Updated STA Phosphorus Modeling For the 2010 Planning Period

Work Order No. CN040902-WO03R2

Prepared for

Prepared by

Under Subcontract to

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FINAL REPORT

October 2007

October 30, 2007

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U.S. Army Corps of Engineers
South Florida Water Management District
Tetra Tech Contract No. CN040902-WO03R2
Updated STA Phosphorus Modeling for the 2010 Period

Dear Ms. Gracie:

I am pleased to submit this final report titled "Updated STA Phosphorus Modeling for the 2010 Planning Period". This document constitutes Deliverable 7.5.2 under Tetra Tech EC Purchase Order 1020342 dated June 25, 2007.

I gratefully acknowledge the valuable contributions of the staff of the South Florida Water Management District, and the technical review by yourself, staff of the District and of the U. S. Army Corps of Engineers, in the development of the information contained in this report.

Certification

I hereby certify, as a Professional Engineer in the State of Florida, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse without specific verification or adaptation by the Engineer. This certification is made in accordance with the provisions of the Laws and Rules of the Florida Board of Professional Engineers under Chapter 61G15-29, Florida Administrative Code.

GF Goforth

Gary F. Goforth, P.E. Florida P.E. # 35525

Date: 10/30/07

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1. Introduction

As part of the adaptive implementation strategy of the *Everglades Protection Area Tributary Basins Long-Term Plan for Achieving Water Quality Goals* (LTP), the analyses presented in the *Baseline Data for the Basin-Specific Feasibility Studies to Achieve the Long-Term Water Quality Goals for the Everglades* (Goforth and Piccone 2001) are to be regularly updated to improve the degree of confidence in the projected total phosphorus loads in inflows to the STAs, or in some instances, discharged directly to the Everglades Protection Area (Burns & McDonnell, 2003 as amended). A previous report updated the basin data sets from Water Year (WY) 1995 through WY2007, covering the period May 1, 1994 through April 30, 2007 (Goforth 2007a). Using the flow and phosphorus data developed in that effort, a subsequent report updated the STA inflow data sets for regional conditions anticipated for the 2010 planning period (Goforth 2007b). This report presents the results of updated STA performance projections based on phosphorus removal modeling using the DMSTA model (Walker and Kadlec 2005).

1.1. Scope of Work

This work constitutes Task 7 of CN040902-WO03.Ta18 - Preparation of an Environmental Impact Statement for Everglades Agricultural Area Conveyance and Regional Treatment Project Plus Compartments B and C - between the District and Tetra Tech EC, Inc. This work is being performed under Purchase Order No. 1030342, which was issued on June 25, 2007, between Tetra Tech EC, Inc., and Gary Goforth, Inc.

The scope of work for Task 7 consists of three major elements:

1. Update Flow and Phosphorus Data Sets for ECP Basins
2. Update STA Inflow Data Sets
3. Conduct DMSTA Modeling

This report presents the results of modeling the phosphorus performance of the STAs, the EAA Storage Reservoir and the treatment areas on Compartments B and C using the updated STA inflow data sets for the 2010 planning period.

1.2. Regional Conditions for the 2010 Planning Period

The previous update of the STA inflow data sets was completed in 2005 as part of the *EAA Regional Feasibility Study* (ADA/Burns & McDonnell 2005). That Study evaluated the regional water management conditions for two time periods, 2006-2009 and 2010-2014. This present analysis focuses on the regional conditions that are anticipated to be present in the 2010 time frame. The anticipated status of the water resources projects within the basins tributary to the STAs (shown in **Figure 1-1**) is provided in the **Table 1-1**. Appendix A contains a more complete summary of the key modeling assumptions used in this simulation throughout the South Florida area.

Figure 1-1: Overview of EAA And Surrounding Basins.

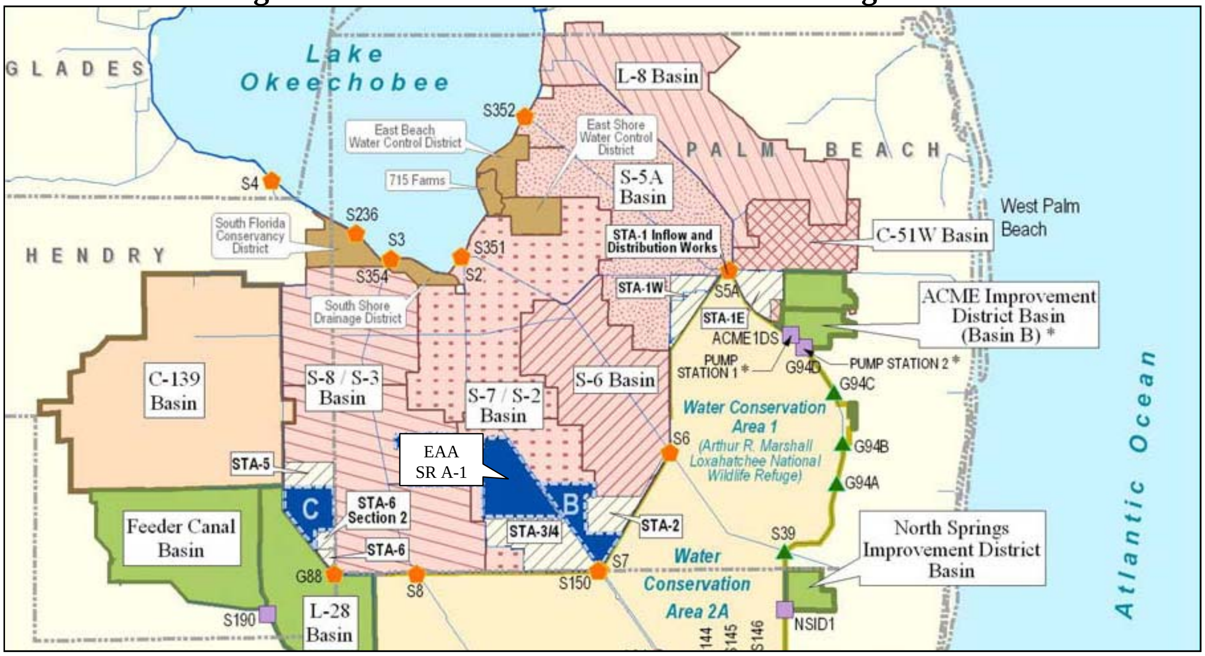


Table 1-1: Anticipated Status of Regional Water Resource Projects in the 2010 Period.

Project	Status During the 2010 Period
Original Everglades Construction Project	All 6 STAs fully operational. Approximately 20% of the S-5A Basin runoff diverted to the Hillsboro Canal through existing facilities. Ch. 298 District and 715 Farms diversions in place. No EAA runoff reduction adjustment necessary to account for Best Management Practices.
Compartment B	Build-out completed and flow-capable by December 2010, including ability to re-direct STA-2 inflow to the North Build-out area.
Compartment C	Build-out completed and flow-capable by December 2010
EAA Storage Reservoir A-1	16,000-acre reservoir operable with a 12-ft depth
Acme Basin B	Runoff directed away from WCA-1 and discharged to C-51W, and then to STA-1E
L-8 Reservoir	Partially completed: 870 acres, depth 44 ft. Facilities not completed for diversion away from S-5A/C-51W.
Everglades Agricultural Area Conveyance and Regional Treatment Project (ECART)	Not completed

1.3. Phosphorus Modeling

The phosphorus removal performance of the STAs, EAA Storage Reservoir and treatment areas of Compartments B and C were estimated using the July 5, 2007 release of the Dynamic Model for Stormwater Treatment Areas, Model Version 2 (DMSTA, 09/30/2005), developed for the U.S. Department of the Interior and the U.S. Army Corps of Engineers by W. Walker and R. Kadlec. Outflow phosphorus concentrations are calculated based on:

- daily input data, consisting of flow, phosphorus concentrations, rainfall evapotranspiration (ET), depth (optional) and releases (optional);
- mass and water balances calculated for each time step for each treatment cell or reservoir compartment,
- treatment area configuration, cell size, flow path width, vegetation type, estimates of hydraulic mixing, outflow hydraulics, seepage estimates;
- phosphorus removal rates that can be either user-defined or available within DMSTA based on calibration data sets extracted from numerous vegetation types, phosphorus characteristics and hydraulic regimes of many south Florida wetland treatment systems through early 2005.

DMSTA was used to predict annual and long-term average flow-weighted mean concentrations, with a 365-day averaging period. In addition, STA performance uncertainty analyses were conducted, using the 10%, mean and 90% values of the settling rates for the specific vegetation types. These projections are subject to the assumptions, constraints and limitations of DMSTA modeling and STA operations, including the following.

- DMSTA calibrations are based upon data from fully functional treatment cells with viable vegetation communities that have near optimal performance. The range of treatment characteristics for each vegetation type is summarized in **Table 1-2**.
- In addition to consideration of the range of calibration treatment characteristics, other important factors not yet incorporated into the model include calcium requirements, antecedent soils, and assumed intensive management, particularly for the enhanced vegetation types.
- DMSTA generates error/warning notices if simulated conditions exceed the range of the calibration characteristics presented in **Table 1-3**.
- The use of the DMSTA calibration vegetation types, e.g., SAV, assumes that the vegetation will be maintained in the long-term. This assumption may produce overly optimistic long-term performance projections for treatment areas subject to periodic disturbance such as hurricanes, droughts and other extreme conditions.
- DMSTA does not allow a treatment cell to dry out, and hence does not reproduce the vegetative responses and phosphorus dynamics (e.g., post-dry-out spikes) observed in treatment cells that periodically go dry. Hence the phosphorus removal performance simulated for large wetland systems with limited water availability, such as Compartment C, may be overly optimistic. Other methods should be used to estimate

the supplemental water required to either avoid dryout or to estimate the phosphorus performance for these large systems that experience periodic dryout.

- STA performance projections are subject to the complete set of DMSTA assumptions, which can be found at http://www.wwwalker.net/DMSTA/index.htm.
- Additional uncertainty exists in flow estimates and regional water management.

Table 1-2: Calibration Dataset Ranges (Draft, from www.wwwalker.net/dmsta/).

Variable	Units	EMERG		PEW		SAV		PSTA		RESERV	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Calib Period	days	641	4017	693	4017	693	1522	245	1062	1460	5843
Calib K	m/yr	12	23	27	49	46	64	18	34	1	8
Mean Depth	cm	35	76	38	66	62	87	13	52	90	304
Max Depth	cm	47	131	71	123	75	132	22	65	187	457
Freq Z < 10 cm	%	0%	9%	0%	13%	0%	0%	0%	38%	0%	0%
Hydraulic Load	cm/day	1.1	6.5	3.0	6.9	5.1	12.7	2.8	14.6	0.4	17.6
Residence Time	days	8	66	7	22	5	17	1	19	8	714
Velocity	cm/sec	0.04	0.45	0.16	0.48	0.30	0.64	0.01	1.12	0.05	1.32
Flow/Width	md/2	26	210	69	276	162	374	3	132	68	1135
Areal Load	mg/m2-yr	382	2908	222	1919	1649	5279	142	1447	212	11781
Storage	mg/m2	921	4299	171	1494	903	2959	96	911	200	4994
Inflow Conc	ppb	39	283	17	110	36	153	7	56	78	1144
FWM Outflow Conc	ppb	20	150	8	28	15	57	6	15	50	767
Outflow GeoMean	ppb	19	125	8	21	15	55	5	15	39	725
Marsh GeoMean	ppb	19	128	8	20	16	56	5	15	38	725

Table 1-3: Variable Ranges for Model Applications - Used to Trigger Warning Messages (Draft, from www.wwwalker.net/dmsta/).

Calibration	K (m/yr)	CV(K)	Depth (cm)		Q/W (m2/d)		Conc (ppb)		Freq Z < 10 cm (%)	
			Min	Max	Min	Max	Min	Max	Min	Max
EMERG_3	16.8	0.20	35	76	26	210	19.5	800	0%	9%
PEW_3	34.9	0.21	38	66	69	276	8.0	110	0%	13%
SAV_3	52.5	0.16	62	87	162	374	14.9	153	0%	0%
PSTA_3	23.6	0.22	13	60	3	132	5.9	56	0%	38%
RES_3	5.0	0.45	90	304	68	1135	50.3	1144	0%	0%

When evaluating DMSTA results, particular attention needs to be given to the simulated outflow concentration, in that DMSTA does not constrain the reported values to minimum levels observed in the calibration data sets reported in Table 1-2. In other words, the model may forecast outflow concentrations lower than have been observed in the field. Forecast error is inherent when using any simulation model. These errors result from limitations of the calibration datasets (measurement error, short duration, etc.) and other sources that are difficult to quantify. Based on information from the DMSTA website (http://www.wwwalker.net/DMSTA/index.htm) and Walker (personal communication), the DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. In addition, the following disclaimer is offered by the authors of DMSTA:

DMSTA2 is a modeling tool with a constrained range of applicability. It has been developed and calibrated to information specific to South Florida. It is intended for use in evaluating Everglades Protection Project by individuals with experience in hydrologic & water quality *modeling. It should not be exercised in any situation without careful examination of all features, assumptions and calibrations, as they relate to a given application and to the supporting research upon which the calibrations are based. When properly calibrated by the user, the hydraulics portion of DMSTA2 is thought to generate predictions that are adequate for the purpose of simulating phosphorus dynamics. The hydraulic simulations should not be relied upon for designing flood control measures, designing levees, for any other purposes in which life and/or property may be at risk. The user assumes all risks associated with using the model for designing treatment areas or any other purpose.*

Proper use of DMSTA2 requires thorough understanding of calibration results & limitations & further documentation provided below. Sample input files are for demonstration purposes. None reflect actual designs. Atmospheric deposition, hydraulic, or seepage input values should not be interpreted as defaults or recommended values. While P cycling parameters are suggested for various situations and within well-defined calibration boundaries, users must decide which calibration is appropriate in any situation.

Additional information on the development, calibration and application of DMSTA can be found at: **www.wwwalker.net/dmsta.**

The development of the daily flow and phosphorus input data sets was described in *Updated STA Inflow Data Sets for the 2010 Period* (Goforth 2007b). Daily rainfall and ET for all the treatment areas except STA-5 and STA-6 were provided by the District as part of the SFWMM modeling. For STA-5 and STA-6, actual rainfall and ET were used based on local gauges. Treatment cell dimensions, hydraulic characteristics and vegetation types were consistent with values used in the 2005 EAA Regional Feasibility Study (ADA/Burns & McDonnell 2005), modified for consistency with updated information obtained from the on-going Compartments B and C design (Brown & Caldwell 2007, URS 2007). All STA enhancements described in the Everglades *Long-Term Plan* scheduled for completion by the end of 2010 are assumed to be completed (Burns & McDonnell 2003, as amended).

1.4. Revised C-139 Basin Data

Subsequent to the transmittal of the final report *Updated STA Inflow Data Sets for the 2010 Period*, a discrepancy was identified between the flows and loads developed for the C-139 Basin and the data set utilized for the C-139 Basin BMP regulatory program. A review of the method used to develop the regulatory program data set revealed that certain flows and loads from the District's DBHYDRO database were revised to better represent the runoff from the C-139 Basin (Walker 2000). The net effect of this revision was to reduce the annual flow and phosphorus loads from the C-139 Basin to be treated in STA-5 and STA-6 by approximately 5,500 AF/yr and 3,000 kg/yr. For consistency with the regulatory program, the data set and STA inflow data used in this work effort for the C-139 Basin were revised. The revised tables and figures for the C-139 Basin and the inflow data sets for STA-5 and STA-6 are presented in Appendix B, along with the revised summary tables.

2. STA-1E

Working in concert with STA-1W, STA-1E will capture and treat runoff from the C-51 Basin, Acme Basin B, L-8 Basin, S-5A Basin and the East Beach Water Control District. A schematic of STA-1E is presented in **Figure 2-1**. The long-term average annual inflow to STA-1E by source is summarized in **Table 2-1**, which does not include a long-term average of approximately 26,000 AF/yr of flow diverted to the eastern C-51 basin. Although the long-term goal is to treat less inflow in STA-1E than shown in Table 2-1, it is recognized that during the interim period before ECART and the L-8 Basin projects are complete, STA-1E inflows will be higher than the long-term goals. With complete diversion of the L-8 Basin runoff and without implementation of ECART, the long-term average annual inflows to STA-1E will be lower than presented in Table 2-1. It should also be noted that significantly higher phosphorus loads to STA-1E are estimated in the present analysis than in the 2005 EAA Regional Feasibility Study, due principally to higher phosphorus concentrations during the updated period of record, observed following the 2004 hurricanes. A longer period of record will be utilized in the 2009 update of the STA data sets, and it is likely that lower concentrations will be applied to future STA-1E inflows at that time.

Figure 2-1: Schematic of STA-1E (Not to Scale).

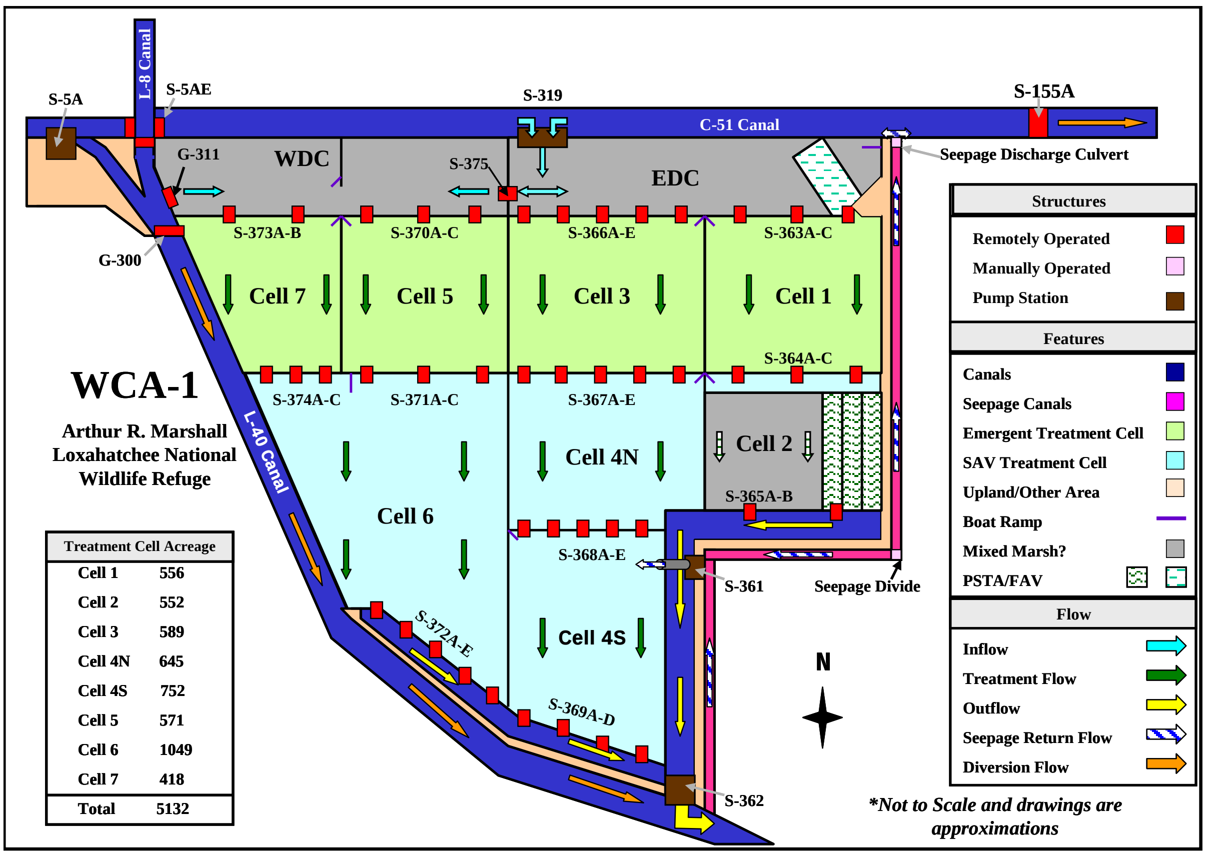


Table 2-1: Summary of Long-term Average Annual Inflow to STA-1E.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-5A Basin	18,766	3,802	164
EBWCD	1,028	593	468
L-8 Basin	8,571	1,019	96
Acme Basin B	35,066	4,915	114
C-51W Basin	130,375	31,529	196
Total	**193,818**	**41,864**	**175**

Prior to construction, the existing ground elevation at STA-1E exhibited a slope from the northeast to the southwest of more than 7 feet. When constructed by the U. S. Army Corps of Engineers, the majority of the treatment cells were leveled to minimize hydraulic short-circuiting and areas of deep depths. However, the East and West Distribution Cells were not leveled and still retain the relatively steep slope that existing prior to the STA construction. As a result, the cells are characterized by areas of high ground without wetland vegetation, areas of deep ponds, and an irregular inundation/dry out cycle. Unlike the Buffer Cell of the prototype STA (the Everglades Nutrient Removal Project), phosphorus removal within the East and West Distribution Cells is not anticipated to be reliable. Hence, these cells are not considered as part of the effective treatment area of STA-1E, and were modeled with an effective settling rate of 0.01 m/yr.

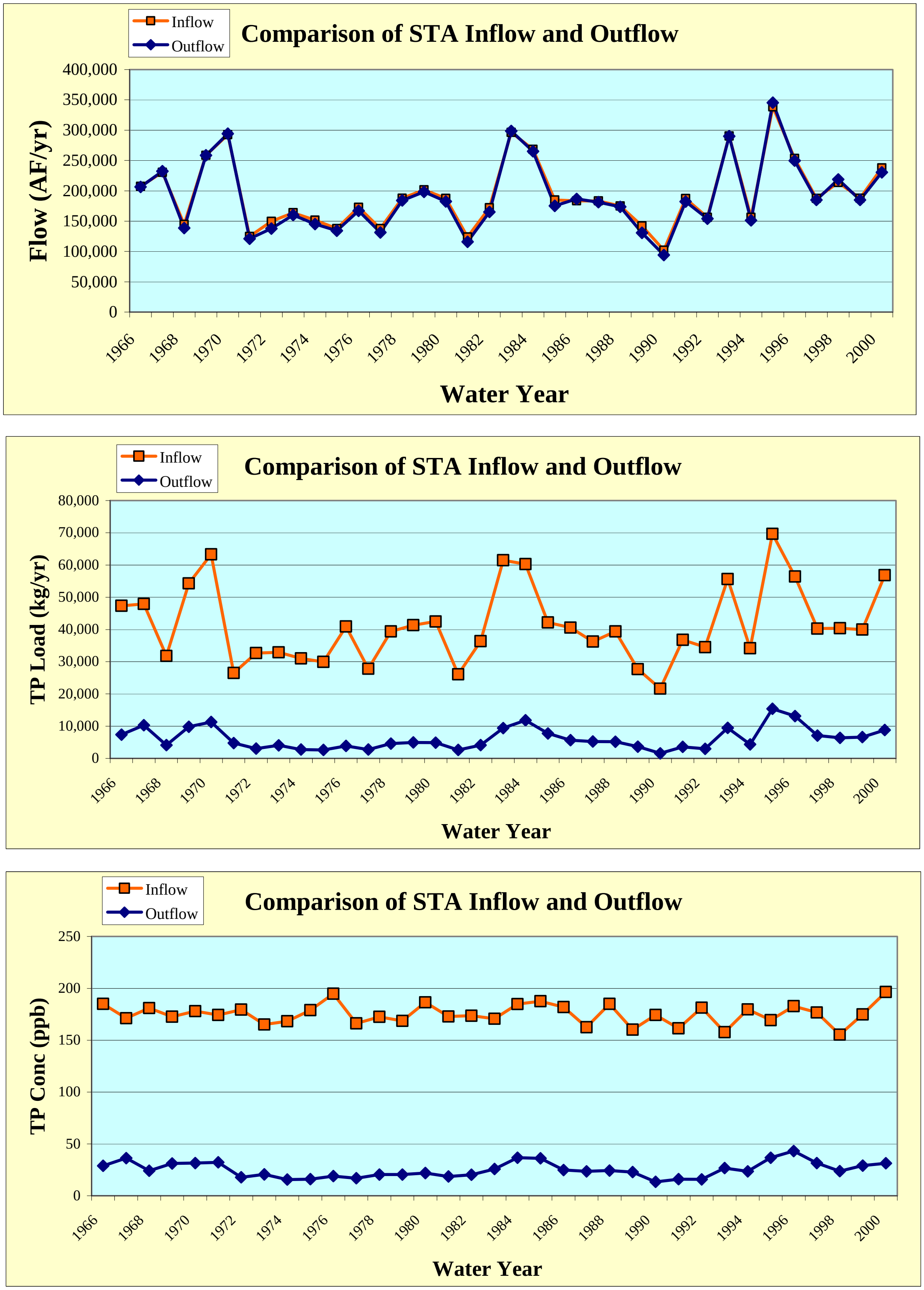
A summary of STA-1E phosphorus performance for the 2010 period is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix C. A long-term flow-weighted mean outflow concentration range of 20-35 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix C. For Cells 2, 4S and 4S, the mean depths were slightly lower than the SAV calibration range. Also for Cell 2, the mean flow/width was slightly lower than the range in the SAV calibration data sets.

Table 2-2: Summary of DMSTA Results for STA-1E.

Parameter	Unit	STA-1E
Effective Treatment Area	acres	5,132
Average Annual Inflow		
Volume	AF/yr	193,818
TP Load	kg/yr	41,864
TP Concentration	ppb	175
Average Annual Outflow		
Volume	AF/yr	190,599
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	20 (10)
Mean Estimate of Settling Rate	ppb	27 (1)
Lower Conf. Limit for Settling Rate	ppb	35
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	18
Mean Estimate of Settling Rate	ppb	24
Lower Conf. Limit for Settling Rate	ppb	32
TP Load (Using Mean TP Conc.)	kg/yr	6,240
Diversion Volumes and Loads		
Volume	AF/yr	26,186
TP Load	kg/yr	4,027
TP Concentration	ppb	125

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 36 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).
3. Diversions related to STA-1E are directed to eastern C-51.

Figure 2-2: Comparison of Inflows and Outflows for STA-1E.



3. STA-1W

Working in concert with STA-1E, STA-1W will capture and treat runoff from the C-51 Basin, Acme Basin B, L-8 Basin, S-5A Basin and the East Beach Water Control District. A schematic of STA-1W is presented in **Figure 3-1**. The long-term average annual inflow to STA-1W by source is summarized in **Table 3-1**. Although the long-term goal is to treat less inflow in STA-1W than shown in **Table 3-1**, it is recognized that during the interim period before ECART and the L-8 Basin projects are complete, STA-1W inflows will be higher than the long-term goals. With complete diversion of the L-8 Basin runoff and without implementation of ECART, the long-term average annual inflows to STA-1W will be lower than presented in **Table 3-1**.

Figure 3-1: Schematic of STA-1W (Not to Scale).

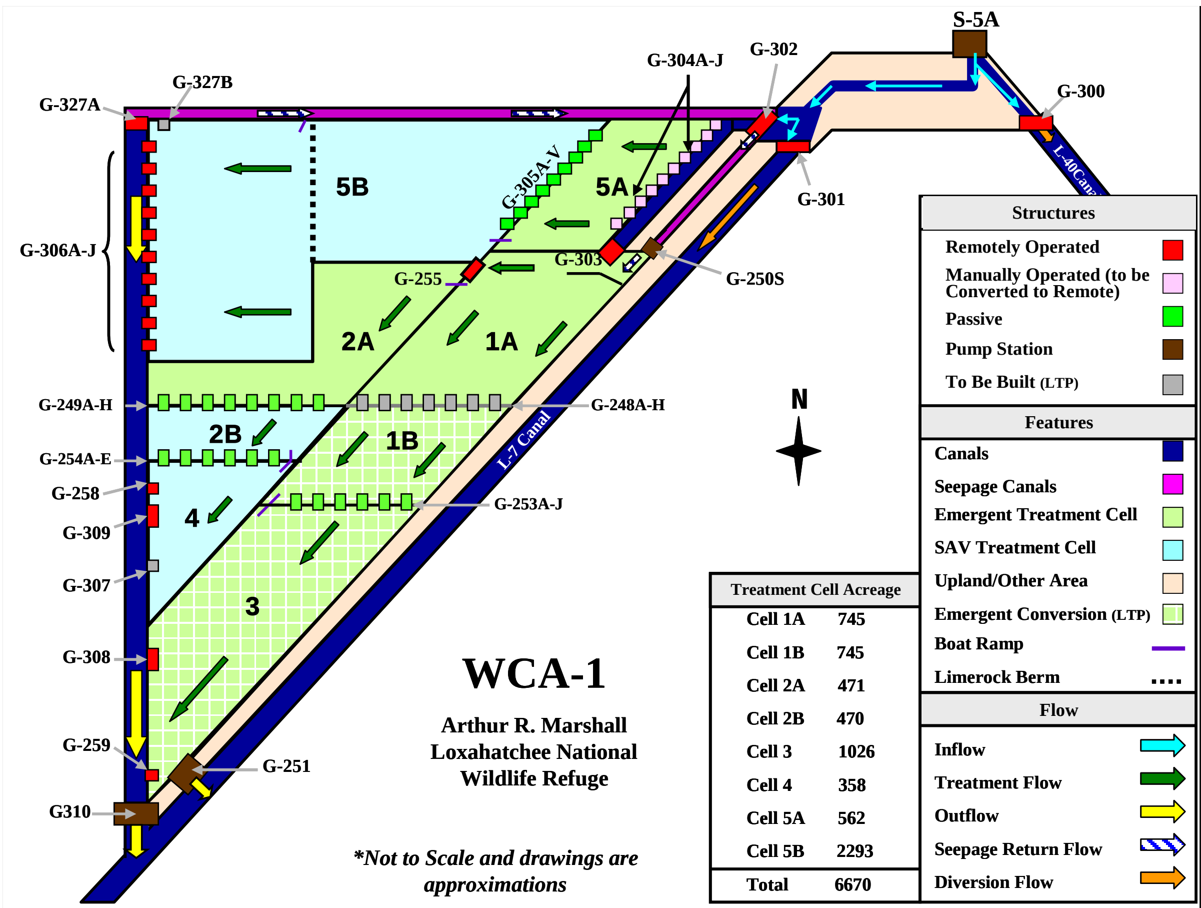


Table 3-1: Summary of Long-term Average Annual Inflow to STA-1W.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-5A Basin	228,143	45,753	163
EBWCD	15,005	8,651	467
Total	**243,172**	**54,409**	**181**

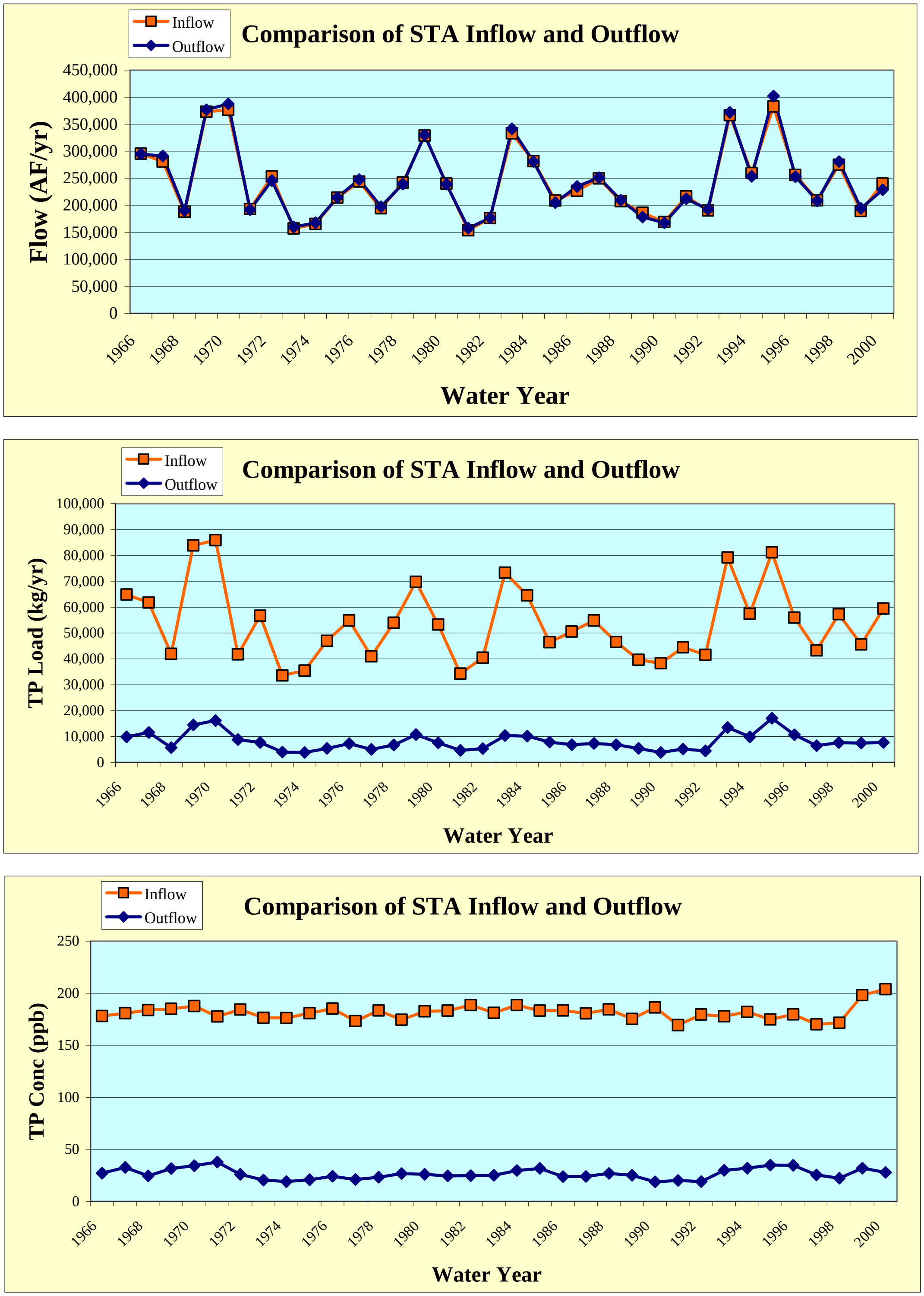
A summary of STA-1W phosphorus performance for the 2010 period is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix C. A long-term flow-weighted mean outflow concentration range of 21-35 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix C. For Cells 2B, 4 and 5B the mean depths and flow/width were slightly below the range of the SAV calibration data sets. For Cell 1A, the flow/width was about 30% above the range of the emergent calibration data sets.

Table 3-2: Summary of DMSTA Results for STA-1W.

Parameter	Unit	STA-1W
Effective Treatment Area	acres	6,670
Average Annual Inflow		
Volume	AF/yr	243,172
TP Load	kg/yr	54,409
TP Concentration	ppb	181
Average Annual Outflow		
Volume	AF/yr	244,928
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	21 (4)
Mean Estimate of Settling Rate	ppb	27
Lower Conf. Limit for Settling Rate	ppb	35
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	20
Mean Estimate of Settling Rate	ppb	26
Lower Conf. Limit for Settling Rate	ppb	33
TP Load (Using Mean TP Conc.)	kg/yr	8,222
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 36 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).

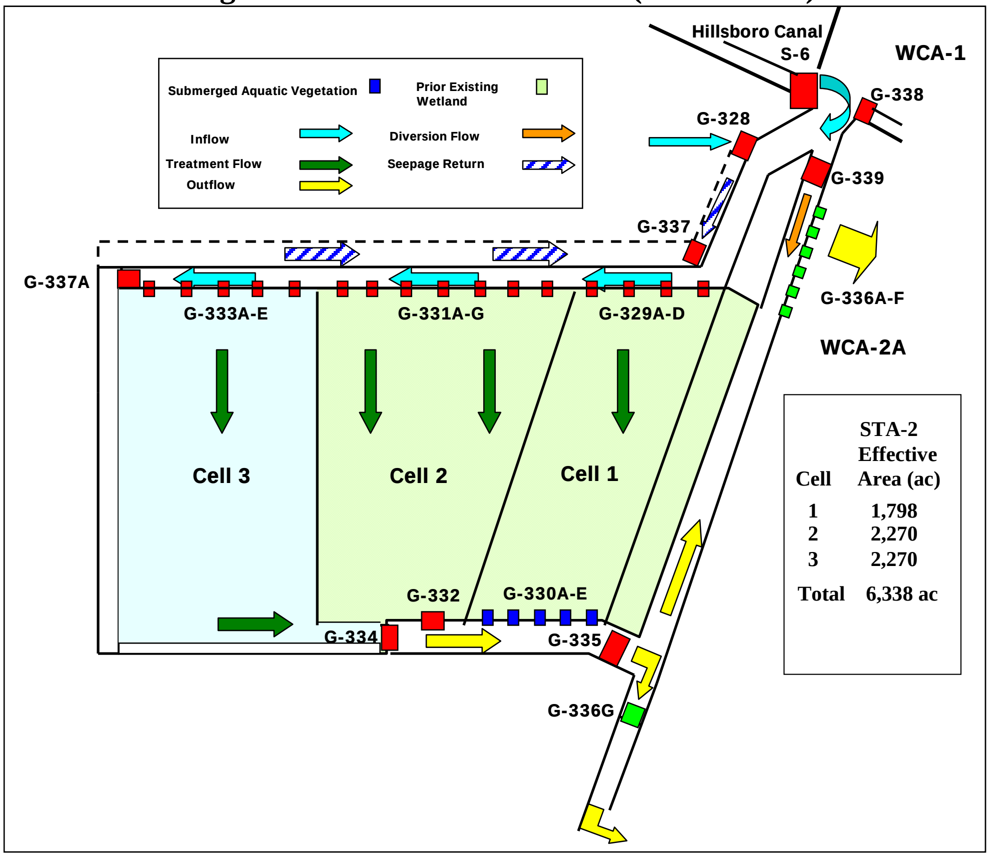
Figure 3-2: Comparison of Inflows and Outflows for STA-1W.



4. STA-2

A schematic of STA-2 is presented in **Figure 4-1**.

Figure 4-1: Schematic of STA-2 (Not to Scale).



Cell	STA-2 Effective Area (ac)
1	1,798
2	2,270
3	2,270
Total	6,338 ac

When the SFWMM Alt1 simulation was developed, the capability did not exist in the model to re-direct a portion of STA-2 inflows west to Compartment B for treatment, with the result that a phosphorus loading rate (PLR) for STA-2 of 1.6 $g/m^2/yr$ was associated with this SFWMM simulation. By comparison for this same SFWMM simulation, the PLR for Compartment B with no re-direction from STA-2 was approximately 0.36 $g/m^2/yr$, indicating available treatment capacity in Compartment B. Consistent with the Compartment B Basis of Design Report (Brown & Caldwell 2007), and because the structural components needed to re-direct water from the S-6 pump station west to Compartment B will be in place upon completion of the Compartment B STA, a portion of STA-2 inflows can in fact be directed to Compartment B in order to reduce the phosphorus loading rate for STA-2. For the purpose of optimizing the treatment performance for the 2010 scenario simulated by the SFWMM Alt1, even though the model did not simulate such a redirection, the District can in reality re-direct STA-2 inflows to Compartment B to better balance the PLR among the treatment areas. A PLR of 1.0 $g/m^2/yr$ would balance the loading rate between STA-2 and the North Build-out area of Compartment B (the South Build-out will not receive STA-2 re-direction).

Hence for the purpose of optimizing the treatment performance for the 2010 scenario simulated by SFWMM Alt1, a sufficient quantity of STA-2 inflows was re-directed to Compartment B North Build-out in order to achieve a PLR of 1.0 g/m^2/yr. **It is important to note that a PLR of 1.0 g/m^2/yr was used for this analysis as a rough target for balancing the loading rate between STA-2 and Compartment B, specifically the North Build-out area, and not as an ultimate PLR goal for STAs in general.** In the future, for example, upon the completion of ECART, the re-distribution of a portion of STA-2 inflows to Compartment B will be re-evaluated to optimize regional benefits. A long-term average annual re-direction of 118,810 AF/yr accomplishes this balanced PLR of 1.0 g/m^2/yr for STA-2 and the North Build-out of Compartment B. The PLR for the South Build-out, which will receive the balance of runoff from the S-7/S-2 Basin, is estimated as 0.5 g/m^2/yr. The resulting PLR for the entire Compartment B is approximately 0.8 g/m^2/yr, indicating some remaining unused treatment capacity in Compartment B even with the above re-distribution scenario. The resulting long-term average annual inflow to STA-2 by source is summarized in **Table 4-1**, showing the inflows before and after the re-direction.

Table 4-1: Long-term Average Annual Inflow to STA-2 For a PLR of 1.0 g/m^2/yr.

Source	STA-2 Inflows To Achieve a PLR of 1.0 g/m2/yr		
	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
WCA-2A Seepage	27,530	509	15
S-5A Basin	61,148	12,289	163
ESWCD & 715 Farms	31,129	5,215	136
S-6/S-2 Basin	181,700	23,661	106
Inflow Prior to Re-direction	***301,507***	***41,675***	***112***
Re-direct to Compartment B	-118,810	-16,012	109
Net Inflow	**182,697**	**25,662**	**114**

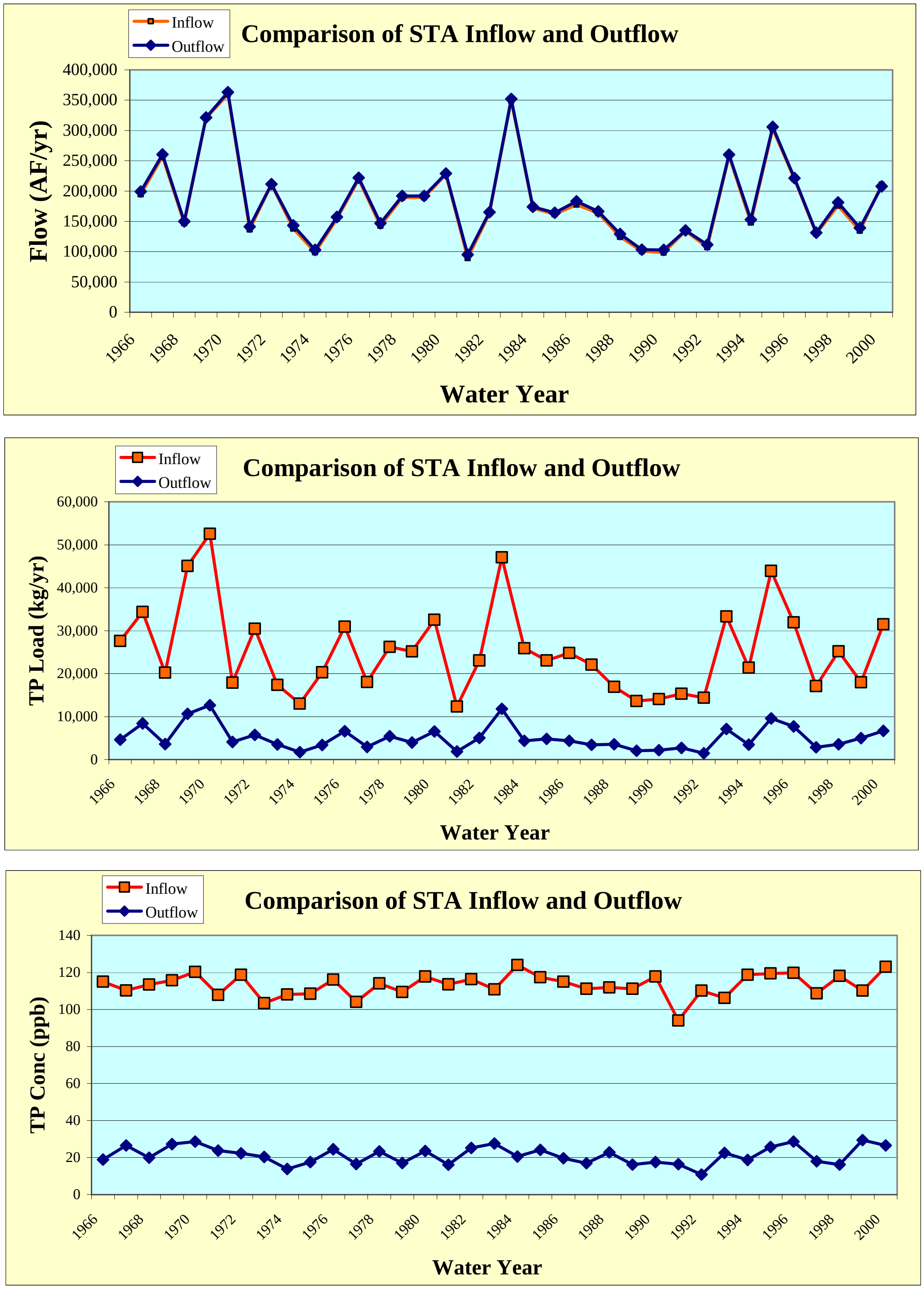
A summary of STA-2 phosphorus performance for the 2010 period with a PLR of 1.0 g/m^2/yr is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix C. A long-term flow-weighted mean outflow concentration range of 19-27 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix C. For Cells 1 and 2, the long-term average inflow concentration was approximately 4% above the range of the prior existing wetland (PEW) calibration data sets. For Cell 3 the mean depth and flow/width were slightly below the range of the SAV calibration data sets.

Table 4-2: Summary of DMSTA Results for STA-2 with a PLR of 1.0 g/m²/yr.

Parameter	Unit	STA-2 - 1.0 g/m2/yr
Effective Treatment Area	acres	6,338
Average Annual Inflow		
Volume	AF/yr	182,697
TP Load	kg/yr	25,662
TP Concentration	ppb	114
Average Annual Outflow		
Volume	AF/yr	186,047
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	19 (2)
Mean Estimate of Settling Rate	ppb	22 (1)
Lower Conf. Limit for Settling Rate	ppb	27
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	17
Mean Estimate of Settling Rate	ppb	21
Lower Conf. Limit for Settling Rate	ppb	25
TP Load (Using Mean TP Conc.)	kg/yr	5,145
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 36 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).

Figure 4-2: Comparison of Inflows and Outflows for STA-2 with a PLR of 1.0 g/m^2/yr.



4.1. Sensitivity Analysis: Redirection to Compartment B to Achieve an STA-2 Phosphorus Loading Rate of 1.3 g/m²/yr

An alternative re-direction target was investigated as a sensitivity analysis. An investigation of the performance of STA treatment cells and other Florida treatment wetlands by Juston and DeBusk (2005) identified a PLR of 1.3 $g/m^2/yr$ as a potential breakpoint between "well-performing" and "challenged" treatment areas. **The simulation of a PLR for STA-2 of 1.3 $g/m^2/yr$ was conducted for the purpose of comparing alternatives and does not represent an ultimate PLR goal for STAs.** The long-term PLR is just one of many factors that influence the phosphorus removal performance of an STA; others include

- Vegetation type
- Soil type
- Antecedent land use
- Phosphorus loading history
- Inflow concentrations
- Hurricanes, droughts and other disturbances

As a reference, STA-2 is presently receiving a PLR of 1.34 $g/m^2/yr$ and is one of the highest performing STAs, with a long-term average flow-weighted mean of 21 ppb (Pietro et al. 2007). In addition, STA-3/4 has been receiving phosphorus at a PLR averaging 1.5 $g/m^2/yr$ and is producing the lowest outflow phosphorus concentration of all the STAs, with a 3-year average flow-weighted mean of 19 ppb (Pietro et al. 2007). These STA performance results suggest that STAs loaded above a PLR 1.3 $g/m^2/yr$ may still achieve optimal performance, which could allow a greater inflow to STA-2 than presently modeled, thus increasing the available treatment capacity in Compartment B. A long-term average annual re-direction of 61,225 AF/yr accomplishes this PLR of 1.3 $g/m^2/yr$ for the SFWMM Alt1 simulation. The PLR for the North Build-out under this re-direction scenario is estimated as 0.6 $g/m^2/yr$. The PLR for the South Build-out, which will receive the balance of runoff from the S-7/S-2 Basin, is estimated as 0.5 $g/m^2/yr$. The PLR for the entire Compartment B is approximately 0.6 $g/m^2/yr$, well below the 1.3 $g/m^2/yr$ value and indicating surplus treatment capacity in Compartment B. Using this re-direction quantity, the long-term average annual inflow to STA-2 by source is summarized in **Table 4-3**.

Table 4-3: Long-term Average Annual Inflow to STA-2 For a PLR of 1.3 $g/m^2/yr$.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
WCA-2A Seepage	27,530	509	15
S-5A Basin	61,148	12,289	163
ESWCD & 715 Farms	31,129	5,215	136
S-6/S-2 Basin	181,700	23,661	106
Divert to Compartment B	-61,225	-8,322	110
Total	**240,282**	**33,353**	**113**

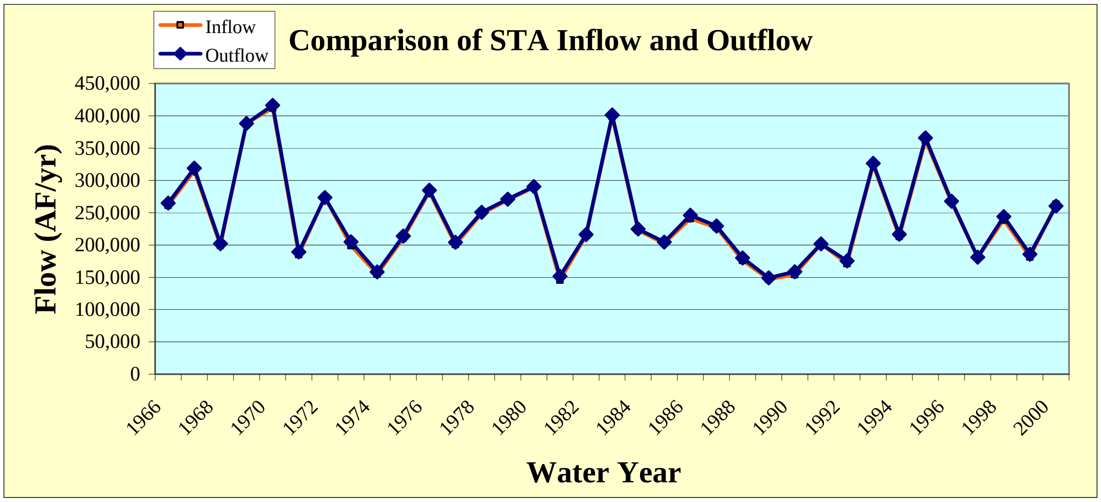
A summary of STA-2 phosphorus performance for the 2010 period with a PLR of 1.3 g/m^2/yr is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix C. A long-term flow-weighted mean outflow concentration range of 19-29 ppb was forecast compared to 19-27 ppb for a PLR of 1.0 g/m^2/yr, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix C. For Cells 1 and 2, the long-term average inflow concentration was approximately 3% above the range of the prior existing wetland (PEW) calibration data sets. For Cell 3 the mean depth and flow/width were slightly below the range of the SAV calibration data sets.

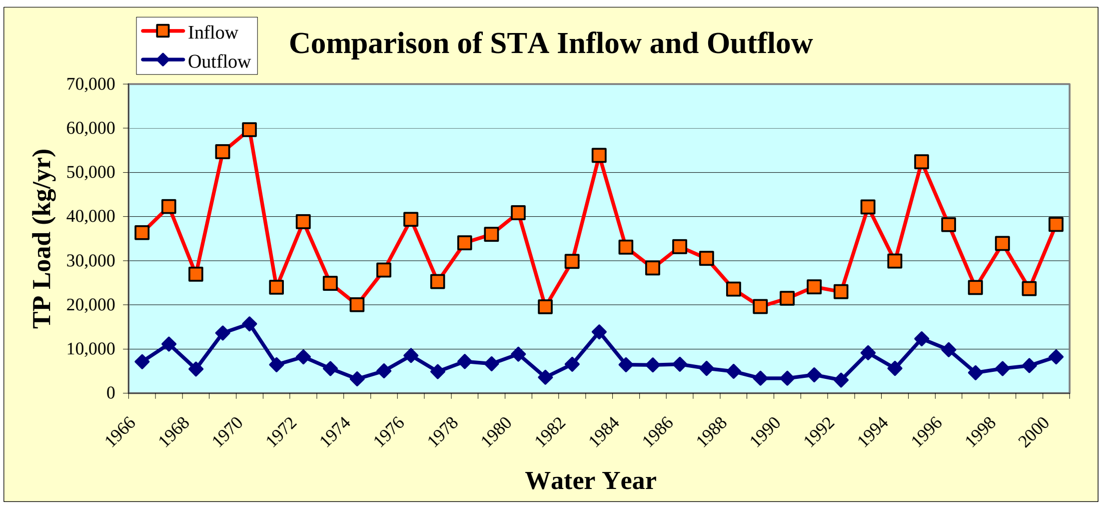
Table 4-4: Summary of DMSTA Results for STA-2 with a PLR of 1.3 g/m^2/yr.

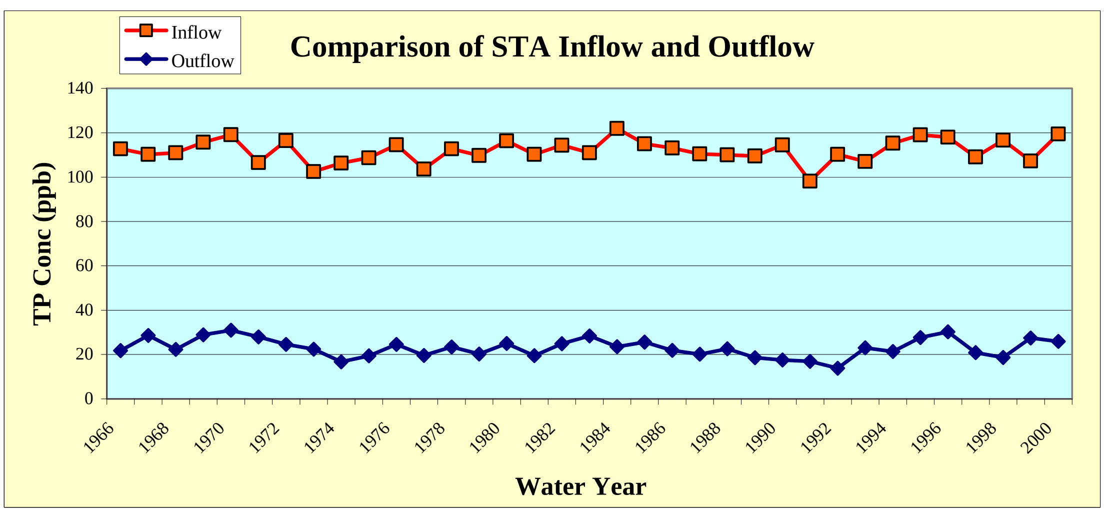
Parameter	Unit	STA-2 - 1.3 g/m2/yr
Effective Treatment Area	acres	6,338
Average Annual Inflow		
Volume	AF/yr	240,282
TP Load	kg/yr	33,353
TP Concentration	ppb	113
Average Annual Outflow		
Volume	AF/yr	243,339
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	19 (1)
Mean Estimate of Settling Rate	ppb	24
Lower Conf. Limit for Settling Rate	ppb	29
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	18
Mean Estimate of Settling Rate	ppb	22
Lower Conf. Limit for Settling Rate	ppb	28
TP Load (Using Mean TP Conc.)	kg/yr	7,151
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 36 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).

Figure 4-3: Comparison of Inflows and Outflows for STA-2 with a PLR of 1.3 g/m²/yr.



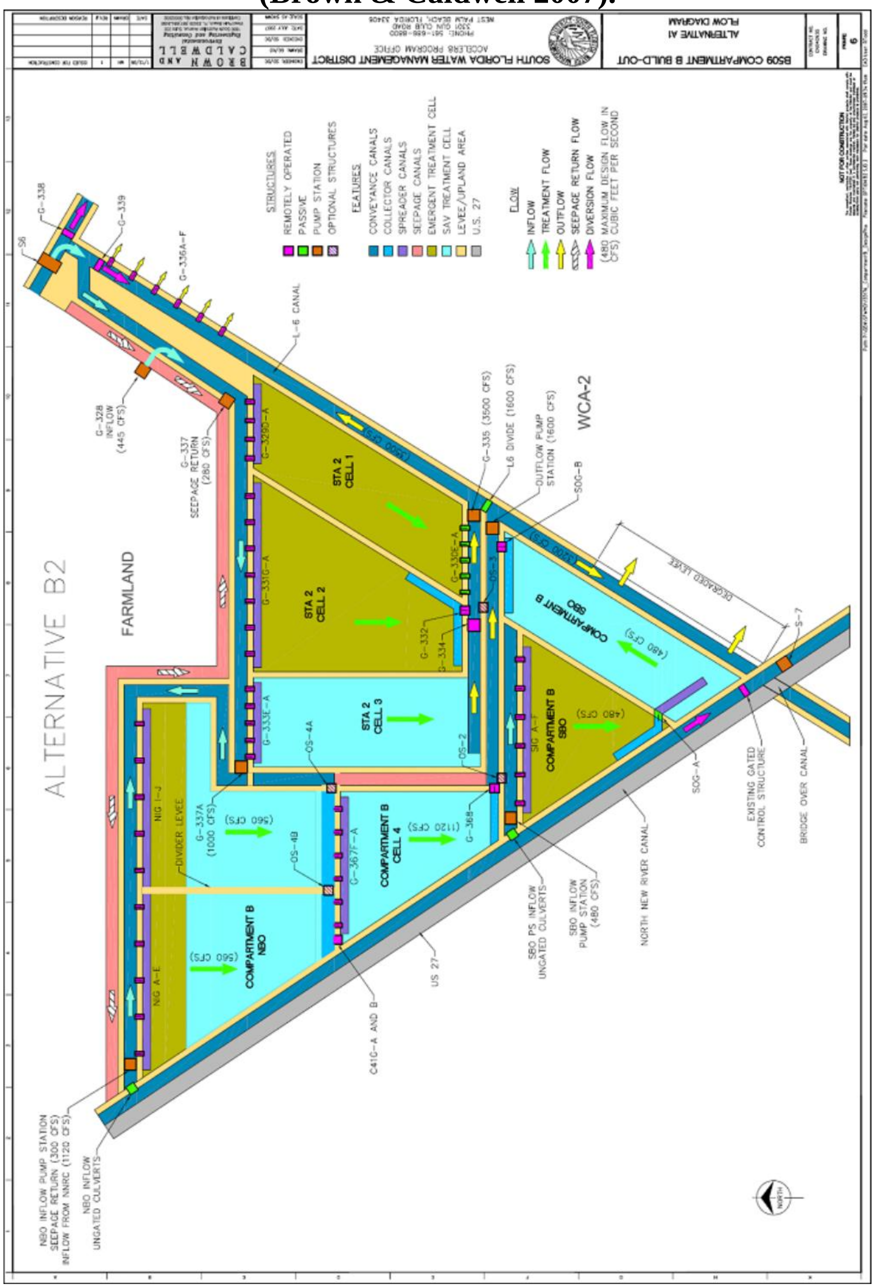




5. Compartment B

A preliminary schematic of the Compartment B Build-out is presented in **Figure 5-1** (Brown & Caldwell 2007).

Figure 5-1: Preliminary Schematic of Compartment B Build-out, Subject to Revision (Brown & Caldwell 2007).



As discussed in Section 4 above, a PLR to STA-2 of 1.0 g/m^2/yr would balance the loading rate between STA-2 and the North Build-out area of Compartment B (the South Build-out will not receive STA-2 re-direction). Hence for the purpose of optimizing the treatment performance for the 2010 scenario simulated by SFWMM Alt1, a sufficient quantity of STA-2 inflows was re-directed to Compartment B North Build-out in order to achieve a PLR of 1.0 g/m^2/yr. **It is important to note that a PLR of 1.0 g/m^2/yr was used for this analysis as a rough target for balancing the loading rate between STA-2 and Compartment B, specifically the North Build-out area, and not as an ultimate PLR goal for STAs in general.** In the future, for example, upon the completion of ECART, the re-distribution of a portion of STA-2 inflows to Compartment B will be re-evaluated to optimize regional benefits. The resulting long-term average annual inflow to Compartment B by source is summarized in **Table 5-1**, showing the inflows before and after the re-direction.

Table 5-1: Long-term Average Annual Inflow to Compartment B For an STA-2 PLR of 1.0 g/m^2/yr.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	106,069	12,411	95
Re-direction from STA-2			
WCA-2A Seepage	10,848	201	15
S-6/S-2 Basin	71,599	9,324	106
S-5 Basin	24,096	4,843	163
ESWCD & 715 Farms	12,267	2,055	136
Total	**224,879**	**28,833**	**104**

A summary of Compartment B phosphorus performance for the 2010 period is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix C. DMSTA forecast long-term average annual phosphorus concentrations of 9.1-14.6 ppb, which are below the minimum of the calibration data sets for SAV (15 ppb), and those forecasts were replaced in Table 5-2 by 15 ppb. The adjusted outflow phosphorus levels in Table 5-2 may still portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a 5 ppb standard deviation on annual values. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix C. For the North and South Build-out cells, the mean depth and flow/width were slightly below the range of the SAV calibration data sets.

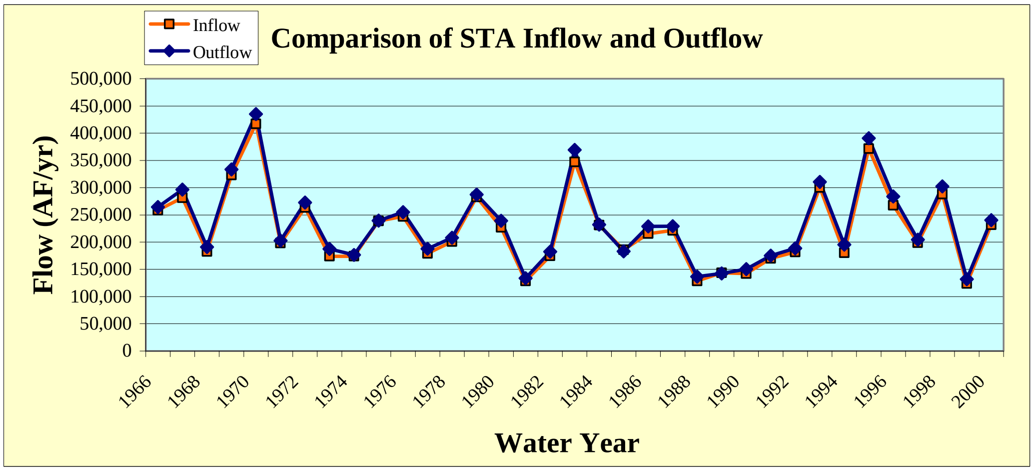
Table 5-2: DMSTA Results for Comp. B with an STA-2 PLR of 1 g/m^2/yr.

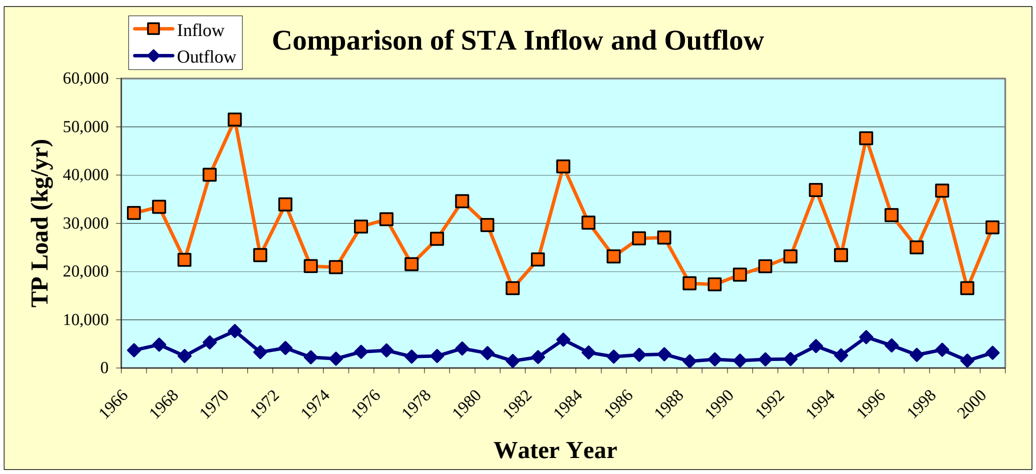
Parameter	Unit	Comp. B North	Comp. B South	Comp. B Combined
Effective Treatment Area	acres	5,824	2,796	8,620
Average Annual Inflow				
Volume	AF/yr	177,228	47,651	224,879
TP Load	kg/yr	22,932	5,553	28,833
TP Concentration	ppb	105	94	104
Average Annual Outflow				
Volume	AF/yr	180,541	53,378	233,919
Flow-weighted Mean TP Concentration				
Upper Conf. Limit for Settling Rate	ppb	15 (35)	15 (35)	15 (35)
Mean Estimate of Settling Rate	ppb	15 (35)	15 (34)	15 (35)
Lower Conf. Limit for Settling Rate	ppb	15 (27)	15 (25)	15 (27)
Geometric Mean TP Concentration				
Upper Conf. Limit for Settling Rate	ppb	15	15	15
Mean Estimate of Settling Rate	ppb	15	15	15
Lower Conf. Limit for Settling Rate	ppb	15	15	15
TP Load (Using Mean TP Conc.)	kg/yr	3,340	988	4,328
Diversion Volumes and Loads				
Volume	AF/yr	0	0	0
TP Load	kg/yr	0	0	0
TP Concentration	ppb	-	-	-

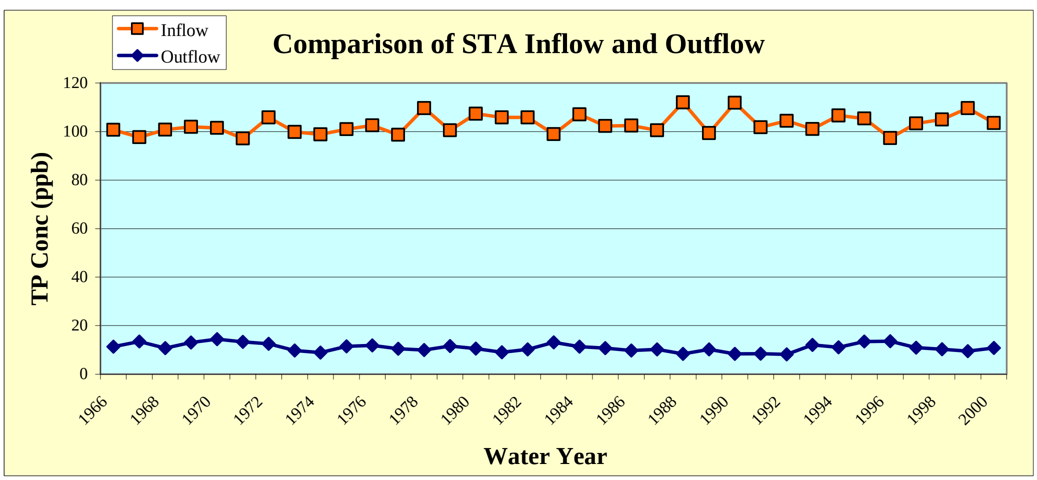
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Outflow values highlighted in yellow had one or more years of the 35 year simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.

Figure 5-2: Comparison of Inflows and Outflows for Compartment B with an STA-2 PLR of 1.0 g/m²/yr.







Note: TP concentrations below 15 ppb have not been sustained.

5.1. Sensitivity Analysis: Redirection to Compartment B to Achieve an STA-2 Phosphorus Loading Rate of 1.3 g/m²/yr

An alternative re-direction target was investigated as a sensitivity analysis. An investigation of the performance of STA treatment cells and other Florida treatment wetlands by Juston and DeBusk (2005) identified a PLR of 1.3 $g/m^2/yr$ as a potential breakpoint between "well-performing" and "challenged" treatment areas. **The simulation of a PLR for STA-2 of 1.3 $g/m^2/yr$ was conducted for the purpose of comparing alternatives and does not represent an ultimate PLR goal for STAs.** The long-term PLR is just one of many factors that influence the phosphorus removal performance of an STA; others include

- Vegetation type
- Soil type
- Antecedent land use
- Phosphorus loading history
- Inflow concentrations
- Hurricanes, droughts and other disturbances

As a reference, STA-2 is presently receiving a PLR of 1.34 $g/m^2/yr$ and is one of the highest performing STAs, with a long-term average flow-weighted mean of 21 ppb (Pietro et al. 2007). In addition, STA-3/4 has been receiving phosphorus at a PLR averaging 1.5 $g/m^2/yr$ and is producing the lowest outflow phosphorus concentration of all the STAs, with a 3-year average flow-weighted mean of 19 ppb (Pietro et al. 2007). These STA performance results suggest that STAs loaded above a PLR 1.3 $g/m^2/yr$ may still achieve optimal performance, which could allow a greater inflow to STA-2 than presently modeled, thus increasing the available treatment capacity in Compartment B. A long-term average annual re-direction of 61,225 AF/yr accomplishes this PLR of 1.3 $g/m^2/yr$ for the SFWMM Alt1 simulation. The PLR for the North Build-out under this re-direction scenario is estimated as 0.6 $g/m^2/yr$. The PLR for the South Build-out, which will receive the balance of runoff from the S-7/S-2 Basin, is estimated as 0.5 $g/m^2/yr$. The PLR for the entire Compartment B is approximately 0.6 $g/m^2/yr$, well below the 1.3 $g/m^2/yr$ value and indicating surplus treatment capacity in Compartment B. Using this re-direction quantity, the long-term average annual inflow to Compartment B by source is summarized in **Table 5-3**.

Table 5-3: Long-term Average Annual Inflow to Compartment B For an STA-2 PLR of 1.3 $g/m^2/yr$.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	106,069	12,411	95
WCA-2A Seepage	5,590	103	15
S-6/S-2 Basin	36,896	4,805	106
S-5 Basin	12,417	2,496	163
ESWCD & 715 Farms	6,321	1,059	136
Total	**167,294**	**20,873**	**101**

As a reference, STA-2 is presently receiving a PLR of 1.34 g/m^2/yr and is one of the highest performing STAs, with a long-term average flow-weighted mean of 21 ppb (Pietro et al. 2007). In addition, STA-3/4 has been receiving phosphorus at a PLR averaging 1.5 g/m^2/yr and is producing the lowest outflow phosphorus concentration of all the STAs, with a 3-year average flow-weighted mean of 19 ppb (Pietro et al. 2007). These STA performance results, in combination with the results of this sensitivity analysis, suggest that STAs loaded above a PLR 1.3 g/m^2/yr may still achieve optimal performance, which could allow a greater loading to STA-2 than presently modeled, thus increasing the available treatment capacity in Compartment B.

A summary of Compartment B phosphorus performance for the 2010 period with a PLR of 1.3 g/m^2/yr to STA-2 is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix C. As was the case for an STA-2 PLR of 1.0 g/m^2/yr, DMSTA forecast long-term outflow concentrations below the low end of the SAV calibration data set (15 ppb) and these were set to the low end value, and hence may be optimistic. Judgment should be applied before using these results as a true indicator of long-term performance. By reference, the lowest sustainable outflow concentration from an STA to date is 19 ppb with a standard deviation of 5 ppb for STA-3/4. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix C. For the North and South Build-out cells, the mean depth and flow/width were slightly below the range of the SAV calibration data sets. For Cell 4, the mean depth was slightly below the range of the SAV calibration data sets.

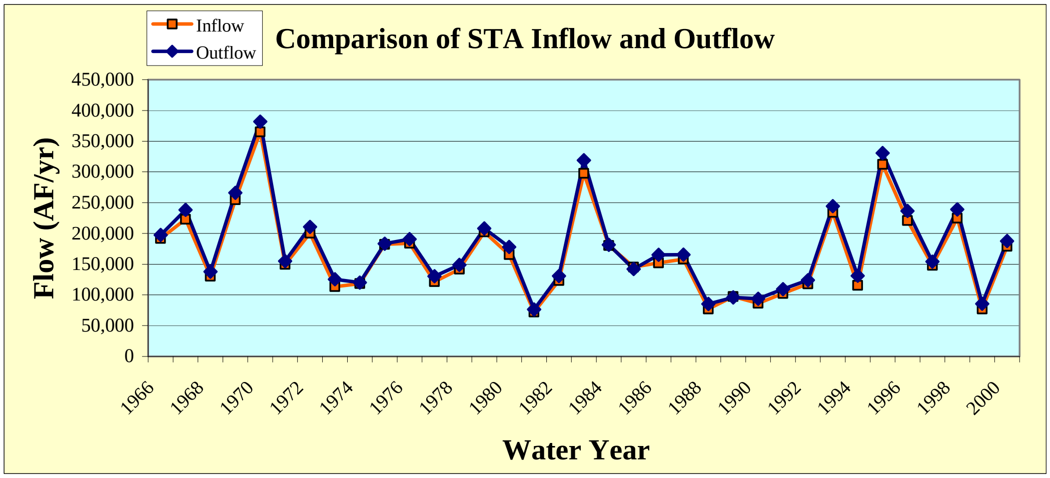
Table 5-4: DMSTA Results for Compartment B with an STA-2 PLR of 1.3 g/m2/yr.

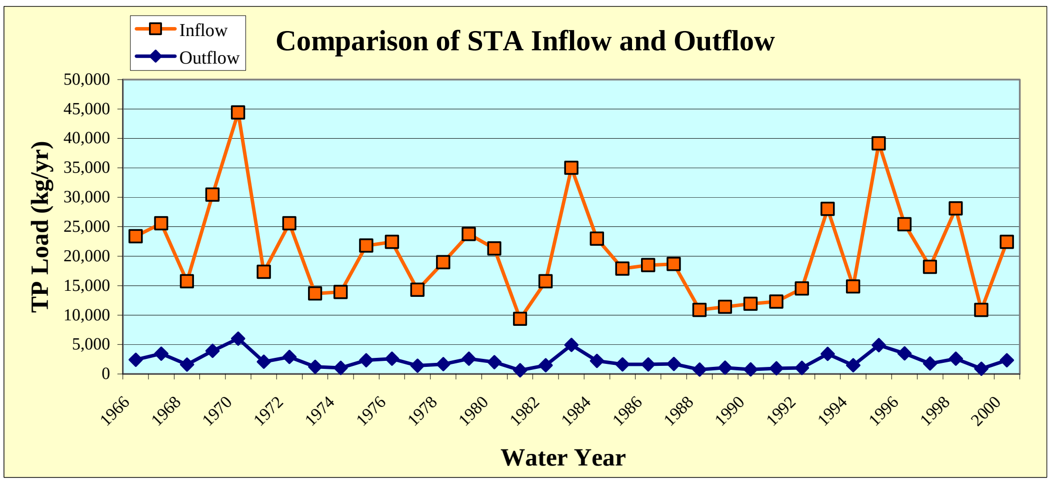
Parameter	Unit	Comp. B North	Comp. B South	Comp. B Combined
Effective Treatment Area	acres	5,824	2,796	8,620
Average Annual Inflow				
Volume	AF/yr	119,643	47,651	167,294
TP Load	kg/yr	15,242	5,553	20,873
TP Concentration	ppb	103	94	101
Average Annual Outflow				
Volume	AF/yr	124,376	53,378	177,754
Flow-weighted Mean TP Concentration				
Upper Conf. Limit for Settling Rate	ppb	15 (35)	15 (35)	15 (35)
Mean Estimate of Settling Rate	ppb	15 (35)	15 (34)	15 (35)
Lower Conf. Limit for Settling Rate	ppb	15 (35)	15 (25)	15 (34)
Geometric Mean TP Concentration				
Upper Conf. Limit for Settling Rate	ppb	15	15	15
Mean Estimate of Settling Rate	ppb	15	15	15
Lower Conf. Limit for Settling Rate	ppb	15	15	15
TP Load (Using Mean TP Conc.)	kg/yr	2,301	988	3,289
Diversion Volumes and Loads				
Volume	AF/yr	0	0	0
TP Load	kg/yr	0	0	0
TP Concentration	ppb	-	-	-

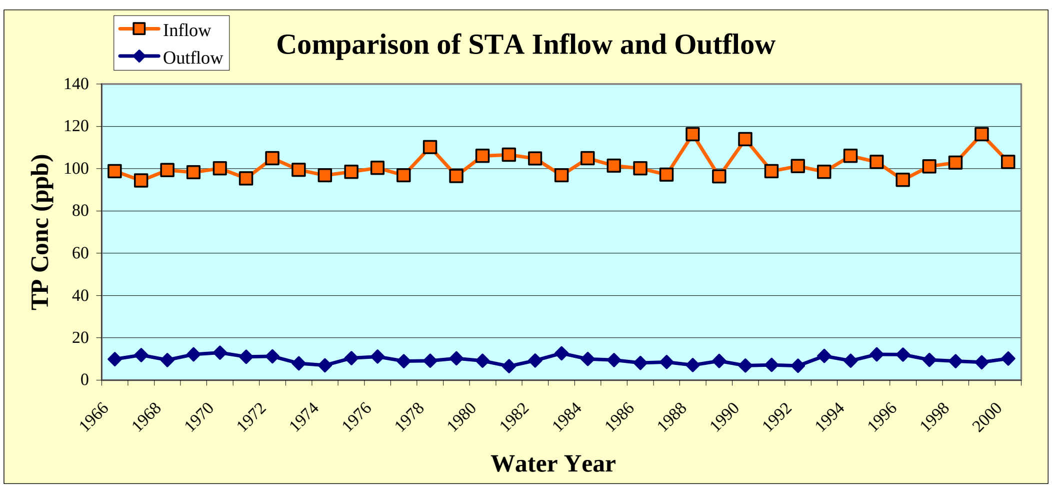
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Outflow values highlighted in yellow had one or more years of the 35 year simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.

Figure 5-3: Comparison of Inflows and Outflows for Compartment B with an STA-2 PLR of 1.3 g/m2/yr.







Note: TP concentrations below 15 ppb have not been sustained.

6. EAA Storage Reservoir A-1

The network feature of DMSTA was used to model the combined EAA Storage Reservoir A-1 (EAASR A-1) and STA-3/4 system. This simulation generated a daily time series of flow and phosphorus levels from the reservoir back to the EAA for irrigation releases and to STA-3/4 for subsequent treatment. Upon review of the outflow time series to STA-3/4, it was observed that DMSTA was simulating releases during the dry season when the SFWMM results indicated no releases from the reservoir to STA-3/4, e.g., for January–May 1981 DMSTA simulated 12,620 AF in releases when SFWMM had 1,926 AF in releases. Further, the phosphorus concentrations associated with these dry season releases were quite high, exceeding 1,600 ppb. For the purpose of the STA-3/4 inflow, the DMSTA-generated time series was replaced by the daily flows from the SFWMM results and the phosphorus concentrations from DMSTA. Although this won't resolve the high concentrations during the dry seasons, it will reduce the frequency of their occurrence. This new time series was then used in combination with basin runoff flows for an independent DMSTA simulation of STA-3/4 that allowed an uncertainty analysis of the STA performance, using the 10%, mean and 90% values of the effective settling rates for the specific vegetation types within STA-3/4.

Several assumptions were incorporated in the DMSTA modeling of the EAASR A-1:

- The SFWMM models the EAASR as two reservoir compartments, EARSN and EARSS. These were simulated in DMSTA as a single reservoir cell.
- Many reservoir characteristics were identical to those evaluated during the Basis of Design Report for the EAASR A-1 (Black and Veatch 2006):
  - The effective treatment area of the EAASR A-1 is 15,200 acres
  - The minimum depth for releases is 15.2 cm
  - The outflow weir depth for bypass is 12.5 ft
  - Seepage characteristics
- Other reservoir characteristics include:
  - The average flow width is 4.5 miles which is the average of the east-west width at the north end of EAASR and the width at the south end
  - The mean settling rate for the reservoir calibration data sets (5 m/yr) was used to simulate phosphorus removal in the reservoir.
- Daily rainfall and evapotranspiration from the SFWMM Alt1 scenario were used in the DMSTA simulation.
- Reservoir depths from the SFWMM Alt1 scenario were used in the DMSTA simulation. The depth time series provides an appropriate range of depths in the reservoir, based on model assumptions of footprint and volume, but is not intended as a true estimate of reservoir depth. Reservoir depth time series are not recommended for calculations outside the 2x2, however, the depth time series can be used as a reference for feasibility-level work such as the present analysis.

- The daily flow time series from the SFWMM Alt simulation quantifying the flow from the EAASR to STA-3/4 (WCS4S and EVBLSS) were used as outflow time series within the DMSTA simulation of the reservoir.

Using the recent phosphorus concentration of Lake Okeechobee releases as 100 ppb, the long-term average annual inflow to the EAASR A-1 by source is summarized in **Table 6-1**.

Table 6-1: Summary of Long-term Average Annual Inflow to EAASR A-1.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	119,549	14,011	95
S-8/S-3 Basin	97,242	10,012	83
Lake Okee.	323,222	39,862	100
Total	**540,013**	**63,885**	**96**

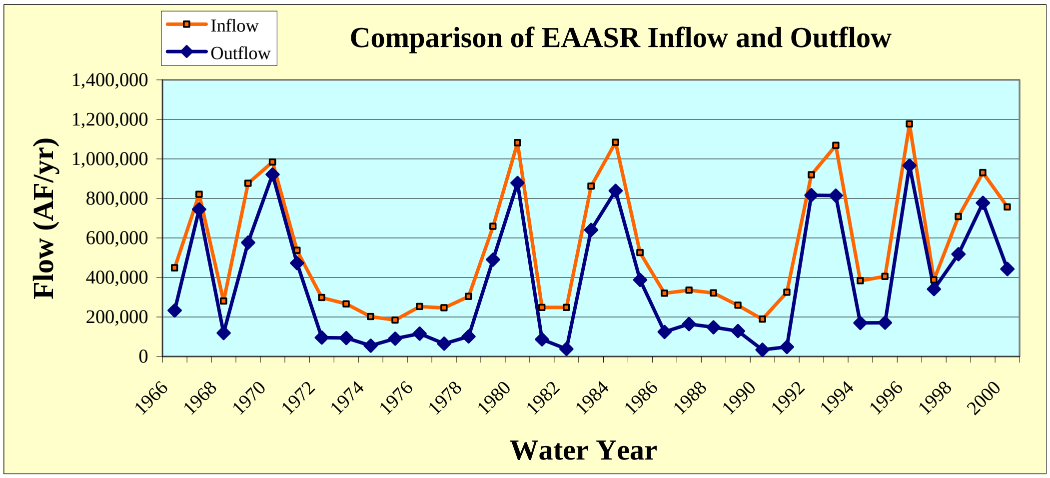
A summary of EAASR A-1 phosphorus performance for the 2010 period is presented in the table and figures below. For WY1990, the simulated flow-weighted mean outflow concentration exceeded the inflow concentration, although the outflow loads were only 25% of the inflow loads. A copy of the DMSTA output is presented in Appendix C. No warning or error messages were generated during the DMSTA simulation for the EAASR A-1. However, the minimum simulated depth was 1 cm, indicating that DMSTA numerically prevented dry-out by reducing the rates of ET, seepage, etc. In reality the reservoir would have dried out and phosphorus levels may temporarily increase upon rewetting; depending on how much time passes between rewetting and discharge to the STA, the impact of this temporary increase in phosphorus levels could vary, however, the long-term concentration shown in Table 6-2 may be optimistic.

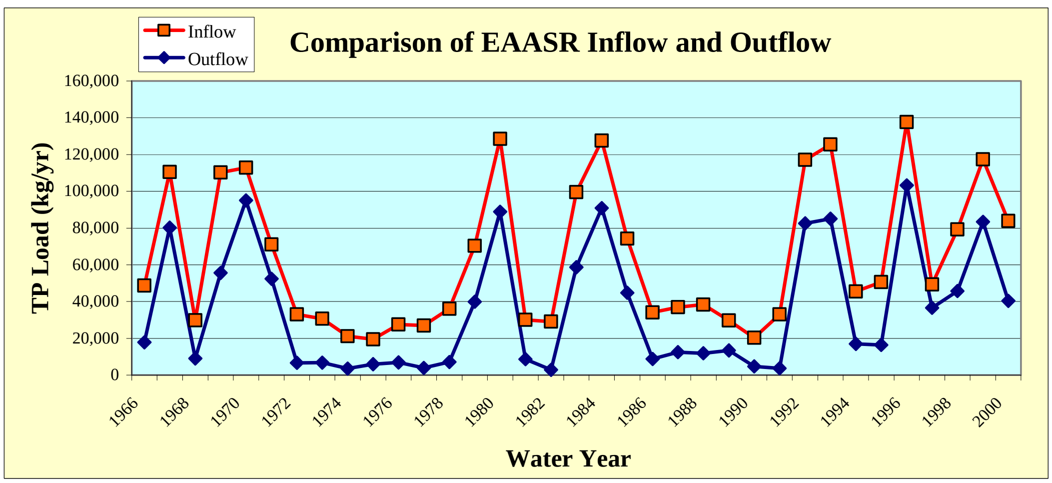
Table 6-2: Summary of DMSTA Results for EAASR A-1 (Lake TP Conc. of 100 ppb).

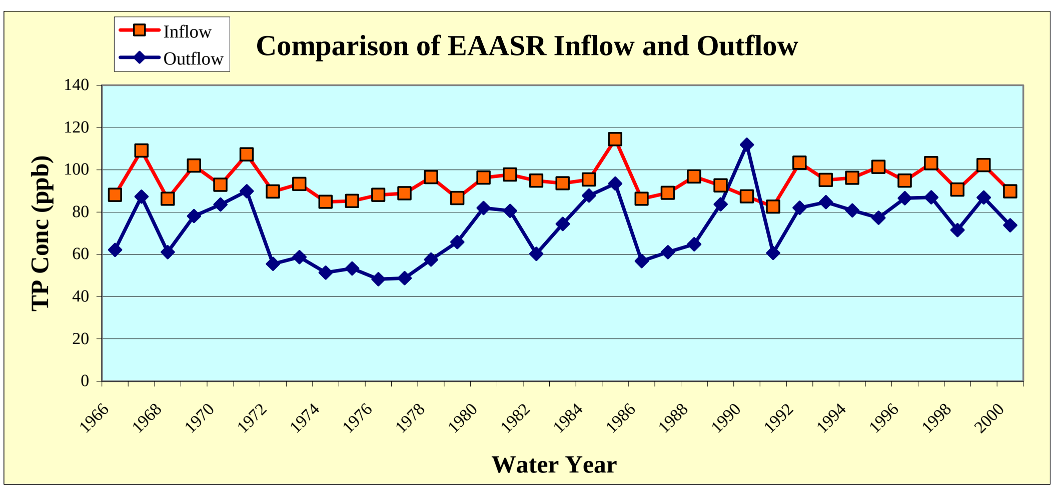
Parameter	Unit	EAASR A-1 Note 2
Effective Treatment Area	acres	15,200
Average Annual Inflow		
Volume	AF/yr	540,013
TP Load	kg/yr	63,885
TP Concentration	ppb	96
Average Annual Outflow		
Volume	AF/yr	363,442
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	80
Lower Conf. Limit for Settling Rate	ppb	-
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	93
Lower Conf. Limit for Settling Rate	ppb	-
TP Load (Using Mean TP Conc.)	kg/yr	35,730
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Shown are outflows to STA-3/4 after adjustment (see text); total outflows, including irrigation releases, were 514,607 AF/yr and 48,699 kg/yr at 77 ppb.

Figure 6-1: Comparison of Inflows and Outflows for EAASR A-1 (Lake TP Concentration of 100 ppb).







6.1. Sensitivity Analysis: Lake Okeechobee TP Concentration of 150 ppb

As an analysis of the sensitivity of reservoir and STA-3/4 performance to the phosphorus concentration of Lake Okeechobee releases, this section describes the performance of EAASR A-1 if the phosphorus concentration of Lake releases is 150 ppb at the inflow to the reservoir. With this assumption, the long-term average annual inflow to the EAASR A-1 by source is summarized in **Table 6-3**.

Table 6-3: Summary of Long-term Average Annual Inflow to EAASR.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	119,549	14,011	95
S-8/S-3 Basin	97,242	10,012	83
Lake Okee.	323,222	59,799	150
Total	**540,013**	**83,822**	**126**

A summary of EAASR A-1 phosphorus performance for the 2010 period is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix C. **The net effect of assuming a Lake Okeechobee phosphorus concentration of 150 ppb appears to be about 27 ppb at the outflow of the reservoir to STA-3/4, resulting in a long-term average additional 12.1 metric tons/yr of phosphorus to STA-3/4.**

No warning or error messages were generated during the DMSTA simulation for the EAASR A-1. However, the minimum simulated depth was 1 cm, indicating that DMSTA numerically prevented dry-out by reducing the rates of ET, seepage, etc. In reality the reservoir would have dried out and phosphorus levels would likely increase upon rewetting; thus the long-term concentration shown in Table 6-4 may be optimistic.

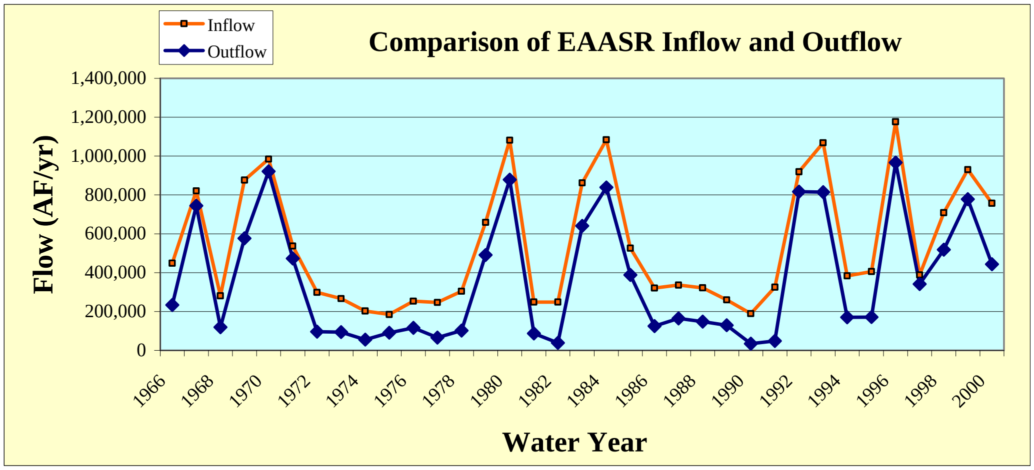
Table 6-4: Summary of DMSTA Results for EAASR A-1 (Lake TP Conc. of 150 ppb).

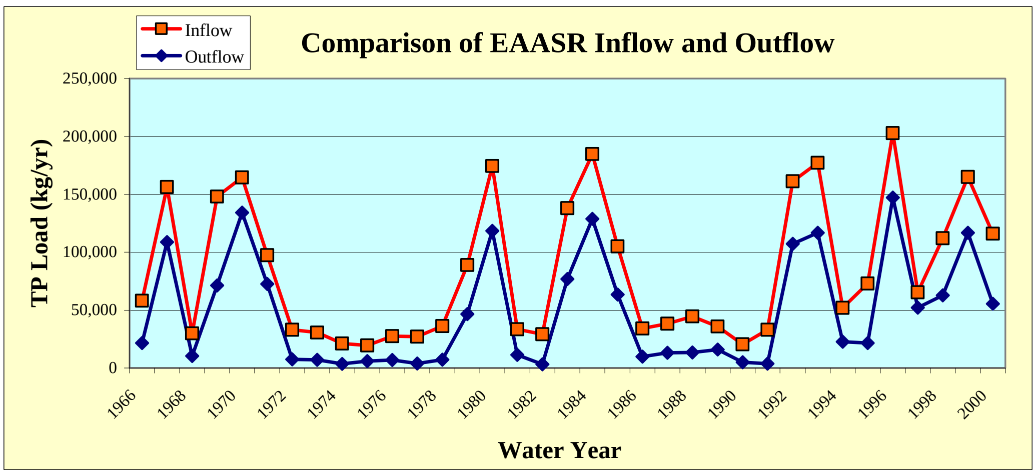
Parameter	Unit	EAASR A-1 Note 2
Effective Treatment Area	acres	15,200
Average Annual Inflow		
Volume	AF/yr	540,417
TP Load	kg/yr	83,883
TP Concentration	ppb	126
Average Annual Outflow		
Volume	AF/yr	363,442
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	-
Mean Estimate of Settling Rate	ppb	107
Lower Conf. Limit for Settling Rate	ppb	-
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	.-
Mean Estimate of Settling Rate	ppb	115
Lower Conf. Limit for Settling Rate	ppb	-
TP Load (Using Mean TP Conc.)	kg/yr	47,791
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

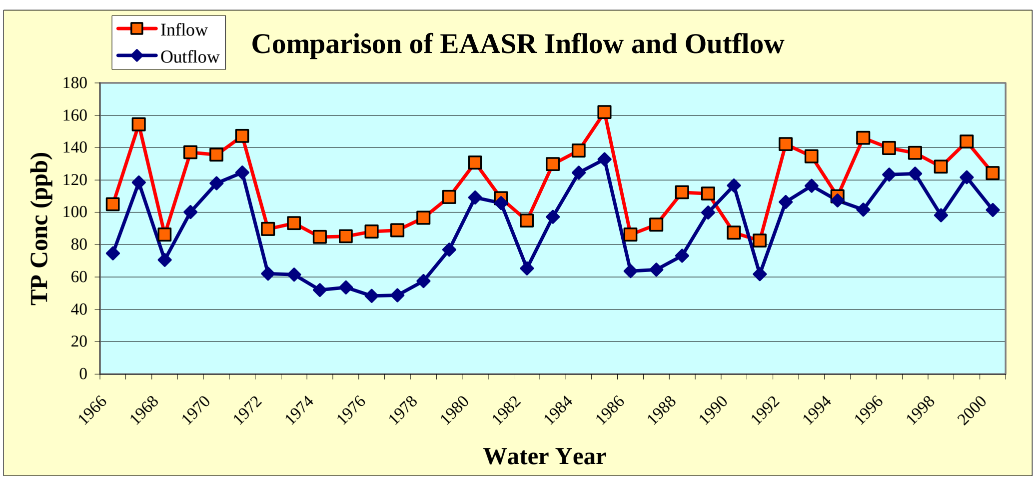
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Shown are outflows to STA-3/4 after adjustment (see text); total outflows, including irrigation releases, were 514,607 AF/yr and 64,262 kg/yr at 101 ppb.

Figure 6-2: Comparison of Inflows and Outflows for EAASR A-1 (Lake TP Concentration of 150 ppb).



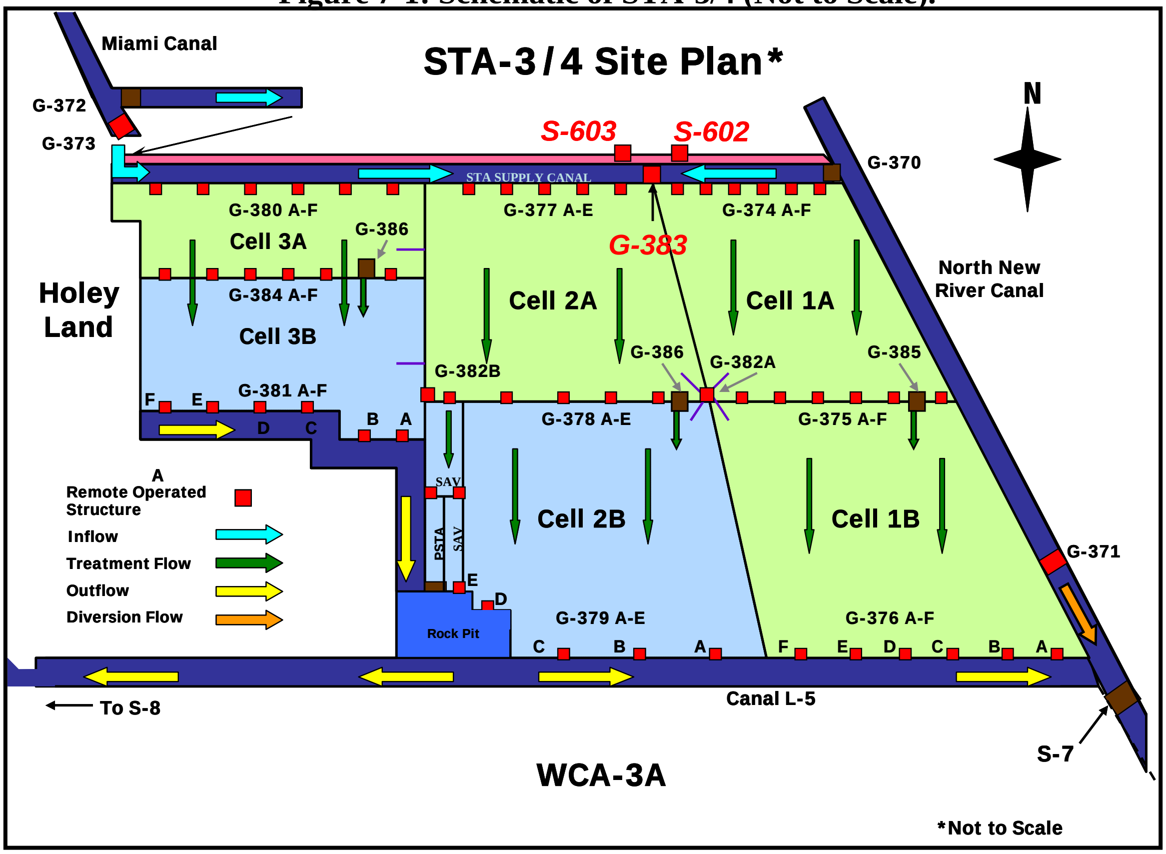




7. STA-3/4

A schematic of STA-3/4 is presented in **Figure 7-1B**, showing the two proposed structures (S-602 and S-603) that will allow transfer of water from the EAA Storage Reservoir to the STA.

Figure 7-1: Schematic of STA-3/4 (Not to Scale).



In developing the *Updated STA Inflow Data Sets,* an assumption had to be made of the flows and phosphorus levels from the EAASR A-1 to STA-3/4. After the DMSTA simulation of the reservoir discussed in Section 6 above, the simulated inflow phosphorus levels were increased 2%, and are summarized in **Table 7-1**.

A summary of STA-3/4 phosphorus performance for the 2010 period is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix C. A long-term flow-weighted mean outflow concentration range of 16-24 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix C. For Cells 1A and 2A, the mean flow/width was about 10% above the range of the emergent calibration data sets. For Cell 3B, the mean flow/width was about 30% below the range of the SAV calibration data sets. For the three SAV cells, the simulated mean depths were slightly below the range of the SAV calibration data sets, although the simulated minimum depths were above 30 cm. Diversion around the STA was simulated to provide water supply to downstream users, including the Big Cypress Basin Seminole Indian Reservation.

Table 7-1: Summary of Long-term Average Annual Inflow to STA-3/4 (Lake TP Conc of 100 ppb).

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	35,102	4,230	98
S-8/S-3 Basin	132,584	13,383	82
C-139 Basin	13,201	3,401	209
SSDD	10,539	1,324	102
SFCD	24,110	3,363	113
EAA SR	363,442	35,730	80
Total	**583,360**	**61,743**	86

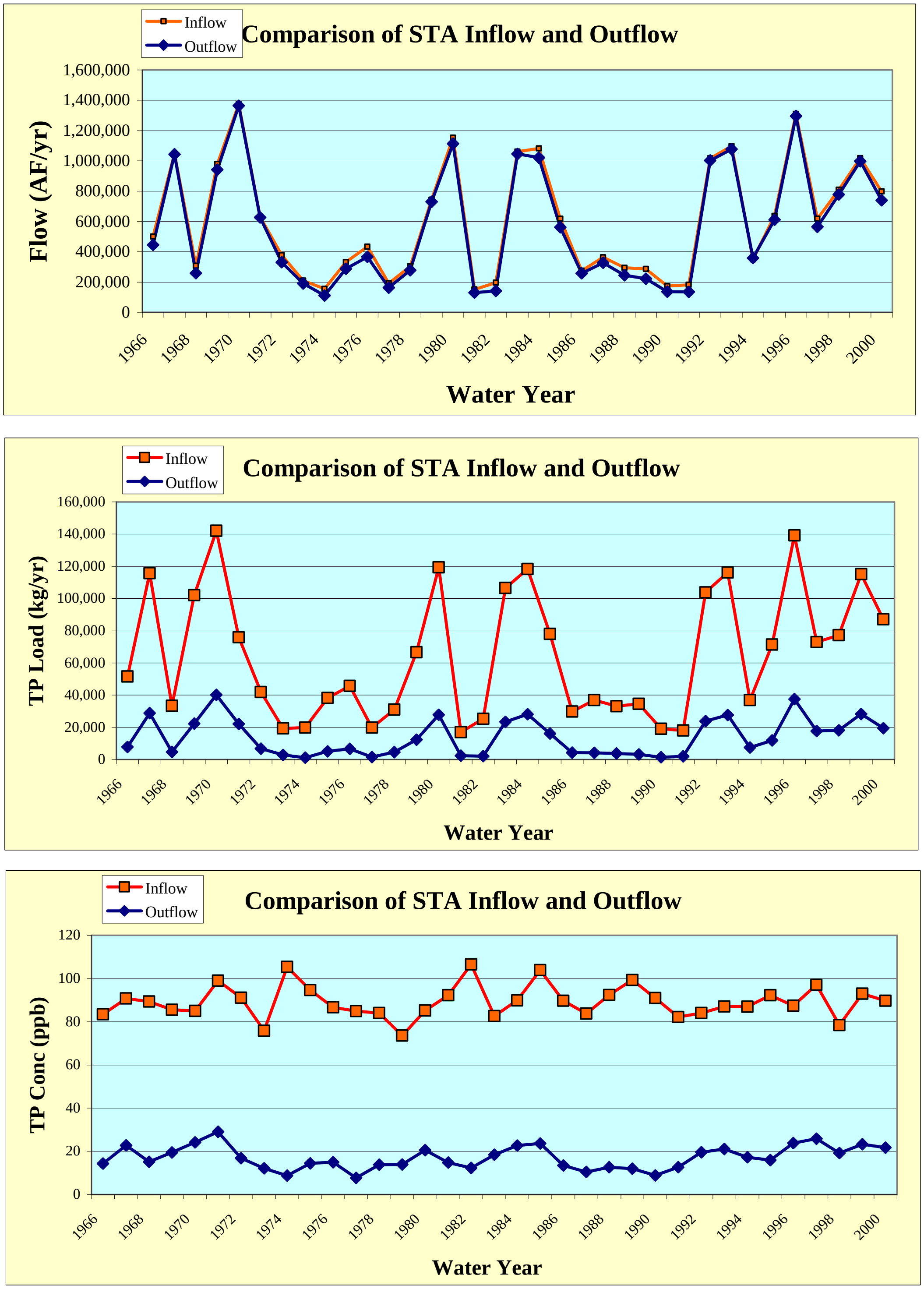
Totals are less than the sum of the components due to daily net negative values within the basin.

Table 7-2: Summary of DMSTA Results for STA-3/4 (Lake TP Conc. of 100 ppb).

Parameter	Unit	STA-3/4
Effective Treatment Area	acres	16,543
Average Annual Inflow		
Volume	AF/yr	583,360
TP Load	kg/yr	61,743
TP Concentration	ppb	86
Average Annual Outflow		
Volume	AF/yr	568,441
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	16 (20)
Mean Estimate of Settling Rate	ppb	20 (16)
Lower Conf. Limit for Settling Rate	ppb	24 (9)
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	14
Mean Estimate of Settling Rate	ppb	16
Lower Conf. Limit for Settling Rate	ppb	20
TP Load (Using Mean TP Conc.)	kg/yr	13,853
Diversion Volumes and Loads		
Volume	AF/yr	64,699
TP Load	kg/yr	7,897
TP Concentration	ppb	99

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 36 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Diversion is for downstream water supply users.

Figure 7-2: Comparison of Inflows and Outflows for STA-3/4 (Lake TP Concentration of 100 ppb).



Note: TP concentrations below 15 ppb have not been sustained.

7.1. Sensitivity Analysis: Lake Okeechobee TP Concentration of 150 ppb

As an analysis of the sensitivity of STA performance to the phosphorus concentration of Lake Okeechobee releases, this section describes the performance of STA-3/4 if the phosphorus concentration of Lake releases is 150 ppb at the inflow to the EAASR. In developing the *Updated STA Inflow Data Sets*, an assumption had to be made of the flows and phosphorus levels from the EAASR A-1 to STA-3/4. After the DMSTA simulation of the reservoir discussed in Section 6.1 above, the inflow phosphorus levels were increased 2% and are summarized in **Table 7-3**.

Table 7-3: Summary of Long-term Average Annual Inflow to STA-3/4 (Lake TP Conc of 150 ppb).

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
S-7/S-2 Basin	35,102	4,230	98
S-8/S-3 Basin	132,584	13,383	82
C-139 Basin	13,201	3,401	209
SSDD	10,539	1,324	102
SFCD	24,110	3,363	113
EAA SR	363,442	47,791	107
Total	**583,360**	**73,804**	103

A summary of STA-3/4 phosphorus performance for the 2010 period is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix C. A long-term flow-weighted mean outflow concentration range of 19-28 ppb was forecast, however this includes years when DMSTA forecast levels that fell below the calibration range of 15 ppb for an SAV system, and hence may be optimistic. These results compare to a simulated range of 16-24 ppb with a concentrations of Lake releases averaging 100 ppb. **The net effect of assuming a Lake Okeechobee phosphorus concentration of 150 ppb appears to be about 3 ppb at the outflow of STA-3/4, resulting in a long-term average annual increase of 2.2 metric tons of phosphorus to the Everglades compared to an average Lake release concentration of 100 ppb.**

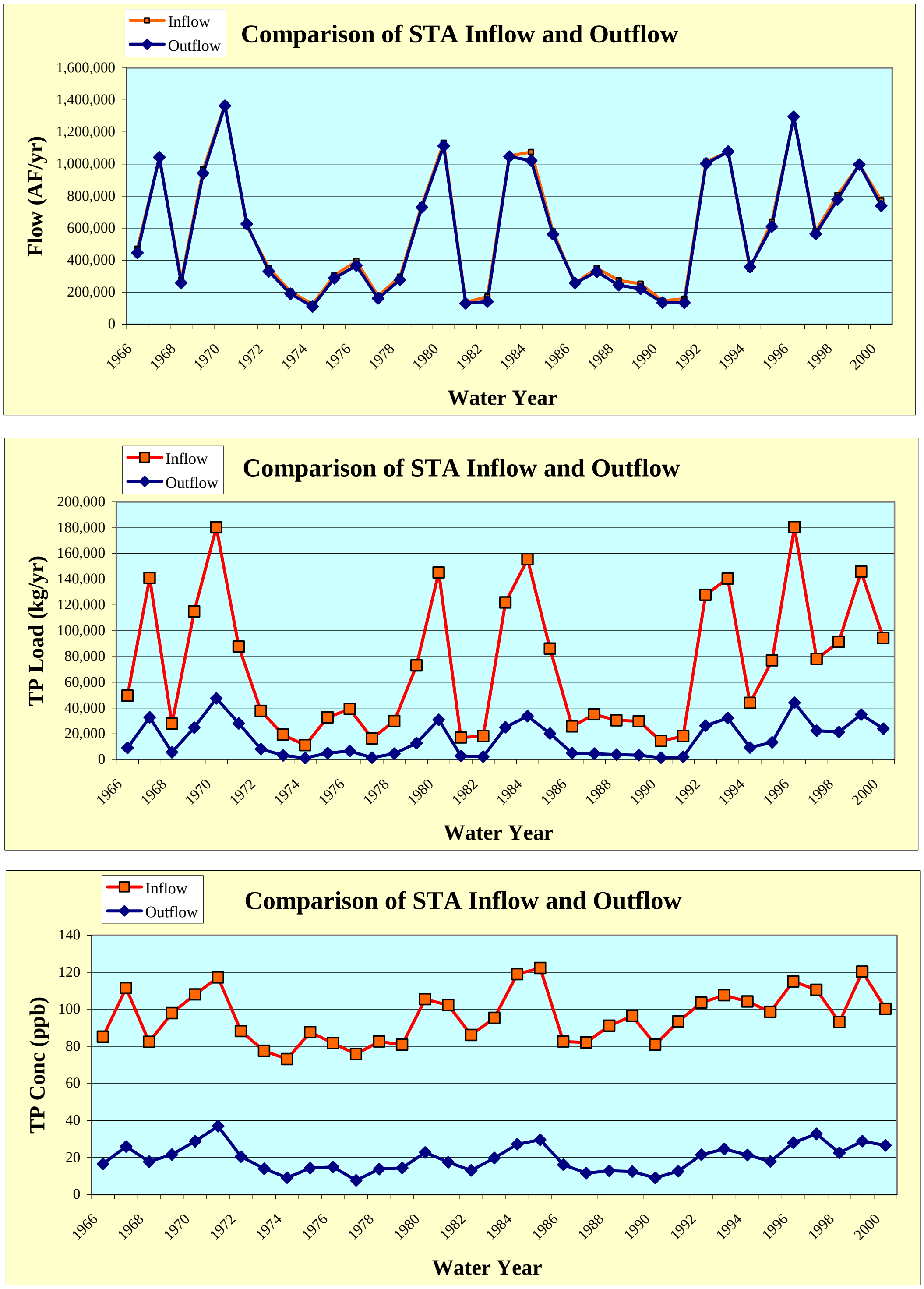
DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix C. For Cells 1A and 2A, the mean flow/width were about 10% above the range of the emergent calibration data sets. For Cell 3B, the mean flow/width was about 30% below the range of the SAV calibration data sets. For the three SAV cells, the simulated mean depths were slightly below the range of the SAV calibration data sets, although the simulated minimum depths were above 30 cm. Diversion around the STA were simulated to provide water supply to downstream users, including the Big Cypress Basin Seminole Indian Reservation.

Table 7-4: Summary of DMSTA Results for STA-3/4 (Lake Conc. of 150 ppb).

Parameter	Unit	STA-3/4
Effective Treatment Area	acres	16,543
Average Annual Inflow		
Volume	AF/yr	583,360
TP Load	kg/yr	73,804
TP Concentration	ppb	103
Average Annual Outflow		
Volume	AF/yr	568,441
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	19 (18)
Mean Estimate of Settling Rate	ppb	23 (13)
Lower Conf. Limit for Settling Rate	ppb	28 (6)
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	15
Mean Estimate of Settling Rate	ppb	18
Lower Conf. Limit for Settling Rate	ppb	22
TP Load (Using Mean TP Conc.)	kg/yr	16,056
Diversion Volumes and Loads		
Volume	AF/yr	64,699
TP Load	kg/yr	11,971
TP Concentration	ppb	150

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 36 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.
3. Diversion is for downstream water supply users.

Figure 7-3: Comparison of Inflows and Outflows for STA-3/4 (Lake TP Concentration of 150 ppb).



Note: TP concentrations below 15 ppb have not been sustained.

8. STA-5

Inflow data sets for STA-5 and STA-6 utilized the historic flows and phosphorus loads for the WY1995-2007 period. For the purpose of developing the STA-5 inflow data set, STA-5 was assumed to be comprised of the existing 3 flow-ways of STA-5, along with the 4th and 5th flow-ways of Compartment C that are soon to be constructed (see **Figure 8-1**; URS 2007). The combined C-139 Basin and C-139 Annex runoff will likely be distributed to STA-5 and STA-6 in an attempt to balance the phosphorus loading rate among the flow-ways of the STAs (see **Table 8-1**). A summary of inflows to STA-5 is presented in **Table 8-2**.

Table 8-1: Estimate of Inflow Distribution to Balance the PLR to STA-5 and STA-6.

Flow-way	Area	TP inflow	Flow at PLR	Load	PLR
STA-5 1	2,055	229	28,177	7,945	0.96
STA-5 2	2,055	229	28,177	7,945	0.96
STA-5 3	1,985	229	27,217	7,674	0.96
STA-5 4	2,176	229	29,836	8,413	0.96
STA-5 5	2,669	229	36,595	10,319	0.96
STA-6 3	1,857	178	32,692	7,180	0.96
STA-6 5	652	97	20,970	2,521	0.96
STA-6 2	245	97	7,880	947	0.96
Total	13,694	203	211,544	52,944	0.96

At this time, it is extremely difficult to forecast the phosphorus removal performance of STA-5. Since the first full water year of operation (2001), the annual inflow concentrations have ranged from 165 ppb to 299 ppb, with a 7-yr average of 235 ppb (Pietro et al. 2007). The phosphorus loading rate has been considerably higher than the other STAs, ranging from 0.94 $g/m^2/yr$ to 4.01 $g/m^2/yr$ with a 7-yr average of 2.1 $g/m^2/yr$. The long-term outflow concentration has ranged from 82-192 ppb, with a 7-yr average of 105 ppb. These characteristics are more similar to the DMSTA emergent vegetation calibration data set than to the SAV data set, which may be related to different soil type than in the EAA STAs (more mineral content) and less calcium in the inflow waters than the EAA STAs. In consideration of the anticipated reduced phosphorus loading rate when the additional treatment cells within Compartment C begin operation, the 2005 Study estimated the performance of STA-5 using the average performance of two DMSTA simulations:

1. Assuming the phosphorus removal downstream cell in each flow-way performs similar to the emergent calibration data set; and
2. Assuming the phosphorus removal downstream cell in each flow-way performs similar to the SAV calibration data set.

For comparison purposes, a similar set of simulations were conducted during the present analysis, ***however, until such time that the STA-5 performance improves, and until performance data for the newly constructed Flow-way 3 is available, the forecast performance will be based on assuming the phosphorus removal of the downstream cell in each flow-way performs similar to the emergent calibration data set.***

Figure 8-1: Preliminary Layout of Compartment C Build-out; Subject to Revision (modified from URS 2007).

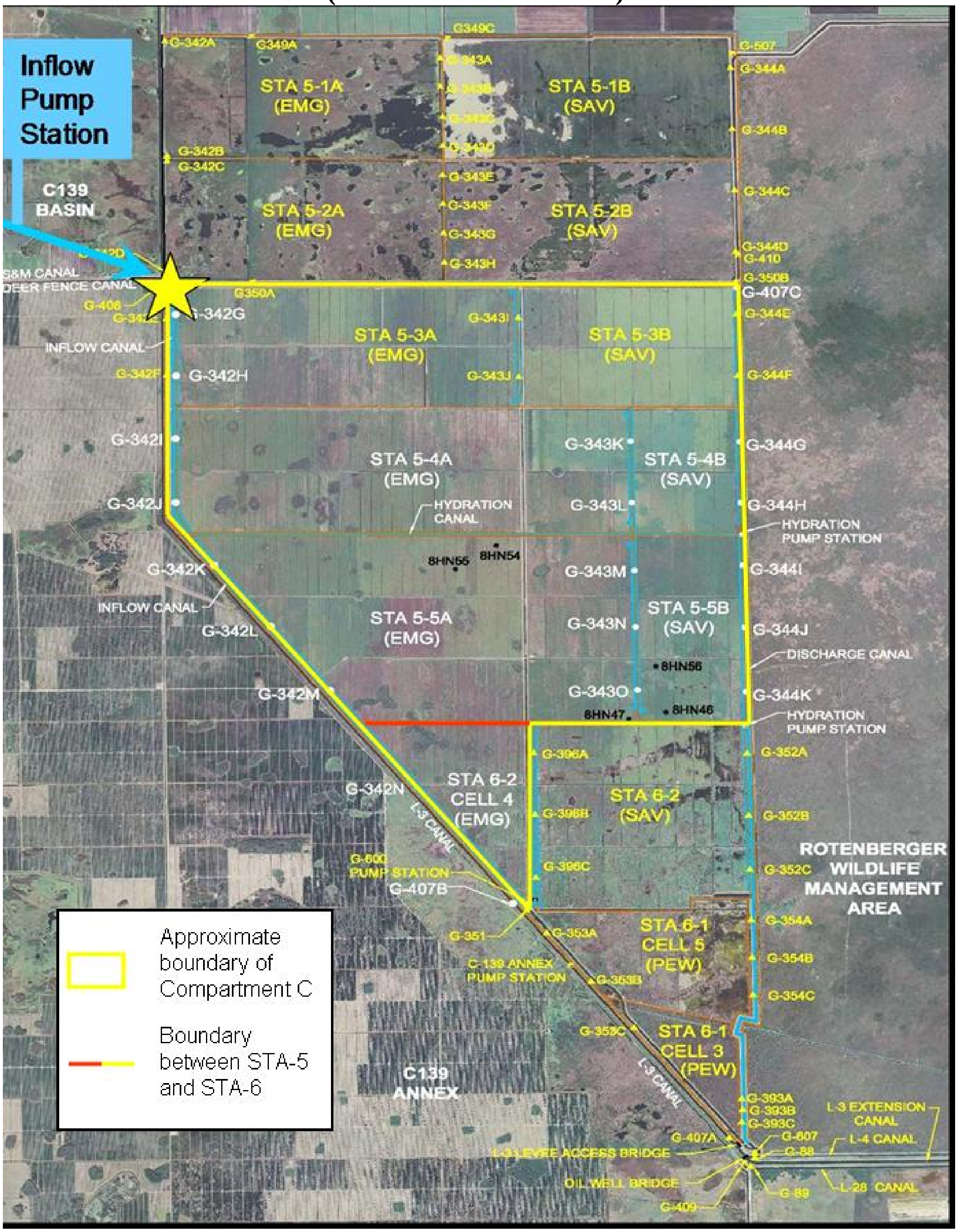


Table 8-2: Summary of Long-term Average Annual Inflow to STA-5, Including Compartment C Build-out.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-139 Basin	150,001	42,300	229

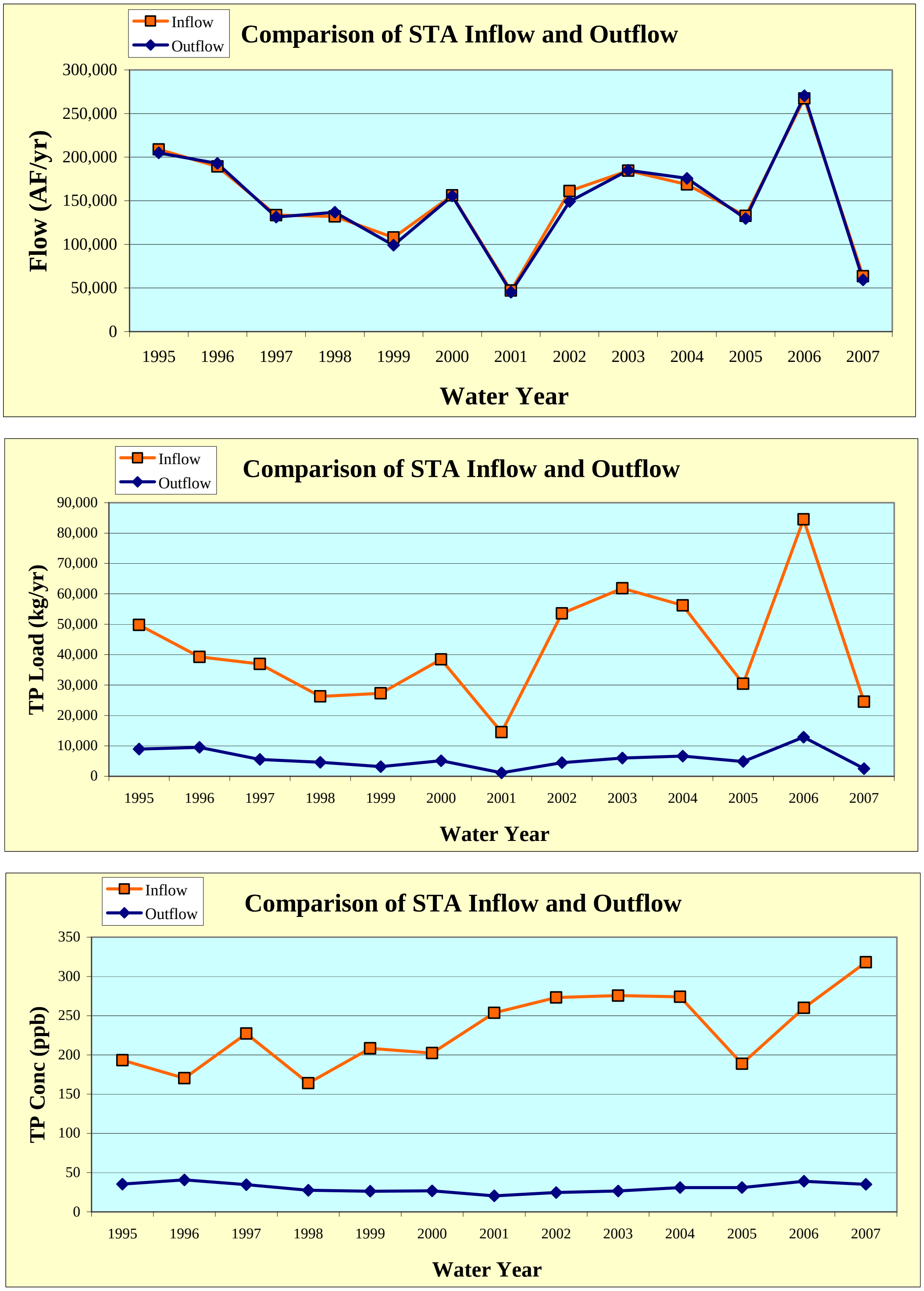
A summary of STA-5 phosphorus performance for the 2010 period is presented in the tables and figures below. Copies of the DMSTA output are presented in Appendix C. For the emergent vegetation scenario, a long-term flow-weighted mean outflow concentration range of 22-47 ppb was forecast, however this includes six of the thirteen years when DMSTA forecast levels that fell below the calibration range of 20 ppb for an emergent system; hence this range may be optimistic, particularly in light of STA-5 performance history. Based on the historic performance of STA-5 and the high degree of uncertainty as to whether these DMSTA forecasts accurately represent actual phosphorus removal within the STAs in Compartment C, it is premature to conclude that there is excess treatment capacity in Compartment C. For the SAV scenario, ***presented only for comparison and not as a forecast of STA-5 performance***, DMSTA forecast long-term outflow concentrations below the low end of the SAV calibration data set (15 ppb) and these were set to the low end value; hence this range is overly optimistic particularly in light of STA-5 performance history. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix C. For the emergent vegetation scenario no warnings messages were generated. However, DMSTA forecast 7% of the time the depth in the upstream cells was less than 10 cm, indicating the potential for insufficient water availability to maintain the minimum desirable water depth of 15 cm. For the SAV scenario, thirteen messages were generated, identifying that mean depths, flow/widths and outflow phosphorus concentrations were below the range of the SAV calibration data sets. In addition, DMSTA forecast 7% of the time the depth in the upstream cells was less than 10 cm, indicating the potential for insufficient water availability to maintain the minimum desirable water depth of 15 cm.

Table 8-3: Summary of DMSTA Results for STA-5, Including Comp. C Build-out.

Parameter	Unit	STA-5 - Emergent	STA-5 - SAV
Effective Treatment Area	acres	10,940	10,940
Average Annual Inflow			
Volume	AF/yr	150,001	150,001
TP Load	kg/yr	42,300	42,300
TP Concentration	ppb	229	229
Average Annual Outflow			
Volume	AF/yr	148,717	148,717
Flow-weighted Mean TP Concentration			
Upper Conf. Limit for Settling Rate	ppb	22 (6)	15 (13)
Mean Estimate of Settling Rate	ppb	32	15 (13)
Lower Conf. Limit for Settling Rate	ppb	47	19 (11)
Geometric Mean TP Concentration			
Upper Conf. Limit for Settling Rate	ppb	20	15
Mean Estimate of Settling Rate	ppb	30	15
Lower Conf. Limit for Settling Rate	ppb	44	17
TP Load (Using Mean TP Conc.)	kg/yr	5,866	2,752
Diversion Volumes and Loads			
Volume	AF/yr	0	0
TP Load	kg/yr	0	0
TP Concentration	ppb	-	-

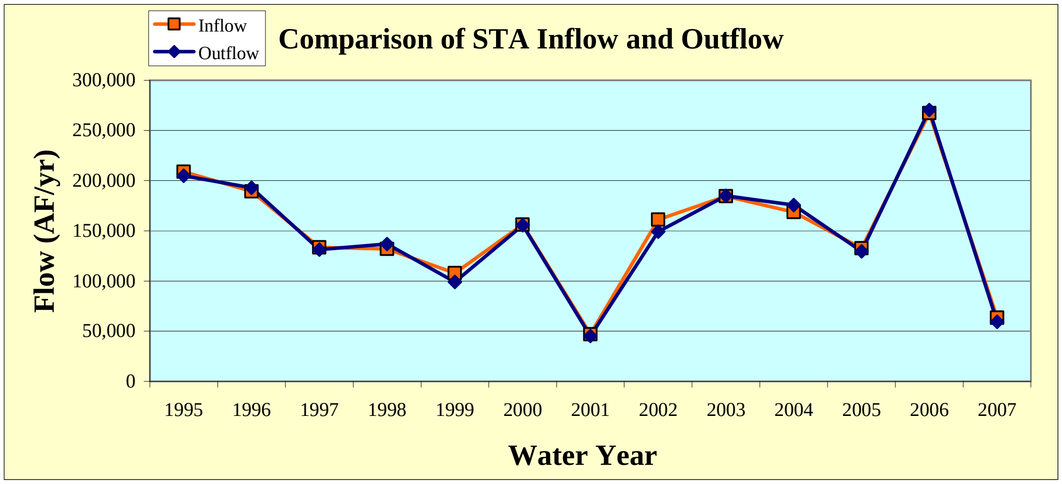
Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value.
There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 13 years simulated below the low end of the calibration data set (enumerated by the number in parentheses).
3. Results for SAV in the downstream cells are presented for comparison only; the emergent vegetation scenario is currently used as a forecast for STA-5

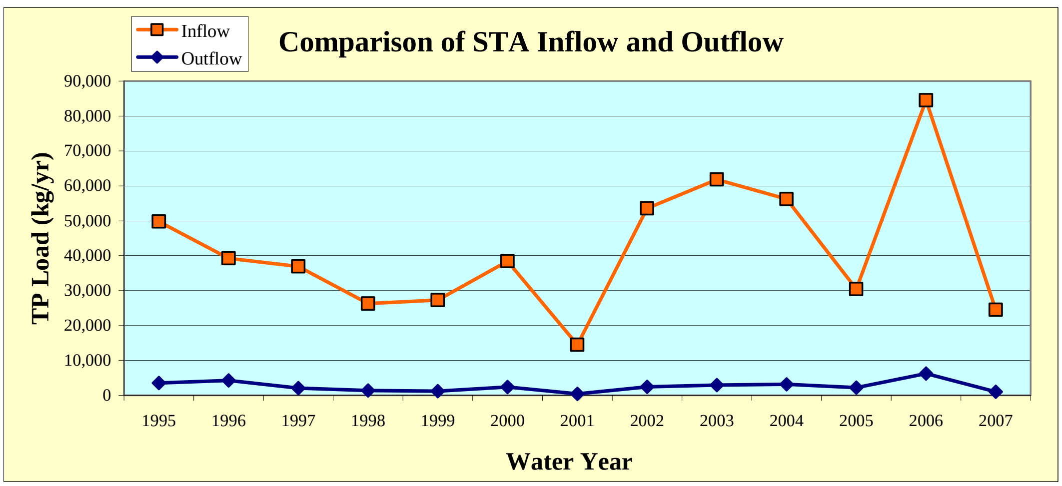
Figure 8-2: Comparison of Inflows and Outflows for STA-5 With Emergent Vegetation in All Cells, Including Compartment C Build-out.

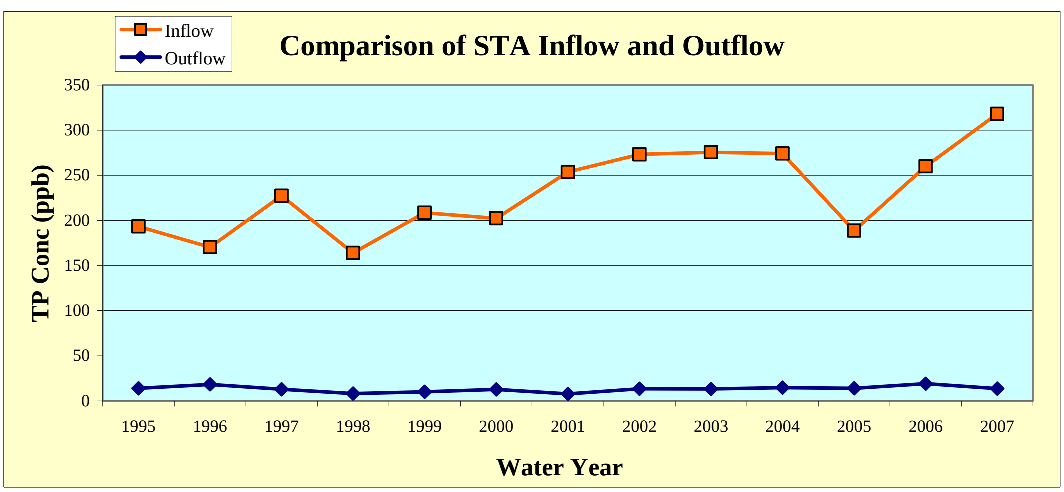


Note: TP concentrations below 15 ppb have not been sustained.

Figure 8-3: Summary of DMSTA Results for STA-5 With SAV in Downstream Cells.







Note: TP concentrations below 15 ppb have not been sustained.

9. STA-6

The combined C-139 Basin and C-139 Annex runoff will be distributed to STA-5 and STA-6 to balance the phosphorus loading rate among the flow-ways of the STAs (see **Table 8-1** above). A summary of the long-term average inflows to STA-6 is presented in **Table 9-1.**

Table 9-1: Summary of Long-term Average Annual Inflow to STA-6, Including Compartment C Build-out.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-139 Basin	20,062	5,657	229
C-139 Annex	41,480	4,987	97
Total	**61,542**	**10,644**	**140**

A summary of STA-6 phosphorus performance for the 2010 period is presented in the table and figures below. A copy of the DMSTA output is presented in Appendix C. DMSTA forecast a best case scenario long-term flow-weighted mean phosphorus concentration of 10 ppb which is below the minimum of the calibration data sets for the vegetation in the treatment cells, and that forecast was replaced in Table 9-2 by 13 ppb[1]. The adjusted outflow phosphorus levels in Table 9-2 may still portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a 5 ppb standard deviation on annual values. Although the simulated performance appears to suggest additional treatment capacity may available in the 2,754 acres of STA-6, based on the historic performance of STA-5 and the high degree of uncertainty as to whether these DMSTA forecasts accurately represent actual phosphorus removal within the STAs in Compartment C, it is premature to conclude that there is excess treatment capacity in Compartment C. DMSTA generates various warning and error messages based on the simulation results compared to the calibration data sets; these are displayed in the DMSTA results in Appendix C. Eight messages were generated, identifying that mean depths, flow/widths and outflow phosphorus concentrations were below the range of the calibration data sets. In addition, the mean inflow concentration (140 ppb) was above the calibration range for the Prior Existing Wetland (PEW) data sets, further suggesting that the forecast outflow concentration may be optimistic.

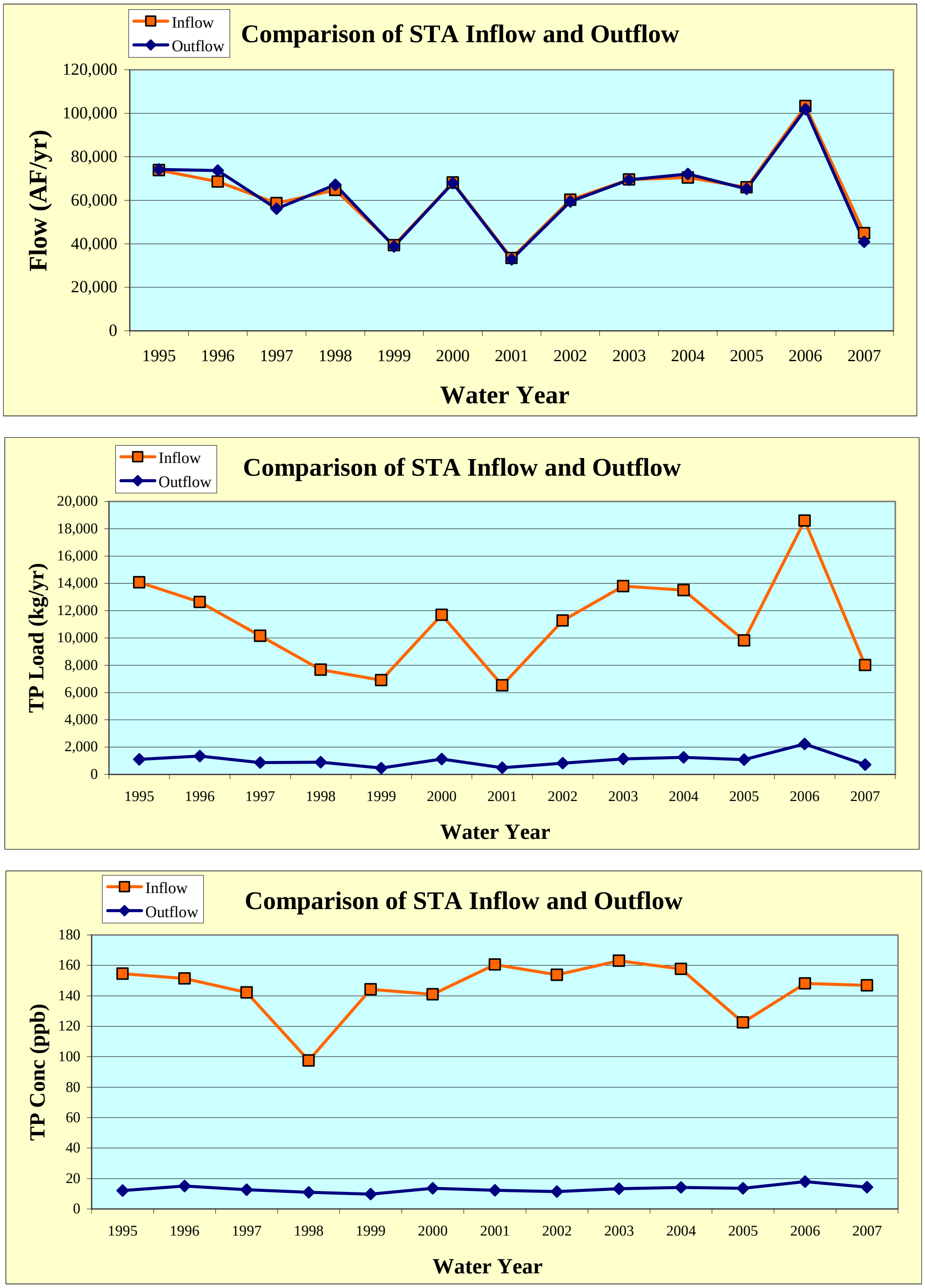
[1] For STA-6, two flow-ways have SAV in the downstream cell which has a minimum calibration concentration of 15 ppb, and one has Prior Existing Wetlands (PEW) which has a minimum calibration concentration of 15 ppb. The flow-weighted minimum concentration for the three flow-ways is 13 ppb.

Table 9-2: Summary of DMSTA Results for STA-6, Including Comp. C Build-out.

Parameter	Unit	STA-6
Effective Treatment Area	acres	2,754
Average Annual Inflow		
Volume	AF/yr	61,542
TP Load	kg/yr	10,644
TP Concentration	ppb	140
Average Annual Outflow		
Volume	AF/yr	61,494
Flow-weighted Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	13 (11)
Mean Estimate of Settling Rate	ppb	13 (7)
Lower Conf. Limit for Settling Rate	ppb	17 (1)
Geometric Mean TP Concentration		
Upper Conf. Limit for Settling Rate	ppb	15
Mean Estimate of Settling Rate	ppb	15
Lower Conf. Limit for Settling Rate	ppb	16
TP Load (Using Mean TP Conc.)	kg/yr	986
Diversion Volumes and Loads		
Volume	AF/yr	0
TP Load	kg/yr	0
TP Concentration	ppb	-

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.
2. Outflow values highlighted in yellow had one or more years of the 13 years simulated below the low end of the calibration data set (enumerated by the number in parentheses). The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.

Figure 9-1: Comparison of Inflows and Outflows for STA-6.



Note: TP concentrations below 15 ppb have not been sustained.

10. Summary

A summary of the simulated phosphorus removal performance in the STAs, the EAASR A-1 and the additional treatment areas in Compartments B and C is presented in **Table 10-1** below[2]. For Compartment B, DMSTA forecast long-term average annual phosphorus concentrations of 9.1-14.6 ppb, which are below the minimum of the calibration data sets for SAV (15 ppb), and those forecasts were replaced in Table 10-1 by 15 ppb. Similarly for STA-6, DMSTA forecast a best case scenario long-term flow-weighted mean phosphorus concentration of 10 ppb which is below the minimum of the calibration data sets for the vegetation in the treatment cells, and that forecast was replaced in Table 10-1 by 13 ppb[3]. The adjusted outflow phosphorus levels in Table 10-1 may still portray optimistic results in that the best performing STA (STA-3/4) is presently averaging about 19 ppb, with a 5 ppb standard deviation on annual values. Simulated long-term average annual outflow concentrations from the individual STAs and additional treatment areas in Compartments B and C ranged from 13-47 ppb. On a cumulative basis, the simulated long-term average annual concentration ranged from 18-28 ppb. In consideration of the forecast error of ±23%, this suggests a potential long-term range of 15-34 ppb for the cumulative long-term average annual outflow concentration. The simulated excellent performance of Compartment B (long-term outflow concentrations of 15 ppb) suggests that excess treatment capacity is available in the treatment areas of Compartment B.

In addition, two sensitivity analyses were evaluated, and the results are summarized below.

STA-2 Inflow Re-direction. Table 10-1 presents results for re-direction of a portion of STA-2 inflows to Compartment B North Build-out sufficient to achieve a balanced long-term phosphorus loading rate (PLR) to STA-2 and the North Build-out of 1.0 $g/m^2/yr$. An alternative simulation was conducted with an STA-2 PLR of 1.3 $g/m^2/yr$, yielding a predicted long-term outflow concentration range for STA-2 of 19-29 ppb compared to 19-27 ppb for a PLR of 1.0 $g/m^2/yr$. The simulated results for Compartment B were essentially the same under both loading scenarios – DMSTA forecast phosphorus concentrations below the lower end of the calibration data sets (15 ppb). **The simulation of PLRs of 1.0 $g/m^2/yr$ and 1.3 $g/m^2/yr$ was conducted for the purpose of comparing alternatives and does not represent ultimate PLR goals for STAs.** The long-term PLR is just one of many factors that influence the phosphorus removal performance of an STA; others include vegetation type, soil type, antecedent land use, phosphorus loading history, inflow concentrations, hurricanes, droughts and other disturbances.

[2] These simulated forecasts of STA performance are made for the comparison of alternatives and not for the development of effluent limits. Effluent limits are determined through the State of Florida's issuance of permits for these facilities.

[3] For STA-6, two flow-ways have SAV in the downstream cell which has a minimum calibration concentration of 15 ppb, and one has Prior Existing Wetlands (PEW) which has a minimum calibration concentration of 15 ppb. The flow-weighted minimum concentration for the three flow-ways is 13 ppb.

Table 10-1: Summary of DMSTA Modeling Results.

Parameter	Unit	STA-1E	STA-1W	STA-2	Comp. B North	Comp. B South	Comp. B Combined	EAASR A-1 Note 3	STA-3/4	STA-5 - Emergent	STA-6	All
Effective Treatment Area	acres	5,132	6,670	6,338	5,824	2,796	8,620	15,200	16,543	10,940	2,754	56,997
		Average Annual Inflow										
Volume	AF/yr	193,818	243,172	182,697	177,228	47,651	224,879	540,013	219,918	150,001	61,542	1,639,469
TP Load	kg/yr	41,864	54,409	25,662	22,932	5,553	28,833	63,885	26,013	42,300	10,644	265,107
TP Concentration	ppb	175	181	114	105	94	104	96	96	229	140	131
		Average Annual Outflow										
Volume	AF/yr	190,599	244,928	186,047	180,541	53,378	233,919	363,442	568,441	148,717	61,494	1,634,145
Flow-weighted Mean TP Concentration												
Upper Conf. Limit for Settling Rate	ppb	20 (10)	21 (4)	19 (2)	15 (35)	15 (35)	15 (35)	-	16 (20)	22 (6)	13 (11)	18
Mean Estimate of Settling Rate	ppb	27 (1)	27	22 (1)	15 (35)	15 (34)	15 (35)	80	20 (16)	32	13 (7)	22
Lower Conf. Limit for Settling Rate	ppb	35	35	27	15 (27)	15 (25)	15 (27)	-	24 (9)	47	17 (1)	28
Geometric Mean TP Concentration												
Upper Conf. Limit for Settling Rate	ppb	18	20	17	15	15	15	-	14	20	15	-
Mean Estimate of Settling Rate	ppb	24	26	21	15	15	15	93	16	30	15	-
Lower Conf. Limit for Settling Rate	ppb	32	33	25	15	15	15	-	20	44	16	-
TP Load (Using Mean TP Conc.)	kg/yr	6,240	8,222	5,145	3,340	988	4,328	35,730	13,853	4,677	986	43,451
		Diversion Volumes and Loads (See Note 4)										
Volume	AF/yr	26,186	0	0	0	0	0	0	64,699	0	0	90,885
TP Load	kg/yr	4,027	0	0	0	0	0	0	7,897	0	0	11,924
TP Concentration	ppb	125	-	-	-	-	-	-	99	-	-	106

Notes: 1. The DMSTA forecast error for flow-weighted mean concentrations is approximately +/-23% of the expected value. There is associated uncertainty in these predictions and actual performance will vary.

2. Outflow values highlighted in yellow had one or more years below the low end of the calibration data set (enumerated by the number in parentheses). For all areas except STA-5 and STA-6, a total of 35 water years (WY66-00) were simulated; for STA-5 and STA-6 a total of 13 water years (WY95-07) were simulated. The lowest sustainable STA outflow phosphorus concentration is 19 ppb (STA-3/4), with a standard deviation of 5 ppb.

3. Outflows shown from EAASR are outflows to STA-3/4; total outflows, including irrigation releases, were 514,580 AF/yr and 48,699 kg/yr at 77 ppb.

4. Diversion around STA-1E is directed to C-51E. Diversion around STA-3/4 is for downstream water supply users. While the SFWMM simulated small diversion volumes of EAA runoff, for the purpose of estimating phosphorus removal performance, these were simulated by DMSTA as being captured in the STAs. Diversions may occur based on the daily hydraulic and treatment capacity of the treatment areas.

As a reference, STA-2 is presently receiving a PLR of 1.34 $g/m^2/yr$ and is one of the highest performing STAs, with a long-term average flow-weighted mean of 21 ppb (Pietro et al. 2007). In addition, STA-3/4 has been receiving phosphorus at a PLR averaging 1.5 $g/m^2/yr$ and is producing the lowest outflow phosphorus concentration of all the STAs, with a 3-year average flow-weighted mean of 19 ppb (Pietro et al. 2007). These STA performance results, in combination with the results of this sensitivity analysis, suggest that STAs loaded above a PLR 1.3 $g/m^2/yr$ may still achieve optimal performance, which could allow a greater loading to STA-2 than presently modeled, thus increasing the available treatment capacity in Compartment B.

Phosphorus Concentrations for Lake Okeechobee Releases. Table 10-1 presents DMSTA modeling results for the EAASR A-1 and STA-3/4 using an average phosphorus concentration for Lake Okeechobee releases of 100 ppb, which corresponds to recent levels. An alternative simulation was conducted assuming an average phosphorus concentration for Lake Okeechobee releases of 150 ppb. While this assumed 50% increase in concentration increased the simulated phosphorus load to the EAASR A-1 by a long-term average of 20 metric tons/yr, the simulated net increase to STA-3/4 was just over 12 metric tons/yr. The 8 metric ton/yr balance either accumulated in the reservoir storage or was discharged to the EAA to satisfy irrigation demand. DMSTA simulated an increase in the long-term STA-3/4 outflow concentration as about 3 ppb, resulting in a predicted long-term average annual increase of about 2.2 metric tons/yr of phosphorus to the Everglades compared to the simulations that used an average Lake release concentration of 100 ppb.

Relationship to EAA Regional Feasibility Study. A direct comparison between the STA performance estimates of this present analysis and the performance estimates presented in the 2005 EAA Regional Feasibility Study is not recommended for the reasons described in the following sections.

EAA Basin. Unlike the 2005 Study, the SFWMM simulation used in this analysis did not include the completion of the EAA Conveyance and Regional Treatment project (ECART), resulting in approximately 93,000 AF/yr more flow to STA-1W and a similar reduction in flow to Compartment B. In addition, the simulated long-term average annual runoff volume to the STAs and EAASR from the entire EAA increased approximately 40,800 AF/yr compared to the 2005 Study as a result of using the latest version of the SFWMM for the current analyses. Additionally, there is marked variation in the EAA sub-basin runoff volumes. For the S-5A sub-basin, the difference (a long-term increase of approximately 17,000 AF/yr) is attributable to variations in the SFWMM results. Some of the EAA-wide variations are attributable to differences in the assumptions used in the SFWMM, e.g.,

1. Land use:
    a. 2005: All land use has been updated using most recent FLUCCS data (1995), modified in the Lower East Coast urban areas using 2000 aerial photography (2x2 scale).
    b. 2007: The land use coverage is intermediate between 2000B3 and 2050B3
2. Miami Canal Basin

   a. 2005: EAA cells in the Miami Canal Basin between STA5 and STA6 are not production cells (shrub Land Use). Then, no irrigation demands are required in this area. Runoff from this area is part of the Miami Canal Basin.
   b. 2007: no such assumption
3. STA Sizes
   a. 2005: Compartment B = 7,575 ac; Compartment C = 7,571 ac
   b. 2007: Compartment B = 6,722 ac; Compartment C = 6,230 ac
4. CERP
   a. 2005: L-8 reservoir (rock pit located in S-5A Basin) 870 ac 2 ft deep
   b. 2007: L-8 reservoir 870 ac 44 ft deep

For the S-7/S-2 and S-6/S-2 sub-basins, in addition to approximately 10,300 AF/yr less flows to the STAs and EAASR compared to this analysis as a result in variations in the SFWMM results, the 2005 Study adjusted the simulated runoff from the S-6/S-2 and S-7/S-2 basins to create a uniform average runoff depth for both basins (ADA/B&M 2005). However, for this current analysis, District modeling staff recommended no adjustment of the SFWMM results.

Western Basins. The estimated runoff volume from the C-139 Basin and C-139 Annex increased approximately 12,400 AF/yr compared to the 2005 Study estimates, due primarily to the apparent omission of a portion of the L-2/L-3 Canal flows in the 2005 Study. In addition, during the 2005 Study, a 10% reduction in phosphorus concentration was incorporated to reflect a then-promising trend in basin BMP effectiveness; for the current analysis, District staff recommended no adjustment to the period of record data for BMP implementation. A final difference is that the 2005 Study included STA-6 Section 2 and the upstream cell as part of STA-5, whereas this analysis modeled these cells as part of STA-6.

Eastern Basins. The 2005 Study assumed 100% of the simulated L-8 Basin runoff that was re-directed to the C-51 Canal through S-5AE was not captured in STA-1E; the present analysis assumed only 75% diversion of this L-8 Basin runoff, based on the best professional judgment of actual operating experience, resulting in an increase of approximately 8,600 AF/yr compared to the 2005 Study. The difference in SFWMM version accounted for approximately 6,000 AF/yr less C-51W Basin runoff to STA-1E in this analysis, however, the increase in S-5A Basin runoff to the STA-1 Inflow Basin due to the absence of ECART resulted in a net increase of approximately 22,000 AF/yr to STA-1E compared to the estimate in the 2005 Study.

Lake Okeechobee. The SFWMM simulated a considerably different magnitude and distribution of Lake Okeechobee releases for the current analyses than were simulated for the 2005 Study. Overall, a long-term average of approximately 39,000 AF/yr less Lake releases were simulated in the 2007 SFWMM Alt1 than in the 2005 simulation. The simulated quantity of water supply releases that bypasses the STAs decreased by almost 50,000 AF/yr to a long-term average annual volume of 85,753 AF/yr. Conversely, the quantity of Lake releases that were captured in the EAA Storage Reservoir increased by a long-term average of almost 40,000 AF/yr compared to the 2005 Study.

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Appendix A. SFWMM Model Assumptions

2010BCalt1_WMM5.5.2.1_082307v2_out

Feature	2010 Base Condition Assumptions	2010BCAlt1 Proposed Action
Climate	• The climatic period of record is from 1965 to 2000. • Rainfall estimates have been revised and updated for 1965-2000. • Revised evapotranspiration methods have been used for 1965-2000.	Same as 2010BS
Topography	Updated November 2001 and September 2003 using latest available information (in NGVD 29 datum). Nov 2001 update (Documented in November 2001 SFWMD memorandum from M. Hinton to K. Tarboton) includes: • USGS High Accuracy Elevation data from helicopter surveys collected 1999-2000 for Everglades National Park and Water Conservation Area (WCA) 3 south of Alligator Alley • USGS Lidar data (May 1999) for WCA-3A north of Alligator Alley • Lindahl, Browning, Ferrari & Helstrom 1999 survey for Rotenberger Wildlife Management Area. • Stormwater Treatment Area surveys from 1990s • Aerometric Corp. 1986 survey of the 8-1/2 square mile area • Includes estimate of Everglades Agricultural Area subsidence • Other data as in SFWMM v3.7 • FWC survey 1992 for the Holey Land Wildlife Management Area. September 2003 update includes: • Reverting to FWC 1992 survey data for Rotenberger Wildlife Management Area.	Same as 2010BS

Feature	2010 Base Condition Assumptions	2010BCAlt1 Proposed Action
	• DHI gridded data from Kimley –Horn contracted survey of EAA, 2002-2003. Regridded to 2x2 scale for EAA outside of STAs and WMAs.	
Sea Level	Sea level data from six long-term NOAA stations were used to generate a historic record to use as sea level boundary conditions for the 1965 to 2000 evaluation period.	Same as 2010BS
Land Use	• The land use coverage is intermediate between 2000B3 and 2050B3	Same as 2010BS
Natural Area Land Cover (Vegetation)	Vegetation classes and their spatial distribution in the natural areas comes from the following data: • Walsh 1995 aerial photography in Everglades National Park • Rutchey 1995 classification in WCA-3B, WCA-3A north of Alligator Alley and the Miami Canal, WCA-2A & 2B • Richardson 1990 data for Loxahatchee National Wildlife Refuge • FLUCCS 1995 for Big Cypress National Preserve, Holey Land & Rotenberger Wildlife Management Areas & WCA-3A south of Alligator Alley and Miami Canal. (Documented in August 2003 SFWMD memorandum from J. Barnes and K. Tarboton to J. Obeysekera).	Same as 2010BS
Lake Okeechobee Service Area		
LOSA Basins	• Southern Indian Prairie Basin, S-4, North Lake Shore and Northeast Lake Shore demands and runoff based on AFSIRS (Agricultural Field-Scale Irrigation Requirement Simulation) modeling using 2010 LU projections.	Same as 2010BS
Lake Okeechobee	• Lake Okeechobee Regulation Schedule WSE according to WSE decision trees, with pulse releases in Zone D modeled as Level III pulse	Same as 2010BS

Feature	2010 Base Condition Assumptions	2010BCAlt1 Proposed Action
	in upper third of the zone, Level II pulse in middle third of the zone, and Level I pulse in the lower third of the zone, when the decision tree calls for regulatory releases to the estuaries in that zone. • WSE thresholds derived from the Class Limit Adjustment (CLA) WSE modification: Increase the frequency of Pulse Releases in Zone D of WSE. • Modified WSE thresholds for zone D1 to improve utilization of EAA reservoir. • Lake Okeechobee Supply Side management policy for Lake Okeechobee Service Area water restriction cutbacks as per rule 40E-21 and 40E-22 in September, 2001 (13.0-10.5 ft. SSM trigger line). • Emergency flood control backpumping to Lake Okeechobee from the Everglades Agricultural Area. • Kissimmee River Restoration and Headwaters Revitalization Project are complete. • Lake Okeechobee environmental releases to supplement reservoir deliveries to Caloosahatchee and St. Lucie Estuaries. • Environmental deliveries to WCA-3A according to Rainfall Driven Operations as means of operating the EAA Reservoirs. • Lake Okeechobee BMP makeup water deliveries to WCAs are not made. • Adaptive protocols are included.	
Acceler8 Projects	Acceler8 Projects On Line by 2010 – See A8 Website. • C44 Reservoirs: 9315 acres, depth 5 .ft. • C43 Reservoirs: 11000 acres, depth 15 ft. • EAA Reservoirs- A-1 Reservoir simulated as two interconnected compartments. Compartment 1: irrigation, 9600 acres, depth 12 ft. Compartment 2: environment 6400 acres, depth	Same as 2010BS

Feature	2010 Base Condition Assumptions	2010BCAlt1 Proposed Action

	12 ft.
	• WPA's
	  • Site 1 Impoundment: 1660 acres; depth 8 ft.
	  • C-9 Impoundment: 1739 acres; depth 4 ft.
	  • C-11 Impoundment: 1730 acres; depth 4 ft.
	  • Acme Basin B discharge to C51W and then to STA1E
	  • WCA-3A/3B Seepage Management Area	

Caloosahatchee River Basin	• Caloosahatchee River Basin irrigation demands and runoff were estimated using the AFSIRS method based on 2010 land use. • Public water supply daily intake from the river is included in the analysis. • C43 reservoir supplements basin irrigation needs and estuarine environmental needs.	Same as 2010BS •
St. Lucie Canal Basin	• St. Lucie Canal Basin demands estimated using the AFSIRS method based on 2010 land use. • Basin demands include the Florida Power & Light reservoir at Indiantown. • C44 reservoir supplements basin irrigation needs and estuarine environmental needs.	• Same as 2010BS
Seminole Brighton Reservation	• Brighton reservation demands were estimated using AFSIRS method based on existing planted acreage in a manner consistent with that applied to other basins not in the distributed mesh of the SFWMM. • The 2 in 10 demand set forth in the Seminole Compact Work plan equals 2,262 MGM (million gallons/month). AFSIRS modeled 2 in 10 demands equaled 2,383 MGM. • While estimated demands, and therefore deliveries, for every month of simulation do not equate to monthly entitlement quantities as per Table 7, Agreement 41-21 (Nov. 1992), tribal rights to these quantities are	Same as 2010BS

Feature	2010 Base Condition Assumptions	2010BCAlt1 Proposed Action
	preserved. • Supply-side Management applies to this agreement.	
Seminole Big Cypress Reservation	• Big Cypress Reservation irrigation demands and runoff were estimated using the AFSIRS method based on existing planted acreage in a manner consistent with that applied to other basins not in the distributed mesh of the SFWMM. • The 2 in 10 demand set forth in the Seminole Compact Work Plan equals 2,606 MGM. AFSIRS modeled 2 in 10 demands equaled 2,659 MGM. • While estimated demands, and therefore deliveries, for every month of simulation do not equate to monthly entitlement quantities as per the District's Final Order and Tribe's Resolution establishing the Big Cypress Reservation entitlement, tribal rights to these quantities are preserved. • Supply-side Management applies to this agreement	Same as 2010BS
Seminole Hollywood Reservation	• Hollywood Reservation demands are set forth under VI. C of the Tribal Rights Compact. • Tribal sources of water supply include various bulk sale agreements with municipal service suppliers.	Same as 2010BS

Feature	2010 Base Condition Assumptions	2010BCAlt1 Proposed Action
Everglades Agricultural Area	• Everglades Agricultural Area irrigation demands are simulated using climatic data for the 36 year period of record and a soil moisture accounting algorithm, with parameters calibrated to match historical regional supplemental deliveries from Lake Okeechobee. • SFWMM EAA runoff and irrigation demand response to rainfall was calibrated for 1984-95 and verified for 1979-1983/1996-2000. No runoff reduction adjustment was necessary to account for Best Management Practices (BMPs).	Same as 2010BS
Everglades Construction Project Stormwater Treatment Areas	• STA-1E: 5132 acres total treatment area • STA-1W: 6670 acres total treatment area • STA-2: 6430 acres total treatment area • STA 2 Cell 4: 1,902 acres total treatment area • STA-3/4: 16543 acres total treatment area • STA-5: 4110 acres total treatment area • STA 5 Flowway 3: 1,985 acres total treatment area • STA-6: 870 acres total treatment area • STA 6 Section 2: 1,387 acres total treatment area • Operation of STAs assumes maintenance of a 6" minimum depth.	Same as 2010BS, plus: • Buildout STA B: 6,722 acres total treatment area. Source 100% EAA runoff • Buildout STA C: 6,230 acres total treatment areas. Source 139 Basin and Annex
Holey Land Wildlife WMA	• As per Memorandum of Agreement between the FWC and the District.	Same as 2010BS
Rotenberger Wildlife WMA	• Interim Operational Schedule as defined in the Operation Plan for Rotenberger (SFWMD Jan 2002).	Same as 2010BS
Water Conservation Areas		
Water Conservation Area 1 (ARM Loxahatchee	• Current C&SF Regulation Schedule. Includes regulatory releases to tide through LEC canals.	Same as 2010BS

Feature	2010 Base Condition Assumptions	2010BCAlt1 Proposed Action
National Wildlife Refuge)	• No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 14 ft. The bottom floor of the schedule (Zone C) is the area below 14 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee.	
Water Conservation Area 2 A&B	• Current C&SF regulation schedule. Includes regulatory releases to tide through LEC canals. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels in WCA-2A are less than minimum operating criteria of 10.5 ft. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee.	Same as 2010BS
Water Conservation Area 3 A&B	• Current C&SF regulation schedule. Includes regulatory releases to tide through LEC canals. • No net outflow to maintain minimum stages in the LEC Service Area canals (salinity control), if water levels are less than minimum operating criteria of 7.5 ft in WCA-3A. Any water supply releases below the floor will be matched by an equivalent volume of inflow from Lake Okeechobee. • Structural and operational modifications for L-67 canal conveyance and S-355 structures as in the federally authorized Modified Water Deliver Project. • Rainfall driven operational criteria for determining timing of deliveries to and discharges from WCA-3A and WCA-3B.	Same as 2010BS
Lower East Coast Service Areas		
Public Water	• 2010 projections based upon permitted	Same as 2010BS

Feature	2010 Base Condition Assumptions	2010BCAlt1 Proposed Action
Supply and Irrigation	allocation to utilities by 2005, with 2010 well field distribution and inclusion of utility ASR. • Irrigation demands are based upon existing land use (updated through 2010) and calculated using AFSIRS, reduced to account for landscape and golf course areas irrigated using reuse water and landscape areas irrigated using public water supply.	
Other Natural Areas	• For the Northwest Fork of the Loxahatchee River, the District operates the G-92 structure and associated structures to provide approximately 50 cfs over Lainhart Dam to the Northwest Fork, when sufficient water is available in C-18 Canal. • Flows to Pond Apple Slough through S-13A are adjusted in the model to approximate measured flows at the structure. • Flows to Biscayne Bay are simulated through Snake Creek, North Bay, the Miami River, Central Bay and South Bay.	Same as 2010BS
Features	• C-4 Impoundment – 843.5 acres	Same as 2010BS
Upper East Coast Operational CERP	• L-8 Reservoir: 870 acres, depth 44 ft.	Same as 2010BS
Western Basins and Big Cypress National Preserve		
Western Basins	• Estimated and updated historical inflows from western basins at two locations: G-136 and G-406. The G-406 location represents potential inflow from the C-139 Basin into STA 5. Data for the period 1978 - 2000 is the same as the data used for the C-139 Basin Rule development. (Documented in June 2002 SFWMD memorandum from L. Cadavid and L. Brion to J. Obeysekera).	Same as 2010BS

Feature	2010 Base Condition Assumptions	2010BCAlt1 Proposed Action
Big Cypress National Preserve	• Tamiami Trail culverts are not modeled in SFWMM due to the coarse (2x2 mile) model resolution.	Same as 2010BS
	Everglades National Park and Florida Bay	
Everglades National Park	• Water deliveries to Everglades National Park are based upon Everglades Rain-driven operations. • 8.5 SMA as per the federally authorized Alternative 6D of the 8.5 SMA project. • Northern C111 project (2002 IOP EIS) • Southern C111 project modeled per C-111 Project 1994 GRR	Same as 2010BS
	Region-wide Water Management and Related Operations	
Water Shortage Rules	• The existing condition reflects the existing water shortage policies in 2005 as reflected in South Florida Water Management District Chapters 40E-21 and 40E-22, FAC	Same as 2010BS

Appendix B. Revised C-139 Basin Data Sets and Inflow Data Sets for STA-5 and STA-6

Revisions to *Updated Flow and Phosphorus Data Sets for the ECP Basins Covering the Period May 1, 1994 – April 30, 2007*

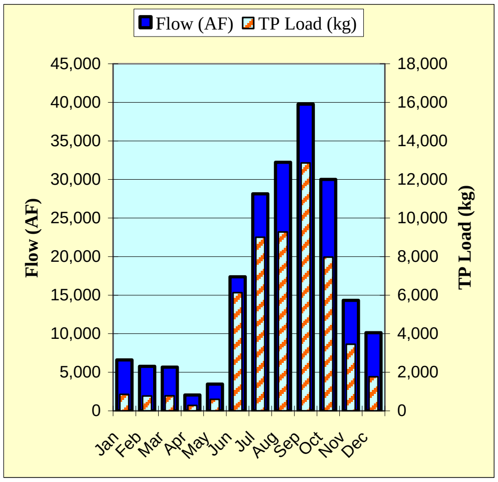
Table 10-4: Discharge Summary for Runoff South of STA-5.

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm^3	kg	ppb		ac-ft	hm^3	kg	ppb
1995	236,266	291.429	56,337	193	**Jan**	3,845	4.742	633	133
1996	214,503	264.585	45,070	170	**Feb**	3,268	4.031	389	96
1997	151,440	186.798	42,427	227	**Mar**	3,172	3.913	467	119
1998	149,152	183.976	30,171	164	**Apr**	1,280	1.579	177	112
1999	122,058	150.556	31,376	208	**May**	2,028	2.502	399	159
2000	168,779	208.186	41,889	201	**Jun**	7,874	9.712	3,093	318
2001	2,738	3.377	973	288	**Jul**	14,733	18.173	4,592	253
2002	23,349	28.800	12,450	432	**Aug**	13,787	17.006	4,036	237
2003	39,061	48.181	13,824	287	**Sep**	18,917	23.333	5,916	254
2004	37,633	46.420	16,457	355	**Oct**	15,740	19.415	4,323	223
2005	30,165	37.208	10,475	282	**Nov**	8,364	10.317	2,013	195
2006	86,124	106.232	44,042	415	**Dec**	4,900	6.044	1,020	169
2007	11,530	14.222	6,274	441	**Annual**	97,907	120.767	27,059	224
Min.	2,738	3.377	973	-					
Max.	236,266	291.429	56,337	-					
Ave.	97,907	120.767	27,059	224					

Table 10-5: Discharge Summary for C-139 Basin.

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm^3	kg	ppb		ac-ft	hm^3	kg	ppb
1995	274,099	338.095	62,190	184	**Jan**	6,599	8.139	861	106
1996	236,150	291.286	48,600	167	**Feb**	5,790	7.142	778	109
1997	169,113	208.598	45,933	220	**Mar**	5,669	6.992	785	112
1998	174,689	215.475	36,375	169	**Apr**	2,055	2.535	284	112
1999	141,167	174.127	36,900	212	**May**	3,495	4.311	603	140
2000	212,472	262.080	53,978	206	**Jun**	17,386	21.446	6,134	286
2001	56,877	70.156	16,908	241	**Jul**	28,144	34.715	9,006	259
2002	204,663	252.448	67,405	267	**Aug**	32,235	39.762	9,282	233
2003	229,260	282.788	77,697	275	**Sep**	39,752	49.034	12,861	262
2004	209,423	258.319	69,154	268	**Oct**	30,010	37.017	7,978	216
2005	195,834	241.557	44,976	186	**Nov**	14,335	17.682	3,456	195
2006	353,264	435.745	109,000	250	**Dec**	10,136	12.503	1,774	142
2007	85,883	105.935	30,303	286	**Annual**	195,607	241.278	53,801	223
Min.	56,877	70.156	16,908	-					
Max.	353,264	435.745	109,000	-					
Ave.	195,607	241.278	53,801	223					

Figure 10-2: Average Monthly Flows and Phosphorus Levels for C-139 Basin Runoff.



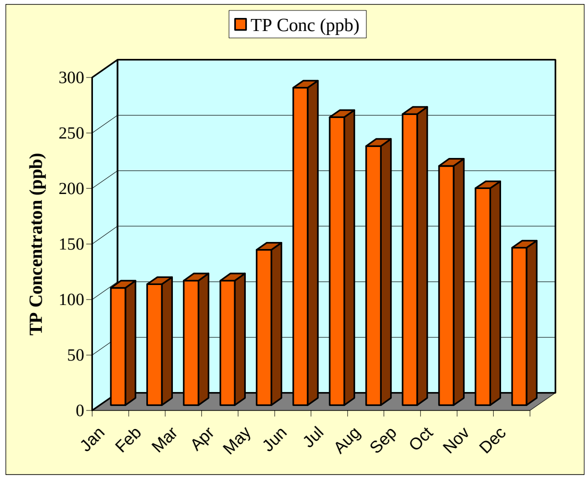


Figure 10-3: WY1995-2007 Flows and Phosphorus Levels for C-139 Basin Runoff.

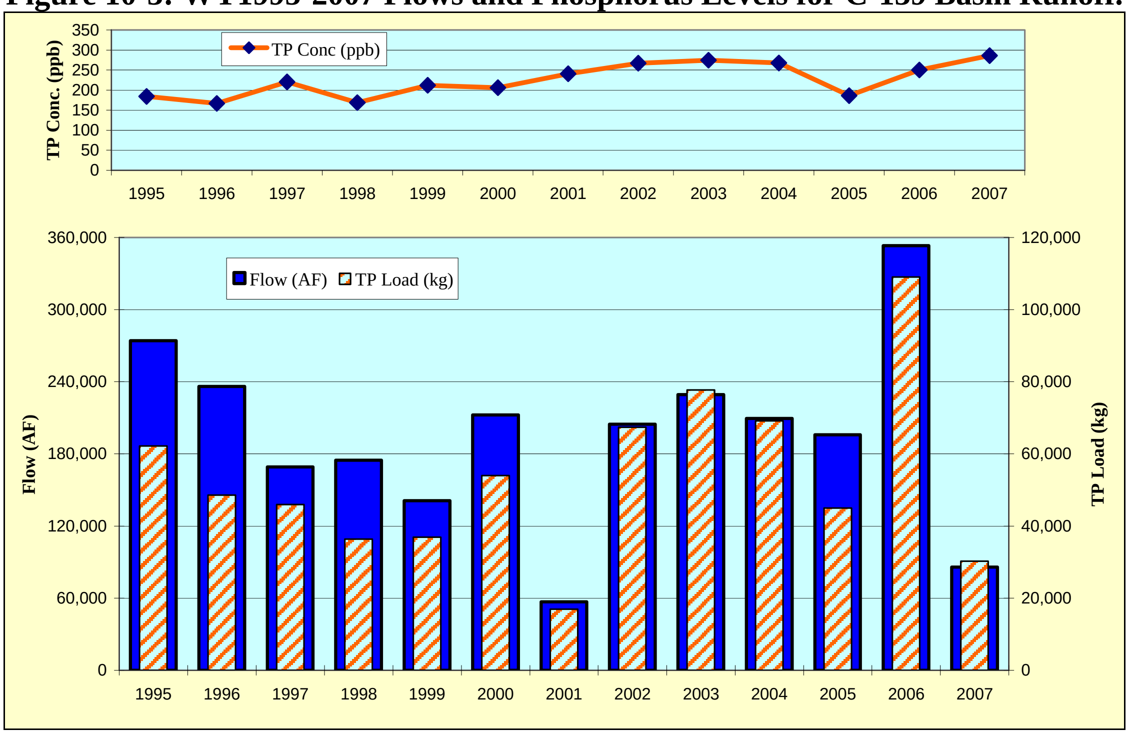


Table 11-1: Comparison of Annual Average Flow and Phosphorus Data

Basin	This Update			2005 Update			Difference		
	Flow AF/yr	TP Load kg/yr	TP Conc ppb	Flow AF/yr	TP Load kg/yr	TP Conc ppb	Flow AF/yr	TP Load kg/yr	TP Conc ppb
S-5A	254,957	51,729	164	277,225	53,171	155	-22,268	-1,442	9
S-6/S-2	284,089	38,023	109	297,002	36,210	99	-12,913	1,813	10
S-7/S-2	237,451	28,179	96	235,812	22,976	79	1,639	5,203	17
S-8/S-3	294,685	29,909	82	309,172	31,199	82	-14,487	-1,290	0
L-8	182,520	22,050	98	171,673	19,743	93	10,847	2,307	5
C-51W	125,326	30,222	196	125,543	19,599	127	-217	10,623	69
Acme Basin B	31,813	4,703	120	33,519	4,892	118	-1,706	-189	2
East Beach Water Control District	16,471	9,938	489	14,490	9,347	523	1,981	591	-34
East Shore Water Control District and 715 Farms	28,608	4,748	135	27,933	4,279	124	675	469	10
South Shore Drainage District	12,785	1,644	104	9,358	1,235	107	3,427	409	-3
South Florida Conservancy District	29,314	4,255	118	24,047	3,658	123	5,267	597	-6
C-139	195,607	53,801	223	265,072	64,101	196	-69,465	-10,300	27
C-139 Annex	41,486	4,987	97	39,627	4,830	99	1,859	157	-1
Total	**1,735,112**	**284,188**	**133**	**1,830,473**	**275,240**	**122**	**-95,361** **-5%**	**8,948** **3%**	**11** **9%**

Revisions to *Updated STA Inflow Data Sets for the 2010 Period*

Table 5-1: Annual Runoff from the C-139 Basin to STA-5 and STA-6.

Water Year	Volume ac-ft	TP Load kg	TP Conc. ppb
1995	236,529	56,368	193
1996	214,503	45,070	170
1997	151,440	42,427	227
1998	149,152	30,171	164
1999	122,058	31,376	208
2000	176,867	44,149	202
2001	53,197	16,642	254
2002	182,608	61,521	273
2003	209,265	71,031	275
2004	190,713	64,536	274
2005	150,075	34,933	189
2006	302,638	97,068	260
2007	71,783	28,149	318
Min. Annual	**53,197**	**16,642**	**-**
Max. Annual	**302,638**	**97,068**	**-**
Ave. Annual	**170,064**	**47,957**	**229**

Table 7-22: Estimate of Inflow Distribution to Balance PLR.

Flow-way	Area	TP inflow	Flow at PLR	Load	PLR
STA-5 1	2,055	229	28,177	7,945	0.96
STA-5 2	2,055	229	28,177	7,945	0.96
STA-5 3	1,985	229	27,217	7,674	0.96
STA-5 4	2,176	229	29,836	8,413	0.96
STA-5 5	2,669	229	36,595	10,319	0.96
STA-6 3	1,857	178	32,692	7,180	0.96
STA-6 5	652	97	20,970	2,521	0.96
STA-6 2	245	97	7,880	947	0.96
Total	13,694	203	211,544	52,944	0.96

Table 7-23: Summary of Long-term Average Annual Inflow to STA-5.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-139 Basin	**150,001**	**42,300**	**229**

Table 7-24: Annual Runoff to STA-5 from All Sources.

Water Year	Volume (acre-feet)	TP Load Load (kg)	TP Conc. (ppb)	Phosphorus Loading Rate (g/m2/yr)
1995	208,626	49,719	193	1.12
1996	189,198	39,753	170	0.90
1997	133,575	37,422	227	0.85
1998	131,557	26,612	164	0.60
1999	107,659	27,675	208	0.63
2000	156,002	38,940	202	0.88
2001	46,922	14,679	254	0.33
2002	161,066	54,263	273	1.23
2003	184,578	62,652	275	1.42
2004	168,215	56,922	274	1.29
2005	132,370	30,812	189	0.70
2006	266,936	85,617	260	1.93
2007	63,315	24,828	318	0.56
Min. Annual	**46,922**	**14,679**	**-**	**0.33**
Max. Annual	**266,936**	**85,617**	**-**	**1.93**
Ave. Annual	**150,001**	**42,300**	**229**	**0.96**

Table 7-25: Summary of Long-term Average Annual Inflow to STA-6.

Source	Flow (AF/yr)	TP Load (kg/yr)	TP Conc (ppb)
C-139 Basin	20,062	5,657	229
C-139 Annex	41,480	4,987	97
Total	**61,542**	**10,644**	**140**

Table 7-26: Annual Runoff to STA-6 from All Sources.

Water Year	Volume (acre-feet)	TP Load Load (kg)	TP Conc. (ppb)	Phosphorus Loading Rate (g/m2/yr)
1995	69,389	11,637	136	1.04
1996	61,742	9,876	130	0.89
1997	58,061	10,112	141	0.91
1998	63,676	7,581	97	0.68
1999	38,669	6,833	143	0.61
2000	67,230	11,624	140	1.04
2001	33,106	6,528	160	0.59
2002	59,264	11,103	152	1.00
2003	68,608	13,640	161	1.22
2004	69,357	13,344	156	1.20
2005	65,222	9,772	121	0.88
2006	101,432	18,352	147	1.65
2007	44,295	7,970	146	0.72
Min. Annual	**33,106**	**6,528**	**-**	**0.59**
Max. Annual	**101,432**	**18,352**	**-**	**1.65**
Ave. Annual	**61,542**	**10,644**	**140**	**0.96**

Table 9-1: Comparison of Current Data Sets to 2005 EAA RFS Values.

Basin or Source	Water Years	2005 EAA RFS[1] Flow AF/yr	2005 EAA RFS[1] TP Load kg/yr	2005 EAA RFS[1] TP Conc ppb	This Analysis Flow AF/yr	This Analysis TP Load kg/yr	This Analysis TP Conc ppb
EAA Basin Runoff							
Discharge to STAs							
S-5A Basin	1966-2000	291,096	55,256	154	308,058	61,844	163
S-6/S-2 Basin	1966-2000	236,624	28,327	97	181,700	23,661	106
S-7/S-2 Basin	1966-2000	109,310	10,747	80	141,171	16,640	96
S-8/S-3 Basin	1966-2000	170,624	17,460	83	132,584	13,383	82
Subtotal	1966-2000	807,654	111,790	112	763,513	115,528	123
Discharge to EAASR							
S-7/S-2 Basin	1966-2000	72,078	7,235	81	119,549	14,011	95
S-8/S-3 Basin	1966-2000	59,784	5,910	80	97,242	10,012	83
Subtotal	1966-2000	131,862	13,145	81	216,791	24,023	90
Discharge to Lake Okeechobee							
S-5A Basin	1966-2000	0	0	-	1,697	341	163
S-2/S-6/S-7 Basin	1966-2000	24,946	2,822	92	17,826	2,197	100
S-8/S-3 Basin	1966-2000	4,091	445	88	5,129	518	82
Subtotal	1966-2000	29,037	3,267	91	24,652	3,056	100
Total from EAA Basins							
S-5A Basin	1966-2000	291,096	55,256	154	309,754	62,185	163
S-2/S-6/S-7 Basin	1966-2000	442,958	49,131	90	460,246	56,509	100
S-8/S-3 Basin	1966-2000	234,499	23,815	82	234,955	23,913	83
Total	1966-2000	968,553	128,202	107	1,004,956	142,607	115
Chapter 298 districts and 715 Farms							
Discharge to STAs							
EBWCD	1966-2000	15,212	9,386	500	16,033	9,244	467
ESWCD/715 Farms	1966-2000	29,818	4,588	125	31,129	5,215	136
SSDD	1966-2000	10,559	1,390	107	10,539	1,324	102
SFCD	1966-2000	21,145	3,183	122	24,110	3,363	113
Subtotal	1966-2000	76,734	18,547	196	81,810	19,146	190
Discharge to Lake Okeechobee							
EBWCD	1966-2000	0	0	-	487	278	462
ESWCD/715 Farms	1966-2000	0	0	-	3,801	479	102
SSDD	1966-2000	0	0	-	344	43	102
SFCD	1966-2000	0	0	-	1,363	190	113
Subtotal	1966-2000	0	0	-	5,996	990	134
Total from Ch. 298 Districts and 715 Farms							
EBWCD	1966-2000	15,212	9,386	500	16,520	9,522	467
ESWCD/715 Farms	1966-2000	29,818	4,588	125	34,931	5,694	132
SSDD	1966-2000	10,559	1,390	107	10,883	1,367	102
SFCD	1966-2000	21,145	3,183	122	25,473	3,553	113
Total	1966-2000	76,734	18,547	196	87,806	20,136	186
Western Basins							
C-139 to L2/L-3	Varies	159,030	39,111	199	170,064	47,957	229
C-139 to STA-3/4	1966-2000	13,204	2,958	182	13,201	3,401	209
C-139 to EAA Irrig.	1966-2000	4,383	969	179	4,385	1,130	209
USSC SDR Unit 2	1998-2005	0	0	-	0	0	-
C-139 Annex	Varies	40,176	4,873	98	41,480	4,987	97
Total	Varies	216,793	47,911	179	229,130	57,475	203
Eastern Basins							
C-51 West to STA	1966-2000	136,812	23,307	138	130,375	31,529	196
C-51West to East	1966-2000	3,610	615	138	6,902	1,669	196
L-8 Basin to STA	1966-2000	0	0	-	8,571	1,019	96
L-8 Basin to Lake	1966-2000	71,931	9,157	103	57,008	6,971	99
L-8 to WPB WCA	1966-2000	0	0	-	85,022	10,397	99
L-8 to L-8 Rock Pit	1966-2000	0	0	-	17,461	2,135	99
L-8 to C-51 East	1966-2000	36,256	3,548	79	25,712	3,173	100
Acme Basin B	1966-2000	34,887	4,850	113	35,066	4,915	114
Total	1966-2000	283,496	41,477	119	366,117	61,809	137
Total Runoff	**Varies**	**1,545,576**	**236,137**	**124**	**1,688,009**	**282,026**	**135**

[1] 2005 EAA RFS values came from Appendix D "Inflow Data Sets for the Period 2010-2014"

Table 9-1: Comparison of Current Data Sets to 2005 EAA RFS Values (Cont'd).

Basin or Source	Water Years	2005 EAA RFS[1]			This Analysis		
		Flow AF/yr	TP Load kg/yr	TP Conc ppb	Flow AF/yr	TP Load kg/yr	TP Conc ppb
Lake Okeechobee Releases							
Flow-Through Releases in STA Inflows							
S-351	1966-2000	1,551	132	69	16	2	100
S-352	1966-2000	19	2	104	0	0	-
S-354	1966-2000	26,581	2,115	65	0	0	-
Subtotal	1966-2000	28,150	2,250	65	16	2	100
Water Supply Bypasses							
S-351	1966-2000	11,484	1,189	84	18,559	2,527	110
S-352	1966-2000	14,184	2,227	127	21,054	3,439	132
S-354	1966-2000	109,279	9,391	70	46,140	5,271	93
Subtotal	1966-2000	134,947	12,807	77	85,753	11,237	106
Total Flow-Through Releases							
S-351	1966-2000	13,035	1,321	82	18,575	2,529	110
S-352	1966-2000	14,203	2,229	127	21,054	3,439	132
S-354	1966-2000	135,860	11,506	69	46,140	5,271	93
Total	1966-2000	163,097	15,056	75	85,769	11,239	106
Lake Okeechobee Releases to EAA Storage Reservoir							
S-351	1966-2000	131,928	16,689	103	139,761	17,233	100
S-354	1966-2000	152,793	16,958	90	183,461	22,629	100
Total	1966-2000	284,721	33,647	96	323,222	39,862	100
Total Lake Okeechobee Releases							
S-351	1966-2000	144,963	18,010	101	158,336	19,762	101
S-352	1966-2000	14,203	2,229	127	21,054	3,439	132
S-354	1966-2000	288,653	28,464	80	229,601	27,900	99
Total	1966-2000	447,819	48,703	88	408,991	51,101	101
EAA Storage Reservoir Releases							
S-2/S-6/S-7 Irrig.	1966-2000	105,115	---	---	95,323	9,007	77[2]
S-3/S-8 Irrig.	1966-2000	74,911	---	---	72,835	6,882	77
STA-3/4	1966-2000	233,685	---	---	363,442	34,340	77
Total	1966-2000	413,711	---	---	531,600	50,229	77
Seepage from WCA-2A							
WCA-2A seepage	1966-2000	27,530	509	15	27,530	509	15
Total Volumes and TP Loads							
Direct STA Inflow	Varies	1,562,245	209,164	109	1,639,453	264,464	131
To EAA SR	1966-2000	416,583	46,792	91	540,013	63,885	96
To Lake Okeechobee	1966-2000	100,968	12,424	100	87,656	11,017	102
Other Destinations	1966-2000	44,249	5,132	94	139,482	18,504	108
Total (w/ L-8 Basin)	Varies	2,124,045	273,512	104	2,406,604	357,870	121
Total (w/o L-8 Basin)	Varies	2,015,858	260,807	105	2,212,830	334,174	122

[1] 2005 EAA RFS values came from Appendix D "Inflow Data Sets for the Period 2010-2014"

[2] Assumes 76.6 ppb TP concentration from EAA Storage Reservoir; Lake O=100 ppb

Table 9-2: Comparison of Basin Runoff to the STAs, Compartments B and C, and the EAA Storage Reservoir.

Source Basin	1994 Conceptual Design[1]			This Analysis		
	Flow AF/yr	TP Load kg/yr	TP Conc ppb	Flow AF/yr	TP Load kg/yr	TP Conc ppb
S-5A	195,342	50,631	210	308,058	61,844	163
S-6/S-2	131,676	23,166	143	181,700	23,661	106
S-7/S-2	155,734	19,211	100	223,454	24,415	89
S-8/S-3	187,020	47,290	205	200,833	19,831	80
Total EAA	***669,772***	***140,298***	***170***	***914,044***	***129,751***	***115***
Ch. 298 Districts/715 Farms	24,857	6,156	201	81,810	19,146	190
C-51W	105,376	24,042	185	130,375	31,529	196
L-8	0	0	-	8,571	1,019	96
C-139	97,605	28,693	238	183,265	51,358	227
C-139 Annex	0	0	-	41,480	4,987	97
Acme Basin B	0	0	-	35,066	4,915	114
WCA-2A	27530.11	509.37586	15	27,530	509	15
Lake Okeechobee[2]	254,571	21,364	68	217,536	20,554	77
Effective Treatment Area		39,690			56,997	
Total Inflows	**1,179,711**	**221,062**	**152**	**1,639,677**	**263,769**	**130**

[1] Assumed 20% reduction in EAA runoff.

[2] Calculated as 60% of EAA SR discharge to STA-3/4, equivalent to percentage of Lake inflows.

Table 9-3: Summary of Inflows to the STAs and EAA Storage Reservoir for STA-2 PLR of 1.0 g/m^2/yr.

STA	Effective Treatment Area acres	Inflow Volume (acre-feet)	Inflow TP Load Load (kg)	Inflow TP Conc. (ppb)	Phosphorus Loading Rate (g/m2/yr)
STA-1E	5,132	193,818	41,864	175	2.02
STA-1W	6,670	243,172	54,409	181	2.02
STA-2	6,338	182,713	25,664	114	1.00
Compartment B	8,620	225,073	28,509	103	0.82
STA-3/4[1]	16,543	583,360	60,353	84	0.90
STA-5 (incl. Comp. C)	10,940	150,001	42,300	229	0.96
STA-6 (incl. Comp. C)	2,754	61,542	10,644	140	0.96
Total Inflow to STAs	**56,997**	**1,639,679**	**263,743**	**130**	**1.14**
EAA SR A-1	15,200	540,013	63,885	96	1.04
Total	**72,197**	**2,179,692**	**327,628**	**122**	**1.12**

[1] Assumes 76.6 ppb TP concentration from EAA Storage Reservoir; Lake O=100 ppb

Table 9-4: Comparison of Inflows to 2005 EAARFS Values (STA-2 PLR of 1.0 g/m²/yr).

Receiving Water Body	2005 EAA RFS[1]			This Analysis		
	Flow AF/yr	TP Load kg/yr	TP Conc ppb	Flow AF/yr	TP Load kg/yr	TP Conc ppb
STA-1E	171,800	27,030	128	193,818	41,864	175
STA-1W	131,400	25,800	160	243,172	54,409	181
STA-2	180,700	20,300	91	182,713	25,664	114
Compartment B	291,100	44,100	123	225,073	28,509	103
STA-3/4	585,500	65,920	91	583,360	60,353	84
STA-5 (incl. Comp. C)	159,030	39,111	199	150,001	42,300	229
STA-6 (incl. Comp. C)	40,176	4,873	98	61,542	10,644	140
EAA SR	416,900	50,000	97	540,013	63,885	96
Total Inflows	**1,976,606**	**277,134**	**114**	**2,179,692**	**327,628**	**122**

[1] For comparison, inflows from the EAA RFS Alternative 1 for the 2010-2014 Period are presented. Alternative 1 included additional facilities to transfer S-5A Basin runoff to the west.

Table 9-5: Comparison of STA Inflows to 1994 Conceptual Design Values, Excluding Compartments B and C for STA-2 PLR of 1.0 g/m²/yr.

Receiving Water Body	1994 Conceptual Design			This Analysis		
	Flow AF/yr	TP Load kg/yr	TP Conc ppb	Flow AF/yr	TP Load kg/yr	TP Conc ppb
STA-1E	124,900	29,500	191	193,818	41,864	175
STA-1W	142,853	37,701	214	243,172	54,409	181
STA-2 (excl. Comp. B)	174,641	33,764	157	182,713	25,664	114
STA-3/4	604,753	87,200	117	583,360	60,353	84
STA-5 (excl. Comp. C)	87,000	28,000	261	56,353	15,890	229
STA-6 (excl. Comp. C)	18,034	4,388	197	28,850	3,468	96
Total Inflows	**1,152,181**	**220,553**	**155**	**1,288,266**	**201,649**	**127**

Table 9-6: Comparison of STA Inflows to 1994 Conceptual Design Values, Including Compartments B and C for STA-2 PLR of 1.0 g/m²/yr.

Receiving Water Body	1994 Conceptual Design				This Analysis			
	Eff. Tr. Area (ac)	Flow AF/yr	TP Load kg/yr	TP Conc ppb	Eff. Tr. Area (ac)	Flow AF/yr	TP Load kg/yr	TP Conc ppb
STA-1E	5,132	124,900	29,500	191	5,132	193,818	41,864	175
STA-1W	6,670	142,853	37,701	214	6,670	243,172	54,409	181
STA-2 (incl. Comp. B)	6,338	174,641	33,764	157	14,958	407,786	54,173	108
STA-3/4	16,543	604,753	87,200	117	16,543	583,360	60,353	84
STA-5 (incl. Comp. C)	4,110	87,000	28,000	261	10,940	150,001	42,300	229
STA-6 (incl. Comp. C)	897	18,034	4,388	197	2,754	61,542	10,644	227
Total Inflows	**39,690**	**1,152,181**	**220,553**	**155**	**56,997**	**1,639,679**	**263,743**	**130**

Appendix C. DMSTA Output

STA-1E

DMSTA2- Inputs & Outputs — Project: STA 1E EIS — Model Release: 07/05/07 — Current Date: 10/19/2007

Input Variable	Units	Value
Design Case Name	-	All EIS Alt1
Input Series Name		TS_All_EIS_Alt1
Starting Date for Simulation	-	05/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description:
All cells
Inflows to cells 1-4 increased by 4% (approx. 6,400 ac-ft/yr) for seepage recycle from west flow path
East Distribution Cell modeled as two cells in parallel; minimal treatment in EDC (K=0.01 m/yr)
West Distribution Cell modeled as two cells in parallel; minimal treatment in WDC (K=0.01 m/yr)

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	26.5	35.0	19.8
GM Outflow C (ppb)	24.1	32.2	17.8
Load Reduction %	85%	80%	89%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	4	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	EDCE	1	2	EDCW	3	4N	4S	WDCW	7	WDCE	5	6
Vegetation Type	-->	none	EMG_3	SAV_3	none	EMG_3	SAV_3	SAV_3	none	EMG_3	none	EMG_3	SAV_3
Inflow Fraction	-	0.215903431			0.3869894				0.1678194		0.2292878		
Downstream Cell Number	-	2	3		5	6	7		9	12	11.00	12.00	
Surface Area	km2	0.95	2.25	2.23	0.95	2.38	2.61	3.04	1.17	1.69	1.17	2.31	4.25
Mean Width of Flow Path	km	0.66	1.55	1.55	0.66	1.55	1.55	1.55	0.75	1.61	0.75	1.18	0.75
Number of Tanks in Series	-	0.5	3.0	3.0	0.5	3.0	3.0	3.0	0.5	3.0	0.5	3.0	3.0
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	91.44	38.1	38.1	38.1	99.06	38.1	38.1	38.1	38.1
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4	4	4	4	4
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1	1	1	1	1
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm									0.0054			0.0057
Inflow Seepage Control Elev	cm									69			94
Inflow Seepage Conc	ppb									20			20
Outflow Seepage Rate	(cm/d) / cm	0.0095	0.0042	0.0042	0.0095			0.0054	0.01		0.01		
Outflow Seepage Control Elev	cm	-137	-137	-99	-87			-38	-15		-76		
Max Outflow Seepage Conc	ppb	20	20	20	20			20	20		20		
Seepage Recycle to Cell Number	-	1	1	1	4			7					
Seepage Recycle Fraction	-	1	1	1	1			1					
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30	30	30	30	30
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500	500	500	500	500
Initial Water Column Depth	cm	50	50	50	50	50	50	50	50	50	50	50	50
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3	3	3	3	3
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22	22	22	22	22
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300	300	300	300	300
K = Net Settling Rate at Steady State	m/yr	0.0	16.8	52.5	0.0	16.8	52.5	52.5	0.0	16.8	0.0	16.8	52.5
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40	40	40	40	40
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100	100	100	100	100
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200	200	200	200	200

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	53.97	55.57	57.37	58.48	59.86	61.40	62.80	64.23	65.66	66.83	68.34	70.03	70.03
Run Date	-	10/19/07	10/19/07	10/19/07	10/19/07	10/19/07	10/19/07	10/19/07	10/19/07	10/19/07	10/19/07	10/19/07	10/19/07	10/19/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784	12784
Cell Label		EDCE	1	2	EDCW	3	4N	4S	WDCW	7	WDCE	5	6	Total
Downstream Cell Label		1	2	Outflow	3	4N	4S	Outflow	7	6	5	6	Outflow	-
Network Simulation Name	-	none	none	none	none	none	none	none	none	none	none	none	none	none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta
Surface Area	km2	0.95	2.25	2.23	0.95	2.38	2.61	3.04	1.17	1.69	1.17	2.31	4.25	25.02
Mean Rainfall	cm/yr	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.94	142.9
Mean ET	cm/yr	129.66	129.66	129.21	129.66	129.66	129.66	129.66	129.66	129.66	129.26	129.44	129.66	129.6
Cell Inflow Volume	hm3/yr	51.7	63.4	57.1	92.6	92.7	93.0	93.4	40.2	35.5	54.9	49.3	86.1	239.3
Cell Inflow Load	kg/yr	9045.2	8665.7	5367.2	16212.8	15464.8	11999.6	5135.4	7030.7	6230.2	9605.9	8670.3	9508.1	41895
Cell Inflow Conc	ppb	175	137	94	175	167	129	55	175	176	175	176	110	175.1
Treated Outflow Volume	hm3/yr	63.4	57.1	52.3	92.7	93.0	93.4	93.8	35.5	36.5	49.3	49.6	89.0	235.1
Treated Outflow Load	kg/yr	8665.7	5367.2	1545.8	15464.8	11999.6	5135.4	2069.9	6230.2	3977.4	8670.3	5530.6	2624	6240
Treated FWM Outflow Conc	ppb	137	94	30	167	129	55	22	176	109	176	111	29	26.5
Upper Confidence Limit	ppb	136.7	102.4	37.8	166.8	136.7	67.1	29.8	175.6	120.8	175.8	123.4	38.8	35.0
Lower Confidence Limit	ppb	136.6	84.3	22.6	166.8	119.7	43.6	16.3	175.6	96.0	175.8	98.0	22.0	19.8
Total Outflow Volume + Bypass	hm3/yr	63.4	57.1	52.3	92.7	93.0	93.4	93.8	35.5	36.5	49.3	49.6	89.0	235.1
Total Outflow Load + Bypass	kg/yr	8665.7	5367.2	1545.8	15464.8	11999.6	5135.4	2069.9	6230.2	3977.4	8670.3	5530.6	2623.8	6239.5
Total FWM Outflow Conc	ppb	136.7	93.9	29.5	166.8	129.0	55.0	22.1	175.6	109.1	175.8	111.4	29.5	26.5
Bypass Load	kg/yr	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Maximum Inflow	hm3/d	0.25	0.28	0.27	0.44	0.44	0.45	0.45	0.19	0.18	0.26	0.25	0.44	1.14
Maximum Outflow	hm3/d	0.28	0.27	0.26	0.44	0.45	0.45	0.46	0.18	0.19	0.25	0.25	0.45	1.17
Surface Load Reduction	kg/yr	744	3299	3821	867	3465	6864	3170	801	2253	936	3140	6884	35655
Load Trapped in Sediments	kg/yr	0	2689	3640	0	3545	6952	3124	0	2325	0	3218	7077	32572
Overall Load Reduction	%	4%	38%	71%	5%	22%	57%	60%	11%	36%	10%	36%	72%	85%
Lower Confidence Limit	%	0.0	0.3	0.7	0.0	0.2	0.5	0.6	0.1	0.3	0.1	0.3	0.7	80%
Upper Confidence Limit	%	0.0	0.4	0.8	0.0	0.3	0.6	0.6	0.1	0.4	0.1	0.4	0.8	89%
Daily Geometric Mean	ppb	102.6	88.3	23.9	141.7	122.7	46.8	16.5	166.9	102.7	163.2	108.9	22.1	#N/A
Outflow Geo Mean - Composites	ppb	134.8	91.5	27.1	165.9	126.6	51.2	20.0	175.1	106.0	175.4	108.6	26.7	24.1
Upper Confidence Limit	ppb	134.8	100.2	35.1	165.9	134.7	63.4	27.3	175.1	118.2	175.4	121.0	35.7	32.2
Lower Confidence Limit	ppb	134.7	81.7	20.5	165.9	116.9	40.0	14.6	175.1	92.5	175.4	94.7	19.7	17.8
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Frequency Outflow Conc > 20 ppb	%	100%	100%	83%	100%	100%	100%	47%	100%	100%	100%	100%	83%	97%
Frequency Outflow Conc > 50 ppb	%	100%	100%	0%	100%	100%	53%	0%	100%	100%	100%	100%	0%	75%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%	96%	100%	100%	100%	100%	100%	100%
95th Percentile Outflow Conc	ppb	150.74	108.53	39.96	180.76	144.24	73.96	30.84	192.66	125.17	192.14	126.70	40.74	37
Mean Biomass P Storage	mg/m2	737	3758	1639	937	4673	2677	1033	1003	4323	813	4379	1679	2466
Storage Increase / Net Removal	%	2063%	0%	0%	2686%	0%	0%	0%	2891%	0%	2801%	0%	0%	0%
Net Storage Turnover Rate	1/yr	0.0	11.1	34.8	0.0	11.1	34.8	34.8	0.0	11.1	0.0	11.1	34.7	18.5
Unit Area P Load	mg/m2-yr	9511	3850	2402	17048	6485	4595	1687	6009	3682	8210	3751	2239	1675
Unit Area P Removal	mg/m2-yr	0	1194	1629	0	1487	2662	1026	0	1374	0	1392	1666	1302
Mean Water Load	cm/d	14.9	7.7	7.0	26.7	10.6	9.8	8.4	9.4	5.7	12.8	5.8	5.5	2.6
Max Water Load	cm/d	25.9	12.5	12.0	46.5	18.6	17.2	14.9	16.4	10.7	22.4	10.7	10.3	4.6
Mean Depth	cm	68	53	51	94	59	59	58	98	47	58	53	68	61
Minimum Depth	cm	59.8	46.5	42.0	92.8	50.6	50.2	49.5	83.9	42.1	42.2	41.7	57.1	52
Maximum Depth	cm	76.1	60.2	59.6	97.8	67.9	68.1	69.1	100.7	54.0	69.5	62.6	82.2	71
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.0%
Flow/Width	m2/day	214	112	101	384	164	164	165	147	60	200	114	314	178.9
HRT Days	days	4.6	6.9	7.3	3.5	5.5	6.0	7.0	10.4	8.2	4.5	9.1	12.3	23.4
Mean Velocity	cm/sec	0.37	0.24	0.23	0.47	0.32	0.32	0.33	0.17	0.15	0.40	0.25	0.53	0.33
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%	0%	12%	0%	10%	0%	0%	4%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
95th Percentile Outflow Volume	hm3/d	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.4	1.0
95th Percentile Outflow Load	kg/d	35.8	23.8	8.2	64.4	53.4	25.9	11.3	26.7	18.4	36.7	25.4	14.3	33.8
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Range Check - Mean Depth	-			0.82			0.94	0.94						3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-			0.62										1
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%
Mass Balance Error	%	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%	0.01%	0.00%	0.01%	0.00%	0.01%	0.01%	0.02%
Warning or Error Messages														4

Warning or Error Messages:
Cell# 3 Depth out of calib. range for SAV_3: 51 vs. 62 - 87 cm
Cell# 3 Flow/Width out of calib. range for SAV_3: 101 vs. 162 - 374 m2/day
Cell# 6 Depth out of calib. range for SAV_3: 59 vs. 62 - 87 cm
Cell# 7 Depth out of calib. range for SAV_3: 58 vs. 62 - 87 cm

STA-1W

DMSTA2- Inputs & Outputs

Project: STA 1W EIS

Model Release: 07/05/07
Current Date: 10/14/2007

Input Variable	Units	Value
Design Case Name	-	EIS Alt1
Input Series Name		TS_EIS_Alt1
Starting Date for Simulation	-	05/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description:
STA-1W with Long Term Plan Enhancements
Include all S-5A Basin and EBWCD Runoff
Distribution of outflows from STA-1 I&D assigned 91% to STA-1W, 9% to westerly flow path of STA-1E

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	27.2	34.7	21.2
GM Outflow C (ppb)	25.9	33.2	20.1
Load Reduction %	85%	81%	88%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	-0.2%	0.4%
Iterations & Convergence	3	0.1%
Warning/Error Messages	7	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	3	2A	2B	4	5A	5B				
Vegetation Type	-->	EMG_3	SAV_3	SAV_3	EMG_3	SAV_3	SAV_3	EMG_3	SAV_3				
Inflow Fraction	-	0.377211394			0.194752624			0.428036					
Downstream Cell Number	-	2	3		5	6		8					
Surface Area	km2	3.02	3.02	4.15	1.91	1.90	1.45	2.28	9.28				
Mean Width of Flow Path	km	1.10	1.10	1.10	2.40	2.00	1.30	1.78	2.34				
Number of Tanks in Series	-	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0				
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1				
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4				
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1				
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.0035	0.0018	0.0023									
Inflow Seepage Control Elev	cm	172	172	185									
Inflow Seepage Conc	ppb	20	20	20									
Outflow Seepage Rate	(cm/d) / cm			0.0014	0.0016	0.0016	0.0021	0.0156	0.0049				
Outflow Seepage Control Elev	cm			-60	-46	-46	-46	-46	-46				
Max Outflow Seepage Conc	ppb			20	20	20	20	20	20				
Seepage Recycle to Cell Number	-							1	1				
Seepage Recycle Fraction	-							0.91	0.8				
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30				
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500				
Initial Water Column Depth	cm	200	200	200	200	200	200	200	200				
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3				
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22				
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300				
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	52.5	16.8	52.5	52.5	16.8	52.5				
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40				
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100				
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200				

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	10.34	10.89	11.43	11.97	12.51	13.06	13.60	14.29					14.29
Run Date	-	10/14/07	10/14/07	10/14/07	10/14/07	10/14/07	10/14/07	10/14/07	10/14/07					10/14/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65					05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65					05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00					04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784	12784	12784					12784
Cell Label		1A	1B	3	2A	2B	4	5A	5B					Total
Downstream Cell Label		1B	3	Outflow	2B	4	Outflow	5B	Outflow					-
Network Simulation Name	-	none	none	none	none	none	none	none	none					none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta					Uncerta
Surface Area	km2	3.02	3.02	4.15	1.91	1.90	1.45	2.28	9.28					27.00
Mean Rainfall	cm/yr	134.86	134.86	134.86	134.86	134.86	134.86	134.86	134.86					134.9
Mean ET	cm/yr	129.94	129.94	129.94	129.83	129.75	129.62	123.08	127.31					128.4
Cell Inflow Volume	hm3/yr	113.2	140.1	142.2	58.5	57.5	56.6	128.5	117.1					300.2
Cell Inflow Load	kg/yr	20538.8	17144.4	9134.7	10604.1	7703.7	3185.7	23306.2	16256.8					54449
Cell Inflow Conc	ppb	181	122	64	181	134	56	181	139					181.4
Treated Outflow Volume	hm3/yr	140.1	142.2	143.7	57.5	56.6	55.7	117.1	102.7					302.1
Treated Outflow Load	kg/yr	17144.4	9134.7	4098.6	7703.7	3185.7	1649.1	16256.8	2474.0					8222
Treated FWM Outflow Conc	ppb	122	64	29	134	56	30	139	24					27.2
Upper Confidence Limit	ppb	128.4	74.7	36.7	143.1	68.3	38.4	145.2	29.9					34.7
Lower Confidence Limit	ppb	115.2	53.7	21.8	123.1	45.2	22.8	131.7	19.5					21.2
Total Outflow Volume + Bypass	hm3/yr	140.1	142.2	143.7	57.5	56.6	55.7	117.1	102.7					302.1
Total Outflow Load + Bypass	kg/yr	17144.4	9134.7	4098.6	7703.7	3185.7	1649.1	16256.8	2474.0					8221.6
Total FWM Outflow Conc	ppb	122.4	64.2	28.5	133.9	56.2	29.6	138.8	24.1					27.2
Bypass Load	kg/yr	0	0	0	0	0	0	0	0					0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%					0.0
Maximum Inflow	hm3/d	0.49	0.58	0.59	0.25	0.25	0.26	0.55	0.52					1.29
Maximum Outflow	hm3/d	0.58	0.59	0.60	0.25	0.26	0.26	0.52	0.50					1.36
Surface Load Reduction	kg/yr	3835	8010	5036	2900	4518	1537	7049	13783					46228
Load Trapped in Sediments	kg/yr	4014	8150	5171	2767	4486	1544	2895	12673					41699
Overall Load Reduction	%	17%	47%	55%	27%	59%	48%	30%	85%					85%
Lower Confidence Limit	%	0.1	0.4	0.5	0.2	0.5	0.4	0.3	0.8					81%
Upper Confidence Limit	%	0.2	0.5	0.6	0.3	0.6	0.5	0.3	0.9					88%
Daily Geometric Mean	ppb	109.6	54.6	22.3	140.0	50.3	22.9	158.3	19.5					#N/A
Outflow Geo Mean - Composites	ppb	120.8	61.9	27.2	131.8	53.6	28.0	136.0	22.8					25.9
Upper Confidence Limit	ppb	126.9	72.6	35.2	141.3	65.5	36.5	142.6	28.4					33.2
Lower Confidence Limit	ppb	113.3	51.4	20.7	120.8	42.8	21.5	128.6	18.4					20.1
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%					100%
Frequency Outflow Conc > 20 ppb	%	100%	100%	94%	100%	100%	94%	100%	72%					100%
Frequency Outflow Conc > 50 ppb	%	100%	92%	0%	100%	67%	0%	100%	0%					89%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	99%					100%
95th Percentile Outflow Conc	ppb	132.52	77.77	36.96	144.45	69.23	37.97	153.73	31.14					35
Mean Biomass P Storage	mg/m2	4183	2708	1245	4551	2354	1063	3986	1360					2309
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%	0%	0%					0%
Net Storage Turnover Rate	1/yr	11.1	34.9	35.0	11.2	35.1	35.1	11.2	35.1					23.4
Unit Area P Load	mg/m2-yr	6810	5684	2199	5561	4049	2198	10243	1751					2016
Unit Area P Removal	mg/m2-yr	1331	2702	1245	1451	2357	1065	1272	1365					1544
Mean Water Load	cm/d	10.3	12.7	9.4	8.4	8.3	10.7	15.5	3.5					3.0
Max Water Load	cm/d	16.2	19.2	14.3	13.2	13.3	17.6	24.3	5.6					4.8
Mean Depth	cm	67	69	70	44	45	48	46	46					55
Minimum Depth	cm	59.5	61.0	61.9	37.1	37.3	37.5	33.1	28.6					43
Maximum Depth	cm	77.1	78.6	80.1	51.3	53.6	59.0	61.1	60.1					66
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%	0%	0%					0.0%
Flow/Width	m2/day	282	349	354	67	79	119	198	137					205.3
HRT Days	days	6.6	5.4	7.5	5.3	5.4	4.5	3.0	13.3					17.9
Mean Velocity	cm/sec	0.48	0.59	0.59	0.17	0.20	0.29	0.49	0.35					0.41
Seepage Outflow / Total Outflow	%	0%	0%	2%	2%	2%	2%	1%	3%					3%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					0.0
95th Percentile Outflow Volume	hm3/d	0.6	0.6	0.6	0.2	0.2	0.2	0.5	0.5					1.3
95th Percentile Outflow Load	kg/d	73.9	42.8	19.9	34.6	15.8	8.4	75.5	13.0					41.3
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					#N/A
Range Check - Mean Depth	-					0.72	0.77		0.74					3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.34				0.49	0.74		0.85					4
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%					0.00%
Mass Balance Error	%	0.01%	0.01%	0.01%	0.01%	0.02%	0.01%	-0.42%	-0.01%					-0.17%
Warning or Error Messages														7

Warning or Error Messages:
Cell# 1 Flow/Width out of calib. range for EMG_3: 282 vs. 26 - 210 m2/day
Cell# 5 Depth out of calib. range for SAV_3: 45 vs. 62 - 87 cm
Cell# 5 Flow/Width out of calib. range for SAV_3: 79 vs. 162 - 374 m2/day
Cell# 6 Depth out of calib. range for SAV_3: 48 vs. 62 - 87 cm
Cell# 6 Flow/Width out of calib. range for SAV_3: 119 vs. 162 - 374 m2/day
Cell# 8 Depth out of calib. range for SAV_3: 46 vs. 62 - 87 cm
Cell# 8 Flow/Width out of calib. range for SAV_3: 137 vs. 162 - 374 m2/day

STA-2 With PLR of 1.0 g/m2/yr

DMSTA2- Inputs & Outputs — **Project: STA 2 EIS** — Model Release: 07/05/07 — Current Date: 10/14/2007

Input Variable	Units	Value
Design Case Name	-	EIS Alt1
Input Series Name		TS_EIS_Alt1
Starting Date for Simulation	-	05/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description:
Analysis for WY 1966-2000
Inflow time series includes allowance of 38 cfs (27,500 ac-ft/yr) seepage from WCA-2A to Supply Canal
PLR = 1.0 g/m2/yr

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	22.4	26.9	18.9
GM Outflow C (ppb)	20.5	24.8	17.2
Load Reduction %	80%	76%	83%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.1%	0.2%
Iterations & Convergence	2	0.2%
Warning/Error Messages	4	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1	2	3									
Vegetation Type	-->	PEW_3	PEW_3	SAV_3									
Inflow Fraction	-	0.283710055	0.358144973	0.358144973									
Downstream Cell Number	-												
Surface Area	km2	7.28	9.19	9.19									
Mean Width of Flow Path	km	1.58	2.00	2.00									
Number of Tanks in Series	-	3.0	3.0	6.0									
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	52.73	29.26	29.87									
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4									
Outflow Coefficient - Intercept	-	1	1	1									
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.008											
Inflow Seepage Control Elev	cm	76											
Inflow Seepage Conc	ppb	20											
Outflow Seepage Rate	(cm/d) / cm	0.004	0.006	0.00337									
Outflow Seepage Control Elev	cm	-61	-61	-30									
Max Outflow Seepage Conc	ppb	20	20	20									
Seepage Recycle to Cell Number	-	1	2	3									
Seepage Recycle Fraction	-	1	1	1									
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30									
Initial P Storage Per Unit Area	mg/m2	500	500	500									
Initial Water Column Depth	cm	200	200	200									
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3									
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22									
C2 = Conc at Half-Max Uptake	ppb	300	300	300									
K = Net Settling Rate at Steady State	m/yr	34.9	34.9	52.5									
Z1 = Saturated Uptake Depth	cm	40	40	40									
Z2 = Lower Penalty Depth	cm	100	100	100									
Z3 = Upper Penalty Depth	cm	200	200	200									

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	3.74	4.46	5.60										5.60
Run Date	-	10/14/07	10/14/07	10/14/07										10/14/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65										05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65										05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00										04/30/00
Output Duration	days	12784	12784	12784										12784
Cell Label		1	2	3										Total
Downstream Cell Label		Outflow	Outflow	Outflow										-
Network Simulation Name	-	none	none	none										none
Simulation Type	-	Uncerta	Uncerta	Uncerta										Uncerta
Surface Area	km2	7.28	9.19	9.19										25.66
Mean Rainfall	cm/yr	129.37	129.37	129.37										129.4
Mean ET	cm/yr	129.37	129.37	129.37										129.4
Cell Inflow Volume	hm3/yr	64.0	80.8	80.8										225.5
Cell Inflow Load	kg/yr	7286.0	9197.5	9197.5										25681
Cell Inflow Conc	ppb	114	114	114										113.9
Treated Outflow Volume	hm3/yr	67.9	80.8	80.8										229.5
Treated Outflow Load	kg/yr	1732.0	2082.1	1330.8										5145
Treated FWM Outflow Conc	ppb	25	26	16										22.4
Upper Confidence Limit	ppb	31.1	31.4	18.9										26.9
Lower Confidence Limit	ppb	21.1	21.4	14.7										18.9
Total Outflow Volume + Bypass	hm3/yr	67.9	80.8	80.8										229.5
Total Outflow Load + Bypass	kg/yr	1732.0	2082.1	1330.8										5144.9
Total FWM Outflow Conc	ppb	25.5	25.8	16.5										22.4
Bypass Load	kg/yr	0	0	0										0.0
Bypass Load	%	0%	0%	0%										0.0
Maximum Inflow	hm3/d	0.34	0.43	0.43										1.21
Maximum Outflow	hm3/d	0.35	0.44	0.44										1.23
Surface Load Reduction	kg/yr	5783	7523	8000										20536
Load Trapped in Sediments	kg/yr	5729	7150	8066										20944
Overall Load Reduction	%	76%	77%	86%										80%
Lower Confidence Limit	%	0.7	0.7	0.8										76%
Upper Confidence Limit	%	0.8	0.8	0.9										83%
Daily Geometric Mean	ppb	14.6	15.2	6.6										#N/A
Outflow Geo Mean - Composites	ppb	23.4	23.6	14.7										20.5
Upper Confidence Limit	ppb	28.9	29.1	16.9										24.8
Lower Confidence Limit	ppb	19.2	19.4	13.1										17.2
Frequency Outflow Conc > 10 ppb	%	100%	100%	92%										100%
Frequency Outflow Conc > 20 ppb	%	69%	75%	19%										92%
Frequency Outflow Conc > 50 ppb	%	0%	0%	0%										53%
Freq Outflow Volume > 10 ppb	%	97%	98%	60%										90%
95th Percentile Outflow Conc	ppb	31.74	32.52	21.33										29
Mean Biomass P Storage	mg/m2	1186	1172	879										1071
Storage Increase / Net Removal	%	0%	0%	0%										0%
Net Storage Turnover Rate	1/yr	23.2	23.2	34.9										26.7
Unit Area P Load	mg/m2-yr	1001	1001	1001										1001
Unit Area P Removal	mg/m2-yr	787	778	878										816
Mean Water Load	cm/d	2.4	2.4	2.4										2.4
Max Water Load	cm/d	4.7	4.7	4.7										4.7
Mean Depth	cm	58	50	50										52
Minimum Depth	cm	55.2	41.4	41.4										45
Maximum Depth	cm	64.4	61.0	61.0										62
Frequency Depth < 10 cm	%	0%	0%	0%										0.0%
Flow/Width	m2/day	111	111	111										110.7
HRT Days	days	24.2	20.6	20.6										21.7
Mean Velocity	cm/sec	0.22	0.26	0.26										0.25
Seepage Outflow / Total Outflow	%	0%	0%	0%										0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
95th Percentile Outflow Volume	hm3/d	0.3	0.4	0.4										1.1
95th Percentile Outflow Load	kg/d	10.0	12.3	8.1										30.4
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A										#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A										#N/A
Range Check - Mean Depth	-			0.80										1
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-			0.68										1
Range Check - Inflow Conc	-	1.04	1.04											2
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%										0.00%
Mass Balance Error	%	0.04%	0.04%	0.22%										0.11%
Warning or Error Messages														4

Warning or Error Messages:
Cell# 1 Inflow Conc out of calib. range for PEW_3: 114 vs. 8 - 110 ppb
Cell# 2 Inflow Conc out of calib. range for PEW_3: 114 vs. 8 - 110 ppb
Cell# 3 Depth out of calib. range for SAV_3: 50 vs. 62 - 87 cm
Cell# 3 Flow/Width out of calib. range for SAV_3: 111 vs. 162 - 374 m2/day

STA-2 With PLR of 1.3 g/m2/yr

DMSTA2- Inputs & Outputs | Project: STA 2 EIS | Model Release: 07/05/07 | Current Date: 10/14/2007

Input Variable	Units	Value	Case Description:						
Design Case Name	-	EIS Alt1 1.3	Analysis for WY 1966-2000						
Input Series Name		TS_EIS_Alt1_1	Inflow time series includes allowance of 38 cfs (27,500 ac-ft/yr) seepage from WCA-2A to Supply Canal						
Starting Date for Simulation	-	05/01/65	PLR = 1.3 g/m2/yr						
Ending Date for Simulation	-	04/30/00							
Starting Date for Output	-	05/01/65							
Integration Steps Per Day	-	4	Simulation Type:	Uncertainty Analysis					
Number of Iterations	-	0	Output Variable	Mean	Lower CL	Upper CL	Diagnostics		
Output Averaging Interval	days	365	FWM Outflow C (ppb)	23.8	29.4	19.3	H20 Balance Error Mean & Max	0.0%	0.0%
Inflow Conc Scale Factor	-	1	GM Outflow C (ppb)	22.4	27.9	18.0	Mass Balance Error Mean & Max	0.1%	0.1%
Rainfall P Conc	ppb	10	Load Reduction %	79%	74%	83%	Iterations & Convergence	2	0.8%
Atmospheric P Load (Dry)	mg/m2-yr	20	Bypass Load (%)	0.0%			Warning/Error Messages	4	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1	2	3									
Vegetation Type	-->	PEW_3	PEW_3	SAV_3									
Inflow Fraction	-	0.283710055	0.358144973	0.358144973									
Downstream Cell Number	-												
Surface Area	km2	7.28	9.19	9.19									
Mean Width of Flow Path	km	1.58	2.00	2.00									
Number of Tanks in Series	-	3.0	3.0	6.0									
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	52.73	29.26	29.87									
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4									
Outflow Coefficient - Intercept	-	1	1	1									
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.008											
Inflow Seepage Control Elev	cm	76											
Inflow Seepage Conc	ppb	20											
Outflow Seepage Rate	(cm/d) / cm	0.004	0.006	0.00337									
Outflow Seepage Control Elev	cm	-61	-61	-30									
Max Outflow Seepage Conc	ppb	20	20	20									
Seepage Recycle to Cell Number	-	1	2	3									
Seepage Recycle Fraction	-	1	1	1									
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30									
Initial P Storage Per Unit Area	mg/m2	500	500	500									
Initial Water Column Depth	cm	200	200	200									
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3									
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22									
C2 = Conc at Half-Max Uptake	ppb	300	300	300									
K = Net Settling Rate at Steady State	m/yr	34.9	34.9	52.5									
Z1 = Saturated Uptake Depth	cm	40	40	40									
Z2 = Lower Penalty Depth	cm	100	100	100									
Z3 = Upper Penalty Depth	cm	200	200	200									

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	3.77	4.46	5.63										5.63
Run Date	-	10/14/07	10/14/07	10/14/07										10/14/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65										05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65										05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00										04/30/00
Output Duration	days	12784	12784	12784										12784
Cell Label		1	2	3										Total
Downstream Cell Label		Outflow	Outflow	Outflow										-
Network Simulation Name	-	none	none	none										none
Simulation Type	-	Uncerta	Uncerta	Uncerta										Uncerta
Surface Area	km2	7.28	9.19	9.19										25.66
Mean Rainfall	cm/yr	129.37	129.37	129.37										129.4
Mean ET	cm/yr	129.37	129.37	129.37										129.4
Cell Inflow Volume	hm3/yr	84.1	106.2	106.2										296.6
Cell Inflow Load	kg/yr	9469.4	11953.8	11953.8										33377
Cell Inflow Conc	ppb	113	113	113										112.5
Treated Outflow Volume	hm3/yr	87.7	106.2	106.2										300.2
Treated Outflow Load	kg/yr	2443.3	2969.7	1738.4										7151
Treated FWM Outflow Conc	ppb	28	28	16										23.8
Upper Confidence Limit	ppb	34.7	34.8	19.7										29.4
Lower Confidence Limit	ppb	22.2	22.3	13.9										19.3
Total Outflow Volume + Bypass	hm3/yr	87.7	106.2	106.2										300.2
Total Outflow Load + Bypass	kg/yr	2443.3	2969.7	1738.4										7151.3
Total FWM Outflow Conc	ppb	27.9	28.0	16.4										23.8
Bypass Load	kg/yr	0	0	0										0.0
Bypass Load	%	0%	0%	0%										0.0
Maximum Inflow	hm3/d	0.39	0.50	0.50										1.39
Maximum Outflow	hm3/d	0.40	0.50	0.50										1.41
Surface Load Reduction	kg/yr	7277	9437	10374										26226
Load Trapped in Sediments	kg/yr	7121	8895	10380										26396
Overall Load Reduction	%	74%	75%	85%										79%
Lower Confidence Limit	%	0.7	0.7	0.8										74%
Upper Confidence Limit	%	0.8	0.8	0.9										83%
Daily Geometric Mean	ppb	19.7	19.9	8.8										#N/A
Outflow Geo Mean - Composites	ppb	26.4	26.4	15.1										22.4
Upper Confidence Limit	ppb	33.2	33.2	18.3										27.9
Lower Confidence Limit	ppb	20.8	20.9	12.7										18.0
Frequency Outflow Conc > 10 ppb	%	100%	100%	94%										100%
Frequency Outflow Conc > 20 ppb	%	92%	92%	17%										97%
Frequency Outflow Conc > 50 ppb	%	0%	0%	0%										72%
Freq Outflow Volume > 10 ppb	%	100%	100%	70%										99%
95th Percentile Outflow Conc	ppb	33.79	33.91	21.10										29
Mean Biomass P Storage	mg/m2	1472	1457	1130										1344
Storage Increase / Net Removal	%	0%	0%	0%										0%
Net Storage Turnover Rate	1/yr	23.3	23.3	35.0										26.8
Unit Area P Load	mg/m2-yr	1301	1301	1301										1301
Unit Area P Removal	mg/m2-yr	978	968	1130										1029
Mean Water Load	cm/d	3.2	3.2	3.2										3.2
Max Water Load	cm/d	5.4	5.4	5.4										5.4
Mean Depth	cm	61	55	55										56
Minimum Depth	cm	57.3	46.9	46.9										50
Maximum Depth	cm	66.4	64.3	64.3										65
Frequency Depth < 10 cm	%	0%	0%	0%										0.0%
Flow/Width	m2/day	146	145	145										145.5
HRT Days	days	19.1	17.3	17.3										17.8
Mean Velocity	cm/sec	0.28	0.31	0.31										0.30
Seepage Outflow / Total Outflow	%	0%	0%	0%										0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
95th Percentile Outflow Volume	hm3/d	0.4	0.5	0.5										1.3
95th Percentile Outflow Load	kg/d	12.7	15.6	9.7										38.1
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A										#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A										#N/A
Range Check - Mean Depth	-			0.88										1
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-			0.90										1
Range Check - Inflow Conc	-	1.03	1.03											2
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%										0.00%
Mass Balance Error	%	0.02%	0.03%	0.14%										0.07%
Warning or Error Messages		Cell# 1 Inflow Conc out of calib. range for PEW_3: 113 vs. 8 - 110 ppb Cell# 2 Inflow Conc out of calib. range for PEW_3: 113 vs. 8 - 110 ppb Cell# 3 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm Cell# 3 Flow/Width out of calib. range for SAV_3: 145 vs. 162 - 374 m2/day												4

Compartment B North Build-out With STA-2 PLR of 1.0 g/m2/yr

DMSTA2- Inputs & Outputs | **Project:** COMP B EIS | Model Release: 07/05/07 | Current Date: 10/15/2007

Input Variable	Units	Value
Design Case Name	-	NBO EIS Alt1
Input Series Name		TS_NBO_EIS_A
Starting Date for Simulation	-	05/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description:
Analysis for WY 1966-2000
Receives re-directed inflow from STA-2 up to 1,000 cfs

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	11.1	13.9	9.1
GM Outflow C (ppb)	10.6	13.3	8.7
Load Reduction %	89%	87%	91%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.1%	0.1%
Iterations & Convergence	3	0.0%
Warning/Error Messages	3	

Cell Number -->	Units	1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	NBO1	NBO2	Cell 4									
Vegetation Type	-->	EMG_3	SAV_3	SAV_3									
Inflow Fraction	-	1											
Downstream Cell Number	-	2	3										
Surface Area	km2	4.35	11.53	7.70									
Mean Width of Flow Path	km	6.50	5.00	2.50									
Number of Tanks in Series	-	3.0	3.0	3.0									
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	42.7									
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4									
Outflow Coefficient - Intercept	-	1	1	1									
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.033	0.0124	0.0064									
Inflow Seepage Control Elev	cm	48	48	60									
Inflow Seepage Conc	ppb	75	75	75									
Outflow Seepage Rate	(cm/d) / cm	0.0045	0.0017										
Outflow Seepage Control Elev	cm	42	42										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	1										
Seepage Recycle Fraction	-	0.75	0.75										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30									
Initial P Storage Per Unit Area	mg/m2	500	500	500									
Initial Water Column Depth	cm	200	200	200									
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3									
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22									
C2 = Conc at Half-Max Uptake	ppb	300	300	300									
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	52.5									
Z1 = Saturated Uptake Depth	cm	40	40	40									
Z2 = Lower Penalty Depth	cm	100	100	100									
Z3 = Upper Penalty Depth	cm	200	200	200									

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	5.31	6.00	6.71										6.71
Run Date	-	10/14/07	10/14/07	10/14/07										10/14/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65										05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65										05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00										04/30/00
Output Duration	days	12784	12784	12784										12784
Cell Label		NBO1	NBO2	Cell 4										Total
Downstream Cell Label		NBO2	Cell 4	Outflow										-
Network Simulation Name	-	none	none	none										none
Simulation Type	-	Uncerta	Uncerta	Uncerta										Uncerta
Surface Area	km2	4.35	11.53	7.70										23.58
Mean Rainfall	cm/yr	128.59	128.59	128.59										128.6
Mean ET	cm/yr	133.76	133.76	133.76										133.8
Cell Inflow Volume	hm3/yr	218.8	221.7	222.1										218.8
Cell Inflow Load	kg/yr	22948.8	18768.9	4844.3										22949
Cell Inflow Conc	ppb	105	85	22										104.9
Treated Outflow Volume	hm3/yr	221.7	222.1	222.7										222.7
Treated Outflow Load	kg/yr	18768.9	4844.3	2461.1										2461
Treated FWM Outflow Conc	ppb	85	22	11										11.1
Upper Confidence Limit	ppb	88.8	27.0	13.9										13.9
Lower Confidence Limit	ppb	79.7	17.5	9.1										9.1
Total Outflow Volume + Bypass	hm3/yr	221.7	222.1	222.7										222.7
Total Outflow Load + Bypass	kg/yr	18768.9	4844.3	2461.1										2461.1
Total FWM Outflow Conc	ppb	84.6	21.8	11.1										11.1
Bypass Load	kg/yr	0	0	0										0.0
Bypass Load	%	0%	0%	0%										0.0
Maximum Inflow	hm3/d	1.00	1.01	1.03										1.00
Maximum Outflow	hm3/d	1.01	1.03	1.04										1.04
Surface Load Reduction	kg/yr	4203	13925	2383										20488
Load Trapped in Sediments	kg/yr	4475	14406	2711										21592
Overall Load Reduction	%	18%	74%	49%										89%
Lower Confidence Limit	%	0.1	0.7	0.5										87%
Upper Confidence Limit	%	0.2	0.8	0.5										91%
Daily Geometric Mean	ppb	79.0	16.5	7.3										#N/A
Outflow Geo Mean - Composites	ppb	84.0	20.8	10.6										10.6
Upper Confidence Limit	ppb	88.3	26.0	13.3										13.3
Lower Confidence Limit	ppb	78.8	16.6	8.7										8.7
Frequency Outflow Conc > 10 ppb	%	100%	100%	64%										64%
Frequency Outflow Conc > 20 ppb	%	100%	64%	0%										0%
Frequency Outflow Conc > 50 ppb	%	100%	0%	0%										0%
Freq Outflow Volume > 10 ppb	%	100%	99%	57%										57%
95th Percentile Outflow Conc	ppb	88.11	26.51	13.19										13
Mean Biomass P Storage	mg/m2	3227	1247	351										1320
Storage Increase / Net Removal	%	0%	0%	0%										0%
Net Storage Turnover Rate	1/yr	11.2	35.1	35.1										24.3
Unit Area P Load	mg/m2-yr	5276	1628	629										973
Unit Area P Removal	mg/m2-yr	1029	1249	352										916
Mean Water Load	cm/d	13.8	5.3	7.9										2.5
Max Water Load	cm/d	22.9	8.8	13.3										4.2
Mean Depth	cm	49	53	64										56
Minimum Depth	cm	39.7	47.3	55.0										48
Maximum Depth	cm	56.2	62.1	74.9										65
Frequency Depth < 10 cm	%	0%	0%	0%										0.0%
Flow/Width	m2/day	92	121	243										155.8
HRT Days	days	3.6	10.1	8.0										22.0
Mean Velocity	cm/sec	0.22	0.26	0.44										0.31
Seepage Outflow / Total Outflow	%	0%	0%	0%										0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
95th Percentile Outflow Volume	hm3/d	0.9	0.9	0.9										0.9
95th Percentile Outflow Load	kg/d	75.2	21.7	11.4										11.4
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A										#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A										#N/A
Range Check - Mean Depth	-		0.86											1
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-		0.75											1
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-			0.74										1
Water Balance Error	%	0.00%	0.00%	0.00%										0.00%
Mass Balance Error	%	0.05%	0.01%	0.02%										0.07%
Warning or Error Messages														3

Warning or Error Messages:
Cell# 2 Depth out of calib. range for SAV_3: 53 vs. 62 - 87 cm
Cell# 2 Flow/Width out of calib. range for SAV_3: 121 vs. 162 - 374 m2/day
Cell# 3 Outflow Conc out of calib. range for SAV_3: 11 vs. 15 - 153 ppb

Compartment B South Build-out

DMSTA2- Inputs & Outputs Project: **COMP B EIS**

Model Release: 07/05/07
Current Date: 10/14/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	SBO EIS Alt1	Analysis for WY 1966-2000
Input Series Name		TS_SBO_EIS_A	Receives inflow from S-7/S-2 Basin
Starting Date for Simulation	-	05/01/65	
Ending Date for Simulation	-	04/30/00	
Starting Date for Output	-	05/01/65	
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	12.3	14.6	10.6
GM Outflow C (ppb)	11.0	13.0	9.5
Load Reduction %	85%	83%	87%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	3	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	SBO1	SBO2										
Vegetation Type	-->	EMG_3	SAV_3										
Inflow Fraction	-	1											
Downstream Cell Number	-	2											
Surface Area	km2	5.98	5.34										
Mean Width of Flow Path	km	2.00	1.50										
Number of Tanks in Series	-	3.0	3.0										
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1										
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4										
Outflow Coefficient - Intercept	-	1	1										
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.0133	0.0164										
Inflow Seepage Control Elev	cm	53	63										
Inflow Seepage Conc	ppb	75	15										
Outflow Seepage Rate	(cm/d) / cm												
Outflow Seepage Control Elev	cm												
Max Outflow Seepage Conc	ppb												
Seepage Recycle to Cell Number	-												
Seepage Recycle Fraction	-												
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30										
Initial P Storage Per Unit Area	mg/m2	500	500										
Initial Water Column Depth	cm	200	200										
C0 = Conc at 0 g/m2 P Storage	ppb	3	3										
C1 = Conc at 1 g/m2 P storage	ppb	22	22										
C2 = Conc at Half-Max Uptake	ppb	300	300										
K = Net Settling Rate at Steady State	m/yr	16.8	52.5										
Z1 = Saturated Uptake Depth	cm	40	40										
Z2 = Lower Penalty Depth	cm	100	100										
Z3 = Upper Penalty Depth	cm	200	200										

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	3.83	4.54											4.54
Run Date	-	10/14/07	10/14/07											10/14/07
Starting Date for Simulation	-	05/01/65	05/01/65											05/01/65
Starting Date for Output	-	05/01/65	05/01/65											05/01/65
Ending Date	-	04/30/00	04/30/00											04/30/00
Output Duration	days	12784	12784											12784
Cell Label		SBO1	SBO2											Total
Downstream Cell Label		SBO2	Outflow											-
Network Simulation Name	-	none	none											none
Simulation Type	-	Uncerta	Uncerta											Uncerta
Surface Area	km2	5.98	5.34											11.32
Mean Rainfall	cm/yr	128.59	128.59											128.6
Mean ET	cm/yr	133.76	133.76											133.8
Cell Inflow Volume	hm3/yr	58.8	61.5											58.8
Cell Inflow Load	kg/yr	5557.2	2543.9											5557
Cell Inflow Conc	ppb	94	41											94.5
Treated Outflow Volume	hm3/yr	61.5	65.8											65.8
Treated Outflow Load	kg/yr	2543.9	810.8											811
Treated FWM Outflow Conc	ppb	41	12											12.3
Upper Confidence Limit	ppb	48.2	14.6											14.6
Lower Confidence Limit	ppb	34.9	10.6											10.6
Total Outflow Volume + Bypass	hm3/yr	61.5	65.8											65.8
Total Outflow Load + Bypass	kg/yr	2543.9	810.8											810.8
Total FWM Outflow Conc	ppb	41.4	12.3											12.3
Bypass Load	kg/yr	0	0											0.0
Bypass Load	%	0%	0%											0.0
Maximum Inflow	hm3/d	0.41	0.42											0.41
Maximum Outflow	hm3/d	0.42	0.43											0.43
Surface Load Reduction	kg/yr	3013	1733											4746
Load Trapped in Sediments	kg/yr	3430	1978											5407
Overall Load Reduction	%	54%	68%											85%
Lower Confidence Limit	%	0.5	0.7											83%
Upper Confidence Limit	%	0.6	0.7											87%
Daily Geometric Mean	ppb	32.1	6.1											#N/A
Outflow Geo Mean - Composites	ppb	39.1	11.0											11.0
Upper Confidence Limit	ppb	46.0	13.0											13.0
Lower Confidence Limit	ppb	32.6	9.5											9.5
Frequency Outflow Conc > 10 ppb	%	100%	69%											69%
Frequency Outflow Conc > 20 ppb	%	100%	0%											3%
Frequency Outflow Conc > 50 ppb	%	0%	0%											0%
Freq Outflow Volume > 10 ppb	%	100%	62%											62%
95th Percentile Outflow Conc	ppb	48.11	14.66											15
Mean Biomass P Storage	mg/m2	1803	371											1127
Storage Increase / Net Removal	%	0%	0%											0%
Net Storage Turnover Rate	1/yr	11.1	35.0											14.8
Unit Area P Load	mg/m2-yr	929	476											491
Unit Area P Removal	mg/m2-yr	573	370											478
Mean Water Load	cm/d	2.7	3.2											1.4
Max Water Load	cm/d	6.9	7.9											3.6
Mean Depth	cm	47	52											49
Minimum Depth	cm	39.0	41.5											40
Maximum Depth	cm	61.2	67.6											64
Frequency Depth < 10 cm	%	0%	0%											0.0%
Flow/Width	m2/day	81	112											95.5
HRT Days	days	17.6	16.5											34.8
Mean Velocity	cm/sec	0.20	0.25											0.22
Seepage Outflow / Total Outflow	%	0%	0%											0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00											0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00											0.0
95th Percentile Outflow Volume	hm3/d	0.3	0.4											0.4
95th Percentile Outflow Load	kg/d	14.3	5.2											5.2
Simulated / Specified Mean Depth	%	#N/A	#N/A											#N/A
Release 1 Demand Met	%	#N/A	#N/A											#N/A
Release 2 Demand Met	%	#N/A	#N/A											#N/A
Outflow Demand Met	%	#N/A	#N/A											#N/A
Range Check - Mean Depth	-		0.84											1
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-		0.69											1
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-		0.83											1
Water Balance Error	%	0.00%	0.00%											0.00%
Mass Balance Error	%	0.03%	0.01%											0.03%
Warning or Error Messages		Cell# 2 Depth out of calib. range for SAV_3: 52 vs. 62 - 87 cm Cell# 2 Flow/Width out of calib. range for SAV_3: 112 vs. 162 - 374 m2/day Cell# 2 Outflow Conc out of calib. range for SAV_3: 12 vs. 15 - 153 ppb												3

Compartment B North Build-out With STA-2 PLR of 1.3 g/m2/yr

DMSTA2- Inputs & Outputs **Project: COMP B EIS** Model Release: 07/05/07 Current Date: 10/15/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	BO EIS Alt1 1	Analysis for WY 1966-2000
Input Series Name		TS_NBO_EIS_Alt1	Receives re-directed inflow from STA-2 up to 1,000 cfs
Starting Date for Simulation	-	05/01/65	
Ending Date for Simulation	-	04/30/00	
Starting Date for Output	-	05/01/65	

Input Variable	Units	Value								
Integration Steps Per Day	-	4	Simulation Type:	Uncertainty Analysis						
Number of Iterations	-	0	Output Variable	Mean	Lower CL	Upper CL		Diagnostics		
Output Averaging Interval	days	365	FWM Outflow C (ppb)	9.3	10.9	8.1		H20 Balance Error Mean & Max	0.0%	0.0%
Inflow Conc Scale Factor	-	1	GM Outflow C (ppb)	8.7	10.1	7.6		Mass Balance Error Mean & Max	0.1%	0.0%
Rainfall P Conc	ppb	10	Load Reduction %	91%	89%	92%		Iterations & Convergence	3	0.0%
Atmospheric P Load (Dry)	mg/m2-yr	20	Bypass Load (%)	0.0%				Warning/Error Messages	4	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	NBO1	NBO2	Cell 4									
Vegetation Type	-->	EMG_3	SAV_3	SAV_3									
Inflow Fraction	-	1											
Downstream Cell Number	-	2	3										
Surface Area	km2	4.35	11.53	7.70									
Mean Width of Flow Path	km	6.50	5.00	2.50									
Number of Tanks in Series	-	3.0	3.0	3.0									
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	42.7									
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4									
Outflow Coefficient - Intercept	-	1	1	1									
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm	0.033	0.0124	0.0064									
Inflow Seepage Control Elev	cm	48	48	60									
Inflow Seepage Conc	ppb	75	75	75									
Outflow Seepage Rate	(cm/d) / cm	0.0045	0.0017										
Outflow Seepage Control Elev	cm	42	42										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	1										
Seepage Recycle Fraction	-	0.75	0.75										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30									
Initial P Storage Per Unit Area	mg/m2	500	500	500									
Initial Water Column Depth	cm	200	200	200									
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3									
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22									
C2 = Conc at Half-Max Uptake	ppb	300	300	300									
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	52.5									
Z1 = Saturated Uptake Depth	cm	40	40	40									
Z2 = Lower Penalty Depth	cm	100	100	100									
Z3 = Upper Penalty Depth	cm	200	200	200									

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	5.31	6.00	6.71										6.71
Run Date	-	10/15/07	10/15/07	10/15/07										10/15/07
Starting Date for Simulation	-	05/01/65	05/01/65	05/01/65										05/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65										05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00										04/30/00
Output Duration	days	12784	12784	12784										12784
Cell Label		NBO1	NBO2	Cell 4										Total
Downstream Cell Label		NBO2	Cell 4	Outflow										-
Network Simulation Name	-	none	none	none										none
Simulation Type	-	Uncerta	Uncerta	Uncerta										Uncerta
Surface Area	km2	4.35	11.53	7.70										23.58
Mean Rainfall	cm/yr	128.59	128.59	128.59										128.6
Mean ET	cm/yr	133.76	133.76	133.76										133.8
Cell Inflow Volume	hm3/yr	147.7	151.1	152.3										147.7
Cell Inflow Load	kg/yr	15252.8	11490.9	2522.9										15253
Cell Inflow Conc	ppb	103	76	17										103.3
Treated Outflow Volume	hm3/yr	151.1	152.3	153.4										153.4
Treated Outflow Load	kg/yr	11490.9	2522.9	1419.8										1420
Treated FWM Outflow Conc	ppb	76	17	9										9.3
Upper Confidence Limit	ppb	81.2	20.1	10.9										10.9
Lower Confidence Limit	ppb	70.1	13.8	8.1										8.1
Total Outflow Volume + Bypass	hm3/yr	151.1	152.3	153.4										153.4
Total Outflow Load + Bypass	kg/yr	11490.9	2522.9	1419.8										1419.8
Total FWM Outflow Conc	ppb	76.1	16.6	9.3										9.3
Bypass Load	kg/yr	0	0	0										0.0
Bypass Load	%	0%	0%	0%										0.0
Maximum Inflow	hm3/d	0.82	0.84	0.85										0.82
Maximum Outflow	hm3/d	0.84	0.85	0.86										0.86
Surface Load Reduction	kg/yr	3777	8968	1103										13833
Load Trapped in Sediments	kg/yr	4118	9514	1466										15099
Overall Load Reduction	%	25%	78%	44%										91%
Lower Confidence Limit	%	0.2	0.8	0.5										89%
Upper Confidence Limit	%	0.3	0.8	0.4										92%
Daily Geometric Mean	ppb	68.0	10.0	5.3										#N/A
Outflow Geo Mean - Composites	ppb	74.8	15.3	8.7										8.7
Upper Confidence Limit	ppb	80.3	18.6	10.1										10.1
Lower Confidence Limit	ppb	68.5	12.8	7.6										7.6
Frequency Outflow Conc > 10 ppb	%	100%	97%	22%										22%
Frequency Outflow Conc > 20 ppb	%	100%	8%	0%										0%
Frequency Outflow Conc > 50 ppb	%	100%	0%	0%										0%
Freq Outflow Volume > 10 ppb	%	100%	82%	40%										40%
95th Percentile Outflow Conc	ppb	81.41	20.30	11.51										12
Mean Biomass P Storage	mg/m2	2971	825	190										1013
Storage Increase / Net Removal	%	0%	0%	0%										0%
Net Storage Turnover Rate	1/yr	11.2	35.0	35.1										22.1
Unit Area P Load	mg/m2-yr	3506	997	328										647
Unit Area P Removal	mg/m2-yr	947	825	190										640
Mean Water Load	cm/d	9.3	3.6	5.4										1.7
Max Water Load	cm/d	18.9	7.3	11.0										3.5
Mean Depth	cm	46	49	58										51
Minimum Depth	cm	38.4	44.1	50.4										45
Maximum Depth	cm	53.2	58.5	70.6										61
Frequency Depth < 10 cm	%	0%	0%	0%										0.0%
Flow/Width	m2/day	62	83	167										106.4
HRT Days	days	4.9	13.6	10.7										29.9
Mean Velocity	cm/sec	0.16	0.20	0.33										0.23
Seepage Outflow / Total Outflow	%	0%	0%	0%										0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00										0.0
95th Percentile Outflow Volume	hm3/d	0.7	0.7	0.7										0.7
95th Percentile Outflow Load	kg/d	54.8	14.0	8.0										8.0
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A										#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A										#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A										#N/A
Range Check - Mean Depth	-		0.79	0.93										2
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-		0.51											1
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-			0.62										1
Water Balance Error	%	0.00%	0.00%	0.00%										0.00%
Mass Balance Error	%	0.05%	0.02%	0.03%										0.06%
Warning or Error Messages		Cell# 2 Depth out of calib. range for SAV_3: 49 vs. 62 - 87 cm												4
		Cell# 2 Flow/Width out of calib. range for SAV_3: 83 vs. 162 - 374 m2/day												
		Cell# 3 Depth out of calib. range for SAV_3: 58 vs. 62 - 87 cm												
		Cell# 3 Outflow Conc out of calib. range for SAV_3: 9 vs. 15 - 153 ppb												

EAASR With Lake Okeechobee TP=100 ppb

DMSTA2- Inputs & Outputs — **Project: PROJECT_EAASR_STA34_NETWORK_EIS** — Model Release: 07/05/07 — Current Date: 10/16/2007

Input Variable	Units	Value
Design Case Name	-	A1
Input Series Name		TS_A1
Starting Date for Simulation	-	01/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	1
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description:
Compartment A-1
15,200 acres (from A8)
Inflow volumes, outflow volumes, and depths from SFWMM simulation
Reservoir settling rate = 5.0 m/yr (Goforth 2006)
Lake Okeechobee deliveries at 100 ppb

Simulation Type:

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	84.5	#N/A	#N/A
GM Outflow C (ppb)	93.1	#N/A	#N/A
Load Reduction %	18%	#N/A	#N/A
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.5%
Warning/Error Messages	0	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1											
Vegetation Type	-->	none											
Inflow Fraction	-	1											
Downstream Cell Number	-												
Surface Area	km2	61.54											
Mean Width of Flow Pa	km	6.70											
Number of Tanks in Series	-	1.0											
Minimum Depth for Releases	cm	15											
Release 1 Series Name		IRRIG											
Release 2 Series Name													
Outflow Series Name		TO_STA											
Depth Series Name		A1_DEPTH											
Outflow Control Depth	cm												
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	1.5											
Outflow Coefficient - Intercept	-	8											
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day	9.05233											
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.00081											
Outflow Seepage Control Elev	cm	6											
Max Outflow Seepage Conc	ppb	100											
Seepage Recycle to Cell Number	-	1											
Seepage Recycle Fraction	-	0.75											
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	105											
Initial P Storage Per Unit Area	mg/m2	525											
Initial Water Column Depth	cm	150											
C0 = Conc at 0 g/m2 P Storage	ppb	3											
C1 = Conc at 1 g/m2 P storage	ppb	150											
C2 = Conc at Half-Max Uptake	ppb												
K = Net Settling Rate at Steady State	m/yr	5.0											
Z1 = Saturated Uptake Depth	cm	40											
Z2 = Lower Penalty Depth	cm	100											
Z3 = Upper Penalty Depth	cm	400											

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	1.53												1.53
Run Date	-	10/16/07												10/16/07
Starting Date for Simulation	-	01/01/65												01/01/65
Starting Date for Output	-	05/01/65												05/01/65
Ending Date	-	04/30/00												04/30/00
Output Duration	days	12784												12784
Cell Label		1												Total
Downstream Cell Label		Outflow												-
Network Simulation Name	-	EAASR_NET												EAASR_NET
Simulation Type	-	Base												Base
Surface Area	km2	61.54												61.54
Mean Rainfall	cm/yr	130.73												130.7
Mean ET	cm/yr	125.71												125.7
Cell Inflow Volume	hm3/yr	666.6		540417.2										666.6
Cell Inflow Load	kg/yr	63931.8												63932
Cell Inflow Conc	ppb	96												95.9
Treated Outflow Volume	hm3/yr	470.5		381414.6										470.5
Treated Outflow Load	kg/yr	39773.0												39773
Treated FWM Outflow Conc	ppb	85												84.5
Upper Confidence Limit	ppb	#N/A												#N/A
Lower Confidence Limit	ppb	#N/A												#N/A
Total Outflow Volume + Bypass	hm3/yr	656.9												656.9
Total Outflow Load + Bypass	kg/yr	52742.5												52742.5
Total FWM Outflow Conc	ppb	80.3												80.3
Bypass Load	kg/yr	0												0.0
Bypass Load	%	0%												0.0
Maximum Inflow	hm3/d	14.75												14.75
Maximum Outflow	hm3/d	10.09												10.09
Surface Load Reduction	kg/yr	25998												24159
Load Trapped in Sediments	kg/yr	12095												12095
Overall Load Reduction	%	18%												18%
Lower Confidence Limit	%	#N/A												#N/A
Upper Confidence Limit	%	#N/A												#N/A
Daily Geometric Mean	ppb	68.2												#N/A
Outflow Geo Mean - Composites	ppb	93.1												93.1
Upper Confidence Limit	ppb	#N/A												#N/A
Lower Confidence Limit	ppb	#N/A												#N/A
Frequency Outflow Conc > 10 ppb	%	100%												100%
Frequency Outflow Conc > 20 ppb	%	100%												100%
Frequency Outflow Conc > 50 ppb	%	92%												100%
Freq Outflow Volume > 10 ppb	%	72%												72%
95th Percentile Outflow Conc	ppb	683.91												684
Mean Biomass P Storage	mg/m2	406												406
Storage Increase / Net Removal	%	2%												2%
Net Storage Turnover Rate	1/yr	16.9												16.9
Unit Area P Load	mg/m2-yr	1039												1039
Unit Area P Removal	mg/m2-yr	197												197
Mean Water Load	cm/d	3.0												3.0
Max Water Load	cm/d	24.0												24.0
Mean Depth	cm	198												198
Minimum Depth	cm	1.0												1
Maximum Depth	cm	387.2												387
Frequency Depth < 10 cm	%	12%												12.1%
Flow/Width	m2/day	272												272.4
HRT Days	days	66.7												66.7
Mean Velocity	cm/sec	0.16												0.16
Seepage Outflow / Total Outflow	%	1%												2%
Release 1 Outflow Volume	hm3/yr	186.46												186.5
Release 2 Outflow Volume	hm3/yr	0.00												0.0
95th Percentile Outflow Volume	hm3/d	9.1												9.1
95th Percentile Outflow Load	kg/d	746.8												746.8
Simulated / Specified Mean Depth	%	100%												1.0
Release 1 Demand Met	%	90%												0.9
Release 2 Demand Met	%	#N/A												#N/A
Outflow Demand Met	%	105%												1.0
Range Check - Mean Depth	-													0
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-													0
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%												0.00%
Mass Balance Error	%	0.01%												0.01%
Warning or Error Messages														0

EAASR With Lake Okeechobee TP=150 ppb

DMSTA2- Inputs & Outputs Project: PROJECT_EAASR_STA34_NETWORK_EIS Model Release: 07/05/07 Current Date: 10/16/2007

Input Variable	Units	Value
Design Case Name	-	A1 150
Input Series Name		TS_A1_150
Starting Date for Simulation	-	01/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description:
Compartment A-1
15,200 acres (from A8)
Inflow volumes, outflow volumes, and depths from SFWMM simulation
Reservoir settling rate = 5.0 m/yr (Goforth 2006)
Lake inflow = 150 ppb

Simulation Type:

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	112.3	#N/A	#N/A
GM Outflow C (ppb)	114.7	#N/A	#N/A
Load Reduction %	17%	#N/A	#N/A
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.8%
Warning/Error Messages	0	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1											
Vegetation Type	-->	none											
Inflow Fraction	-	1											
Downstream Cell Number	-												
Surface Area	km2	61.54											
Mean Width of Flow Pa	km	6.70											
Number of Tanks in Series	-	1.0											
Minimum Depth for Releases	cm	15											
Release 1 Series Name		IRRIG											
Release 2 Series Name													
Outflow Series Name		TO_STA											
Depth Series Name		A1_DEPTH											
Outflow Control Depth	cm												
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	1.5											
Outflow Coefficient - Intercept	-	8											
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day	9.05233											
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.00081											
Outflow Seepage Control Elev	cm	6											
Max Outflow Seepage Conc	ppb	100											
Seepage Recycle to Cell Number	-	1											
Seepage Recycle Fraction	-	0.75											
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	105											
Initial P Storage Per Unit Area	mg/m2	525											
Initial Water Column Depth	cm	150											
C0 = Conc at 0 g/m2 P Storage	ppb	3											
C1 = Conc at 1 g/m2 P storage	ppb	150											
C2 = Conc at Half-Max Uptake	ppb												
K = Net Settling Rate at Steady State	m/yr	5.0											
Z1 = Saturated Uptake Depth	cm	40											
Z2 = Lower Penalty Depth	cm	100											
Z3 = Upper Penalty Depth	cm	400											

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	1.56												1.56
Run Date	-	10/16/07												10/16/07
Starting Date for Simulation	-	01/01/65												01/01/65
Starting Date for Output	-	05/01/65												05/01/65
Ending Date	-	04/30/00												04/30/00
Output Duration	days	12784												12784
Cell Label		1												Total
Downstream Cell Label		Outflow												-
Network Simulation Name	-	AASR_NET 150												EAASR_NET 1
Simulation Type	-	Base												Base
Surface Area	km2	61.54												61.54
Mean Rainfall	cm/yr	130.73												130.7
Mean ET	cm/yr	125.71												125.7
Cell Inflow Volume	hm3/yr	666.6												666.6
Cell Inflow Load	kg/yr	83883.4												83883
Cell Inflow Conc	ppb	126												125.8
Treated Outflow Volume	hm3/yr	470.5												470.5
Treated Outflow Load	kg/yr	52848.7												52849
Treated FWM Outflow Conc	ppb	112												112.3
Upper Confidence Limit	ppb	#N/A												#N/A
Lower Confidence Limit	ppb	#N/A												#N/A
Total Outflow Volume + Bypass	hm3/yr	656.9												656.9
Total Outflow Load + Bypass	kg/yr	69304.8												69304.8
Total FWM Outflow Conc	ppb	105.5												105.5
Bypass Load	kg/yr	0												0.0
Bypass Load	%	0%												0.0
Maximum Inflow	hm3/d	14.75												14.75
Maximum Outflow	hm3/d	10.09												10.09
Surface Load Reduction	kg/yr	33175												31035
Load Trapped in Sediments	kg/yr	14901												14901
Overall Load Reduction	%	17%												17%
Lower Confidence Limit	%	#N/A												#N/A
Upper Confidence Limit	%	#N/A												#N/A
Daily Geometric Mean	ppb	81.8												#N/A
Outflow Geo Mean - Composites	ppb	114.7												114.7
Upper Confidence Limit	ppb	#N/A												#N/A
Lower Confidence Limit	ppb	#N/A												#N/A
Frequency Outflow Conc > 10 ppb	%	100%												100%
Frequency Outflow Conc > 20 ppb	%	100%												100%
Frequency Outflow Conc > 50 ppb	%	93%												100%
Freq Outflow Volume > 10 ppb	%	72%												72%
95th Percentile Outflow Conc	ppb	806.27												806
Mean Biomass P Storage	mg/m2	508												508
Storage Increase / Net Removal	%	3%												3%
Net Storage Turnover Rate	1/yr	16.7												16.7
Unit Area P Load	mg/m2-yr	1363												1363
Unit Area P Removal	mg/m2-yr	242												242
Mean Water Load	cm/d	3.0												3.0
Max Water Load	cm/d	24.0												24.0
Mean Depth	cm	198												198
Minimum Depth	cm	1.0												1
Maximum Depth	cm	387.2												387
Frequency Depth < 10 cm	%	12%												12.1%
Flow/Width	m2/day	272												272.4
HRT Days	days	66.7												66.7
Mean Velocity	cm/sec	0.16												0.16
Seepage Outflow / Total Outflow	%	1%												2%
Release 1 Outflow Volume	hm3/yr	186.46												186.5
Release 2 Outflow Volume	hm3/yr	0.00												0.0
95th Percentile Outflow Volume	hm3/d	9.1												9.1
95th Percentile Outflow Load	kg/d	1022.9												1022.9
Simulated / Specified Mean Depth	%	100%												1.0
Release 1 Demand Met	%	90%												0.9
Release 2 Demand Met	%	#N/A												#N/A
Outflow Demand Met	%	105%												1.0
Range Check - Mean Depth	-													0
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-													0
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%												0.00%
Mass Balance Error	%	0.01%												0.01%
Warning or Error Messages														0

STA-3/4 With Lake Okeechobee TP=100 ppb

DMSTA2- Inputs & Outputs — Project: PROJECT_EAASR_STA34_NETWORK_EIS — Model Release: 07/05/07 — Current Date: 10/29/2007

Input Variable	Units	Value	Case Description:
Design Case Name	-	STA34 ind	STA-3/4 stand alone
Input Series Name		TS_STA34_ind	Inflows distributed uniformly based on area
Starting Date for Simulation	-	01/01/65	Lake Okeechobee deliveries at 100 ppb
Ending Date for Simulation	-	04/30/00	PSTA Demo in Cell 2B modeled as SAV_3
Starting Date for Output	-	05/01/65	Used EAASR inflows from network simulation to run uncertainty analysis
Integration Steps Per Day	-	4	
Number of Iterations	-	0	
Output Averaging Interval	days	365	
Inflow Conc Scale Factor	-	1	
Rainfall P Conc	ppb	10	
Atmospheric P Load (Dry)	mg/m2-yr	20	

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	19.8	23.7	16.4
GM Outflow C (ppb)	16.2	19.5	13.6
Load Reduction %	77%	73%	81%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.2%
Warning/Error Messages	7	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B						
Vegetation Type	-->	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3						
Inflow Fraction	-	0.394547543		0.328598199		0.276854							
Downstream Cell Number	-	2		4		6							
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83						
Mean Width of Flow Path	km	3.42	4.50	2.89	4.02	4.88	4.88						
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0						
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	38.1	38.1	38.1						
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4						
Outflow Coefficient - Intercept	-	1	1	1	1	1	1						
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0058	0.0029	0.0014		0.0038							
Outflow Seepage Control Elev	cm	16	40	-67		-64							
Max Outflow Seepage Conc	ppb	20	20	20	20	20	20						
Seepage Recycle to Cell Number	-	1		3		5							
Seepage Recycle Fraction	-	0.5	0.5	0.5	0.5	0.5	0.5						
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	52	12	55	15	55	15						
Initial P Storage Per Unit Area	mg/m2	2400	615	2400	615	2400	615						
Initial Water Column Depth	cm	60	60	60	60	60	60						
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3						
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22						
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300						
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	16.8	52.5	16.8	52.5						
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40						
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100						
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200						

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	16.50	18.03	19.62	21.34	24.37	25.76							25.76
Run Date	-	10/29/07	10/29/07	10/29/07	10/29/07	10/29/07	10/29/07							10/29/07
Starting Date for Simulation	-	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65							01/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65							05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00							04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784							12784
Cell Label		1A	1B	2A	2B	3A	3B							Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow							-
Network Simulation Name	-	none	none	none	none	none	none							none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta							Uncerta
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83							66.98
Mean Rainfall	cm/yr	129.99	129.99	129.99	129.99	129.99	129.99							130.0
Mean ET	cm/yr	134.33	133.93	134.02	133.88	132.61	133.69							133.8
Cell Inflow Volume	hm3/yr	284.1	278.4	236.6	233.0	199.4	192.5							720.1
Cell Inflow Load	kg/yr	24219.9	15548.5	20171.5	12980.4	16995.1	10631.1							61387
Cell Inflow Conc	ppb	85	56	85	56	85	55							85.2
Treated Outflow Volume	hm3/yr	278.4	276.5	233.0	232.5	192.5	192.1							701.2
Treated Outflow Load	kg/yr	15548.5	5422.8	12980.4	4588.2	10631.1	3841.9							13853
Treated FWM Outflow Conc	ppb	56	20	56	20	55	20							19.8
Upper Confidence Limit	ppb	60.7	23.6	60.5	23.7	59.8	23.8							23.7
Lower Confidence Limit	ppb	50.5	16.3	50.5	16.4	50.3	16.7							16.4
Total Outflow Volume + Bypass	hm3/yr	278.4	276.5	233.0	232.5	192.5	192.1							701.2
Total Outflow Load + Bypass	kg/yr	15548.5	5422.8	12980.4	4588.2	10631.1	3841.9							13853.0
Total FWM Outflow Conc	ppb	55.9	19.6	55.7	19.7	55.2	20.0							19.8
Bypass Load	kg/yr	0	0	0	0	0	0							0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%							0.0
Maximum Inflow	hm3/d	1.83	1.81	1.52	1.52	1.28	1.27							4.63
Maximum Outflow	hm3/d	1.81	1.81	1.52	1.52	1.27	1.27							4.61
Surface Load Reduction	kg/yr	8775	10148	7255	8392	6497	6789							47534
Load Trapped in Sediments	kg/yr	8503	10435	7034	8683	5612	7033							47301
Overall Load Reduction	%	36%	65%	36%	65%	37%	64%							77%
Lower Confidence Limit	%	0.3	0.6	0.3	0.6	0.3	0.6							73%
Upper Confidence Limit	%	0.4	0.7	0.4	0.7	0.4	0.7							81%
Daily Geometric Mean	ppb	47.5	11.2	47.3	11.3	47.5	11.2							#N/A
Outflow Geo Mean - Composites	ppb	50.6	16.0	50.4	16.1	50.0	16.7							16.2
Upper Confidence Limit	ppb	56.1	19.3	55.8	19.4	55.0	19.9							19.5
Lower Confidence Limit	ppb	44.8	13.4	44.7	13.5	44.7	14.1							13.6
Frequency Outflow Conc > 10 ppb	%	100%	92%	100%	92%	100%	94%							92%
Frequency Outflow Conc > 20 ppb	%	100%	31%	100%	31%	100%	33%							56%
Frequency Outflow Conc > 50 ppb	%	64%	0%	64%	0%	61%	0%							31%
Freq Outflow Volume > 10 ppb	%	100%	89%	100%	90%	100%	91%							90%
95th Percentile Outflow Conc	ppb	65.56	24.59	65.64	24.76	65.54	24.52							25
Mean Biomass P Storage	mg/m2	2181	751	2158	753	2035	728							1394
Storage Increase / Net Removal	%	1%	1%	1%	1%	1%	1%							1%
Net Storage Turnover Rate	1/yr	11.1	34.4	11.1	34.4	11.1	34.4							17.7
Unit Area P Load	mg/m2-yr	1969	1101	1960	1108	1950	1082							917
Unit Area P Removal	mg/m2-yr	691	739	684	741	644	716							706
Mean Water Load	cm/d	6.3	5.4	6.3	5.4	6.3	5.4							2.9
Max Water Load	cm/d	14.9	12.8	14.8	12.9	14.7	12.9							6.9
Mean Depth	cm	56	54	55	53	46	48							52
Minimum Depth	cm	37.9	33.8	37.2	33.1	30.8	30.4							34
Maximum Depth	cm	77.8	75.4	77.6	74.2	64.5	67.1							73
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%							0.0%
Flow/Width	m2/day	228	170	225	159	112	108							170.2
HRT Days	days	8.8	10.0	8.8	9.8	7.4	9.0							17.8
Mean Velocity	cm/sec	0.47	0.36	0.47	0.35	0.28	0.26							0.37
Seepage Outflow / Total Outflow	%	2%	0%	1%	0%	3%	0%							2%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
95th Percentile Outflow Volume	hm3/d	1.5	1.5	1.3	1.3	1.1	1.1							3.9
95th Percentile Outflow Load	kg/d	92.4	33.7	77.0	28.6	63.1	23.8							86.1
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Range Check - Mean Depth	-		0.87		0.86		0.78							3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.08		1.07	0.98		0.67							4
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%							0.00%
Mass Balance Error	%	0.03%	0.02%	0.02%	0.02%	-0.03%	0.03%							0.02%
Warning or Error Messages														7

Warning or Error Messages:
Cell# 1 Flow/Width out of calib. range for EMG_3: 228 vs. 26 - 210 m2/day
Cell# 2 Depth out of calib. range for SAV_3: 54 vs. 62 - 87 cm
Cell# 3 Flow/Width out of calib. range for EMG_3: 225 vs. 26 - 210 m2/day
Cell# 4 Depth out of calib. range for SAV_3: 53 vs. 62 - 87 cm
Cell# 4 Flow/Width out of calib. range for SAV_3: 159 vs. 162 - 374 m2/day
Cell# 6 Depth out of calib. range for SAV_3: 48 vs. 62 - 87 cm
Cell# 6 Flow/Width out of calib. range for SAV_3: 108 vs. 162 - 374 m2/day

STA-3/4 With Lake Okeechobee TP=150 ppb

DMSTA2- Inputs & Outputs | **Project: PROJECT_EAASR_STA34_NETWORK_EIS** | Model Release: 07/05/07 | Current Date: 10/29/2007

Input Variable	Units	Value
Design Case Name	-	STA34 ind 150
Input Series Name		TS_STA34_ind_1
Starting Date for Simulation	-	01/01/65
Ending Date for Simulation	-	04/30/00
Starting Date for Output	-	05/01/65
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description:
STA-3/4 stand alone
Inflows distributed uniformly based on area
Lake Okeechobee deliveries at 150 ppb
PSTA Demo in Cell 2B modeled as SAV_3
Used EAASR inflows from network simulation to run uncertainty analysis

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	22.9	27.8	18.7
GM Outflow C (ppb)	18.3	22.3	15.1
Load Reduction %	78%	73%	82%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	2	0.8%
Warning/Error Messages	7	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B						
Vegetation Type	-->	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3						
Inflow Fraction	-	0.394547543		0.328598199		0.276854							
Downstream Cell Number	-	2		4		6							
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83						
Mean Width of Flow Path	km	3.42	4.50	2.89	4.02	4.88	4.88						
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0						
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	38.1	38.1	38.1	38.1	38.1						
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4						
Outflow Coefficient - Intercept	-	1	1	1	1	1	1						
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0058	0.0029	0.0014		0.0038							
Outflow Seepage Control Elev	cm	16	40	-67		-64							
Max Outflow Seepage Conc	ppb	20	20	20	20	20	20						
Seepage Recycle to Cell Number	-	1		3		5							
Seepage Recycle Fraction	-	0.5	0.5	0.5	0.5	0.5	0.5						
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	52	12	55	15	55	15						
Initial P Storage Per Unit Area	mg/m2	2400	615	2400	615	2400	615						
Initial Water Column Depth	cm	60	60	60	60	60	60						
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3						
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22						
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300						
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	16.8	52.5	16.8	52.5						
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40						
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100						
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200						

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	20.89	22.67	24.31	26.41	28.48	30.23							30.23
Run Date	-	10/29/07	10/29/07	10/29/07	10/29/07	10/29/07	10/29/07							10/29/07
Starting Date for Simulation	-	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65	01/01/65							01/01/65
Starting Date for Output	-	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65	05/01/65							05/01/65
Ending Date	-	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00	04/30/00							04/30/00
Output Duration	days	12784	12784	12784	12784	12784	12784							12784
Cell Label		1A	1B	2A	2B	3A	3B							Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow							-
Network Simulation Name	-	none	none	none	none	none	none							none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta							Uncerta
Surface Area	km2	12.30	14.12	10.29	11.72	8.72	9.83							66.98
Mean Rainfall	cm/yr	129.99	129.99	129.99	129.99	129.99	129.99							130.0
Mean ET	cm/yr	134.33	133.93	134.02	133.88	132.61	133.69							133.8
Cell Inflow Volume	hm3/yr	284.1	278.4	236.6	233.0	199.4	192.5							720.1
Cell Inflow Load	kg/yr	28982.0	18813.0	24137.6	15696.9	20336.7	12815.5							73456
Cell Inflow Conc	ppb	102	68	102	67	102	67							102.0
Treated Outflow Volume	hm3/yr	278.4	276.5	233.0	232.5	192.5	192.1						568440.6	701.2
Treated Outflow Load	kg/yr	18813.0	6294.7	15696.9	5324.9	12815.5	4436.6							16056
Treated FWM Outflow Conc	ppb	68	23	67	23	67	23							22.9
Upper Confidence Limit	ppb	73.4	27.7	73.1	27.9	72.0	27.9							27.8
Lower Confidence Limit	ppb	61.2	18.6	61.0	18.7	60.6	19.0							18.7
Total Outflow Volume + Bypass	hm3/yr	278.4	276.5	233.0	232.5	192.5	192.1							701.2
Total Outflow Load + Bypass	kg/yr	18813.0	6294.7	15696.9	5324.9	12815.5	4436.6							16056.2
Total FWM Outflow Conc	ppb	67.6	22.8	67.4	22.9	66.6	23.1							22.9
Bypass Load	kg/yr	0	0	0	0	0	0							0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%							0.0
Maximum Inflow	hm3/d	1.83	1.81	1.52	1.52	1.28	1.27							4.63
Maximum Outflow	hm3/d	1.81	1.81	1.52	1.52	1.27	1.27							4.61
Surface Load Reduction	kg/yr	10273	12541	8505	10372	7654	8379							57400
Load Trapped in Sediments	kg/yr	9857	12785	8141	10636	6478	8601							56498
Overall Load Reduction	%	35%	67%	35%	66%	37%	65%							78%
Lower Confidence Limit	%	0.3	0.6	0.3	0.6	0.3	0.6							73%
Upper Confidence Limit	%	0.4	0.7	0.4	0.7	0.4	0.7							82%
Daily Geometric Mean	ppb	57.0	13.0	56.5	13.1	56.3	13.0							#N/A
Outflow Geo Mean - Composites	ppb	59.4	18.1	59.1	18.2	58.0	18.7							18.3
Upper Confidence Limit	ppb	65.9	22.1	65.4	22.2	63.8	22.6							22.3
Lower Confidence Limit	ppb	52.4	14.8	52.2	14.9	51.8	15.6							15.1
Frequency Outflow Conc > 10 ppb	%	100%	92%	100%	92%	100%	94%							92%
Frequency Outflow Conc > 20 ppb	%	100%	44%	100%	47%	100%	47%							64%
Frequency Outflow Conc > 50 ppb	%	72%	0%	69%	0%	67%	0%							47%
Freq Outflow Volume > 10 ppb	%	100%	91%	100%	92%	100%	92%							92%
95th Percentile Outflow Conc	ppb	85.51	30.26	85.65	30.43	85.17	30.32							30
Mean Biomass P Storage	mg/m2	2531	922	2501	924	2352	892							1642
Storage Increase / Net Removal	%	1%	1%	1%	1%	1%	1%							1%
Net Storage Turnover Rate	1/yr	11.1	34.4	11.1	34.4	11.1	34.4							18.0
Unit Area P Load	mg/m2-yr	2356	1332	2345	1340	2333	1304							1097
Unit Area P Removal	mg/m2-yr	801	905	791	908	743	875							844
Mean Water Load	cm/d	6.3	5.4	6.3	5.4	6.3	5.4							2.9
Max Water Load	cm/d	14.9	12.8	14.8	12.9	14.7	12.9							6.9
Mean Depth	cm	56	54	55	53	46	48							52
Minimum Depth	cm	37.9	33.8	37.2	33.1	30.8	30.4							34
Maximum Depth	cm	77.8	75.4	77.6	74.2	64.5	67.1							73
Frequency Depth < 10 cm	%	0%	0%	0%	0%	0%	0%							0.0%
Flow/Width	m2/day	228	170	225	159	112	108							170.2
HRT Days	days	8.8	10.0	8.8	9.8	7.4	9.0							17.8
Mean Velocity	cm/sec	0.47	0.36	0.47	0.35	0.28	0.26							0.37
Seepage Outflow / Total Outflow	%	2%	0%	1%	0%	3%	0%							2%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00							0.0
95th Percentile Outflow Volume	hm3/d	1.5	1.5	1.3	1.3	1.1	1.1							3.9
95th Percentile Outflow Load	kg/d	117.3	40.5	97.6	34.5	80.1	28.4							103.4
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A							#N/A
Range Check - Mean Depth	-		0.87		0.86		0.78							3
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	1.08		1.07	0.98		0.67							4
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%							0.00%
Mass Balance Error	%	0.03%	0.02%	0.03%	0.02%	-0.03%	0.03%							0.02%
Warning or Error Messages														7

Warning or Error Messages:
Cell# 1 Flow/Width out of calib. range for EMG_3: 228 vs. 26 - 210 m2/day
Cell# 2 Depth out of calib. range for SAV_3: 54 vs. 62 - 87 cm
Cell# 3 Flow/Width out of calib. range for EMG_3: 225 vs. 26 - 210 m2/day
Cell# 4 Depth out of calib. range for SAV_3: 53 vs. 62 - 87 cm
Cell# 4 Flow/Width out of calib. range for SAV_3: 159 vs. 162 - 374 m2/day
Cell# 6 Depth out of calib. range for SAV_3: 48 vs. 62 - 87 cm
Cell# 6 Flow/Width out of calib. range for SAV_3: 108 vs. 162 - 374 m2/day

STA-5 With Emergent Vegetation in All Cells

DMSTA2- Inputs & Outputs Project: STA 5 EIS Model Release: 07/05/07

Current Date: 10/19/2007

Input Variable	Units	Value
Design Case Name	-	EIS Alt1 EMG
Input Series Name		TS_EIS_Alt1
Starting Date for Simulation	-	05/01/94
Ending Date for Simulation	-	04/30/07
Starting Date for Output	-	05/01/94
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description:

STA-5 Expanded to Include Full Build-out of Compartment C
Downstream cells considered as EMG_3; Inflows are C-139 Basin

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	32.0	46.5	21.7
GM Outflow C (ppb)	30.2	44.3	20.2
Load Reduction %	86%	80%	91%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.1%
Warning/Error Messages	0	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B		
Vegetation Type	-->	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3	EMG_3		
Inflow Fraction	-	0.190896424		0.1908964		0.1843939		0.1922898		0.2415235			
Downstream Cell Number	-	2		4		6		8		10			
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79		
Mean Width of Flow Path	km	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	2.34	2.34		
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96		
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4	4	4		
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1	1	1		
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0075	0.0075										
Outflow Seepage Control Elev	cm	-46	-38										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	2										
Seepage Recycle Fraction	-	1	1										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30	30	30		
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500	500	500		
Initial Water Column Depth	cm	200	200	200	200	200	200	200	200	200	200		
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3	3	3		
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22	22	22		
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300	300	300		
K = Net Settling Rate at Steady State	m/yr	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.8		
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40	40	40		
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100	100	100		
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200	200	200		

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	19.62	20.46	21.31	22.16	22.92	23.77	24.62	25.46	26.31	27.16			27.16
Run Date	-	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07			10/18/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07			04/30/07
Output Duration	days	4748	4748	4748	4748	4748	4748	4748	4748	4748	4748			4748
Cell Label		1A	1B	2A	2B	3A	3B	4A	4B	5A	5B			Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow	4B	Outflow	5B	Outflow			-
Network Simulation Name	-	none	none	none	none	none	none	none	none	none	none			none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta			Uncerta
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79			43.58
Mean Rainfall	cm/yr	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21			127.2
Mean ET	cm/yr	131.28	131.30	131.23	131.30	131.23	131.30	130.99	131.30	131.02	131.30			131.2
Cell Inflow Volume	hm3/yr	35.3	35.2	35.3	35.2	34.1	34.0	35.6	35.4	44.7	44.4		150124.5	185.2
Cell Inflow Load	kg/yr	8081.3	3096.5	8081.3	3679.6	7806.1	2827.4	8140.3	2026.2	10224.6	2711.2			42334
Cell Inflow Conc	ppb	229	88	229	104	229	83	229	57	229	61			228.6
Treated Outflow Volume	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3		148716.7	183.4
Treated Outflow Load	kg/yr	3096.5	945.5	3679.6	1114.1	2827.4	1074.8	2026.2	1227.4	2711.2	1504.1			5866
Treated FWM Outflow Conc	ppb	88	27	104	32	83	32	57	35	61	34			32.0
Upper Confidence Limit	ppb	102.9	37.1	124.9	47.1	104.0	47.2	76.0	50.7	80.2	49.8			46.5
Lower Confidence Limit	ppb	72.8	19.3	83.9	21.3	63.8	21.1	41.8	23.4	44.8	22.8			21.7
Total Outflow Volume + Bypass	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3			183.4
Total Outflow Load + Bypass	kg/yr	3096.5	945.5	3679.6	1114.1	2827.4	1074.8	2026.2	1227.4	2711.2	1504.1			5865.9
Total FWM Outflow Conc	ppb	87.9	27.0	104.5	31.8	83.2	31.8	57.3	34.8	61.0	33.9			32.0
Bypass Load	kg/yr	0	0	0	0	0	0	0	0	0	0			0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0.0
Maximum Inflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.22	0.22			0.90
Maximum Outflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.22	0.22			0.91
Surface Load Reduction	kg/yr	5153	2405	4402	2566	4979	1753	6114	799	7513	1207			36468
Load Trapped in Sediments	kg/yr	3956	2133	4514	2727	5121	1874	6328	860	7767	1298			36579
Overall Load Reduction	%	62%	69%	54%	70%	64%	62%	75%	39%	73%	45%			86%
Lower Confidence Limit	%	0.6	0.6	0.5	0.6	0.5	0.5	0.7	0.3	0.7	0.4			80%
Upper Confidence Limit	%	0.7	0.7	0.6	0.7	0.7	0.7	0.8	0.4	0.8	0.5			91%
Daily Geometric Mean	ppb	91.1	22.6	110.0	26.8	84.7	26.6	55.5	29.2	59.7	28.4			#N/A
Outflow Geo Mean - Composites	ppb	82.9	25.6	97.2	30.2	76.8	30.1	52.5	32.6	56.0	31.9			30.2
Upper Confidence Limit	ppb	97.7	35.4	117.4	45.0	96.8	45.1	70.2	47.8	74.2	47.1			44.3
Lower Confidence Limit	ppb	68.0	18.2	77.2	19.9	58.3	19.8	38.0	21.8	40.7	21.2			20.2
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			100%
Frequency Outflow Conc > 20 ppb	%	100%	92%	100%	100%	100%	100%	100%	100%	100%	100%			100%
Frequency Outflow Conc > 50 ppb	%	100%	0%	100%	0%	100%	0%	54%	0%	62%	0%			100%
Freq Outflow Volume > 10 ppb	%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			100%
95th Percentile Outflow Conc	ppb	115.68	33.33	128.72	39.59	108.26	39.61	76.17	43.65	80.98	42.22			40
Mean Biomass P Storage	mg/m2	3607	1369	4143	1744	3692	1587	3025	1451	3129	1462			2618
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Net Storage Turnover Rate	1/yr	4.2	4.1	4.2	4.1	4.2	4.1	4.2	4.1	4.2	4.1			4.2
Unit Area P Load	mg/m2-yr	2391	627	2391	745	1810	759	1249	1088	1322	971			971
Unit Area P Removal	mg/m2-yr	1170	432	1335	552	1188	503	971	462	1004	465			839
Mean Water Load	cm/d	2.9	2.0	2.9	2.0	2.2	2.5	1.5	5.2	1.6	4.4			1.2
Max Water Load	cm/d	5.1	3.5	5.1	3.5	3.9	4.5	2.7	9.4	2.8	7.9			2.1
Mean Depth	cm	42	55	42	55	41	55	41	55	40	55			47
Minimum Depth	cm	1.4	22.8	1.2	22.6	1.2	23.2	1.2	23.7	1.2	23.7			10
Maximum Depth	cm	51.7	62.0	51.7	62.0	51.4	61.9	51.7	62.1	49.9	61.6			56
Frequency Depth < 10 cm	%	7%	0%	7%	0%	7%	0%	7%	0%	7%	0%			4.2%
Flow/Width	m2/day	62	62	62	62	60	60	62	62	52	52			59.3
HRT Days	days	14.5	28.4	14.5	28.4	19.0	22.1	27.6	10.6	25.3	12.6			40.4
Mean Velocity	cm/sec	0.17	0.13	0.17	0.13	0.17	0.12	0.18	0.13	0.15	0.11			0.15
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
95th Percentile Outflow Volume	hm3/d	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2			0.8
95th Percentile Outflow Load	kg/d	15.4	4.6	18.8	5.6	15.6	5.5	11.8	6.3	15.7	7.7			29.7
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Range Check - Mean Depth	-													0
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-													0
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-													0
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			0.00%
Mass Balance Error	%	0.00%	0.00%	-0.02%	0.00%	-0.01%	0.00%	-0.01%	0.00%	-0.01%	0.00%			-0.01%
Warning or Error Messages														0

STA-5 With SAV in the Downstream Cells

DMSTA2- Inputs & Outputs | **Project: STA 5 EIS** | Model Release: 07/05/07 | Current Date: 10/19/2007

Input Variable	Units	Value
Design Case Name	-	EIS Alt1 SAV
Input Series Name		TS_EIS_Alt1
Starting Date for Simulation	-	05/01/94
Ending Date for Simulation	-	04/30/07
Starting Date for Output	-	05/01/94
Integration Steps Per Day	-	4
Number of Iterations	-	0
Output Averaging Interval	days	365
Inflow Conc Scale Factor	-	1
Rainfall P Conc	ppb	10
Atmospheric P Load (Dry)	mg/m2-yr	20

Case Description:
STA-5 Expanded to Include Full Build-out of Compartment C
Downstream cells considered as SAV_3; Inflows are C-139 Basin

Simulation Type: Uncertainty Analysis

Output Variable	Mean	Lower CL	Upper CL
FWM Outflow C (ppb)	14.1	19.0	11.0
GM Outflow C (ppb)	12.8	17.3	10.0
Load Reduction %	94%	92%	95%
Bypass Load (%)	0.0%		

Diagnostics		
H20 Balance Error Mean & Max	0.0%	0.0%
Mass Balance Error Mean & Max	0.0%	0.0%
Iterations & Convergence	3	0.0%
Warning/Error Messages	13	

Cell Number -->		1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	1A	1B	2A	2B	3A	3B	4A	4B	5A	5B		
Vegetation Type	-->	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3	EMG_3	SAV_3		
Inflow Fraction	-	0.190896424		0.1908964		0.1843939		0.1922898		0.2415235			
Downstream Cell Number	-	2		4		6		8		10			
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79		
Mean Width of Flow Path	km	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	2.34	2.34		
Number of Tanks in Series	-	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96	38.1	60.96		
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4	4	4	4	4	4	4		
Outflow Coefficient - Intercept	-	1	1	1	1	1	1	1	1	1	1		
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm	0.0075	0.0075										
Outflow Seepage Control Elev	cm	-46	-38										
Max Outflow Seepage Conc	ppb	20	20										
Seepage Recycle to Cell Number	-	1	2										
Seepage Recycle Fraction	-	1	1										
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30	30	30	30	30	30	30		
Initial P Storage Per Unit Area	mg/m2	500	500	500	500	500	500	500	500	500	500		
Initial Water Column Depth	cm	200	200	200	200	200	200	200	200	200	200		
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3	3	3	3	3	3	3		
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22	22	22	22	22	22	22		
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300	300	300	300	300	300	300		
K = Net Settling Rate at Steady State	m/yr	16.8	52.5	16.8	52.5	16.8	52.5	16.8	52.5	16.8	52.5		
Z1 = Saturated Uptake Depth	cm	40	40	40	40	40	40	40	40	40	40		
Z2 = Lower Penalty Depth	cm	100	100	100	100	100	100	100	100	100	100		
Z3 = Upper Penalty Depth	cm	200	200	200	200	200	200	200	200	200	200		

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	104.39	106.39	109.70	113.24	115.93	118.78	122.16	124.39	127.55	133.55			133.55
Run Date	-	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07	10/18/07			10/18/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94	05/01/94			05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07	04/30/07			04/30/07
Output Duration	days	4748	4748	4748	4748	4748	4748	4748	4748	4748	4748			4748
Cell Label		1A	1B	2A	2B	3A	3B	4A	4B	5A	5B			Total
Downstream Cell Label		1B	Outflow	2B	Outflow	3B	Outflow	4B	Outflow	5B	Outflow			-
Network Simulation Name	-	none	none	none	none	none	none	none	none	none	none			none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta	Uncerta			Uncerta
Surface Area	km2	3.38	4.94	3.38	4.94	4.31	3.72	6.52	1.86	7.73	2.79			43.58
Mean Rainfall	cm/yr	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21	127.21			127.2
Mean ET	cm/yr	131.28	131.30	131.23	131.30	131.23	131.30	130.99	131.30	131.02	131.30			131.2
Cell Inflow Volume	hm3/yr	35.3	35.2	35.3	35.2	34.1	34.0	35.6	35.4	44.7	44.4			185.2
Cell Inflow Load	kg/yr	8081.3	3096.5	8081.3	3679.6	7806.1	2827.4	8140.3	2026.2	10224.6	2711.2			42334
Cell Inflow Conc	ppb	229	88	229	104	229	83	229	57	229	61			228.6
Treated Outflow Volume	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3			183.4
Treated Outflow Load	kg/yr	3096.5	389.4	3679.6	415.3	2827.4	434.0	2026.2	626.7	2711.2	723.9			2589
Treated FWM Outflow Conc	ppb	88	11	104	12	83	13	57	18	61	16			14.1
Upper Confidence Limit	ppb	102.9	13.8	124.9	15.1	104.0	16.9	76.0	25.3	80.2	23.0			19.0
Lower Confidence Limit	ppb	72.8	9.3	83.9	9.8	63.8	10.3	41.8	13.0	44.8	12.2			11.0
Total Outflow Volume + Bypass	hm3/yr	35.2	35.0	35.2	35.0	34.0	33.8	35.4	35.3	44.4	44.3			183.4
Total Outflow Load + Bypass	kg/yr	3096.5	389.4	3679.6	415.3	2827.4	434.0	2026.2	626.7	2711.2	723.9			2589.3
Total FWM Outflow Conc	ppb	87.9	11.1	104.5	11.9	83.2	12.8	57.3	17.8	61.0	16.3			14.1
Bypass Load	kg/yr	0	0	0	0	0	0	0	0	0	0			0.0
Bypass Load	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0.0
Maximum Inflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.22	0.22			0.90
Maximum Outflow	hm3/d	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.22	0.22			0.91
Surface Load Reduction	kg/yr	5153	2872	4402	3264	4979	2393	6114	1399	7513	1987			39744
Load Trapped in Sediments	kg/yr	3956	2832	4514	3426	5121	2515	6328	1460	7767	2079			39998
Overall Load Reduction	%	62%	87%	54%	89%	64%	85%	75%	69%	73%	73%			94%
Lower Confidence Limit	%	0.6	0.9	0.5	0.9	0.5	0.8	0.7	0.7	0.7	0.7			92%
Upper Confidence Limit	%	0.7	0.9	0.6	0.9	0.7	0.8	0.8	0.7	0.8	0.7			95%
Daily Geometric Mean	ppb	91.1	6.2	110.0	6.3	84.7	7.0	55.5	10.9	59.7	9.7			#N/A
Outflow Geo Mean - Composites	ppb	82.9	10.2	97.2	10.8	76.8	11.7	52.5	16.0	56.0	14.8			12.8
Upper Confidence Limit	ppb	97.7	12.7	117.4	13.8	96.8	15.4	70.2	22.8	74.2	20.8			17.3
Lower Confidence Limit	ppb	68.0	8.6	77.2	8.9	58.3	9.3	38.0	11.8	40.7	11.1			10.0
Frequency Outflow Conc > 10 ppb	%	100%	62%	100%	69%	100%	77%	100%	92%	100%	85%			85%
Frequency Outflow Conc > 20 ppb	%	100%	0%	100%	0%	100%	0%	100%	15%	100%	15%			15%
Frequency Outflow Conc > 50 ppb	%	100%	0%	100%	0%	100%	0%	54%	0%	62%	0%			0%
Freq Outflow Volume > 10 ppb	%	100%	54%	100%	60%	100%	66%	100%	88%	100%	84%			75%
95th Percentile Outflow Conc	ppb	115.68	13.65	128.72	14.97	108.26	16.63	76.17	24.09	80.98	21.99			19
Mean Biomass P Storage	mg/m2	3607	570	4143	687	3692	668	3025	773	3129	734			2254
Storage Increase / Net Removal	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Net Storage Turnover Rate	1/yr	4.2	13.1	4.2	13.1	4.2	13.1	4.2	13.2	4.2	13.2			5.3
Unit Area P Load	mg/m2-yr	2391	627	2391	745	1810	759	1249	1088	1322	971			971
Unit Area P Removal	mg/m2-yr	1170	573	1335	694	1188	675	971	784	1004	744			918
Mean Water Load	cm/d	2.9	2.0	2.9	2.0	2.2	2.5	1.5	5.2	1.6	4.4			1.2
Max Water Load	cm/d	5.1	3.5	5.1	3.5	3.9	4.5	2.7	9.4	2.8	7.9			2.1
Mean Depth	cm	42	55	42	55	41	55	41	55	40	55			47
Minimum Depth	cm	1.4	22.8	1.2	22.6	1.2	23.2	1.2	23.7	1.2	23.7			10
Maximum Depth	cm	51.7	62.0	51.7	62.0	51.4	61.9	51.7	62.1	49.9	61.6			56
Frequency Depth < 10 cm	%	7%	0%	7%	0%	7%	0%	7%	0%	7%	0%			4.2%
Flow/Width	m2/day	62	62	62	62	60	60	62	62	52	52			59.3
HRT Days	days	14.5	28.4	14.5	28.4	19.0	22.1	27.6	10.6	25.3	12.6			40.4
Mean Velocity	cm/sec	0.17	0.13	0.17	0.13	0.17	0.12	0.18	0.13	0.15	0.11			0.15
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.0
95th Percentile Outflow Volume	hm3/d	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2			0.8
95th Percentile Outflow Load	kg/d	15.4	1.9	18.8	2.1	15.6	2.3	11.8	3.5	15.7	4.0			13.8
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			#N/A
Range Check - Mean Depth	-		0.89		0.89		0.89		0.89		0.88			5
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-		0.38		0.38		0.37		0.38		0.32			5
Range Check - Inflow Conc	-													0
Range Check - Outflow Conc	-		0.75		0.80		0.86							3
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%			0.00%
Mass Balance Error	%	0.00%	0.00%	-0.02%	0.00%	-0.01%	0.00%	-0.01%	0.00%	-0.01%	0.00%			-0.01%
Warning or Error Messages														13

Warning or Error Messages:
Cell# 2 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm
Cell# 2 Flow/Width out of calib. range for SAV_3: 62 vs. 162 - 374 m2/day
Cell# 2 Outflow Conc out of calib. range for SAV_3: 11 vs. 15 - 153 ppb
Cell# 4 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm
Cell# 4 Flow/Width out of calib. range for SAV_3: 62 vs. 162 - 374 m2/day
Cell# 4 Outflow Conc out of calib. range for SAV_3: 12 vs. 15 - 153 ppb
Cell# 6 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm
Cell# 6 Flow/Width out of calib. range for SAV_3: 60 vs. 162 - 374 m2/day
Cell# 6 Outflow Conc out of calib. range for SAV_3: 13 vs. 15 - 153 ppb
Cell# 8 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm
Cell# 8 Flow/Width out of calib. range for SAV_3: 62 vs. 162 - 374 m2/day
Cell# 10 Depth out of calib. range for SAV_3: 55 vs. 62 - 87 cm
Cell# 10 Flow/Width out of calib. range for SAV_3: 52 vs. 162 - 374 m2/day

STA-6

DMSTA2- Inputs & Outputs — Project: STA 6 EIS — Model Release: 07/05/07 — Current Date: 10/18/2007

Input Variable	Units	Value	Case Description:				
Design Case Name	-	EIS Alt1	STA-6 3 flow-ways				
Input Series Name		TS_EIS_Alt1	Inflows are a mixture of C-139 Basin and C-139 Annex (USSO)				
Starting Date for Simulation	-	05/01/94					
Ending Date for Simulation	-	04/30/07					
Starting Date for Output	-	05/01/94					
Integration Steps Per Day	-	4	Simulation Type:	Uncertainty Analysis			
Number of Iterations	-	0	Output Variable	Mean	Lower CL	Upper CL	Diagnostics
Output Averaging Interval	days	365	FWM Outflow C (ppb)	12.9	16.9	10.2	H20 Balance Error Mean & Max: 0.0% 0.0%
Inflow Conc Scale Factor	-	1	GM Outflow C (ppb)	12.4	16.3	9.8	Mass Balance Error Mean & Max: 0.0% 0.0%
Rainfall P Conc	ppb	10	Load Reduction %	91%	88%	93%	Iterations & Convergence: 3 0.0%
Atmospheric P Load (Dry)	mg/m2-yr	20	Bypass Load (%)	0.0%			Warning/Error Messages: 8

Cell Number -->	Units	1	2	3	4	5	6	7	8	9	10	11	12
Cell Label	-	3	5	2	4								
Vegetation Type	-->	PEW_3	PEW_3	EMG_3	SAV_3								
Inflow Fraction	-	0.0865	0.2301	0.6835									
Downstream Cell Number	-			4									
Surface Area	km2	0.99	2.64	2.23	5.62								
Mean Width of Flow Path	km	0.61	1.31	1.14	2.39								
Number of Tanks in Series	-	3.0	3.0	3.0	3.0								
Minimum Depth for Releases	cm												
Release 1 Series Name													
Release 2 Series Name													
Outflow Series Name													
Depth Series Name													
Outflow Control Depth	cm	28.3464	35.3568	38.1	48.8								
Outflow Weir Depth	cm												
Outflow Coefficient - Exponent	-	4	4	4	4								
Outflow Coefficient - Intercept	-	1	1	1	1								
Bypass Depth	cm												
Maximum Inflow	hm3/day												
Maximum Outflow	hm3/day												
Inflow Seepage Rate	(cm/d) / cm												
Inflow Seepage Control Elev	cm												
Inflow Seepage Conc	ppb												
Outflow Seepage Rate	(cm/d) / cm												
Outflow Seepage Control Elev	cm												
Max Outflow Seepage Conc	ppb												
Seepage Recycle to Cell Number	-												
Seepage Recycle Fraction	-												
Seepage Discharge Fraction	-												
Initial Water Column Conc	ppb	30	30	30	30								
Initial P Storage Per Unit Area	mg/m2	500	500	500	500								
Initial Water Column Depth	cm	200	200	200	200								
C0 = Conc at 0 g/m2 P Storage	ppb	3	3	3	3								
C1 = Conc at 1 g/m2 P storage	ppb	22	22	22	22								
C2 = Conc at Half-Max Uptake	ppb	300	300	300	300								
K = Net Settling Rate at Steady State	m/yr	34.9	34.9	16.8	52.5								
Z1 = Saturated Uptake Depth	cm	40	40	40	40								
Z2 = Lower Penalty Depth	cm	100	100	100	100								
Z3 = Upper Penalty Depth	cm	200	200	200	200								

Output Variables	Units	1	2	3	4	5	6	7	8	9	10	11	12	Overall
Execution Time	sec/yr	9.15	9.92	10.69	11.46									11.46
Run Date	-	10/18/07	10/18/07	10/18/07	10/18/07									10/18/07
Starting Date for Simulation	-	05/01/94	05/01/94	05/01/94	05/01/94									05/01/94
Starting Date for Output	-	05/01/94	05/01/94	05/01/94	05/01/94									05/01/94
Ending Date	-	04/30/07	04/30/07	04/30/07	04/30/07									04/30/07
Output Duration	days	4748	4748	4748	4748									4748
Cell Label		3	5	2	4									Total
Downstream Cell Label		Outflow	Outflow	4	Outflow									-
Network Simulation Name	-	none	none	none	none									none
Simulation Type	-	Uncerta	Uncerta	Uncerta	Uncerta									Uncerta
Surface Area	km2	0.99	2.64	2.23	5.62									11.47
Mean Rainfall	cm/yr	129.55	129.55	129.55	129.55									129.5
Mean ET	cm/yr	130.68	130.68	130.68	130.68									130.7
Cell Inflow Volume	hm3/yr	6.6	17.5	51.9	51.9									76.0
Cell Inflow Load	kg/yr	921.5	2451.2	7281.1	4779.1									10654
Cell Inflow Conc	ppb	140	140	140	92									140.2
Treated Outflow Volume	hm3/yr	6.6	17.5	51.9	51.8									75.9
Treated Outflow Load	kg/yr	108.5	282.5	4779.1	586.0									977
Treated FWM Outflow Conc	ppb	17	16	92	11									12.9
Upper Confidence Limit	ppb	22.6	22.1	101.4	14.4									16.9
Lower Confidence Limit	ppb	12.4	12.2	81.5	9.2									10.2
Total Outflow Volume + Bypass	hm3/yr	6.6	17.5	51.9	51.8									75.9
Total Outflow Load + Bypass	kg/yr	108.5	282.5	4779.1	586.0									977.1
Total FWM Outflow Conc	ppb	16.5	16.2	92.1	11.3									12.9
Bypass Load	kg/yr	0	0	0	0									0.0
Bypass Load	%	0%	0%	0%	0%									0.0
Maximum Inflow	hm3/d	0.03	0.08	0.23	0.23									0.34
Maximum Outflow	hm3/d	0.03	0.08	0.23	0.23									0.34
Surface Load Reduction	kg/yr	813	2169	2502	4193									9677
Load Trapped in Sediments	kg/yr	846	2256	2575	4378									10055
Overall Load Reduction	%	88%	88%	34%	88%									91%
Lower Confidence Limit	%	0.8	0.8	0.3	0.9									88%
Upper Confidence Limit	%	0.9	0.9	0.4	0.9									93%
Daily Geometric Mean	ppb	15.5	13.5	88.5	7.4									#N/A
Outflow Geo Mean - Composites	ppb	16.0	15.6	89.9	10.8									12.4
Upper Confidence Limit	ppb	22.0	21.4	99.5	13.8									16.3
Lower Confidence Limit	ppb	12.0	11.8	79.1	8.8									9.8
Frequency Outflow Conc > 10 ppb	%	100%	100%	100%	62%									92%
Frequency Outflow Conc > 20 ppb	%	8%	8%	100%	0%									8%
Frequency Outflow Conc > 50 ppb	%	0%	0%	100%	0%									0%
Freq Outflow Volume > 10 ppb	%	98%	95%	100%	53%									72%
95th Percentile Outflow Conc	ppb	20.11	19.54	107.88	13.59									15
Mean Biomass P Storage	mg/m2	1279	1282	3616	775									1487
Storage Increase / Net Removal	%	0%	0%	0%	0%									0%
Net Storage Turnover Rate	1/yr	8.7	8.7	4.2	13.1									7.7
Unit Area P Load	mg/m2-yr	929	928	3269	851									929
Unit Area P Removal	mg/m2-yr	852	854	1156	780									876
Mean Water Load	cm/d	1.8	1.8	6.4	2.5									1.8
Max Water Load	cm/d	3.0	3.0	10.5	4.2									3.0
Mean Depth	cm	36	40	52	51									47
Minimum Depth	cm	12.3	19.3	23.2	33.8									27
Maximum Depth	cm	43.2	46.7	62.7	56.1									54
Frequency Depth < 10 cm	%	0%	0%	0%	0%									0.0%
Flow/Width	m2/day	29	37	125	59									64.3
HRT Days	days	20.0	22.3	8.2	20.1									26.2
Mean Velocity	cm/sec	0.09	0.10	0.28	0.14									0.15
Seepage Outflow / Total Outflow	%	0%	0%	0%	0%									0%
Release 1 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00									0.0
Release 2 Outflow Volume	hm3/yr	0.00	0.00	0.00	0.00									0.0
95th Percentile Outflow Volume	hm3/d	0.0	0.1	0.2	0.2									0.3
95th Percentile Outflow Load	kg/d	0.5	1.2	19.8	2.6									4.2
Simulated / Specified Mean Depth	%	#N/A	#N/A	#N/A	#N/A									#N/A
Release 1 Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Release 2 Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Outflow Demand Met	%	#N/A	#N/A	#N/A	#N/A									#N/A
Range Check - Mean Depth	-	0.97			0.82									2
Range Check - Freq Depth < 10 cm	-													0
Range Check - Flow/Width	-	0.43	0.53		0.37									3
Range Check - Inflow Conc	-	1.28	1.28											2
Range Check - Outflow Conc	-				0.76									1
Water Balance Error	%	0.00%	0.00%	0.00%	0.00%									0.00%
Mass Balance Error	%	0.00%	0.00%	0.00%	0.00%									0.00%
Warning or Error Messages														8

Warning or Error Messages:

- Cell# 1 Depth out of calib. range for PEW_3: 36 vs. 38 - 66 cm
- Cell# 1 Flow/Width out of calib. range for PEW_3: 29 vs. 69 - 276 m2/day
- Cell# 1 Inflow Conc out of calib. range for PEW_3: 140 vs. 8 - 110 ppb
- Cell# 2 Flow/Width out of calib. range for PEW_3: 37 vs. 69 - 276 m2/day
- Cell# 2 Inflow Conc out of calib. range for PEW_3: 140 vs. 8 - 110 ppb
- Cell# 4 Depth out of calib. range for SAV_3: 51 vs. 62 - 87 cm
- Cell# 4 Flow/Width out of calib. range for SAV_3: 59 vs. 162 - 374 m2/day
- Cell# 4 Outflow Conc out of calib. range for SAV_3: 11 vs. 15 - 153 ppb