre-2006 projects in the ECP Basins afford the potential for achieving the long-term water quality improvement goals within the existing Everglades Construction Project Stormwater Treatment Areas, consistent with the requirements of the EFA:

The district shall optimize the design and construction of the STAs described in the Everglades Construction Project prior to expanding their size. Additional methods to achieve compliance with water quality standards shall not be limited to more intensive management of the STAs.

Following operation of the Pre-2006 projects, the long-term geometric mean TP concentration in discharges from the Everglades Construction Project , equal to approximately 88% of the water entering the Everglades, are predicted to range from 10-14 ppb. The only basins that are predicted to have discharge concentrations above that range after December 31, 2006 are that basins that have future CERP projects. These include the North Springs Improvement District, C-11 West, L-28 and Feeder Canal basins. Those basins' discharges account for approximately 12% of the total surface flows to the Everglades after completion of the Pre-2006 Projects and CERP projects scheduled for completion prior to December 2006.

Nonetheless, there remains a significant degree of uncertainty as to whether or not that range of estimated performance in the ECP Basins can be realized without additional measures. In fact, the

possible range of performance of the recommended measures is somewhat broader than indicated in Table ES.3, which simply summarizes two current estimates of performance. A more descriptive presentation of the possible range of performance of the recommended projects is shown in Figure ES-2. Modeling uncertainties alone could impact projected long-term mean concentrations and TP loads in discharges from the STAs by plus or minus 20%. Even that possible range of performance cannot be assured with certainty in biological treatment systems. The current performance of SAV in Cell 5B of STA-1W and STA-5 suggests that additional efforts may be needed to address full-scale implementation difficulties.

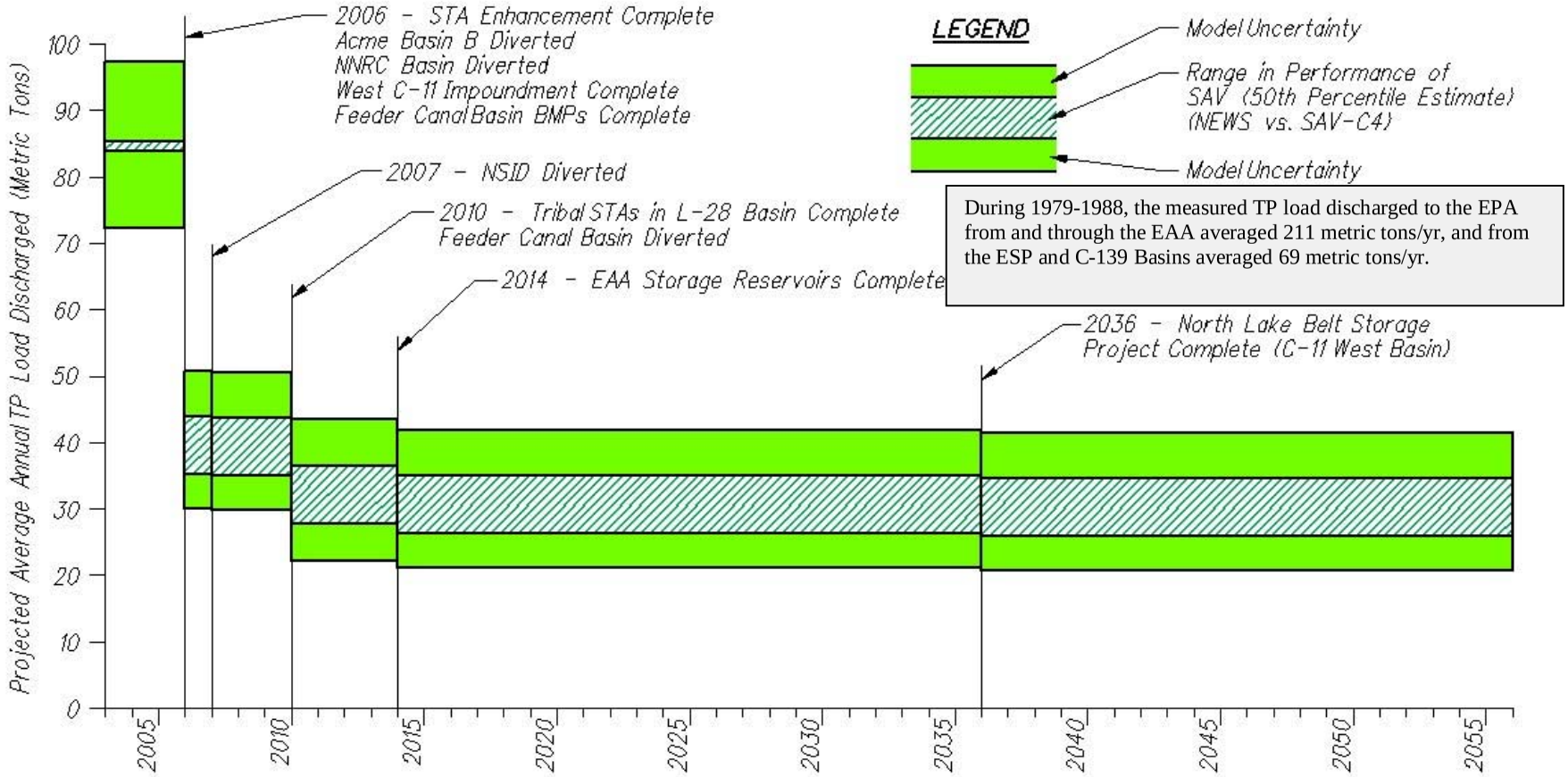

Figure ES-2. Potential TP Load Reductions under Long-Term Plan

Note: One metric ton equals 1,000 kilograms

The **Process Development and Engineering (PDE)** component of the overall strategy consists of a series of focused efforts directed towards increasing the certainty that the overall water quality improvement objectives can be met by completion of the recommended measures.

The various elements of the PDE component, described in detail in Part 5 of this Long-Term Plan, are directed towards:

- Identifying opportunities to maintain and improve upon the performance of source controls (BMPs) in reducing overall pollutant loads;
- Enhancing the control and monitoring of water quality improvement measures now in place, and which form the foundation of the recommended additional measures;
- Continued improvement in analytical and forecasting tools used to project treatment performance;
- Identification of specific means and methods to replicate on a reliable long-term basis the performance of the SAV community on which the more favorable performance projections in Table ES.3 are based (e.g., optimization of SAV performance);
- Development of engineering criteria and forecasting tools for additional water quality improvement measures, including the possible implementation of Periphyton-Based Stormwater Treatment Areas (PSTA);
- Improving the reliability of estimated treatment facility inflow volumes and pollutant loads, particularly in those basins for which current data is limited;
- Refining the estimated impact of CERP projects on basin discharge volumes and pollutant loads, including in particular the influence of the EAA Storage Reservoir projects, as well as long-term trends in the quality and quantity of water discharged from Lake Okeechobee;
- Determining the relationship between the quality of surface water discharged into, and the water quality within, the Everglades Protection Area (EPA).

A total expenditure of $42 million (in FY 2003 dollars) is projected for the PDE plan component. This PDE plan component will continue through 2016, with annual evaluations of the data collected and model refinements. The evaluations will address attainment of water quality standards, including the numeric phosphorus criterion (Rule 62-302.540, F.A.C.) and other long-term water quality improvement objectives of the Everglades Forever Act, and will recommend additional measures as may then be considered necessary. The evaluations, including the 2008

report described below, will be presented and reviewed at the District's public STA Design Review Staff meetings. Information and recommendations resulting from the PDE effort are intended to be coordinated by the District, in consultation with the Department, and implemented through the renewal process for the District's permits and other public processes. It is the intent of this Long-Term Plan that additional steps, once identified and their need confirmed, be expeditiously implemented.

The Everglades Forever Act (EFA) (s. 373.4592 F.S.) acknowledges that this Long-Term Plan is a planning document that shall be revised by adaptive management throughout the course of its implementation.

> *Revisions to the Long-Term Plan shall be incorporated through an adaptive management approach including a process development and engineering component to identify and implement incremental optimization measures for further phosphorus reductions. Revisions to the Long-Term Plan shall be approved by the department. In addition, the department may propose changes to the Long-Term Plan as science and environmental conditions warrant. [s. 373.4592(3)(b), F.S.]*

The EFA further states that "Not later than December 31, 2008, and each 5 years thereafter, the department shall review and approve incremental phosphorus reduction measures" [s. 373.4592(3)(e), F.S.]. However, the EFA does not specify the review and approval process. A proposed process for revisions to this Long-Term Plan, developed by staff of the District and the Department, is presented in Part 1. Legislative review and approval of revisions to the initial 13-year (through 12/31/2016) phase is not required, but Legislative review and approval is required of the 10-year second phase (post 12/31/2016) prior to implementation.

It is the intent of this Long-Term Plan to evaluate pre-2006 steps, commencing in January 2007 and extending over a two-year period, during which the required performance information is acquired and analyzed. It is further intended that the District, no later than December 31, 2008, submit a comprehensive report to the Governor and Legislature on the status and progress of the Long-Term Plan recommended herein. This 2008 timing is anticipated to coincide with the renewal of the Long-Term permits required under Section 10 of the EFA. That report, which is intended to be separate from the Everglades Consolidated Report, should include:

- A summary of the measured performance of the pre-2006 projects in improving the quality of water discharged to the EPA;
- A comparison of that performance to the performance which would have been anticipated employing the analytical tools utilized in this Long-Term Plan;
- Recommended updates to analytical tools to more closely reflect the actual performance of the pre-2006 projects, including:
    - Model structure;
    - Parameter calibrations;
    - Uncertainty analyses.
- Updated and refined estimates of basin runoff volumes and loads, including the extent to which they are then expected to be modified by completion of CERP;
- Evaluation of the performance and cost-effectiveness of specific pre-2006 measures;
- Identification of post-2006 measures necessary to achieve or maintain water quality standards and the goals of the EFA, together with an evaluation of the cost-effectiveness of those measures.

Given the complexity and scale of the overall water quality improvement strategy recommended herein, it should be considered possible that additional measures will be needed. Those measures will be completed at the earliest practicable date through a strategy of **Adaptive Implementation**.

It is intended that science and engineering factors will drive the decision process for the adaptive implementation of additional measures. The funding needs projected herein include an **allowance** of $36 million in funds ($30.6 million in FY 2003 dollars) for the adaptive implementation process recommended herein, initially distributed as $9 million per year in each of Fiscal Years 2007 through 2010. It is further intended that those measures be implemented without waiting for a response from the 2008 Report.

Documentation of any additional measures (the **Post-2006 Projects**) will be to a level of detail not less than that presented herein for the Pre-2006 Projects. The following is a list of some measures that might be included in such an adaptive implementation strategy (none of which are included in the current recommended strategy, for reasons discussed in Part 6 of this Long-Term Plan):

- Conversion of additional lands in the STAs to SAV, or other vegetative communities;
- Additional structural and operational modifications within existing STAs;
- Interbasin transfer of water among the STAs for more integrated and improved operation;
- Integration of water quality improvement strategies into CERP projects;
- Implementation of more aggressive urban and agricultural source control programs.

The adaptive implementation funds described above would be reserved for application to such Post-2006 Projects as may be recommended, and are included in this Long-Term Plan so that the additional measures can be implemented as soon as their need and suitability is confirmed. It is the principal function and purpose of the PDE component to develop those measures necessary to provide adequate assurance of the ability to meet water quality standards, including the numeric phosphorus criterion, in the most cost-effective fashion possible.

The projected costs presented herein also include monies for:

- The operation and maintenance of the STAs as they now exist or are being constructed, including monitoring necessary for demonstration of permit compliance, control of the treatment works, and furtherance of the PDE component of this Long-Term Plan. While the cost for basic operation and maintenance of the STAs was considered in the February 15, 1994, *Everglades Protection Project, Conceptual Design* and recognized in the Everglades Forever Act, those documents specifically excluded costs associated with monitoring. The estimated cost for operation, maintenance and monitoring of the STAs (developed in Part 8 of this Long-Term Plan) over the period FY 2014 through 2016 is $215 million (expressed in FY 2003 dollars), which includes an estimated cost of $82 million for flow and water quality monitoring.

- Completion of the hydropattern restoration works intended in the February 15, 1994, *Everglades Protection Project, Conceptual Design* and authorized by Everglades Forever Act, together with additional activities to permit an accelerated recovery of previously impacted areas within the EPA. Development and operation of the hydropattern restoration works has not been permitted to date, due to concern over the potential impacts of discharging waters not meeting water quality standards to previously unimpacted areas in the

EPA. In addition, the continued refinement of information and design requirements has resulted in significant change in the nature of the works necessary to achieve the originally authorized intent. Strategies, schedules and estimated costs for completion of the hydropattern restoration works are discussed in detail in Part 7 of this Long-Term Plan. The estimated dates for project completion are driven by the need to assure that all such discharges meet water quality standards prior to implementation of the project(s). The estimated capital cost for those works (expressed in FY 2003 dollars) is approximately $24 million. Incremental operation and maintenance costs for those works are estimated to average roughly $0.4 million per year (again, in FY 2003 dollars).

It is intended that adoption and implementation of the strategies recommended in this Long-Term Plan result in compliance with water quality standards and the improvement goals of the EFA, including the phosphorus criterion established in Rule 62-302.540, F.A.C. Nonetheless, it remains possible that other, more extensive measures might eventually be required if the strategies recommended herein eventually prove inadequate, or if the intended full integration with CERP is not realized. Analyses and discussions of such future possible measures are included in Part 6 of this Long-Term Plan. Those measures, none of which are presently recommended for implementation, might include expansion of the STAs in the ECP Basins and additional measures, including diversion works and new treatment facilities in the ESP Basins.

Given the significant magnitude of possible additional expenditures for the items listed above (approaching $670 million in FY 2003 dollars as developed in Part 6 of this Long-Term Plan), it is intended that the District submit the December 31, 2008, comprehensive report to the Governor and Legislature on the status and progress of the Long-Term Plan discussed previously in this Executive Summary. That report should include specific identification of which, if any, of the above (or other) more extensive measures are then considered necessary and defensible to achieve water quality standards and the goals of the EFA. **It is the intent of this Long-Term Plan to prevent the need for such more extensive measures if at all possible.**

Projected costs for all components of the recommended water quality improvement strategies recommended herein are summarized in Table ES.4. Those projected funding needs include allowances for cost escalation at an average annual rate of 3%, and extend from Fiscal Year 2004 through Fiscal Year 2016.

Table ES.4 Projected Costs through FY 2016, by Plan Component

Fiscal Year	Summary of Projected Expenditures by Function (in $1,000s)									
	Pre-2006 Projects		PD&E Process	Recovery of Impacted Areas	Operation & Maintenance	Monitoring		Program Management	Funds for Adaptive Implement.	Fiscal Year Total Expenditure
	ECP Basins	ESP Basins				Permit Compliance	Operations Support			
2004	$5,049	$500	$8,835	$1,283	$9,433	$3,640	$2,208	$916	$0	$31,864
2005	$15,044	$750	$8,650	$1,317	$10,894	$3,475	$3,167	$1,248	$0	$44,544
2006	$11,426	$667	$6,268	$1,351	$12,085	$3,363	$3,580	$1,108	$0	$39,847
2007	$0	$0	$5,827	$279	$12,173	$3,450	$3,673	$1,970	$9,000	$36,372
2008	$0	$0	$5,404	$460	$12,545	$3,581	$3,812	$979	$9,000	$35,782
2009	$0	$0	$4,648	$1,199	$12,917	$3,674	$3,911	$994	$9,000	$36,343
2010	$0	$0	$1,050	$3,207	$12,816	$3,785	$4,029	$964	$9,000	$34,851
2011	$0	$0	$799	$15,525	$13,201	$3,898	$4,150	$1,073	$0	$38,644
2012	$0	$0	$626	$15,878	$13,593	$4,000	$4,258	$1,098	$0	$39,454
2013	$0	$0	$847	$2,000	$14,538	$4,135	$4,402	$706	$0	$26,628
2014	$0	$0	$666	$2,000	$14,974	$4,260	$4,534	$719	$0	$27,153
2015	$0	$0	$757	$0	$15,423	$4,387	$4,670	$681	$0	$25,919
2016	$0	$0	$563	$0	$15,893	$4,536	$4,829	$695	$0	$26,518
Total	**$31,518**	**$1,917**	**$44,942**	**$44,498**	**$170,484**	**$50,185**	**$51,224**	**$13,151**	**$36,000**	**$443,918**

Note: The above projections are expressed in escalated dollars, considering average annual inflation of 3% throughout the planning period.

The opinions of cost shown in Table ES.4 and throughout this Long-Term Plan are preliminary in nature, may be refined due to refined unit costs associated with the operation, maintenance and monitoring of the STAs, unanticipated work effort, increased scope, use of contract staff (as compared to in-house staff), and other unanticipated factors. Similarly, slippage in the schedules presented may occur as a result of limitations on staff resources, lack of the timely receipt of funding and other factors outside the control of the implementing parties.

The projected costs identified in Table ES.4 exclude costs for those recommended measures that are expected to be included in the purview of CERP.

At present, the only dedicated source of funding for the strategies recommended in this Long-Term Plan is the Everglades Trust Fund established by the Everglades Forever Act. Everglades Trust Fund revenues are subject to expenditures not otherwise included in the projected costs summarized in Table ES.4. Those expenditures include remaining capital expenditures for completion of the 1994 Everglades Construction Project.