



# Updated Flow and Phosphorus Data Sets for the ECP Basins

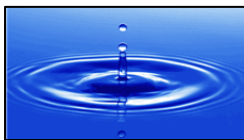
Covering the Period  
May 1, 1994 – April 30, 2007

Work Order No. CN040902-WO03R2

Prepared for



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**FINAL REPORT - REVISED**

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October 2007

August 21, 2007

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**REVISED 10/30/07**

U.S. Army Corps of Engineers  
South Florida Water Management District  
Tetra Tech Contract No. CN040902-WO03R2  
**Updated Flow and Phosphorus Data Sets for the ECP Basins**

Dear Ms. Gracie:

I am pleased to submit this final report titled "Updated Flow and Phosphorus Data Sets for ECP Basins". This document constitutes Deliverable 7.2.2 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 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.

\_\_\_\_\_  
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 continually improve the degree of confidence in the projected total phosphorus loads in inflows to the STAs, or in some instances, discharged directly to the EPA (Burns & McDonnell, 2003 as amended). This report updates the basin data sets from Water Year (WY) 1995 through WY2007, covering the period May 1, 1994 through April 30, 2007. This is the second update, following that of the 2005 EAA Regional Feasibility Study (ADA/Burns & McDonnell 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 South Florida Water Management District (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 updated flow and Total Phosphorus (TP) data sets for ECP basins. Historic volumes and phosphorus data were provided primarily by the District, and were subsequently checked for reasonableness, segregated by source, and summarized by water year and monthly average for the thirteen years covering WY1995-WY2007.

### 1.2. Source Data

Data supplied by the District consisted of daily estimates of flows, TP concentrations and TP loads at water control structures and monitoring locations representing the boundaries of each ECP basin. Data were transmitted in Excel files, and a summary of the DBKEYs and periods of record for each data stream is provided in Appendix A. MOD1 flow data were used instead of the "Preferred" DBKEY flow data when MOD1 data were available. One can safely assume that MOD1 data are correct if they are different from Preferred DBKEY data because MOD1 data go through an additional QA/QC step (Mo 2007). District engineers review the Preferred DBKEY data and correct any mistakes, fill any missing or partial data, incorporate any additional information such as better calibrated



rating curves etc., and load the new improved data into MOD1 data set. Some District reports have no other choice but to use the Preferred data set because the lag time for the MOD1 data could be 1-2 years. However, the MOD1 data set are utilized for the Updated Baseline Data Set because they are more accurate data. For the L-8 Basin, District-supplied data were supplemented by data furnished by CH2M Hill from the City of West Palm Beach for their pump station No. 2 (CH2M Hill 2007).

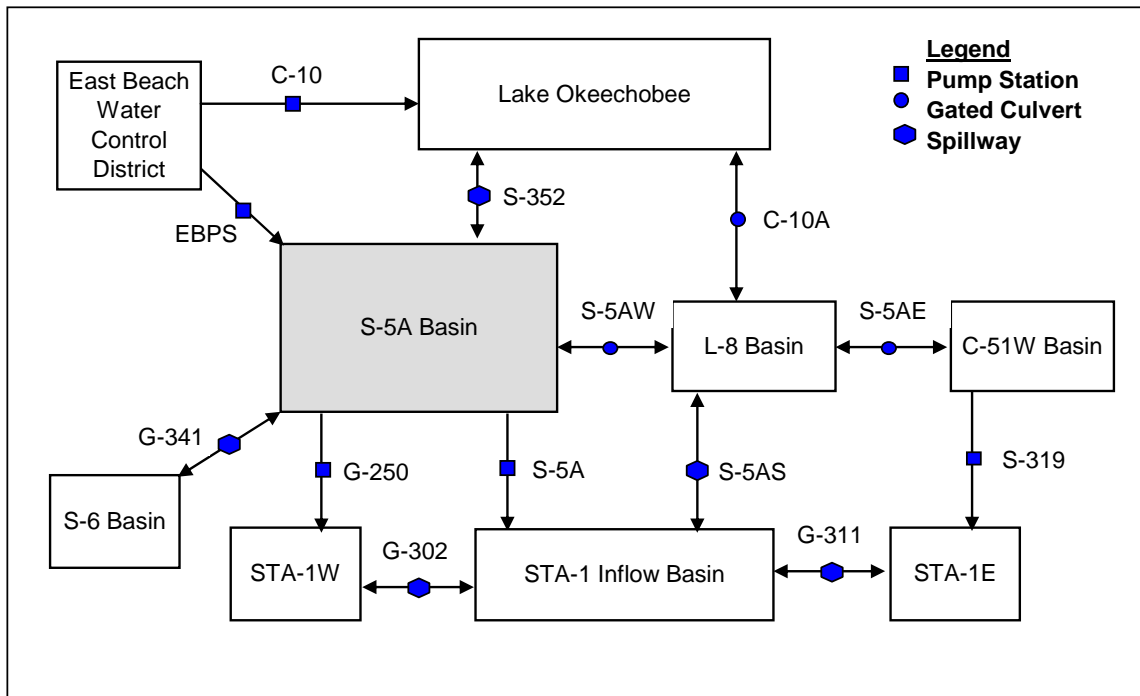
### ***1.3. Basin Flow and Phosphorus Balances***

Available data were used to establish flow and TP balances for each of the ECP Basins for the WY1995-2007 period. Basin-specific methods and assumptions used are described in the following sections.



## 2. S-5A Basin

The S-5A Basin covers approximately 194.3 square miles in northwestern Palm Beach County (Goforth and Piccone 2001). A schematic of the basin showing the primary conveyance features, water control structures and receiving waters is presented in **Figure 2-1**. The flow and TP levels through each of the principal water control structures are described in the following sections.



**Figure 2-1: S-5A Basin Schematic.**

### 2.1. S-352 Spillway

The S-352 gated spillway controls the flow between Lake Okeechobee and the West Palm Beach Canal within the EAA. With the implementation of the Interim Action Plan in 1979, the predominant flow is from the Lake to the EAA. A single runoff event was discharged into the Lake on October 5, 2000 of 105 acre feet and 32 kg of TP. The table below presents the annual and monthly summaries of flow and TP for the S-352 spillway.



**Table 2-1: Discharge Summary for Spillway S-352.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
<b>1995</b>	171,193	211.164	25,501	121	<b>Jan</b>	16,915	20.864	5026	241
<b>1996</b>	242,912	299.627	40,846	136	<b>Feb</b>	12,630	15.579	3525	226
<b>1997</b>	121,904	150.366	22,161	147	<b>Mar</b>	12,670	15.629	3,039	194
<b>1998</b>	109,437	134.989	30,050	223	<b>Apr</b>	24,301	29.975	5,912	197
<b>1999</b>	262,772	324.124	58,669	181	<b>May</b>	23,941	29.531	4,743	161
<b>2000</b>	164,604	203.035	42,383	209	<b>Jun</b>	8,390	10.349	1,673	162
<b>2001</b>	128,561	158.578	30,372	192	<b>Jul</b>	4,649	5.735	789	138
<b>2002</b>	63,813	78.712	15,227	193	<b>Aug</b>	6,619	8.164	1,460	179
<b>2003</b>	427,017	526.718	100,610	191	<b>Sep</b>	7,036	8.679	1,103	127
<b>2004</b>	87,737	108.222	21,153	195	<b>Oct</b>	15,195	18.743	2,643	141
<b>2005</b>	132,330	163.227	39,425	242	<b>Nov</b>	14,556	17.955	3,315	185
<b>2006</b>	78,164	96.413	23,687	246	<b>Dec</b>	15,468	19.080	3,773	198
<b>2007</b>	120,394	148.504	30,923	208	<b>Annual</b>	162,372	200.283	37,001	185
<b>Min.</b>	63,813	78.712	15,227	-					
<b>Max.</b>	427,017	526.718	100,610	-					
<b>Ave.</b>	162,372	200.283	37,001	185					

Approximately 52% of the Lake water released at S-352 flows through the EAA and is discharged to the STA-1 Inflow Basin and A. R. M. Loxahatchee National Wildlife Refuge (Refuge) to satisfy downstream water supply demands and for Lake regulatory releases. The table below quantifies the Lake flow-through at S-5A, and uses the TP concentration at S-5A, consistent with the method used in the EAA Regional Feasibility Study (ADA/Burns & McDonnell 2005).



**Table 2-2: Discharge Summary for Lake Okeechobee Flow-through at S-5A.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
<b>1995</b>	115,466	142.425	20,039	141	<b>Jan</b>	11,155	13.760	2,340	170
<b>1996</b>	169,866	209.526	41,051	196	<b>Feb</b>	5,879	7.251	1,107	153
<b>1997</b>	54,883	67.697	6,012	89	<b>Mar</b>	4,332	5.343	766	143
<b>1998</b>	66,814	82.414	16,389	199	<b>Apr</b>	8,429	10.397	1,358	131
<b>1999</b>	125,461	154.754	18,027	116	<b>May</b>	7,642	9.426	985	104
<b>2000</b>	91,261	112.568	13,871	123	<b>Jun</b>	1,427	1.760	143	81
<b>2001</b>	29,254	36.084	2,433	67	<b>Jul</b>	2,065	2.547	228	89
<b>2002</b>	2,420	2.985	258	87	<b>Aug</b>	4,585	5.656	958	169
<b>2003</b>	322,079	397.279	54,445	137	<b>Sep</b>	6,251	7.711	995	129
<b>2004</b>	36,547	45.080	4,428	98	<b>Oct</b>	12,543	15.471	1,792	116
<b>2005</b>	51,464	63.479	7,127	112	<b>Nov</b>	9,085	11.206	1,900	170
<b>2006</b>	13,678	16.872	2,576	153	<b>Dec</b>	10,517	12.972	1,877	145
<b>2007</b>	11,631	14.347	1,146	80	<b>Annual</b>	83,910	103.501	14,446	140
<b>Min.</b>	2,420	2.985	258	-					
<b>Max.</b>	322,079	397.279	54,445	-					
<b>Ave.</b>	83,910	103.501	14,446	140					

## 2.2. East Beach Pump Station

The East Beach Pump Station (EBPS) was enlarged as part of the Everglades Construction Project (ECP) Ch. 298 Districts Diversion project. The enlarged capacity functions to divert into the S-5A Basin runoff from the East Beach Water Control District (EBWCD) that previously entered Lake Okeechobee. A part of the EBWCD was in the EAA boundary before the diversion project. Consistent with the EAA Rule (40E-63), to approximate the new external load entering the S-5A Basin, the total flow and TP load beginning in July 2001 from the EBPS was segregated by contributing area into an amount outside of the EAA boundary (81.3%) and an amount originating inside the EAA (18.7%). The table below presents the annual and monthly summaries of flow and TP for the East Beach Pump Station, after application of the 81.3% adjustment.



**Table 2-3: Discharge Summary for East Beach Pump Station.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	498	0.614	122	198
1996					Feb	919	1.134	251	222
1997					Mar	760	0.937	284	303
1998					Apr	402	0.496	94	190
1999					May	794	0.980	179	183
2000					Jun	2,529	3.120	1,056	338
2001					Jul	2,018	2.489	840	338
2002<	10,018	12.357	3,197	259	Aug	2,688	3.316	1,265	381
2003	16,165	19.939	6,154	309	Sep	2,626	3.239	1,618	500
2004	19,088	23.545	7,041	299	Oct	1,317	1.625	1,047	644
2005	21,545	26.575	12,229	460	Nov	582	0.718	260	363
2006	14,578	17.982	8,730	485	Dec	632	0.779	161	207
2007	9,873	12.178	4,484	368	Annual	15,765	19.446	7,178	369
Min.	9,873	12.178	4,484	-					
Max.	21,545	26.575	12,229	-					
Ave.	16,250	20.044	7,727	386					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.

### 2.3. S-5A and G-250 Pump Stations

Pump stations S-5A and G-250 control the discharges at the southern boundary of the S-5A Basin. Pump station S-5A discharges into the STA-1 Inflow Basin; from the Inflow Basin, water can be directed into STA-1W, STA-1E, the Refuge, or to the L-8 Basin via the S-5AS spillway. The table below presents the annual and monthly summaries of flow and TP for the S-5A pump station.





**Table 2-4: Discharge Summary for S-5A Pump Station.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	545,559	672.937	108,398	161	Jan	14,504	17.890	2,800	156
1996	388,994	479.817	78,807	164	Feb	14,619	18.033	3,220	179
1997	185,306	228.571	33,422	146	Mar	14,547	17.943	3,425	191
1998	306,067	377.528	74,169	196	Apr	10,781	13.298	2,048	154
1999	237,275	292.674	45,869	157	May	12,719	15.689	2,310	147
2000	413,875	510.507	82,650	162	Jun	33,362	41.152	7,160	174
2001	182,916	225.623	29,471	131	Jul	29,416	36.284	5,308	146
2002	267,792	330.317	34,250	104	Aug	48,630	59.984	10,525	175
2003	639,587	788.919	121,958	155	Sep	53,537	66.036	11,791	179
2004	314,173	387.526	52,740	136	Oct	52,255	64.455	10,072	156
2005	437,181	539.254	124,151	230	Nov	26,440	32.613	5,708	175
2006	209,017	257.818	56,887	221	Dec	20,598	25.407	4,580	180
2007	180,556	222.712	53,533	240	Annual	331,407	408.785	68,946	169
Min.	180,556	222.712	29,471	-					
Max.	639,587	788.919	124,151	-					
Ave.	331,407	408.785	68,946	169					

Pump station G-250 was constructed to serve as the inflow structure for the Everglades Nutrient Removal Project. The facility functioned in this capacity until the construction of STA-1W in July 1999. The table below presents the annual and monthly summaries of flow and TP for the G-250 pump station.

**Table 2-5: Discharge Summary for G-250 Pump Station.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	92,364	113.930	15,453	136	Jan	9,199	11.347	1,372	121
1996	182,670	225.320	24,466	109	Feb	7,652	9.438	1,109	117
1997	118,780	146.513	14,391	98	Mar	6,465	7.974	793	99
1998	80,304	99.053	11,536	116	Apr	11,736	14.476	1,700	117
1999	88,532	109.203	11,096	102	May	7,095	8.751	967	111
2000<	9,912	12.226	1,331	109	Jun	4,988	6.153	601	98
2001					Jul	7,000	8.635	909	105
2002					Aug	8,037	9.913	1,416	143
2003					Sep	10,323	12.734	1,168	92
2004					Oct	14,188	17.501	1,973	113
2005					Nov	11,490	14.172	1,577	111
2006					Dec	12,523	15.447	1,575	102
2007					Annual	110,696	136.541	15,159	111
Min.	80,304	99.053	11,096	-					
Max.	182,670	225.320	24,466	-					
Ave.	112,530	138.804	15,388	111					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.

2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.



### 2.4. S-5AW Culvert

Gated culvert S-5AW allows the transfer of water between the S-5A Basin and the L-8 Basin. The tables below present the annual and monthly summaries of flow and TP for the S-5AW culvert for flow out of the S-5A Basin and flow into the basin.

**Table 2-6: Discharge Summary for Culvert S-5AW (out of S-5A Basin).**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	0	0.000	0		Jan	0	0.000	0	
1996	0	0.000	0		Feb	0	0.000	0	
1997	0	0.000	0		Mar	43	0.053	4	68
1998	0	0.000	0		Apr	175	0.216	15	71
1999	0	0.000	0		May	0	0.000	0	
2000	0	0.000	0		Jun	197	0.243	57	235
2001	558	0.688	47	68	Jul	0	0.000	0	
2002	2,565	3.164	744	235	Aug	0	0.000	0	
2003	0	0.000	0		Sep	0	0.000	0	
2004	0	0.000	0		Oct	0	0.000	0	
2005	0	0.000	0		Nov	0	0.000	0	
2006	0	0.000	0		Dec	0	0.000	0	
2007	2,272	2.803	198	71	Annual	415	0.512	76	149
Min.	0	0.000	0	-					
Max.	2,565	3.164	744	-					
Ave.	415	0.512	76	149					

**Table 2-7: Discharge Summary for Culvert S-5AW (into S-5A Basin).**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	82,222	101.419	25,290	249	Jan	337	0.415	25	59
1996	104,886	129.375	12,424	96	Feb	408	0.504	19	38
1997	19,691	24.288	721	30	Mar	496	0.612	28	46
1998	13,774	16.990	403	24	Apr	300	0.370	14	39
1999	14,065	17.349	858	49	May	1,288	1.589	269	169
2000	39,680	48.945	5,120	105	Jun	378	0.467	50	107
2001	21,484	26.500	1,354	51	Jul	562	0.693	35	50
2002	10,397	12.825	475	37	Aug	2,687	3.314	560	169
2003	16,285	20.087	1,777	88	Sep	5,420	6.685	794	119
2004	5,374	6.629	371	56	Oct	11,853	14.620	1,655	113
2005	32,306	39.849	6,748	169	Nov	3,514	4.334	630	145
2006	1,164	1.436	256	178	Dec	1,069	1.319	293	222
2007	6,728	8.299	1,029	124	Annual	28,312	34.922	4,371	125
Min.	1,164	1.436	256	-					
Max.	104,886	129.375	25,290	-					
Ave.	28,312	34.922	4,371	125					



## 2.5. G-341 Divide Structure

Spillway G-341 serves as a basin divide between the S-5A Basin and the S-6 Basin. Flow and TP records began in September 2005. The tables below presents the annual and monthly summaries of flow and TP for the G-341 divide structure for flow out of the S-5A Basin and flow into the basin.

**Table 2-8: Discharge Summary for Spillway G-341 (out of S-5A Basin).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	1,129	1.393	142	102
1996					Feb	145	0.179	14	81
1997					Mar	732	0.903	95	105
1998					Apr	1,173	1.447	184	127
1999					May	4,757	5.867	625	107
					Jun	10,894	13.438	1,331	99
2000					Jul	0	0.000	0	
2001					Aug	928	1.144	245	214
2002					Sep	0	0.000	0	
2003					Oct	1,549	1.911	339	177
2004					Nov	4,343	5.357	751	140
2005					Dec	8,137	10.036	1,467	146
2006<	28,919	35.671	5,415	152	Annual	33,787	41.675	5,194	125
2007	22,076	27.230	2,771	102					
Min.	22,076	27.230	2,771	-					
Max.	22,076	27.23	2,771	-					
Ave.	22,076	27.23	2,771	102					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.

2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.

**Table 2-9: Discharge Summary for Spillway G-341 (into S-5A Basin).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	0	0.000	0	301
1996					Feb	4,780	5.896	1,777	190
1997					Mar	3,251	4.010	762	160
1998					Apr	2,630	3.245	519	116
1999					May	4,683	5.776	671	455
					Jun	1,767	2.180	992	100
2000					Jul	2,270	2.800	280	398
2001					Aug	19,291	23.795	9,472	304
2002					Sep	7,610	9.386	685	183
2003					Oct	868	1.071	85	79
2004					Nov	141	0.174	21	119
2005					Dec	50,333	62.085	18,114	292
2006<	23,834	29.399	7,301	248	Annual	50,333	62.085	18,114	292
2007	48,820	60.218	17,511	291					
Min.	48,820	60.218	17,511	-					
Max.	48,820	60.22	17,511	-					
Ave.	48,820	60.22	17,511	291					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.

2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.



## 2.6. S-5A Basin Runoff

The S-5A Basin runoff was estimated as the net result of the various flow components described above:

- S-5A discharges to the STA-1 Inflow Basin
- Plus G-250 discharges to STA-1W (through July 1, 1999)
- Plus runoff to the Lake through S-352
- Minus flow-through release from Lake at S-352
- Minus new inflows from East Beach Water Control District
- Plus discharges to points east through the S-5AW culvert
- Minus discharges from points east through the S-5AW culvert
- Plus discharges to points west through the G-341 divide structure (beginning September 9, 2005)
- Minus discharges from points west through the G-341 divide structure (beginning September 9, 2005)

The table below presents the annual and monthly summaries of flow and TP for runoff from the S-5A Basin. The figures present the monthly and annual variability associated with the S-5A Basin runoff.

**Table 2-10: Discharge Summary for S-5A Basin Runoff.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	440,236	543.022	78,521	145	Jan	6,494	8.010	929	116
1996	296,912	366.236	49,798	136	Feb	10,138	12.505	2,133	171
1997	229,512	283.099	41,080	145	Mar	11,510	14.198	2,706	191
1998	305,783	377.177	68,913	183	Apr	6,330	7.808	1,249	160
1999	186,280	229.773	38,080	166	May	6,764	8.343	1,431	172
2000	292,846	361.219	64,990	180	Jun	33,786	41.674	6,922	166
2001	132,736	163.727	25,730	157	Jul	28,914	35.665	5,056	142
2002	247,521	305.313	31,064	102	Aug	41,796	51.555	8,259	160
2003	285,058	351.614	59,582	169	Sep	43,453	53.599	9,266	173
2004	253,164	312.273	40,901	131	Oct	32,479	40.062	6,847	171
2005	331,866	409.350	98,047	240	Nov	18,526	22.852	3,766	165
2006	184,681	227.800	43,438	191	Dec	14,767	18.214	3,164	174
2007	127,851	157.702	32,332	205	Annual	254,957	314.485	51,729	164
Min.	127,851	157.702	25,730	-					
Max.	440,236	543.022	98,047	-					
Ave.	254,957	314.485	51,729	164					



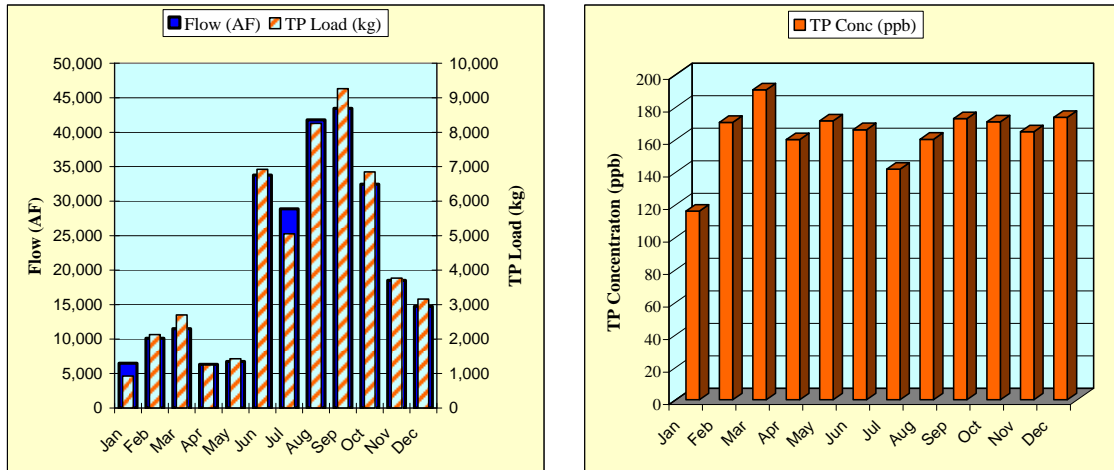


Figure 2-2: Average Monthly Flows and Phosphorus Levels for S-5A Basin Runoff.

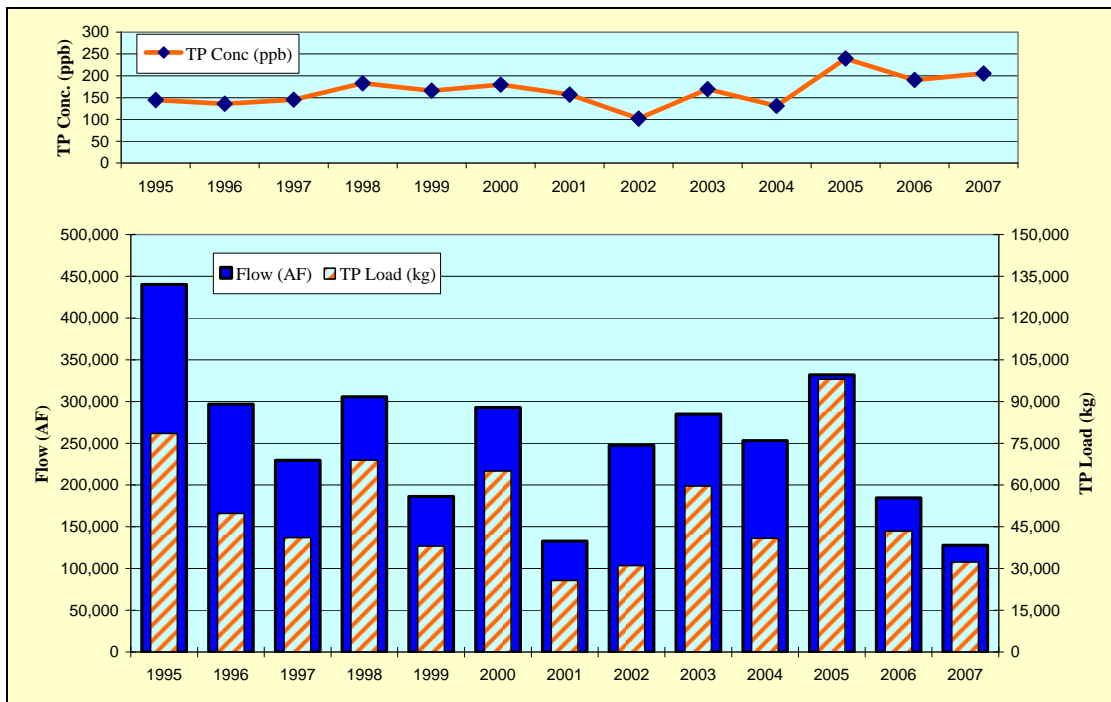


Figure 2-3: WY1995-2007 Flows and Phosphorus Levels for S-5A Basin Runoff.

### 2.7. S-5A Basin Discharge to the Everglades Protection Area and STAs

The tables below present the annual and monthly summaries of flow and TP from the S-5A Basin to the Everglades Protection Area (EPA) and STAs, segregated by source.



**Table 2-11: Annual Summary of S-5A Basin Discharges to the EPA by Source.**

Water Year	Lake Okeechobee Flow-through		S-5A Basin Runoff		Other (EBPS + S-5AW)		S-5A Basin Total		
	ac-ft	kg	ac-ft	kg	ac-ft	kg	ac-ft	kg	ppb
1995	115,466	20,039	440,236	78,521	82,222	25,290	637,924	123,850	157
1996	169,866	41,051	296,912	49,798	104,886	12,424	571,664	103,273	146
1997	54,883	6,012	229,512	41,080	19,691	721	304,086	47,814	127
1998	66,814	16,389	305,783	68,913	13,774	403	386,371	85,705	180
1999	125,461	18,027	186,280	38,080	14,065	858	325,807	56,965	142
2000	91,261	13,871	292,846	64,990	39,680	5,120	423,787	83,981	161
2001	29,254	2,433	132,736	25,730	20,926	1,307	182,916	29,471	131
2002	2,420	258	247,521	31,064	17,851	2,928	267,792	34,250	104
2003	322,079	54,445	285,058	59,582	32,450	7,931	639,587	121,958	155
2004	36,547	4,428	253,164	40,901	24,462	7,412	314,173	52,740	136
2005	51,464	7,127	331,866	98,047	53,851	18,976	437,181	124,151	230
2006	13,678	2,576	184,681	43,438	15,742	8,986	214,101	55,000	208
2007	11,631	1,146	127,851	32,332	14,329	5,315	153,812	38,793	204
Min.	2,420	258	127,851	25,730	13,774	403	153,812	29,471	-
Max.	322,079	54,445	440,236	98,047	104,886	25,290	639,587	124,151	-
Ave.	83,910	14,446	254,957	51,729	34,918	7,513	373,785	73,689	160

Note: No data exist for EBPS prior to July 2001, so the annual average is underestimated.

**Table 2-12: Monthly Summary of S-5A Basin Discharge Volume to EPA by Source.**

Month	Lake Okeechobee Flow-through		S-5A Basin Runoff		Other (EBPS + S-5AW)		S-5A Basin Total	
	ac-ft	hm <sup>3</sup>	ac-ft	hm <sup>3</sup>	ac-ft	hm <sup>3</sup>	ac-ft	hm <sup>3</sup>
Jan	11,155	13.760	6,494	8.010	835	1.030	18,484	22.799
Feb	5,879	7.251	10,138	12.505	1,328	1.638	17,344	21.394
Mar	4,332	5.343	11,510	14.198	1,213	1.496	17,055	21.037
Apr	8,429	10.397	6,330	7.808	528	0.651	15,287	18.856
May	7,642	9.426	6,764	8.343	2,082	2.568	16,488	20.338
Jun	1,427	1.760	33,786	41.674	2,710	3.343	37,923	46.777
Jul	2,065	2.547	28,914	35.665	2,580	3.182	33,559	41.394
Aug	4,585	5.656	41,796	51.555	5,375	6.630	51,756	63.840
Sep	6,251	7.711	43,453	53.599	8,046	9.924	57,750	71.234
Oct	12,543	15.471	32,479	40.062	13,170	16.245	58,192	71.778
Nov	9,085	11.206	18,526	22.852	4,096	5.052	31,707	39.110
Dec	10,517	12.972	14,767	18.214	1,701	2.098	26,984	33.285
Annual	83,910	103.501	254,957	314.485	43,662	53.856	382,529	471.842





**Table 2-13: Monthly Summary of S-5A Basin Phosphorus Levels to EPA by Source.**

Month	Lake Okeechobee Flow-through		S-5A Basin Runoff		Other (EBPS + S-5AW)		S-5A Basin Total	
	TP Load kg	TP Conc ppb	TP Load kg	TP Conc ppb	TP Load kg	TP Conc ppb	TP Load kg	TP Conc ppb
<b>Jan</b>	2,340	170	929	116	146	142	3,415	150
<b>Feb</b>	1,107	153	2,133	171	270	165	3,511	164
<b>Mar</b>	766	143	2,706	191	308	206	3,780	180
<b>Apr</b>	1,358	131	1,249	160	93	144	2,701	143
<b>May</b>	985	104	1,431	172	448	174	2,863	141
<b>Jun</b>	143	81	6,922	166	1,048	314	8,113	173
<b>Jul</b>	228	89	5,056	142	875	275	6,159	149
<b>Aug</b>	958	169	8,259	160	1,824	275	11,041	173
<b>Sep</b>	995	129	9,266	173	2,412	243	12,673	178
<b>Oct</b>	1,792	116	6,847	171	2,702	166	11,341	158
<b>Nov</b>	1,900	170	3,766	165	891	176	6,557	168
<b>Dec</b>	1,877	145	3,164	174	455	217	5,496	165
<b>Annual</b>	14,446	140	51,729	164	11,473	213	77,649	165



### 3. L-8 Basin

The L-8 Basin covers approximately 171.2 square miles in north central Palm Beach County (Cooper 1989). A schematic of the basin showing the primary conveyance features, water control structures and receiving waters is presented in the figure below. The flow and TP levels through each of the principal water control structures are described in the following sections.

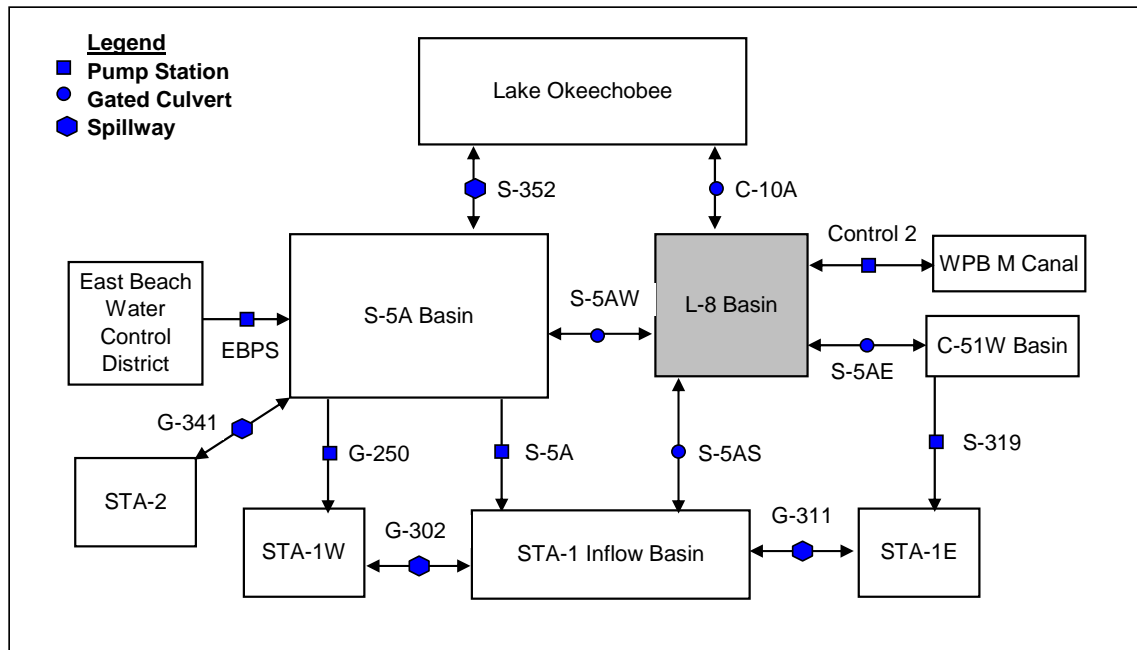


Figure 3-1: L-8 Basin Schematic.

#### 3.1. Culvert 10A

A portion of the L-8 Basin runoff discharges north into Lake Okeechobee through Culvert 10A. During periods of water supply deliveries and regulatory releases, the flap gates at Culvert 10A are raised and water flows into the L-8 Canal. The tables below present the annual and monthly summaries of flow and TP for Culvert 10A. An estimate of the daily Lake flow-through releases was developed by taking the minimum of the flow from the Lake at C-10A and the flow from the L-8 Basin through S-5AE. An estimate of the TP load carried by these flow through releases was obtained by applying the S-5AE TP concentration. Annual and monthly summaries are presented below.



**Table 3-1: Discharge Summary for Culvert 10A (out of L-8 Basin).**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	79,903	98.558	8,302	84	Jan	873	1.077	104	96
1996	32,122	39.622	4,827	122	Feb	688	0.849	124	146
1997	28,546	35.211	2,506	71	Mar	761	0.938	86	92
1998	97,058	119.720	9,236	77	Apr	905	1.116	147	131
1999	56,121	69.224	4,552	66	May	560	0.691	66	96
2000	48,244	59.508	7,636	128	Jun	4,923	6.073	861	142
2001	73,322	90.442	12,855	142	Jul	6,110	7.537	719	95
2002	132,271	163.154	16,359	100	Aug	12,324	15.201	1,405	92
2003	32,031	39.510	6,032	153	Sep	9,100	11.225	941	84
2004	26,521	32.713	2,144	66	Oct	9,945	12.266	1,379	112
2005	41,352	51.007	5,242	103	Nov	4,689	5.784	478	83
2006	12,094	14.918	2,294	154	Dec	1,949	2.404	209	87
2007	27,171	33.515	2,775	83	Annual	52,827	65.162	6,520	100
Min.	12,094	14.918	2,144	-					
Max.	132,271	163.154	16,359	-					
Ave.	52,827	65.162	6,520	100					

**Table 3-2: Discharge Summary for Culvert 10A (into L-8 Basin).**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	27,878	34.387	5,034	146	Jan	10,564	13.030	3,431	263
1996	85,373	105.306	15,936	151	Feb	8,157	10.062	2,439	242
1997	38,765	47.816	5,783	121	Mar	7,949	9.805	2,354	240
1998	2,589	3.193	711	223	Apr	9,358	11.543	2,595	225
1999	42,236	52.097	9,639	185	May	8,027	9.901	1,722	174
2000	100,503	123.968	30,968	250	Jun	2,918	3.599	631	175
2001	11,193	13.806	2,309	167	Jul	3,327	4.104	761	185
2002	20,599	25.408	8,273	326	Aug	2,488	3.069	611	199
2003	154,741	190.870	35,239	185	Sep	3,814	4.705	753	160
2004	186,474	230.012	41,298	180	Oct	3,823	4.715	724	154
2005	153,516	189.359	58,259	308	Nov	6,980	8.610	1,421	165
2006	174,161	214.824	49,268	229	Dec	10,715	13.217	3,137	237
2007	17,532	21.625	4,811	222	Annual	78,120	96.359	20,579	214
Min.	2,589	3.193	711	-					
Max.	186,474	230.012	58,259	-					
Ave.	78,120	96.359	20,579	214					



**Table 3-3: Discharge Summary for Flow-through Releases through L-8.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	24,618	30.366	3,152	104	Jan	7,070	8.721	1,267	145
1996	70,440	86.886	7,010	81	Feb	5,425	6.691	995	149
1997	22,298	27.504	1,693	62	Mar	5,656	6.977	1,151	165
1998	2,006	2.474	220	89	Apr	5,725	7.062	936	133
1999	20,865	25.737	1,784	69	May	4,311	5.317	666	125
2000	60,884	75.099	8,750	117	Jun	1,590	1.962	180	92
2001	3,161	3.899	453	116	Jul	2,908	3.587	360	100
2002	5,405	6.666	361	54	Aug	2,267	2.796	446	159
2003	112,635	138.933	17,422	125	Sep	3,725	4.595	369	80
2004	167,171	206.202	22,769	110	Oct	2,856	3.523	311	88
2005	92,358	113.922	22,281	196	Nov	5,678	7.003	760	108
2006	139,963	172.641	28,263	164	Dec	8,474	10.453	1,371	131
2007	2,089	2.577	388	150	Annual	55,684	68.685	8,811	128
Min.	2,006	2.474	220	-					
Max.	167,171	206.202	28,263	-					
Ave.	55,684	68.685	8,811	128					

### 3.2. Culvert S-5AE

Culvert S-5AE controls flows between the C-51W Basin and the L-8 Basin. The tables below present the annual and monthly summaries of flow and TP for Culvert S-5AE for flow out of the L-8 Basin and flow into the basin.

**Table 3-4: Discharge Summary for Culvert S-5AE (out of L-8 Basin).**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	230,235	283.991	21,937	77	Jan	15,715	19.384	1,857	96
1996	203,129	250.556	19,142	76	Feb	10,940	13.494	1,466	109
1997	76,696	94.603	5,879	62	Mar	15,211	18.762	2,548	136
1998	185,988	229.413	14,708	64	Apr	10,796	13.317	1,634	123
1999	112,789	139.123	10,586	76	May	7,678	9.470	1,146	121
2000	157,077	193.751	20,906	108	Jun	6,431	7.933	684	86
2001	16,237	20.028	2,340	117	Jul	9,222	11.375	976	86
2002	56,441	69.619	3,487	50	Aug	8,853	10.921	1,149	105
2003	195,841	241.566	27,187	113	Sep	14,563	17.963	1,570	87
2004	257,314	317.392	31,242	98	Oct	13,314	16.423	1,366	83
2005	155,595	191.923	35,118	183	Nov	17,046	21.026	1,704	81
2006	233,896	288.506	40,923	142	Dec	16,933	20.887	2,096	100
2007	25,904	31.952	3,087	97	Annual	146,703	180.956	18,195	101
Min.	16,237	20.028	2,340	-					
Max.	257,314	317.392	40,923	-					
Ave.	146,703	180.956	18,195	101					



**Table 3-5: Discharge Summary for Culvert S-5AE (into L-8 Basin).**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995	0	0.000	0		Jan	812	1.002	116	116
1996	472	0.582	25	43	Feb	420	0.518	34	66
1997	0	0.000	0		Mar	0	0.000	0	
1998	0	0.000	0		Apr	664	0.819	74	90
1999	29,379	36.239	3,143	87	May	460	0.567	50	89
2000	5,980	7.376	654	89	Jun	9	0.011	2	145
2001	75	0.093	12	129	Jul	0	0.000	0	
2002	121	0.149	22	145	Aug	32	0.039	3	73
2003	0	0.000	0		Sep	0	0.000	0	
2004	0	0.000	0		Oct	23	0.029	2	65
2005	0	0.000	0		Nov	0	0.000	0	
2006	0	0.000	0		Dec	382	0.472	20	43
2007	404	0.498	58	117	Annual	2,802	3.457	301	87
Min.	0	0.000	0	-					
Max.	29,379	36.239	3,143	-					
Ave.	2,802	3.457	301	87					

### 3.3. Culvert S-5AW

Gated culvert S-5AW allows the transfer of water between the S-5A Basin and the L-8 Basin. The tables below present the annual and monthly summaries of flow and TP for the S-5AW culvert for flow out of the L-8 Basin and flow into the basin.

**Table 3-6: Discharge Summary for Culvert S-5AW (into L-8 Basin).**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995	0	0.000	0		Jan	0	0.000	0	
1996	0	0.000	0		Feb	0	0.000	0	
1997	0	0.000	0		Mar	43	0.053	4	68
1998	0	0.000	0		Apr	175	0.216	15	71
1999	0	0.000	0		May	0	0.000	0	
2000	0	0.000	0		Jun	197	0.243	57	235
2001	558	0.688	47	68	Jul	0	0.000	0	
2002	2,565	3.164	744	235	Aug	0	0.000	0	
2003	0	0.000	0		Sep	0	0.000	0	
2004	0	0.000	0		Oct	0	0.000	0	
2005	0	0.000	0		Nov	0	0.000	0	
2006	0	0.000	0		Dec	0	0.000	0	
2007	2,272	2.803	198	71	Annual	415	0.512	76	149
Min.	0	0.000	0	-					
Max.	2,565	3.164	744	-					
Ave.	415	0.512	76	149					



**Table 3-7: Discharge Summary for Culvert S-5AW (out of L-8 Basin).**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	82,222	101.419	25,290	249	Jan	337	0.415	25	59
1996	104,886	129.375	12,424	96	Feb	408	0.504	19	38
1997	19,691	24.288	721	30	Mar	496	0.612	28	46
1998	13,774	16.990	403	24	Apr	300	0.370	14	39
1999	14,065	17.349	858	49	May	1,288	1.589	269	169
2000	39,680	48.945	5,120	105	Jun	378	0.467	50	107
2001	21,484	26.500	1,354	51	Jul	562	0.693	35	50
2002	10,397	12.825	475	37	Aug	2,687	3.314	560	169
2003	16,285	20.087	1,777	88	Sep	5,420	6.685	794	119
2004	5,374	6.629	371	56	Oct	11,853	14.620	1,655	113
2005	32,306	39.849	6,748	169	Nov	3,514	4.334	630	145
2006	1,164	1.436	256	178	Dec	1,069	1.319	293	222
2007	6,728	8.299	1,029	124	Annual	28,312	34.922	4,371	125
Min.	1,164	1.436	256	-					
Max.	104,886	129.375	25,290	-					
Ave.	28,312	34.922	4,371	125					

### 3.4. Culvert S-5AS

Gated culvert S-5AS allows the transfer of water between the L-8 Basin and the STA-1 Inflow Basin. The tables below present the annual and monthly summaries of flow and TP for the S-5AS culvert for flow out of the L-8 Basin and flow into the basin.

**Table 3-8: Discharge Summary for Culvert S-5AS (out of L-8 Basin).**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	54,850	67.657	5,926	88	Jan	1,911	2.357	353	150
1996	10,437	12.874	1,402	109	Feb	704	0.868	90	103
1997	0	0.000	0		Mar	1,039	1.282	221	172
1998	1,712	2.111	308	146	Apr	102	0.126	22	173
1999	13,040	16.085	2,709	168	May	0	0.000	0	
2000	34,788	42.910	7,889	184	Jun	43	0.053	9	163
2001	9,774	12.055	585	49	Jul	51	0.062	11	170
2002	12,218	15.070	888	59	Aug	1,543	1.903	188	99
2003	9,053	11.167	1,529	137	Sep	2,685	3.312	334	101
2004	5,258	6.485	1,096	169	Oct	1,733	2.138	321	150
2005	19,367	23.889	4,301	180	Nov	2,703	3.335	390	117
2006	6,021	7.427	1,344	181	Dec	1,064	1.312	214	163
2007	0	0.000	0		Annual	13,578	16.749	2,152	128
Min.	0	0.000	0	-					
Max.	54,850	67.657	7,889	-					
Ave.	13,578	16.749	2,152	128					





**Table 3-9: Discharge Summary for Culvert S-5AS (into L-8 Basin).**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
<b>1995</b>	108,806	134.210	13,424	100	<b>Jan</b>	10,910	13.457	1,197	89
<b>1996</b>	78,940	97.371	7,594	78	<b>Feb</b>	6,626	8.173	648	79
<b>1997</b>	8,172	10.080	861	85	<b>Mar</b>	7,662	9.451	966	102
<b>1998</b>	86,411	106.586	7,574	71	<b>Apr</b>	5,646	6.965	818	118
<b>1999</b>	111,382	137.387	10,823	79	<b>May</b>	5,646	6.964	675	97
<b>2000</b>	54,711	67.485	11,361	168	<b>Jun</b>	1,944	2.398	196	82
<b>2001</b>	75,783	93.477	6,016	64	<b>Jul</b>	2,666	3.288	449	136
<b>2002</b>	39,359	48.549	3,528	73	<b>Aug</b>	3,747	4.622	572	124
<b>2003</b>	60,803	74.999	9,676	129	<b>Sep</b>	3,000	3.701	489	132
<b>2004</b>	50,068	61.758	6,388	103	<b>Oct</b>	3,647	4.498	329	73
<b>2005</b>	37,421	46.158	7,709	167	<b>Nov</b>	4,774	5.889	477	81
<b>2006</b>	13,078	16.132	2,737	170	<b>Dec</b>	6,784	8.368	775	93
<b>2007</b>	94,750	116.872	10,973	94	<b>Annual</b>	63,053	77.774	7,589	98
<b>Min.</b>	8,172	10.080	861	-					
<b>Max.</b>	111,382	137.387	13,424	-					
<b>Ave.</b>	63,053	77.774	7,589	98					

### 3.5. Water Supply to City of West Palm Beach

The City of West Palm Beach operates Control 2 pump station to provide water supply to the Water Catchment Area. Water from the L-8 Canal is withdrawn into the M Canal via Control 2 pump station. Flow data were provided by CH2M Hill for the City of West Palm Beach (CH2M Hill 2007). Monthly TP concentrations were obtained by taking the flow-weighted mean concentration of the combined discharges from the L-8 Canal at the S-5AE, S-5AS and S-5AW control structures. The table below presents the annual and monthly summaries of flow and TP for the City of West Palm Beach Pump Station No. 2.



**Table 3-10: Discharge Summary for City of West Palm Beach Control No. 2.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
<b>1995</b>	33,461	41.273	6,597	160	<b>Jan</b>	4,636	5.718	753	132
<b>1996</b>	39,669	48.931	4,693	96	<b>Feb</b>	4,202	5.183	638	123
<b>1997</b>	36,200	44.652	2,051	46	<b>Mar</b>	4,346	5.361	635	118
<b>1998</b>	9,076	11.195	610	54	<b>Apr</b>	4,722	5.825	655	112
<b>1999</b>	45,823	56.521	4,390	78	<b>May</b>	6,653	8.207	971	118
<b>2000</b>	35,965	44.362	6,072	137	<b>Jun</b>	3,765	4.644	479	103
<b>2001</b>	67,474	83.228	6,358	76	<b>Jul</b>	3,590	4.428	477	108
<b>2002</b>	30,046	37.061	1,904	51	<b>Aug</b>	2,665	3.288	284	86
<b>2003</b>	59,935	73.928	8,544	116	<b>Sep</b>	1,626	2.005	146	73
<b>2004</b>	55,303	68.215	6,887	101	<b>Oct</b>	1,823	2.248	196	87
<b>2005</b>	61,962	76.429	12,886	169	<b>Nov</b>	3,069	3.786	394	104
<b>2006</b>	32,384	39.945	7,893	198	<b>Dec</b>	2,562	3.160	291	92
<b>2007</b>	60,263	74.333	8,057	108	<b>Annual</b>	43,658	53.852	5,918	110
<b>Min.</b>	9,076	11.195	610	-					
<b>Max.</b>	67,474	83.228	12,886	-					
<b>Ave.</b>	43,658	53.852	5,918	110					

### 3.6. L-8 Basin Runoff

The L-8 Basin runoff was estimated as the net result of the various flow components described above:

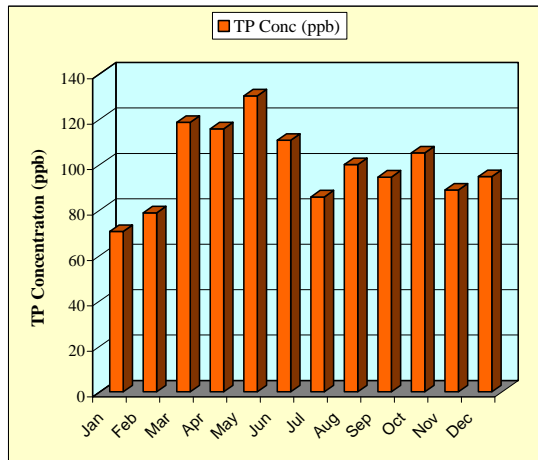
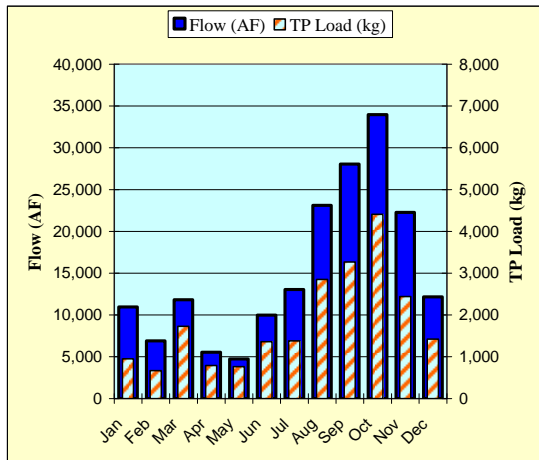
- Discharges to Lake Okeechobee through C-10A
- Plus net discharge east through S-5AE
- Plus net discharge west through S-5AW
- Plus net discharge south through S-5AS (irrigation supplies to L-8 are excluded)
- Minus Lake Okeechobee flow-through releases

The table below presents the annual and monthly summaries of flow and TP for the L-8 Basin. The figures present the monthly and annual variability associated with the L-8 Basin runoff.



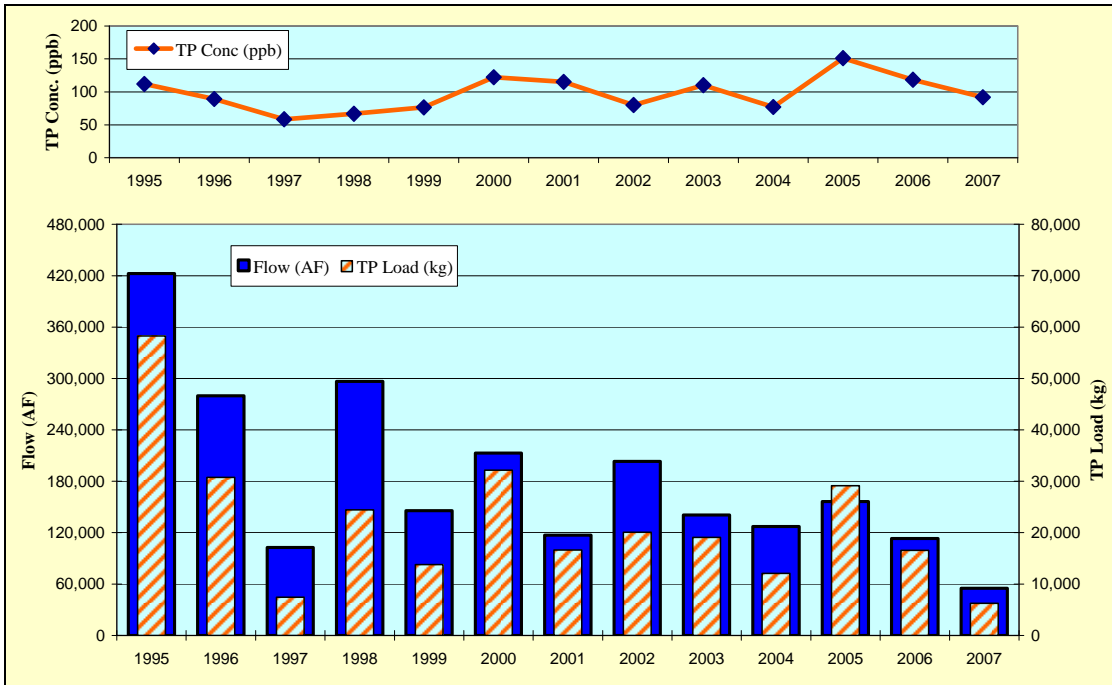
**Table 3-11: Discharge Summary for L-8 Basin Runoff.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	422,592	521.259	58,302	112	Jan	10,954	13.511	955	71
1996	279,662	344.958	30,760	89	Feb	6,896	8.506	670	79
1997	102,635	126.598	7,413	59	Mar	11,808	14.564	1,729	119
1998	296,526	365.760	24,434	67	Apr	5,540	6.834	791	116
1999	145,771	179.806	13,777	77	May	4,755	5.865	765	130
2000	212,926	262.640	32,146	122	Jun	9,979	12.309	1,364	111
2001	117,023	144.345	16,622	115	Jul	13,037	16.081	1,380	86
2002	203,237	250.689	20,083	80	Aug	23,108	28.504	2,853	100
2003	140,575	173.397	19,102	110	Sep	28,043	34.591	3,271	95
2004	127,296	157.017	12,085	77	Oct	33,966	41.896	4,409	105
2005	156,262	192.746	29,127	151	Nov	22,275	27.476	2,443	89
2006	113,213	139.646	16,553	119	Dec	12,159	14.998	1,422	95
2007	55,037	67.887	6,247	92	Annual	182,520	225.134	22,050	98
Min.	55,037	67.887	6,247	-					
Max.	422,592	521.259	58,302	-					
Ave.	182,520	225.134	22,050	98					



**Figure 3-2: Average Monthly Flows and Phosphorus Levels for L-8 Basin Runoff.**



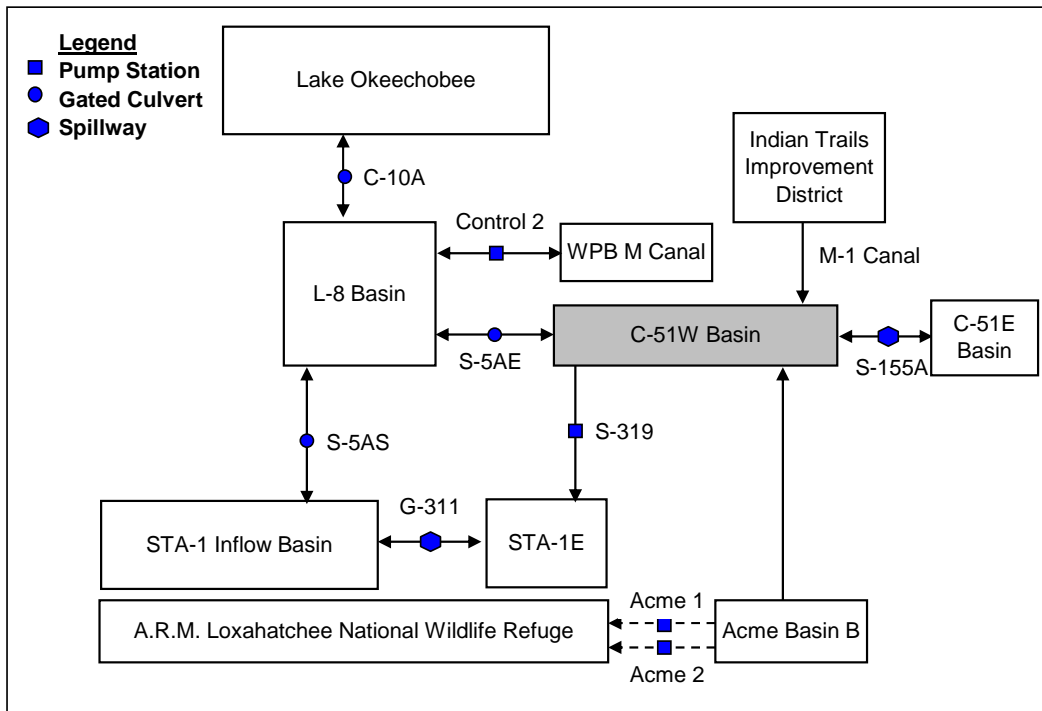


**Figure 3-3: WY1995-2007 Flows and Phosphorus Levels for L-8 Basin Runoff.**



## 4. C-51W Basin

The C-51W Basin has a contributing watershed of approximately 73 square miles in eastern Palm Beach County (Burns & McDonnell 2000). A schematic of the basin showing the primary conveyance features, water control structures and receiving waters is presented in the figure below. The flow and TP levels through each of the principal water control structures are described in the following sections.



**Figure 4-1: C-51 West Basin Schematic.**

### 4.1. Culvert S-5AE

Culvert S-5AE controls flows between the C-51W Basin and the L-8 Basin. The tables below present the annual and monthly summaries of flow and TP for Culvert S-5AE.



**Table 4-1: Discharge Summary for Culvert S-5AE (out of C-51W Basin).**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>				kg	ppb		
1995	0	0.000	0		Jan	812	1.002	116	116
1996	472	0.582	25	43	Feb	420	0.518	34	66
1997	0	0.000	0		Mar	0	0.000	0	
1998	0	0.000	0		Apr	664	0.819	74	90
1999	29,379	36.239	3,143	87	May	460	0.567	50	89
2000	5,980	7.376	654	89	Jun	9	0.011	2	145
2001	75	0.093	12	129	Jul	0	0.000	0	
2002	121	0.149	22	145	Aug	32	0.039	3	73
2003	0	0.000	0		Sep	0	0.000	0	
2004	0	0.000	0		Oct	23	0.029	2	65
2005	0	0.000	0		Nov	0	0.000	0	
2006	0	0.000	0		Dec	382	0.472	20	43
2007	404	0.498	58	117	Annual	2,802	3.457	301	87
Min.	0	0.000	0	-					
Max.	29,379	36.239	3,143	-					
Ave.	2,802	3.457	301	87					

**Table 4-2: Discharge Summary for Culvert S-5AE (into C-51W Basin).**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>				kg	ppb		
1995	230,235	283.991	21,937	77	Jan	15,715	19.384	1,857	96
1996	203,129	250.556	19,142	76	Feb	10,940	13.494	1,466	109
1997	76,696	94.603	5,879	62	Mar	15,211	18.762	2,548	136
1998	185,988	229.413	14,708	64	Apr	10,796	13.317	1,634	123
1999	112,789	139.123	10,586	76	May	7,678	9.470	1,146	121
2000	157,077	193.751	20,906	108	Jun	6,431	7.933	684	86
2001	16,237	20.028	2,340	117	Jul	9,222	11.375	976	86
2002	56,441	69.619	3,487	50	Aug	8,853	10.921	1,149	105
2003	195,841	241.566	27,187	113	Sep	14,563	17.963	1,570	87
2004	257,314	317.392	31,242	98	Oct	13,314	16.423	1,366	83
2005	155,595	191.923	35,118	183	Nov	17,046	21.026	1,704	81
2006	233,896	288.506	40,923	142	Dec	16,933	20.887	2,096	100
2007	25,904	31.952	3,087	97	Annual	146,703	180.956	18,195	101
Min.	16,237	20.028	2,340	-					
Max.	257,314	317.392	40,923	-					
Ave.	146,703	180.956	18,195	101					

#### 4.2. S-319

S-319 is the primary inflow pump station for STA-1E. Inflow records for S-319 began as part of the emergency operations associated with the 2004 hurricanes. The table below presents the annual and monthly summaries of flow and TP for S-319.



**Table 4-3: Discharge Summary for S-319 Pump Station.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995					Jan	551	0.680	103	151
1996					Feb	300	0.370	64	173
1997					Mar	158	0.195	32	167
1998					Apr	168	0.207	41	197
1999					May	163	0.201	33	166
2000					Jun	270	0.333	44	131
2001					Jul	1,047	1.292	230	178
2002					Aug	749	0.924	136	147
2003					Sep	854	1.053	165	157
2004					Oct	565	0.697	96	138
2005<	8,033	9.908	2,092	211	Nov	475	0.586	79	135
2006	18,026	22.235	4,060	183	Dec	736	0.907	143	158
2007	52,422	64.661	9,007	139	Annual	6,037	7.446	1,166	157
Min.	18,026	22.235	4,060	-					
Max.	52,422	64.661	9,007	-					
Ave.	35,224	43.448	6,534	150					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.

### 4.3. C-51 West Canal at State Road 7

The intersection of the C-51 Canal and State Road 7 represents the divide between the C-51 West and East Basins. The District monitored flow and TP at this location between July 1997 and July 2001. The table below presents the annual and monthly summaries of flow and TP for this location.





**Table 4-4: Discharge Summary for C-51 W Canal at State Road 7.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
<b>1995</b>					<b>Jan</b>	26,646	32.867	3,573	109
<b>1996</b>					<b>Feb</b>	20,002	24.672	2,158	87
<b>1997</b>					<b>Mar</b>	17,576	21.679	1,819	84
<b>1998&lt;</b>	346,106	426.915	45,413	106	<b>Apr</b>	10,118	12.480	1,495	120
<b>1999</b>	244,443	301.516	34,434	114	<b>May</b>	8,954	11.045	1,283	116
<b>2000</b>	247,463	305.240	44,741	147	<b>Jun</b>	11,696	14.427	2,653	184
<b>2001</b>	59,067	72.858	9,557	131	<b>Jul</b>	9,468	11.679	1,645	141
<b>2002&lt;</b>	13,032	16.075	3,002	187	<b>Aug</b>	23,934	29.522	3,706	126
<b>2003</b>					<b>Sep</b>	26,062	32.147	4,054	126
<b>2004</b>					<b>Oct</b>	20,549	25.347	3,518	139
<b>2005</b>					<b>Nov</b>	22,526	27.786	4,159	150
<b>2006</b>					<b>Dec</b>	27,631	34.082	3,821	112
<b>2007</b>					<b>Annual</b>	225,161	277.731	33,885	122
<b>Min.</b>	13,032	16.075	3,002	-					
<b>Max.</b>	346,106	426.915	45,413	-					
<b>Ave.</b>	183,658	226.538	29,577	131					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.

2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.

Spillway S-155A was constructed as part of the U.S. Army Corps of Engineers C-51 West End Flood Control Project, and serves to separate the C-51 East basin flows from those to the west. The structure is located just west of State Road 7. Prior to the construction of the North Palm Beach County Project, stormwater runoff from the L-8 Basin will continue to flow east through S-5AE. While a portion of this flow may be picked up by S-319, the operational intent is that an equivalent volume and/or TP load of runoff from the C-51 W Basin will be discharged east through the S-155A structure. Flow records began in March 2004. The table below presents the annual and monthly summaries of flow and TP for S-155A.



**Table 4-5: Discharge Summary for Spillway S-155A.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	5,945	7.333	1564	213
1996					Feb	7,983	9.847	1524	155
1997					Mar	14,139	17.440	3209	184
1998					Apr	9,771	12.053	2656	220
1999					May	13,214	16.299	3134	192
					Jun	18,703	23.070	2974	129
2000					Jul	19,469	24.015	2896	121
2001					Aug	22,255	27.451	4915	179
2002					Sep	50,799	62.660	12812	204
2003					Oct	41,370	51.029	17796	349
2004<	6,439	7.943	2,081	262	Nov	23,791	29.346	3541	121
2005	279,502	344.760	107,201	311	Dec	15,982	19.714	3227	164
2006	397,964	490.881	63,121	129	Annual	243,423	300.258	60,250	201
2007	70,274	86.682	14,212	164					
Min.	70,274	86.682	14,212	-					
Max.	397,964	490.881	107,201	-					
Ave.	249,247	307.441	61,511	200					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.

The table below presents the annual and monthly summaries of flow and TP for the combined flows and TP loads at State Road 7 and S-155A.

**Table 4-6: Combined Discharge Summary for SR7 and S-155A.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	17,774	21.924	2,712	124
1996					Feb	14,851	18.318	1,886	103
1997					Mar	15,857	19.560	2,514	129
1998<	346,106	426.915	45,413	106	Apr	9,944	12.266	2,076	169
1999	244,443	301.516	34,435	114	May	10,780	13.297	2,076	156
					Jun	14,699	18.131	2,791	154
2000	247,463	305.240	44,744	147	Jul	13,218	16.305	2,114	130
2001	59,067	72.858	9,657	131	Aug	23,214	28.634	4,224	148
2002<	13,032	16.075	3,080	187	Sep	36,664	45.224	7,808	173
2003					Oct	29,473	36.354	9,637	265
2004<	6,439	7.943	2,081	262	Nov	23,068	28.454	3,894	137
2005	279,502	344.760	107,201	311	Dec	22,638	27.924	3,566	128
2006	397,964	490.881	63,121	129	Annual	232,181	286.391	45,299	158
2007	70,274	86.682	14,212	164					
Min.	59,067	72.858	9,657	-					
Max.	397,964	490.881	63,121	-					
Ave.	216,452	266.990	45,561	171					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.



#### ***4.4. M-1 Canal***

Discharges from the L-8 Basin, specifically the Indian Trails Water Control District sub-basin, also enters the C-51 Canal during storm events when insufficient capacity exists in the L-8 Basin. Unfortunately, no flow records are available to document the flows and TP loads into the C-51 W Basin from the M-1 Canal.

#### ***4.5. C-51 West Basin Runoff***

The C-51 West Basin runoff was estimated as the net result of the various flow components described above:

- Discharges to the west at S-5AE
- Minus discharges east at S-5AE
- Plus S-319 discharges to STA-1E
- Plus net eastward discharge at State Road 7 and S-155A

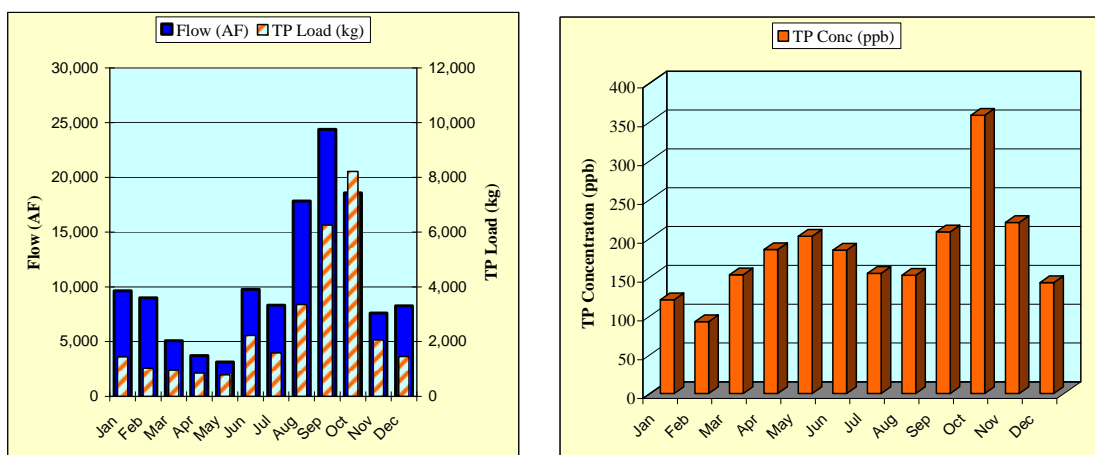
Because of the limited periods of overlapping data entering and leaving the basin, runoff can only be estimated for a partial period of the WY1995-2007 period. The table below presents the annual monthly summaries of flow and TP for the C-51W Basin. The figures present the monthly and annual variability associated with the C-51W Basin runoff. Note that the table and figures contain an unquantifiable contribution from the M-1 Canal. The flows and loads associated with the 2004 hurricanes significantly influence the monthly flows and TP concentrations for the C-51W Basin, and Table 4-8 presents the annual and monthly values when September and October 2004 flows and loads are excluded from the data set. The annual flow-weighted mean TP concentration decreases from 196 ppb to 156 ppb if the flows and loads are excluded.



**Table 4-7: Discharge Summary for C-51 West Basin Runoff (includes 2004 hurricane flows and loads).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995					Jan	9,641	11.892	1,437	121
1996					Feb	8,988	11.086	1,026	93
1997					Mar	5,072	6.256	957	153
1998<	160,939	198.515	32,358	163	Apr	3,722	4.591	851	185
1999	161,033	198.631	29,031	146	May	3,146	3.881	787	203
2000	96,366	118.865	21,093	177	Jun	9,766	12.047	2,226	185
2001	42,906	52.924	7,208	136	Jul	8,333	10.278	1,590	155
2002<	13,141	16.209	2,835	175	Aug	17,830	21.993	3,352	152
2003					Sep	24,386	30.080	6,258	208
2004					Oct	18,583	22.921	8,218	359
2005	131,940	162.745	74,175	456	Nov	7,601	9.376	2,066	220
2006	182,094	224.609	26,258	117	Dec	8,257	10.185	1,455	143
2007	97,196	119.890	20,190	168	Annual	125,326	154.587	30,222	196
Min.	13,141	52.924	21,093	-					
Max.	182,094	224.609	74,175	-					
Ave.	118,589	146.277	37,639	257					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.



**Figure 4-2: Average Monthly Flows and Phosphorus Levels for C-51W Basin Runoff.**



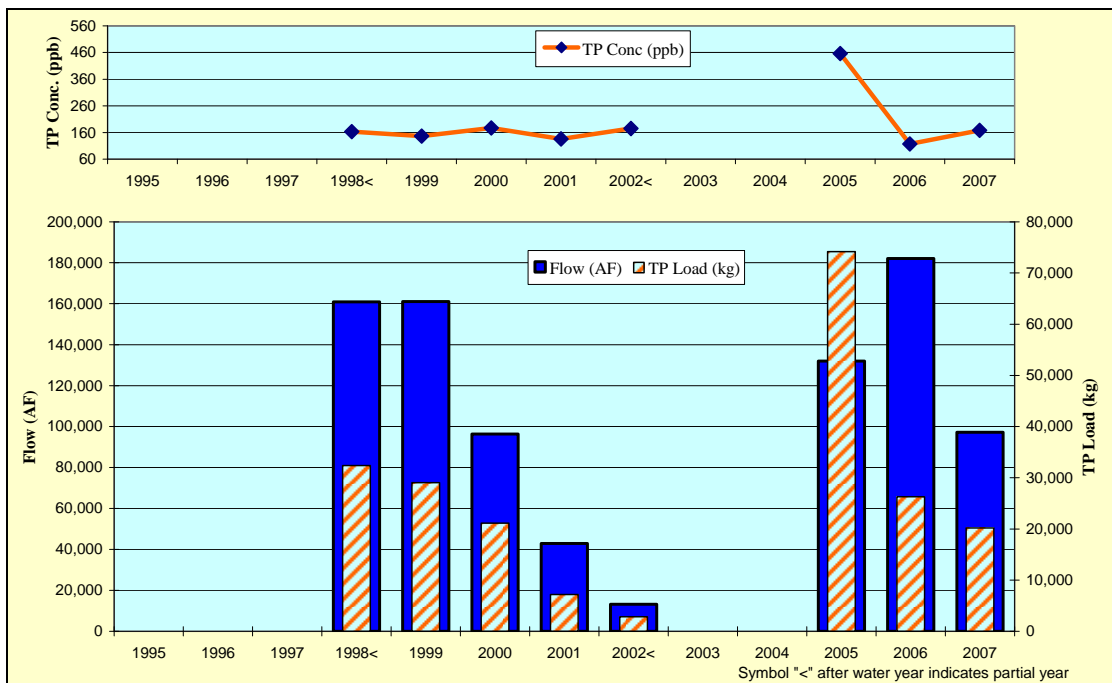


Figure 4-3: WY1995-2007 Flows and Phosphorus Levels for C-51W Basin Runoff.

Table 4-8: Discharge Summary for C-51 West Basin Runoff (excludes 2004 hurricane flows and loads).

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	9,641	11.892	1,437	121
1996					Feb	8,988	11.086	1,026	93
1997					Mar	5,072	6.256	957	153
1998<	160,939	198.515	32,358	163	Apr	3,722	4.591	851	185
1999	161,033	198.631	29,031	146	May	3,146	3.881	787	203
2000	96,366	118.865	21,093	177	Jun	9,766	12.047	2,226	185
2001	42,906	52.924	7,208	136	Jul	8,333	10.278	1,590	155
2002<	13,141	16.209	2,835	175	Aug	17,830	21.993	3,352	152
2003					Sep	19,975	24.638	4,149	168
2004					Oct	15,841	19.540	2,674	137
2005	46,054	56.806	13,786	243	Nov	7,601	9.376	2,066	220
2006	182,094	224.609	26,258	117	Dec	8,257	10.185	1,455	143
2007	97,196	119.890	20,190	168	Annual	118,173	145.764	22,570	155
Min.	13,141	52.924	13,786	-					
Max.	182,094	224.609	29,031	-					
Ave.	104,275	128.621	22,542	175					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.



## 5. Acme Basin B

Prior to December 2006, stormwater runoff from Acme Basin B drainage basin was discharged into the Refuge through two pump stations: ACME1 and ACME2. Beginning January 2007, runoff has been diverted north to the C-51 Canal west of the S-155A spillway. The tables below present the annual and monthly summaries of flow and TP for these pumps, and for the combined discharges. The figures present the monthly and annual variability associated with the Acme Basin B runoff.

**Table 5-1: Discharge Summary for Acme 1 Pump Station.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
<b>1995</b>	28,317	34,928	2,415	69	<b>Jan</b>	467	0.576	48	84
<b>1996</b>	22,172	27,349	4,841	177	<b>Feb</b>	629	0.776	64	82
<b>1997</b>	17,168	21,176	1,421	67	<b>Mar</b>	491	0.606	53	87
<b>1998</b>	26,393	32,556	2,972	91	<b>Apr</b>	174	0.215	14	65
<b>1999</b>	19,776	24,393	3,579	147	<b>May</b>	447	0.551	44	80
<b>2000</b>	19,316	23,826	3,619	152	<b>Jun</b>	2,148	2.650	217	82
<b>2001</b>	5,422	6,688	436	65	<b>Jul</b>	2,131	2.628	229	87
<b>2002</b>	16,422	20,257	1,777	88	<b>Aug</b>	2,396	2.955	260	88
<b>2003</b>	8,817	10,875	915	84	<b>Sep</b>	3,038	3.747	419	112
<b>2004</b>	10,018	12,358	957	77	<b>Oct</b>	2,254	2.780	533	192
<b>2005</b>	11,729	14,468	1,892	131	<b>Nov</b>	1,431	1.765	199	113
<b>2006</b>	14,161	17,467	1,403	80	<b>Dec</b>	938	1.157	102	88
<b>2007&lt;</b>	13,611	16,789	1,968	117	<b>Annual</b>	16,545	20.408	2,183	107
<b>Min.</b>	5,422	6,688	436	-					
<b>Max.</b>	28,317	34,928	4,841	-					
<b>Ave.</b>	16,643	20,528	2,186	106					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.

2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.



**Table 5-2: Discharge Summary for Acme 2 Pump Station.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	26,630	32.848	3,622	110	Jan	438	0.541	50	92
1996	22,244	27.438	4,800	175	Feb	550	0.678	73	108
1997	12,911	15.925	1,346	85	Mar	434	0.535	54	102
1998	20,898	25.777	2,597	101	Apr	250	0.308	32	105
1999	16,930	20.883	3,755	180	May	366	0.452	36	80
2000	18,725	23.097	3,137	136	Jun	2,064	2.546	273	107
2001	6,159	7.597	917	121	Jul	1,980	2.443	297	121
2002	17,531	21.624	3,286	152	Aug	2,174	2.682	312	116
2003	9,473	11.685	1,303	112	Sep	2,769	3.415	529	155
2004	9,871	12.176	1,227	101	Oct	2,070	2.553	502	197
2005	9,959	12.284	2,517	205	Nov	1,306	1.610	248	154
2006	12,767	15.748	1,832	116	Dec	868	1.070	115	107
2007<	12,711	15.679	2,217	141	Annual	15,268	18.832	2,521	134
Min.	6,159	7.597	917	-					
Max.	26,630	32.848	4,800	-					
Ave.	15,341	18.923	2,528	134					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.

2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.

**Table 5-3: Discharge Summary for Acme Basin B.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	54,947	67.776	6,038	89	Jan	905	1.117	98	88
1996	44,416	54.787	9,641	176	Feb	1,179	1.454	137	94
1997	30,079	37.102	2,767	75	Mar	925	1.141	107	94
1998	47,291	58.333	5,569	95	Apr	424	0.523	46	89
1999	36,705	45.275	7,334	162	May	813	1.003	81	80
2000	38,041	46.922	6,756	144	Jun	4,212	5.196	490	94
2001	11,581	14.285	1,353	95	Jul	4,111	5.071	525	104
2002	33,953	41.881	5,064	121	Aug	4,570	5.637	573	102
2003	18,290	22.560	2,218	98	Sep	5,807	7.162	948	132
2004	19,890	24.533	2,184	89	Oct	4,324	5.333	1,034	194
2005	21,688	26.752	4,409	165	Nov	2,737	3.376	447	132
2006	26,928	33.215	3,236	97	Dec	1,806	2.227	217	97
2007<	26,322	32.468	4,185	129	Annual	31,813	39.240	4,703	120
Min.	11,581	14.285	1,353	-					
Max.	54,947	67.776	9,641	-					
Ave.	31,984	39.452	4,714	119					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.

2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.





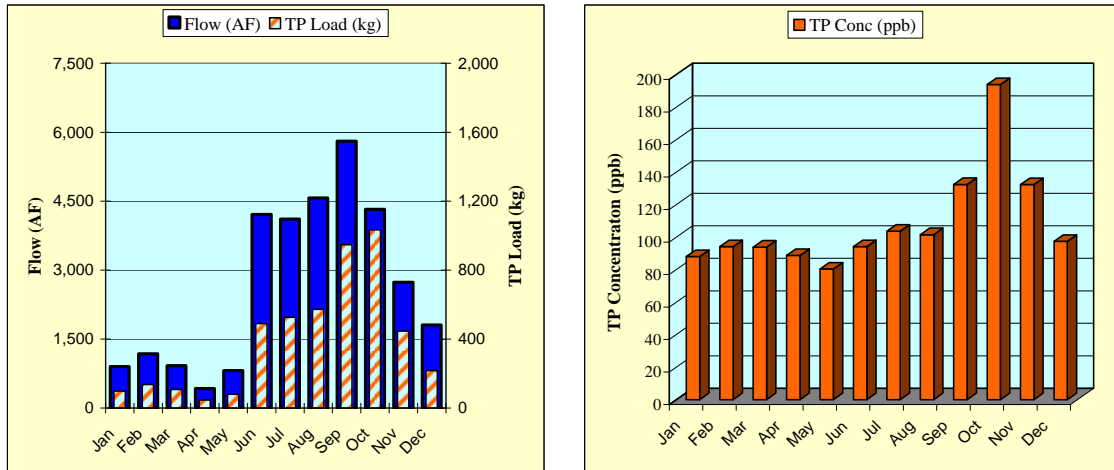


Figure 5-1: Average Monthly Flows and Phosphorus Levels for Acme Basin B Runoff.

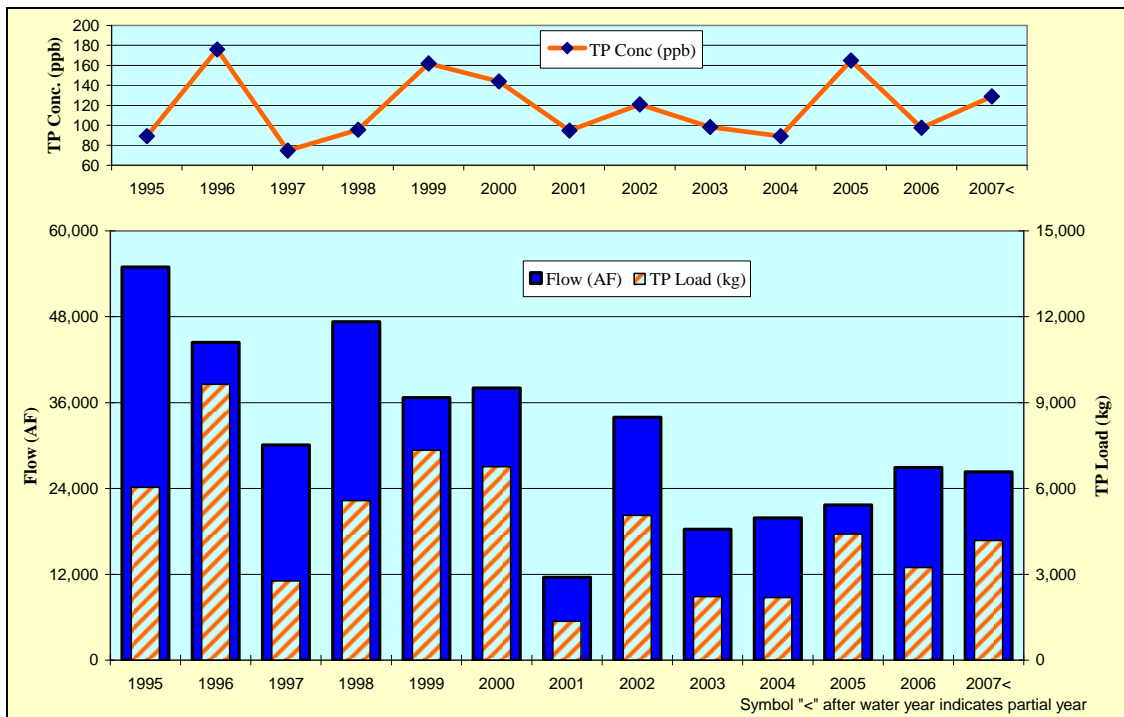
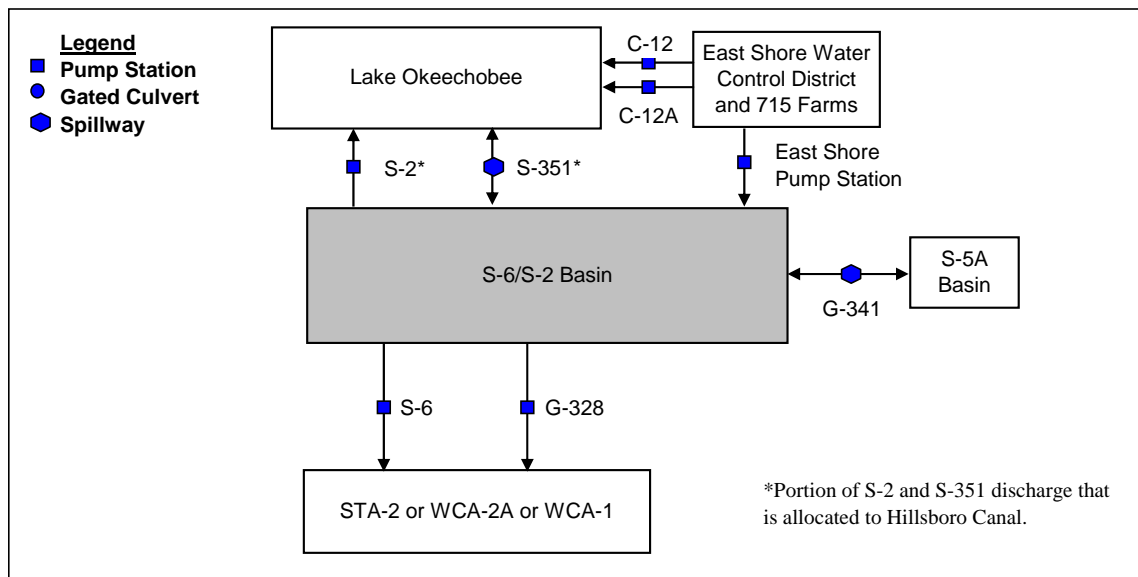


Figure 5-2: WY1995-2007 Flows and Phosphorus Levels for Acme Basin B Runoff.



## 6. S-6/S-2 Basin

The S-6 Basin covers approximately 133 square miles in central Palm Beach County (Goforth and Piccone 2001). A schematic of the basin showing the primary conveyance features, water control structures and receiving waters is presented in the figure below. The flow and TP levels through each of the principal water control structures are described in the following sections.



**Figure 6-1: S-2/S-6 Basin Schematic.**

### 6.1. S-2 Pump Station and S-351 Spillway

The original design and initial operation of the S-2 pump station called for the pump station to provide flood protection to the northern area of the Hillsboro Canal and North New River Canal Basins. Two significant regional actions have modified the operation of S-2. In 1979, the District implemented the Interim Action Plan, designed to reduce the amount of nitrogen entering Lake Okeechobee from the EAA. Since that time, the vast majority of the basin runoff has been discharged south through the southern pump stations. With the construction and operation of the STAs, the function and operation of the southern pump stations has been modified to integrate with the ECP. Beginning in June 1999, discharges from the S-6 pump station have been diverted into STA-2 for treatment prior to discharge into the WCA-2A. Similarly, in 2003, the function and operation of S-7 has been modified to serve as one of the outflow pump stations for STA-3/4.



The data analysis presented herein allocates approximately 34.8% of the discharge at S-2 to the S-6/S-2 Basin, consistent with Rule 40-E63. The table below presents the annual and monthly summaries of flow and TP for the S-2 pump station allocated to the S-6/S-2 Basin.

**Table 6-1: Discharge Summary for Pump Station S-2 Allocated to the S-6/S-2 Basin.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995	21,662	26.720	5,598	210	Jan	11	0.014	2	173
1996	16,425	20.259	3,097	153	Feb	208	0.257	63	244
1997	1,996	2.462	385	156	Mar	217	0.267	45	170
1998	3,888	4.796	826	172	Apr	185	0.229	38	168
1999	16,143	19.913	4,269	214	May	0	0.000	0	
2000	13,603	16.779	3,793	226	Jun	798	0.984	118	120
2001	11,206	13.823	2,915	211	Jul	1,795	2.214	214	97
2002	73,090	90.155	9,508	105	Aug	2,578	3.179	377	118
2003	325	0.401	79	196	Sep	2,034	2.509	303	121
2004	74	0.091	18	197	Oct	2,471	3.049	618	203
2005	7,498	9.249	1,232	133	Nov	1,839	2.269	517	228
2006	3,601	4.442	805	181	Dec	1,007	1.243	225	181
2007	1,364	1.682	235	140	Annual	13,144	16.213	2,520	155
Min.	74	0.091	18	-					
Max.	73,090	90.155	9,508	-					
Ave.	13,144	16.213	2,520	155					

The S-351 spillway is operated to release water from Lake Okeechobee for EAA irrigation, and make water supply and regulatory releases downstream. The table below presents the annual and monthly summaries of flow and TP for the S-351 gated spillway allocated to the S-6/S-2 Basin.



**Table 6-2: Discharge Summary for Spillway S-351.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
<b>1995</b>	102,608	126.565	9,506	75	<b>Jan</b>	8,335	10.281	1,579	154
<b>1996</b>	108,907	134.335	15,268	114	<b>Feb</b>	5,816	7.174	1,129	157
<b>1997</b>	54,792	67.585	5,624	83	<b>Mar</b>	7,561	9.326	1,369	147
<b>1998</b>	29,541	36.438	2,956	81	<b>Apr</b>	15,036	18.547	2,330	126
<b>1999</b>	107,096	132.101	12,784	97	<b>May</b>	14,325	17.670	2,174	123
<b>2000</b>	63,297	78.076	11,792	151	<b>Jun</b>	5,046	6.225	785	126
<b>2001</b>	74,564	91.973	14,373	156	<b>Jul</b>	1,789	2.207	192	87
<b>2002</b>	24,358	30.045	3,194	106	<b>Aug</b>	787	0.971	104	107
<b>2003</b>	89,287	110.134	9,539	87	<b>Sep</b>	542	0.668	56	83
<b>2004</b>	62,482	77.071	7,327	95	<b>Oct</b>	4,462	5.504	450	82
<b>2005</b>	102,750	126.741	20,363	161	<b>Nov</b>	4,608	5.683	630	111
<b>2006</b>	69,707	85.983	23,241	270	<b>Dec</b>	6,411	7.908	1,142	144
<b>2007</b>	81,953	101.088	19,254	190	<b>Annual</b>	74,719	92.164	11,940	130
<b>Min.</b>	24,358	30.045	2,956	-					
<b>Max.</b>	108,907	134.335	23,241	-					
<b>Ave.</b>	74,719	92.164	11,940	130					

Approximately 32% of the Lake water released at S-351 flows through the EAA and is discharged to the EPA or STAs to satisfy downstream water supply demands and for Lake regulatory releases. The table below quantifies the Lake flow-through at S-6, and uses the TP concentration at S-6, consistent with the method used in the EAA Regional Feasibility Study (ADA/Burns & McDonnell 2005).



**Table 6-3: Discharge Summary for Lake Flow-through Releases at S-6.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	81,211	100.173	6,921	69	Jan	4,140	5.106	326	64
1996	61,516	75.879	4,380	58	Feb	1,571	1.938	134	69
1997	6,988	8.619	753	87	Mar	2,046	2.524	126	50
1998	22,920	28.272	2,505	89	Apr	4,386	5.410	355	66
1999	27,375	33.767	2,650	78	May	2,056	2.536	211	83
2000	28,346	34.965	3,310	95	Jun	1,062	1.310	109	83
2001	11,445	14.118	1,168	83	Jul	52	0.064	5	77
2002	2,262	2.790	59	21	Aug	131	0.161	8	52
2003	44,195	54.514	2,711	50	Sep	201	0.248	26	104
2004	7,357	9.075	326	36	Oct	3,074	3.792	340	90
2005	11,994	14.794	957	65	Nov	3,112	3.838	267	70
2006	6,977	8.606	778	90	Dec	2,930	3.614	205	57
2007	9,276	11.442	942	82	Annual	24,759	30.539	2,112	69
Min.	2,262	2.790	59	-					
Max.	81,211	100.173	6,921	-					
Ave.	24,759	30.539	2,112	69					

## 6.2. East Shore Pump Station

The East Shore Pump Station (ESPS) was constructed as part of the Everglades Construction Project (ECP) Ch. 298 Districts Diversion project. The pump station functions to divert into the S-6 Basin runoff from the East Shore Water Control District (EBWCD) and 715 Farms that previously entered Lake Okeechobee. Flow records began in December 2001. The table below presents the annual and monthly summaries of flow and TP for the East Shore Pump Station.



**Table 6-4: Discharge Summary for East Shore Pump Station.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995					Jan	687	0.847	55	65
1996					Feb	1,522	1.877	146	78
1997					Mar	1,117	1.378	124	90
1998					Apr	495	0.610	41	67
1999					May	1,389	1.713	137	80
2000					Jun	3,671	4.528	447	99
2001					Jul	3,782	4.664	595	127
2002<	4,893	6.036	404	67	Aug	4,486	5.533	651	118
2003	32,606	40.219	3,607	90	Sep	3,246	4.003	739	185
2004	29,812	36.773	2,988	81	Oct	2,442	3.012	807	268
2005	34,326	42.341	6,124	145	Nov	817	1.008	182	181
2006	26,800	33.058	6,884	208	Dec	907	1.118	62	55
2007	18,913	23.329	3,902	167	Annual	24,558	30.292	3,985	132
Min.	18,913	23.329	2,988	-					
Max.	34,326	42.341	6,884	-					
Ave.	28,491	35.144	4,701	134					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.

### 6.3. S-6 Pump Station

The original design and initial operation of the S-6 pump station called for the pump station to provide flood protection to the southern area of the Hillsboro Canal, with discharge into the Refuge. Two significant regional actions have modified the operation of S-6. In 1979, the District implemented the Interim Action Plan, designed to reduce the amount of nitrogen entering Lake Okeechobee from the EAA. Since that time, the vast majority of the S-6/S-2 basin runoff has been discharged south through S-6. With the construction and operation of the STAs, the function and operation of S-6 has been modified to integrate with the ECP. Beginning in June 1999, discharges from the S-6 pump station have been diverted into STA-2 for treatment prior to discharge into the WCA-2A. The table below presents the annual and monthly summaries of flow and TP for the S-6 pump station.



**Table 6-5: Discharge Summary for Pump Station S-6.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	623,414	768.969	68,566	89	Jan	11,240	13.864	792	57
1996	429,597	529.900	39,717	75	Feb	13,600	16.775	1,464	87
1997	251,547	310.279	33,034	106	Mar	15,592	19.233	2,282	119
1998	351,268	433.282	43,163	100	Apr	10,285	12.686	1,535	121
1999	215,752	266.126	26,566	100	May	12,342	15.224	1,429	94
2000	327,663	404.166	57,178	141	Jun	34,677	42.773	3,584	84
2001	154,610	190.708	23,246	122	Jul	30,984	38.218	3,762	98
2002	191,550	236.273	18,605	79	Aug	44,083	54.376	5,707	105
2003	276,753	341.370	21,436	63	Sep	45,298	55.875	6,983	125
2004	245,526	302.851	23,779	79	Oct	40,166	49.544	5,848	118
2005	291,867	360.012	47,758	133	Nov	21,358	26.344	2,356	89
2006	282,060	347.915	43,036	124	Dec	17,140	21.141	1,950	92
2007	216,318	266.824	43,921	165	Annual	296,763	366.052	37,693	103
Min.	154,610	190.708	18,605	-					
Max.	623,414	768.969	68,566	-					
Ave.	296,763	366.052	37,693	103					

#### 6.4. G-328 Pump Station

Prior to the construction of STA-2, runoff from farm lands tributary to G-328 was discharged into the L-6 borrow canal and S-6 pump station. Runoff from these lands are now discharged via G-328 directly into the STA-2 Supply Canal, with flow records beginning in April 2000. The table below presents the annual and monthly summaries of flow and TP for the G-328 pump station.





**Table 6-6: Discharge Summary for Pump Station G-328.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995					Jan	0	0.000	0	
1996					Feb	286	0.353	10	28
1997					Mar	644	0.795	34	43
1998					Apr	382	0.471	16	35
1999					May	122	0.150	6	40
2000<	3,838	4.734	178	38	Jun	666	0.821	29	35
2001	17,273	21.305	797	37	Jul	1,652	2.037	78	38
2002	21,258	26.222	1,058	40	Aug	1,813	2.236	98	44
2003	5,978	7.374	288	39	Sep	1,451	1.790	108	60
2004	11,413	14.078	509	36	Oct	1,313	1.619	87	54
2005	24,407	30.106	1,280	42	Nov	151	0.187	10	53
2006	15,628	19.277	1,059	55	Dec	128	0.158	6	37
2007	12,114	14.942	1,105	74	Annual	8,608	10.618	483	45
Min.	5,978	7.374	288	-					
Max.	24,407	30.106	1,280	-					
Ave.	15,439	19.043	871	46					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.

### 6.5. G-341 Divide Structure

Spillway G-341 serves as a basin divide between the S-5A Basin and the S-6 Basin. Flow and TP records began in September 2005. The tables below presents the annual and monthly summaries of flow and TP for the G-341 divide structure for flow into and out of the S-6 Basin.



**Table 6-7: Discharge Summary for Spillway G-341 (into S-6 Basin).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	1,129	1.393	142	102
1996					Feb	145	0.179	14	81
1997					Mar	732	0.903	95	105
1998					Apr	1,173	1.447	184	127
1999					May	4,757	5.867	625	107
2000					Jun	10,894	13.438	1,331	99
2001					Jul	0	0.000	0	
2002					Aug	928	1.144	245	214
2003					Sep	0	0.000	0	
2004					Oct	1,549	1.911	339	177
2005					Nov	4,343	5.357	751	140
2006<	28,919	35.671	5,415	152	Dec	8,137	10.036	1,467	146
2007	22,076	27.230	2,771	102	Annual	33,787	41.675	5,194	125
Min.	22,076	27.230	2,771	-					
Max.	22,076	27.23	2,771	-					
Ave.	22,076	27.23	2,771	102					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.

**Table 6-8: Discharge Summary for Spillway G-341 (out of S-6 Basin).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	0	0.000	0	
1996					Feb	4,780	5.896	1,777	301
1997					Mar	3,251	4.010	762	190
1998					Apr	2,630	3.245	519	160
1999					May	4,683	5.776	671	116
2000					Jun	1,767	2.180	992	455
2001					Jul	2,270	2.800	280	100
2002					Aug	19,291	23.795	9,472	398
2003					Sep	7,610	9.386	2,850	304
2004					Oct	3,041	3.751	685	183
2005					Nov	868	1.071	85	79
2006<	23,834	29.399	7,301	248	Dec	141	0.174	21	119
2007	48,820	60.218	17,511	291	Annual	50,333	62.085	18,114	292
Min.	48,820	60.218	17,511	-					
Max.	48,820	60.22	17,511	-					
Ave.	48,820	60.22	17,511	291					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.



### 6.6. S-6/S-2 Basin Runoff

The S-6/S-2 Basin runoff was estimated as the net result of the various flow components described above:

- S-6 discharges to the Refuge and STA-2
- Plus discharges to Lake Okeechobee through S-2 and S-351
- Plus discharges from G-328
- Plus discharges to the S-5A Basin through the G-341 divide structure (beginning September 9, 2005)
- Minus flow-through release from Lake at S-351
- Minus inflows from East Shore Pump Station
- Minus discharges from the S-5A Basin through the G-341 divide structure (beginning September 9, 2005)

The table below presents the annual and monthly summaries of flow and TP for the S-6/S-2 Basin runoff. The figures present the monthly and annual variability associated with the S-6/S-2 Basin runoff.

**Table 6-9: Discharge Summary for S-6/S-2 Basin Runoff.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	563,865	695.516	67,243	97	Jan	6,620	8.166	421	52
1996	384,506	474.280	38,434	81	Feb	12,534	15.461	1,606	104
1997	246,556	304.122	32,667	107	Mar	14,279	17.613	2,280	129
1998	332,235	409.806	41,484	101	Apr	6,462	7.971	1,267	159
1999	204,520	252.271	28,185	112	May	9,761	12.040	1,164	97
2000	316,758	390.714	57,839	148	Jun	32,682	40.312	3,390	84
2001	171,643	211.718	25,790	122	Jul	32,808	40.468	3,796	94
2002	278,742	343.823	28,708	83	Aug	47,685	58.819	6,583	112
2003	206,256	254.412	15,485	61	Sep	48,256	59.522	7,465	125
2004	219,842	271.171	20,991	77	Oct	39,979	49.314	5,893	119
2005	277,453	342.232	43,189	126	Nov	19,325	23.837	2,430	102
2006	262,427	323.698	39,125	121	Dec	13,696	16.894	1,725	102
2007	228,351	281.666	55,157	196	Annual	284,089	350.418	38,023	109
Min.	171,643	211.718	15,485	-					
Max.	563,865	695.516	67,243	-					
Ave.	284,089	350.418	38,023	109					



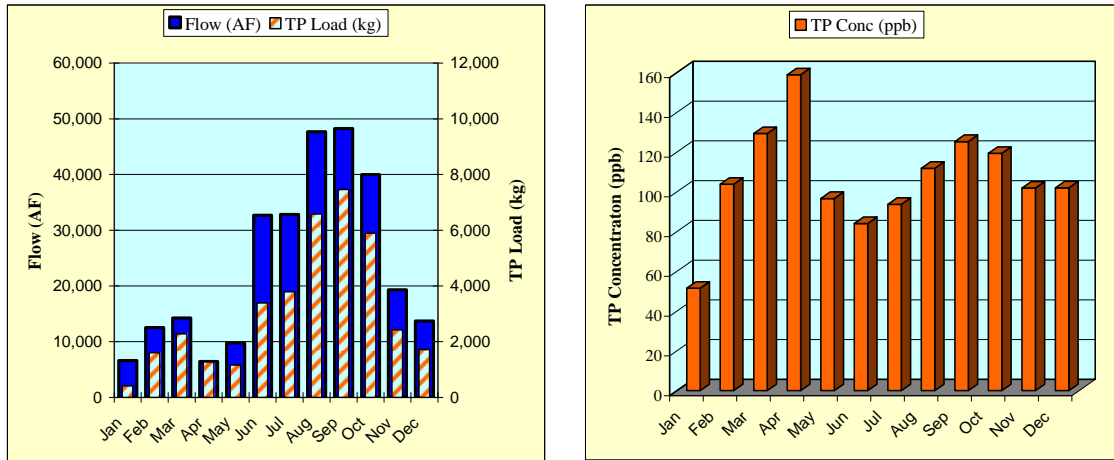


Figure 6-2: Average Monthly Flows and Phosphorus Levels for S-6/S-2 Basin Runoff.

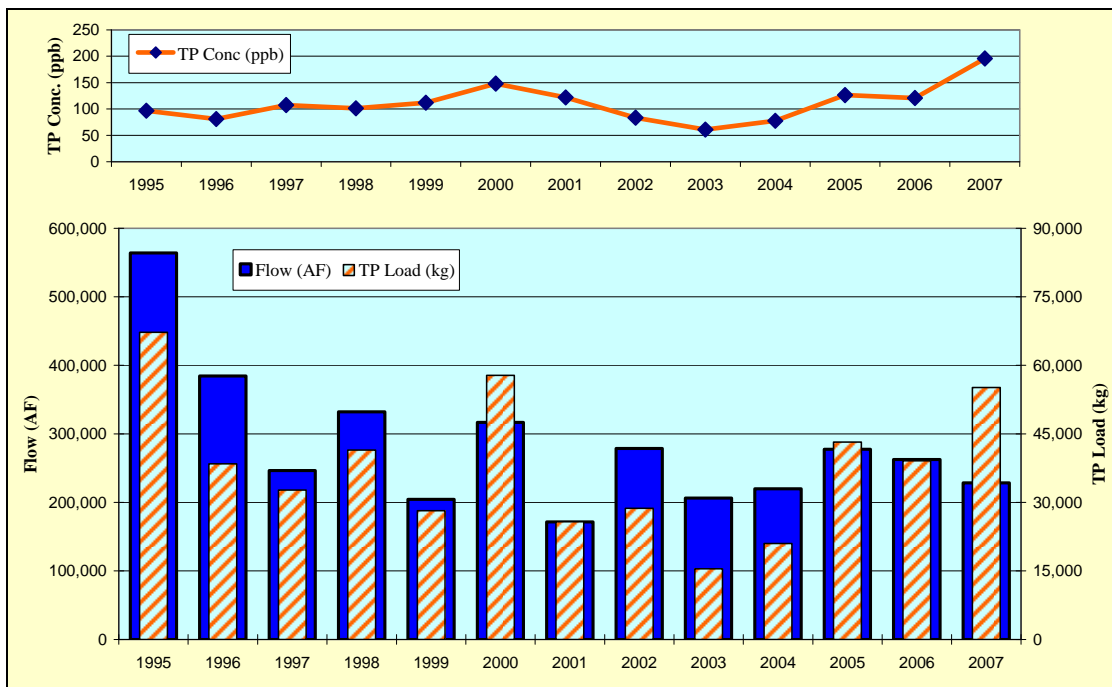


Figure 6-3: WY1995-2007 Flows and Phosphorus Levels for S-6/S-2 Basin Runoff.

### 6.7. S-6/S-2 Basin Discharge to the Everglades Protection Area and STAs

The tables below present the annual and monthly summaries of flow and TP from the S-6/S-2 Basin to the Everglades Protection Area (EPA) and STAs, segregated by source.



**Table 6-10: Annual Summary of S-6/S-2 Basin Discharges to EPA by Source.**

Water Year	Lake Okeechobee Flow-through		S-6 Basin Runoff to STA-2/EPA <sup>1</sup>		EBWCD and 715 Farms		S-6 Basin Total		
	ac-ft	kg	ac-ft	kg	ac-ft	kg	ac-ft	kg	ppb
1995	81,211	6,921	542,203	61,645			623,414	68,566	89
1996	61,516	4,380	368,081	35,337			429,597	39,717	75
1997	6,988	753	244,560	32,282			251,547	33,034	106
1998	22,920	2,505	328,347	40,658			351,268	43,163	100
1999	27,375	2,650	188,376	23,916			215,752	26,566	100
2000	28,346	3,310	303,155	54,046			331,501	57,356	140
2001	11,445	1,168	160,437	22,875			171,882	24,043	113
2002	2,262	59	205,653	19,200	4,893	404	212,808	19,663	75
2003	44,195	2,711	205,930	15,406	32,606	3,607	282,732	21,724	62
2004	7,357	326	219,769	20,974	29,812	2,988	256,939	24,288	77
2005	11,994	957	269,954	41,957	34,326	6,124	316,274	49,037	126
2006	6,977	778	258,826	38,320	26,800	6,884	292,603	45,982	127
2007	9,276	942	226,987	54,922	18,913	3,902	255,176	59,766	190
Min.	2,262	59	160,437	15,406	4,893	404	171,882	19,663	-
Max.	81,211	6,921	542,203	61,645	34,326	6,884	623,414	68,566	-
Ave.	24,759	2,112	270,944	35,503	24,558	3,985	307,038	39,454	104

<sup>1</sup> Excludes S-6 Basin runoff to Lake Okeechobee.

**Table 6-11: Monthly Summary of S-6/S-2 Basin Discharge Volume to EPA by Source.**

Month	Lake Okeechobee Flow-through		S-6 Basin Runoff to STA-2/EPA <sup>1</sup>		EBWCD and 715 Farms <sup>2</sup>		S-6 Basin Total	
	ac-ft	hm <sup>3</sup>	ac-ft	hm <sup>3</sup>	ac-ft	hm <sup>3</sup>	ac-ft	hm <sup>3</sup>
Jan	4,140	5.106	6,609	8.152	687	0.847	11,066	13.649
Feb	1,571	1.938	12,326	15.204	1,522	1.877	14,599	18.008
Mar	2,046	2.524	14,063	17.346	1,117	1.378	16,624	20.505
Apr	4,386	5.410	6,277	7.742	495	0.610	10,891	13.434
May	2,056	2.536	9,761	12.040	1,389	1.713	12,351	15.235
Jun	1,062	1.310	31,884	39.328	3,671	4.528	34,358	42.380
Jul	52	0.064	31,013	38.254	3,782	4.664	32,519	40.112
Aug	131	0.161	45,108	55.639	4,486	5.533	46,964	57.929
Sep	201	0.248	46,221	57.013	3,246	4.003	47,671	58.801
Oct	3,074	3.792	37,508	46.265	2,442	3.012	41,521	51.215
Nov	3,112	3.838	17,486	21.568	817	1.008	20,912	25.794
Dec	2,930	3.614	12,689	15.652	907	1.118	16,037	19.782
Annual	24,759	30.539	270,944	334.205	24,558	30.292	305,512	376.844

<sup>1</sup> Excludes S-6 Basin runoff to Lake Okeechobee.

<sup>2</sup> The East Shore Pump Station period of record is December 2001-April 2007, and its contribution to the basin total was prorated accordingly.



**Table 6-12: Monthly Summary of S-6/S-2 Basin Phosphorus Levels to EPA by Source.**

Month	Lake Okeechobee Flow-through		S-6 Basin Runoff to STA-2/EPA <sup>1</sup>		EBWCD and 715 Farms <sup>2</sup>		S-6 Basin Total	
	TP Load kg	TP Conc ppb	TP Load kg	TP Conc ppb	TP Load kg	TP Conc ppb	TP Load kg	TP Conc ppb
<b>Jan</b>	326	64	419	51	55	65	770	56
<b>Feb</b>	134	69	1,544	102	146	78	1,745	97
<b>Mar</b>	126	50	2,235	129	124	90	2,419	118
<b>Apr</b>	355	66	1,229	159	41	67	1,603	119
<b>May</b>	211	83	1,164	97	137	80	1,428	94
<b>Jun</b>	109	83	3,272	83	447	99	3,553	84
<b>Jul</b>	5	77	3,582	94	595	127	3,816	95
<b>Aug</b>	8	52	6,206	112	651	118	6,465	112
<b>Sep</b>	26	104	7,163	126	739	185	7,473	127
<b>Oct</b>	340	90	5,275	114	807	268	5,926	116
<b>Nov</b>	267	70	1,913	89	182	181	2,250	87
<b>Dec</b>	205	57	1,500	96	62	55	1,734	88
<b>Annual</b>	2,112	69	35,503	106	3,985	132	39,181	104

<sup>1</sup> Excludes S-6 Basin runoff to Lake Okeechobee.

<sup>2</sup> The East Shore Pump Station period of record is December 2001-April 2007, and its contribution to the basin total was prorated accordingly.



## 7. S-7/S-2 Basin

The S-7/S-2 Basin covers approximately 131 square miles in south-central Palm Beach County (Goforth and Piccone 2001). A schematic of the basin showing the primary conveyance features, water control structures and receiving waters is presented in the figure below. The flow and TP levels through each of the principal water control structures are described in the following sections.

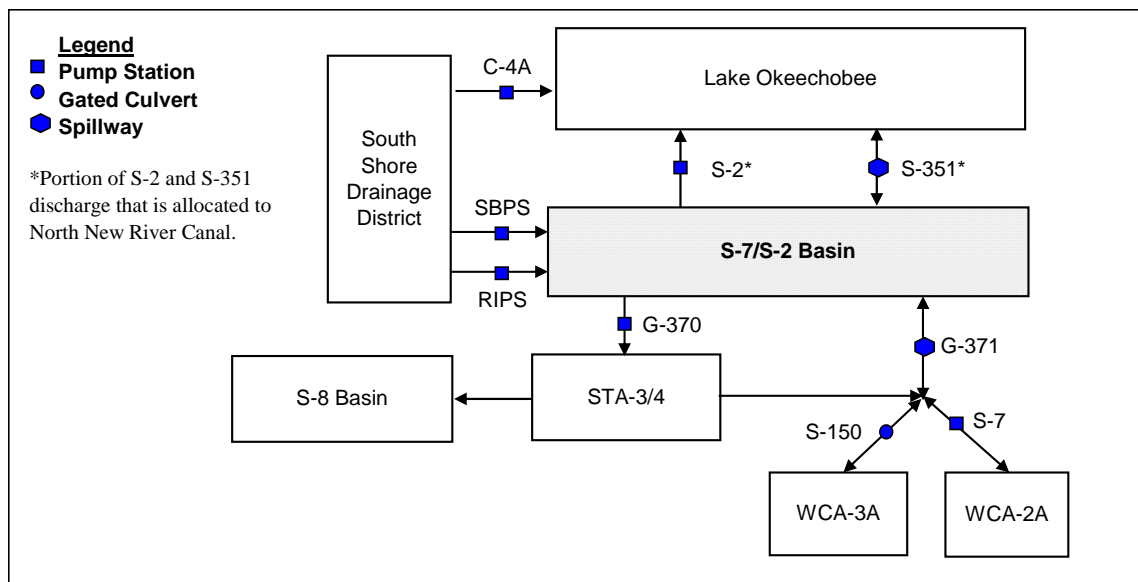


Figure 7-1: S-2/S-7 Basin Schematic.

### 7.1. S-2 Pump Station and S-351 Spillway

The original design and initial operation of the S-2 pump station called for the pump station to provide flood protection to the northern area of the Hillsboro Canal and North New River Canal Basins. Two significant regional actions have modified the operation of S-2. In 1979, the District implemented the Interim Action Plan, designed to reduce the amount of nitrogen entering Lake Okeechobee from the EAA. Since that time, the vast majority of the basin runoff has been discharged south through the southern pump stations. With the construction and operation of the STAs, the function and operation of the southern pump stations has been modified to integrate with the ECP. Beginning in June 1999, discharges from the S-6 pump station have been diverted into STA-2 for treatment prior to discharge into the WCA-2A. Similarly, in 2003, the function and operation of S-7 has been modified to serve as one of the outflow pump stations for STA-3/4.





The data analysis presented herein allocates approximately 65.1% of the discharge at S-2 to the S-7/S-2 Basin, consistent with Rule 40-E63. The table below presents the annual and monthly summaries of flow and TP for the S-2 pump station allocated to the S-7/S-2 Basin.

**Table 7-1: Discharge Summary for Pump Station S-2 Allocated to the S-7/S-2 Basin.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	40,508	49.966	10,469	210	Jan	21	0.026	4	173
1996	30,714	37.885	5,791	153	Feb	390	0.481	117	244
1997	3,732	4.604	720	156	Mar	405	0.500	85	170
1998	7,270	8.968	1,544	172	Apr	347	0.428	72	168
1999	30,188	37.237	7,983	214	May	0	0.000	0	
2000	25,436	31.375	7,093	226	Jun	1,491	1.840	221	120
2001	20,957	25.850	5,451	211	Jul	3,357	4.141	400	97
2002	136,675	168.586	17,780	105	Aug	4,820	5.945	704	118
2003	607	0.749	147	196	Sep	3,804	4.692	566	121
2004	137	0.169	33	197	Oct	4,622	5.701	1,155	203
2005	14,022	17.296	2,304	133	Nov	3,439	4.242	967	228
2006	6,734	8.306	1,505	181	Dec	1,884	2.323	421	181
2007	2,549	3.145	439	140	Annual	24,579	30.318	4,712	155
Min.	137	0.169	33	-					
Max.	136,675	168.586	17,780	-					
Ave.	24,579	30.318	4,712	155					

The S-351 spillway is operated to release water from Lake Okeechobee for EAA irrigation, and make water supply and regulatory releases downstream. The table below presents the annual and monthly summaries of flow and TP for the S-351 gated spillway allocated to the S-7/S-2 Basin.



**Table 7-2: Discharge Summary for Lake Releases at Spillway S-351.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	191,872	236.671	17,775	75	Jan	15,586	19.224	2,953	154
1996	203,652	251.201	28,550	114	Feb	10,877	13.416	2,112	157
1997	102,461	126.383	10,516	83	Mar	14,139	17.440	2,560	147
1998	55,240	68.138	5,528	81	Apr	28,117	34.682	4,356	126
1999	200,268	247.027	23,905	97	May	26,788	33.042	4,065	123
2000	118,365	146.000	22,051	151	Jun	9,437	11.640	1,467	126
2001	139,435	171.991	26,876	156	Jul	3,346	4.128	360	87
2002	45,549	56.184	5,973	106	Aug	1,472	1.816	195	107
2003	166,965	205.948	17,837	87	Sep	1,014	1.250	104	83
2004	116,842	144.122	13,702	95	Oct	8,343	10.291	842	82
2005	192,142	237.003	38,078	161	Nov	8,616	10.627	1,178	111
2006	130,351	160.785	43,459	270	Dec	11,988	14.787	2,136	144
2007	153,250	189.031	36,005	190	Annual	139,722	172.345	22,327	130
Min.	45,549	56.184	5,528	-					
Max.	203,652	251.201	43,459	-					
Ave.	139,722	172.345	22,327	130					

Approximately 26% of the Lake water released at S-351 flows through the EAA and is discharged to the EPA or STAs to satisfy downstream water supply demands and for Lake regulatory releases. The table below quantifies the Lake flow-through at S-7 through September 2004, when an earthen plug was installed in the North New River Canal for the construction of G-371, and uses the TP concentration at S-7, consistent with the method used in the EAA Regional Feasibility Study (ADA/Burns & McDonnell 2005). G-371 was operable in August 2005, and the table below presents the estimate of Lake flow-through at G-371 after that point, using the concentration measured at G-371.



**Table 7-3: Discharge Summary for Lake Flow-through Releases at S-7 and G-371.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
<b>1995</b>	105,473	130.099	8,372	64	<b>Jan</b>	5,776	7.124	505	71
<b>1996</b>	99,656	122.924	11,132	91	<b>Feb</b>	3,479	4.291	308	72
<b>1997</b>	34,754	42.868	2,613	61	<b>Mar</b>	3,720	4.588	231	50
<b>1998</b>	1,461	1.802	122	67	<b>Apr</b>	9,033	11.142	886	80
<b>1999</b>	86,312	106.464	8,002	75	<b>May</b>	5,322	6.565	650	99
<b>2000</b>	36,087	44.513	6,613	149	<b>Jun</b>	469	0.579	29	50
<b>2001</b>	18,730	23.103	1,053	46	<b>Jul</b>	621	0.766	34	44
<b>2002</b>	231	0.285	6	23	<b>Aug</b>	21	0.026	1	55
<b>2003</b>	46,900	57.850	2,823	49	<b>Sep</b>	342	0.421	33	79
<b>2004</b>	13,011	16.049	621	39	<b>Oct</b>	2,942	3.629	272	75
<b>2005</b>	20,489	25.273	1,062	42	<b>Nov</b>	2,143	2.644	197	75
<b>2006</b>	4,384	5.408	477	88	<b>Dec</b>	2,947	3.635	250	69
<b>2007</b>	11,113	13.708	1,271	93	<b>Annual</b>	36,815	45.411	3,397	75
<b>Min.</b>	231	0.285	6	-					
<b>Max.</b>	105,473	130.099	11,132	-					
<b>Ave.</b>	36,815	45.411	3,397	75					

## 7.2. South Shore Drainage District

The South Shore Drainage District is located along the south shore of Lake Okeechobee, and prior to the ECP, runoff was discharged into Lake Okeechobee (through the Bean City Pump Station and culvert C4A) and the North New River Canal. As part of the ECP Ch. 298 Districts Diversion project, a new pump station was constructed on the Miami Canal to re-direct runoff from the Lake to the Miami Canal, and that structure began operations in July 2004. However, the two existing pump stations on the North New River Canal will remain – the South Bay Pump Station and the Rabbit Island Pump Station. The flows and TP loads from these facilities are described below.

### 7.2.1. South Bay Pump Station

The South Bay Pump Station (SBPS), SFWMD designation NR25.8TW (permit 50-00081-E), consists of 2 pumps totaling 13,075 gallons per minute (gpm) and discharges to the North New River Canal. Data records available to the District began May 2001. Missing monthly data prior to that were generated as the long-term monthly average percentage of the combined discharges from the other two sites (Rabbit Island Pump Station and C-4A). For example, during January 2001-2007, the flow at SBPS averaged 9% of the combined discharges from the Rabbit Island Pump Station and C-4A. Thus, for the period May 1995-April 2001, the flows during each January were estimated as 9% of the flows from the other structures during the same month. The table below presents the annual and monthly summaries of flow and TP for the South Bay Pump Station.



**Table 7-4: Discharge Summary for South Bay Pump Station\*.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995	2,977	3.672	264	72	Jan	29	0.036	1	39
1996	2,134	2.632	127	48	Feb	89	0.110	7	66
1997	1,516	1.870	67	36	Mar	32	0.039	2	61
1998	2,464	3.039	314	103	Apr	7	0.009	1	101
1999	1,518	1.873	142	76	May	60	0.074	7	88
2000	3,004	3.705	211	57	Jun	293	0.362	13	36
2001	688	0.849	80	95	Jul	239	0.294	11	36
2002	1,131	1.396	61	44	Aug	268	0.331	25	76
2003	1,270	1.566	76	48	Sep	231	0.285	25	87
2004	537	0.662	33	50	Oct	54	0.066	5	73
2005	720	0.888	78	88	Nov	60	0.075	5	67
2006	917	1.131	100	89	Dec	170	0.210	25	117
2007	1,059	1.306	96	73	Annual	1,533	1.891	127	67
Min.	537	0.662	33	-					
Max.	3,004	3.705	314	-					
Ave.	1,533	1.891	127	67					

\*Missing data prior to May 2001 were replaced with average long-term monthly percentage of other SSDD discharges.

### 7.2.2. Rabbit Island Pump Station

The Rabbit Island Pump Station, SFWMD designation NR26.7TW (permit 50-00081-E), consists of two pumps totaling 27,273 gpm and discharges to the North New River Canal. The table below presents the annual and monthly summaries of flow and TP for the Rabbit Island Pump Station.

**Table 7-5: Discharge Summary for Rabbit Island Pump Station.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995	3,894	4.804	394	82	Jan	215	0.266	16	61
1996	3,045	3.755	224	60	Feb	257	0.317	31	99
1997	2,255	2.781	333	120	Mar	198	0.244	27	111
1998	3,061	3.776	613	162	Apr	128	0.158	22	137
1999	3,090	3.812	355	93	May	239	0.295	27	91
2000	5,362	6.614	461	70	Jun	414	0.511	42	83
2001	1,253	1.545	165	107	Jul	360	0.444	43	97
2002	2,270	2.800	131	47	Aug	375	0.463	48	104
2003	3,268	4.031	382	95	Sep	387	0.477	49	104
2004	2,710	3.343	112	34	Oct	265	0.327	32	97
2005	4,618	5.697	465	82	Nov	174	0.215	31	144
2006	4,697	5.794	1,095	189	Dec	205	0.252	26	103
2007	2,297	2.833	403	142	Annual	3,217	3.968	395	99
Min.	1,253	1.545	112	-					
Max.	5,362	6.614	1,095	-					
Ave.	3,217	3.968	395	99					



### 7.3. G-370 Pump Station

Pump station G-370 moves water from the North New River Canal into STA-3/4, and began operating in October 2003. The table below presents the annual and monthly summaries of flow and TP for the G-370 pump station.

**Table 7-6: Discharge Summary for Pump Station G-370.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995					Jan	5,528	6.819	1,192	175
1996					Feb	9,138	11.271	1,835	163
1997					Mar	10,289	12.692	1,754	138
1998					Apr	6,110	7.537	1,624	215
1999					May	11,377	14.033	2,633	188
2000					Jun	32,466	40.046	4,565	114
2001					Jul	28,606	35.286	3,732	106
2002					Aug	52,454	64.702	6,917	107
2003					Sep	52,274	64.479	9,909	154
2004<	10,756	13.267	485	37	Oct	13,873	17.112	2,195	128
2005	305,238	376.505	46,699	124	Nov	2,748	3.390	247	73
2006	252,720	311.726	39,680	127	Dec	9,295	11.465	1,657	145
2007	190,747	235.282	38,421	163	Annual	234,160	288.831	38,260	132
Min.	190,747	235.282	38,421	-					
Max.	305,238	376.505	46,699	-					
Ave.	249,568	307.838	41,600	135					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.

### 7.4. G-371 Divide Structure

The G-371 divide structure is located just north of the S-7 pump station. The structure began operating in September 2004 to segregate untreated water in the North New River Canal from treated discharges from STA-3/4. G-371 is normally closed, but can be opened to allow movement of water for the following purposes:

1. to allow untreated diversion of runoff from the S-7/S-2 basin when the capacity of STA-3/4 is exceeded;
2. to allow Lake water supply releases to move south into WCA-2A (via S-7) or WCA-3A (via S-150);
3. to allow water from the WCAs to move into the EAA for water supply.

The tables below present the annual and monthly summaries of flow and TP for G-371 for flow out of and into the S-7/S-2 basin.



**Table 7-7: Discharge Summary for Spillway G-371 (out of S-7 Basin).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	0	0.000	0	
1996					Feb	0	0.000	0	
1997					Mar	105	0.129	3	22
1998					Apr	1,897	2.340	183	78
1999					May	4,432	5.467	564	103
2000					Jun	712	0.878	73	83
2001					Jul	0	0.000	0	72
2002					Aug	0	0.000	0	69
2003					Sep	0	0.000	0	
2004					Oct	0	0.000	0	
2005<	0	0.000	0		Nov	1	0.001	0	50
2006	4,384	5.408	477	88	Dec	0	0.000	0	
2007	11,912	14.693	1,353	92	Annual	7,147	8.815	822	93
Min.	4,384	5.408	477	-					
Max.	11,912	14.693	1,353	-					
Ave.	8,148	10.050	915	91					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.

**Table 7-8: Discharge Summary for Spillway G-371 (into S-7 Basin).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	1,533	1.891	31	16
1996					Feb	46	0.056	1	20
1997					Mar	49	0.060	1	20
1998					Apr	0	0.000	0	
1999					May	0	0.000	0	
2000					Jun	0	0.000	0	
2001					Jul	15	0.019	1	55
2002					Aug	3	0.004	0	49
2003					Sep	0	0.000	0	
2004					Oct	4,771	5.884	113	19
2005<	0	0.000	0		Nov	3,209	3.958	63	16
2006	0	0.000	0		Dec	207	0.255	4	15
2007	29,478	36.361	642	18	Annual	9,832	12.128	214	18
Min.	0	0.000	0	-					
Max.	29,478	36.361	642	-					
Ave.	14,739	18.180	321	18					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.



### 7.5. S-7 Pump Station

The original design and initial operation of the S-7 pump station called for the pump station to provide flood protection to the southern area of the North New River Canal basin, with discharge into WCA-2A. Two significant regional actions have modified the operation of S-7. In 1979, the District implemented the Interim Action Plan, designed to reduce the amount of nitrogen entering Lake Okeechobee from the EAA. Since that time, the vast majority of the S-7/S-2 basin runoff has been discharged south. With the construction and operation of the STAs, the function and operation of S-7 has been modified to integrate with the ECP. On February 26, 2004, discharges from STA-3/4 Flow-way 1 began and were conveyed into the EPA through S-7. On June 8, 2004, Flow-way 3 began discharging. On September 16, 2004, Flow-way 2 began discharging. Divide structure G-371 began operation on September 9, 2004, and all flows/loads through S-7 (except for intentional Lake deliveries to the WCAs) after that date came from STA-3/4. STA-3/4 discharge records were evaluated to parse out S-7 flows and loads that originated within STA-3/4. For WY2005 prior to September 9, 2004, Table 2C-3 of the SFER (page 2C-25) identifies that 46,900 AF and 472 kg of the discharge at S-7 was attributable to STA-3/4 discharges. This represents 41% of the flow and 17% of the load, and hence this percentage was backed out of the DBHYDRO values for S-7 for that period. The tables below present the annual and monthly summaries of flow and TP for pump station S-7.

**Table 7-9: Discharge Summary for Pump Station S-7 (excludes STA-3/4 Discharges).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
<b>1995</b>	433,676	534.931	46,945	88	<b>Jan</b>	7,683	9.476	663	70
<b>1996</b>	285,858	352.600	26,235	74	<b>Feb</b>	8,077	9.963	675	68
<b>1997</b>	148,646	183.351	18,427	101	<b>Mar</b>	10,339	12.753	695	55
<b>1998</b>	198,560	244.919	18,844	77	<b>Apr</b>	10,212	12.597	928	74
<b>1999</b>	183,352	226.161	24,551	109	<b>May</b>	10,008	12.345	1,192	97
<b>2000</b>	243,102	299.862	21,306	71	<b>Jun</b>	23,249	28.677	2,404	84
<b>2001</b>	103,331	127.457	11,028	87	<b>Jul</b>	21,038	25.949	1,947	75
<b>2002</b>	98,119	121.028	5,783	48	<b>Aug</b>	23,590	29.098	1,572	54
<b>2003</b>	142,924	176.294	9,527	54	<b>Sep</b>	25,153	31.026	2,048	66
<b>2004</b>	132,280	163.164	7,460	46	<b>Oct</b>	26,897	33.177	2,236	67
<b>2005&lt;</b>	77,160	95.175	2,774	29	<b>Nov</b>	15,858	19.561	2,483	127
<b>2006</b>					<b>Dec</b>	14,807	18.264	1,734	95
<b>2007</b>					<b>Annual</b>	196,912	242.887	18,577	76
<b>Min.</b>	98,119	121.028	5,783	-					
<b>Max.</b>	433,676	534.931	46,945	-					
<b>Ave.</b>	196,985	242.977	19,011	78					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.

2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.





Reverse flow at S-7, i.e., to the north, has occurred during periods of water supply. The table below presents the annual and monthly summaries of flow and TP for releases north through S-7.

**Table 7-10: Discharge Summary Reverse Flow at Pump Station S-7.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	1,434	1.769	267	151	Jan	2,351	2.900	102	35
1996	142	0.175	9	52	Feb	287	0.354	22	61
1997	1,412	1.742	93	53	Mar	749	0.924	37	40
1998	10,326	12.737	629	49	Apr	119	0.146	6	40
1999	3,517	4.339	1,102	254	May	9	0.011	1	85
2000	538	0.663	70	106	Jun	18	0.023	1	48
2001	42,059	51.880	1,960	38	Jul	504	0.622	31	50
2002	69,021	85.136	4,102	48	Aug	2,238	2.761	146	53
2003	17,175	21.185	1,034	49	Sep	562	0.694	43	63
2004	2,007	2.476	50	20	Oct	1,979	2.441	162	66
2005	0	0.000	0	-	Nov	5,229	6.449	258	40
2006	42	0.052	3	49	Dec	2,003	2.471	95	39
2007	60,971	75.207	2,433	32	Annual	16,050	19.797	904	46
Min.	0	0.000	0	-					
Max.	69,021	85.136	4,102	-					
Ave.	16,050	19.797	904	46					

### 7.6. S-150 Culvert

S-150 is located in the L-5 Borrow Canal directly west of S-7, and discharges into the northeast corner of WCA-3A. Its operation history is similar to that of S-7 (see Section 6.5 above). STA-3/4 discharge records were evaluated to parse out S-150 flows and loads that originated within STA-3/4. For WY2005 (May-August 2004), Table 2C-3 of the SFER (page 2C-25) identifies that 7,700 AF and 128 kg of the discharge at S-150 was attributable to STA-3/4 discharges. This represents 25% of the flow and 10% of the load, and hence this percentage was backed out of the DBHYDRO values for that period. The table below presents the annual and monthly summaries of flow and TP for S-150.





**Table 7-11: Discharge Summary for Culvert S-150 (Excludes STA-3/4 Discharges).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	21,261	26.226	1,911	73	Jan	4,761	5.873	179	30
1996	51,081	63.007	4,462	71	Feb	5,478	6.757	396	59
1997	87,281	107.659	4,527	42	Mar	3,430	4.231	292	69
1998	23,419	28.887	1,822	63	Apr	7,562	9.327	695	75
1999	64,163	79.144	4,860	61	May	4,609	5.685	437	77
2000	58,317	71.933	6,114	85	Jun	5,103	6.295	339	54
2001	39,367	48.559	2,282	47	Jul	6,373	7.861	386	49
2002	21,267	26.232	966	37	Aug	2,181	2.690	127	47
2003	68,669	84.701	4,102	48	Sep	619	0.763	29	38
2004	5,025	6.198	209	34	Oct	979	1.208	54	45
2005<	23,167	28.576	1,125	39	Nov	686	0.846	22	26
2006					Dec	2,694	3.323	152	46
2007					Annual	44,475	54.859	3,109	57
Min.	5,025	6.198	209	-					
Max.	87,281	107.659	6,114	-					
Ave.	43,985	54.255	3,125	58					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.

Reverse flow at S-150, i.e., to the north, has occurred during periods of water supply. The table below presents the annual and monthly summaries of flow and TP for releases north through S-150.

**Table 7-12: Discharge Summary for Reverse Flow at Culvert S-150.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	852	1.051	73	69	Jan	4	0.005	1	257
1996	934	1.153	120	104	Feb	19	0.024	6	264
1997	382	0.471	34	71	Mar	52	0.065	9	132
1998	1,611	1.987	431	217	Apr	0	0.000	0	41
1999	554	0.683	44	64	May	5	0.006	0	58
2000	0	0.000	0		Jun	103	0.128	12	96
2001	84	0.103	7	64	Jul	12	0.015	2	106
2002	25	0.031	2	64	Aug	74	0.092	12	133
2003	0	0.000	0	41	Sep	6	0.007	1	71
2004	0	0.000	0		Oct	13	0.016	3	206
2005	0	0.000	0		Nov	10	0.013	3	240
2006	0	0.000	0		Dec	42	0.052	5	101
2007	0	0.000	0		Annual	342	0.422	55	130
Min.	0	0.000	0	-					
Max.	1,611	1.987	431	-					
Ave.	342	0.422	55	130					



### 7.7. S-7/S-2 Basin Runoff

The S-7/S-2 Basin runoff was estimated as the net result of the various flow components described above:

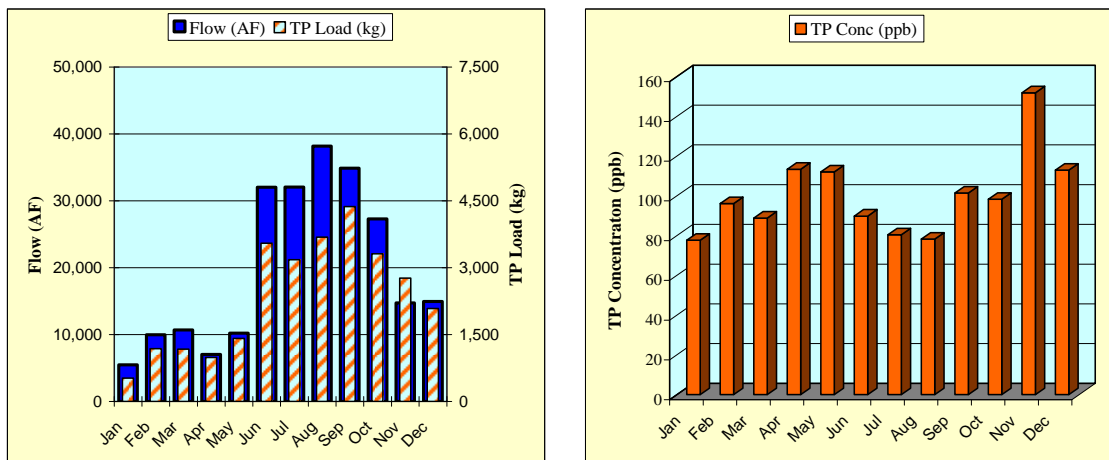
- S-7 discharges to WCA-2A (through September 1, 2004, when the earthen plug at G-371 was installed)
- Plus discharges to Lake Okeechobee through S-2 and S-351
- Plus discharges to WCA-3A via S-150 (through September 1, 2004, when the earthen plug at G-371 was installed)
- Plus discharges to STA-3/4 through G-370 (beginning October 2003)
- Plus discharges south through G-371 (beginning September 2, 2004)
- Minus flow-through releases from the Lake at S-351
- Minus inflows from South Shore Drainage District

The table below presents the annual and monthly summaries of flow and TP for the S-7/S-2 Basin runoff. The figures present the monthly and annual variability associated with the S-7/S-2 Basin runoff.

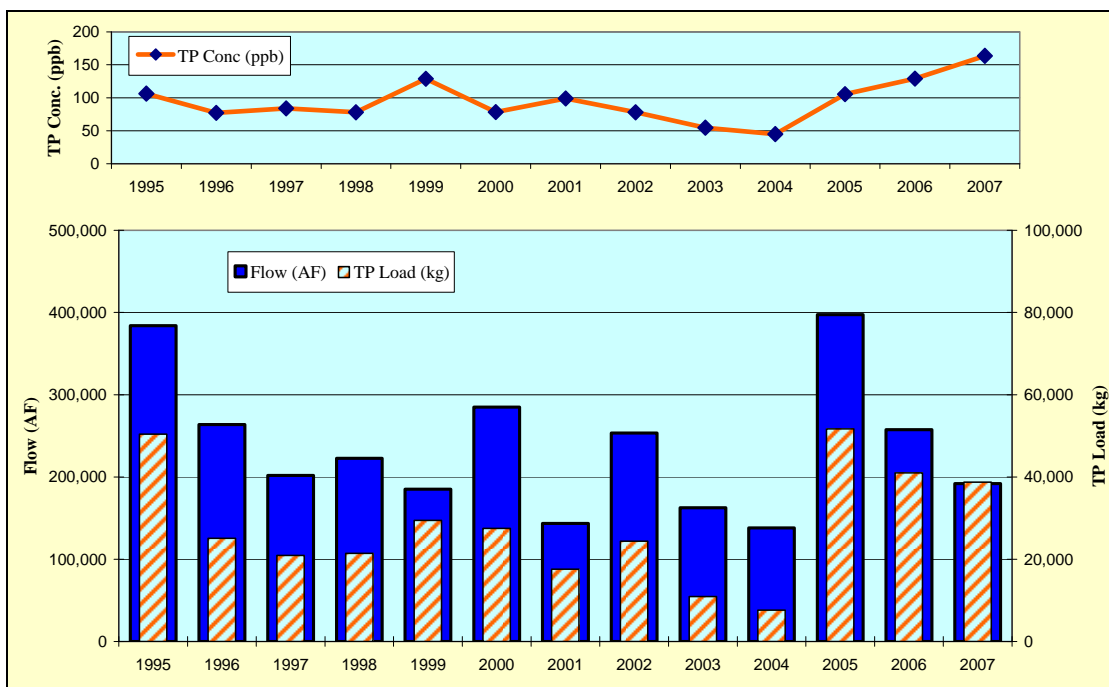
**Table 7-13: Discharge Summary for S-7/S-2 Basin.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	384,019	473.680	50,425	106	Jan	5,460	6.735	523	78
1996	263,729	325.304	25,103	77	Feb	9,973	12.301	1,183	96
1997	201,872	249.006	20,928	84	Mar	10,404	12.833	1,149	90
1998	222,861	274.894	21,461	78	Apr	7,289	8.991	974	108
1999	188,355	232.332	29,110	125	May	10,234	12.623	1,409	112
2000	284,761	351.248	27,477	78	Jun	32,027	39.505	3,551	90
2001	143,571	177.092	17,548	99	Jul	32,054	39.538	3,180	80
2002	253,567	312.770	24,401	78	Aug	38,173	47.086	3,686	78
2003	162,760	200.761	10,956	55	Sep	34,887	43.033	4,368	101
2004	134,113	165.425	7,500	45	Oct	27,284	33.654	3,309	98
2005	397,658	490.503	51,685	105	Nov	14,747	18.190	2,763	152
2006	257,621	317.771	40,985	129	Dec	14,919	18.402	2,082	113
2007	191,977	236.800	38,750	164	Annual	237,451	292.891	28,179	96
Min.	134,113	165.425	7,500	-					
Max.	397,658	490.503	51,685	-					
Ave.	237,451	292.891	28,179	96					





**Figure 7-2: Average Monthly Flows and Phosphorus Levels for S-7/S-2 Basin Runoff.**



**Figure 7-3: WY1995-2007 Flows and Phosphorus Levels for S-7/S-2 Basin Runoff.**

### 7.8. S-7/S-2 Basin Discharge to the Everglades Protection Area and STAs

The tables below present the annual and monthly summaries of flow and TP from the S-7/S-2 Basin to the Everglades Protection Area (EPA) and STAs, segregated by source.



**Table 7-14: Annual Summary of S-7 Basin Discharges to EPA by Source.**

Water Year	Lake Okeechobee Flow-through		S-7/S-2 Runoff to STA-3/4 / EPA <sup>1</sup>		South Shore Drainage District <sup>2</sup>		S-7/S-2 Basin Total		
	ac-ft	kg	ac-ft	kg	ac-ft	kg	ac-ft	kg	ppb
1995	105,473	8,372	343,511	39,956	5,563	493	454,547	48,821	87
1996	99,656	11,132	233,015	19,312	3,988	237	336,659	30,681	74
1997	34,754	2,613	198,140	20,208	2,834	125	235,728	22,946	79
1998	1,461	122	215,590	19,917	4,605	587	221,656	20,625	75
1999	86,312	8,002	158,167	21,127	2,837	265	247,316	29,393	96
2000	36,087	6,613	259,325	20,384	5,614	394	301,026	27,392	74
2001	18,730	1,053	122,614	12,097	1,286	150	142,630	13,300	76
2002	231	6	116,892	6,621	2,115	114	119,237	6,741	46
2003	46,900	2,823	162,153	10,808	2,373	142	211,426	13,773	53
2004	13,011	621	133,975	7,466	1,004	62	147,990	8,149	45
2005	20,489	1,062	383,636	49,381	1,345	145	405,470	50,588	101
2006	4,384	477	250,887	39,480	1,713	187	256,984	40,144	127
2007	11,113	1,271	189,428	38,311	1,979	179	202,520	39,761	159
Min.	231	6	116,892	6,621	1,004	62	119,237	6,741	46
Max.	105,473	11,132	383,636	49,381	5,614	587	454,547	50,588	90
Ave.	36,815	3,397	212,872	23,467	2,866	237	252,553	27,101	87

<sup>1</sup> Excludes S-7 Basin runoff to Lake Okeechobee.

<sup>2</sup> Assumes 93% of SSDD discharges south, consistent with S-2/S-7 Basin average.

**Table 7-15: Monthly Summary of S-7 Basin Discharge Volume to EPA by Source.**

Month	Lake Okeechobee Flow-through		S-7/S-2 Runoff to STA-3/4 / EPA <sup>1</sup>		South Shore Drainage District		S-7/S-2 Basin Total	
	ac-ft	hm <sup>3</sup>	ac-ft	hm <sup>3</sup>	ac-ft	hm <sup>3</sup>	ac-ft	hm <sup>3</sup>
Jan	5,776	7.124	5,439	6.709	55	0.067	11,270	13.901
Feb	3,479	4.291	9,583	11.821	167	0.206	13,229	16.317
Mar	3,720	4.588	9,999	12.334	59	0.073	13,778	16.994
Apr	9,033	11.142	6,943	8.564	14	0.017	15,989	19.723
May	5,322	6.565	10,234	12.623	112	0.138	15,668	19.326
Jun	469	0.579	30,536	37.665	548	0.676	31,554	38.921
Jul	621	0.766	28,697	35.397	446	0.550	29,764	36.713
Aug	21	0.026	33,353	41.140	502	0.619	33,876	41.785
Sep	342	0.421	31,084	38.341	432	0.533	31,857	39.296
Oct	2,942	3.629	22,662	27.953	100	0.124	25,705	31.706
Nov	2,143	2.644	11,308	13.948	113	0.139	13,564	16.731
Dec	2,947	3.635	13,035	16.078	318	0.392	16,300	20.105
Annual	36,815	45.411	212,872	262.573	2,866	3.535	252,553	311.519

<sup>1</sup> Excludes S-7 Basin runoff to Lake Okeechobee.

<sup>2</sup> Assumes 93% of SSDD discharges south, consistent with S-2/S-7 Basin average.



**Table 7-16: Monthly Summary of S-7 Basin Phosphorus Levels to EPA by Source.**

Month	Lake Okeechobee Flow-through		S-7/S-2 Runoff to STA-3/4 / EPA <sup>1</sup>		South Shore Drainage District <sup>2</sup>		S-7/S-2 Basin Total	
	TP Load kg	TP Conc ppb	TP Load kg	TP Conc ppb	TP Load kg	TP Conc ppb	TP Load kg	TP Conc ppb
<b>Jan</b>	505	71	519	77	3	39	1,026	74
<b>Feb</b>	308	72	1,066	90	14	66	1,388	85
<b>Mar</b>	231	50	1,064	86	4	61	1,300	76
<b>Apr</b>	886	80	903	105	2	101	1,791	91
<b>May</b>	650	99	1,409	112	12	88	2,072	107
<b>Jun</b>	29	50	3,330	88	25	36	3,384	87
<b>Jul</b>	34	44	2,781	79	20	36	2,834	77
<b>Aug</b>	1	55	2,982	72	47	76	3,031	73
<b>Sep</b>	33	79	3,802	99	46	87	3,882	99
<b>Oct</b>	272	75	2,155	77	9	73	2,436	77
<b>Nov</b>	197	75	1,795	129	9	67	2,002	120
<b>Dec</b>	250	69	1,662	103	46	117	1,957	97
<b>Annual</b>	3,397	75	23,467	89	237	67	27,101	87

<sup>1</sup> Excludes S-7 Basin runoff to Lake Okeechobee.

<sup>2</sup> Assumes 93% of SSDD discharges south, consistent with S-2/S-7 Basin average.



## 8. S-8/S-3 Basin

The S-8/S-3 Basin covers approximately 201 square miles in southwestern Palm Beach County (Goforth and Piccone 2001). A schematic of the basin showing the primary conveyance features, water control structures and receiving waters is presented in the figure below. The flow and TP levels through each of the principal water control structures are described in the following sections.

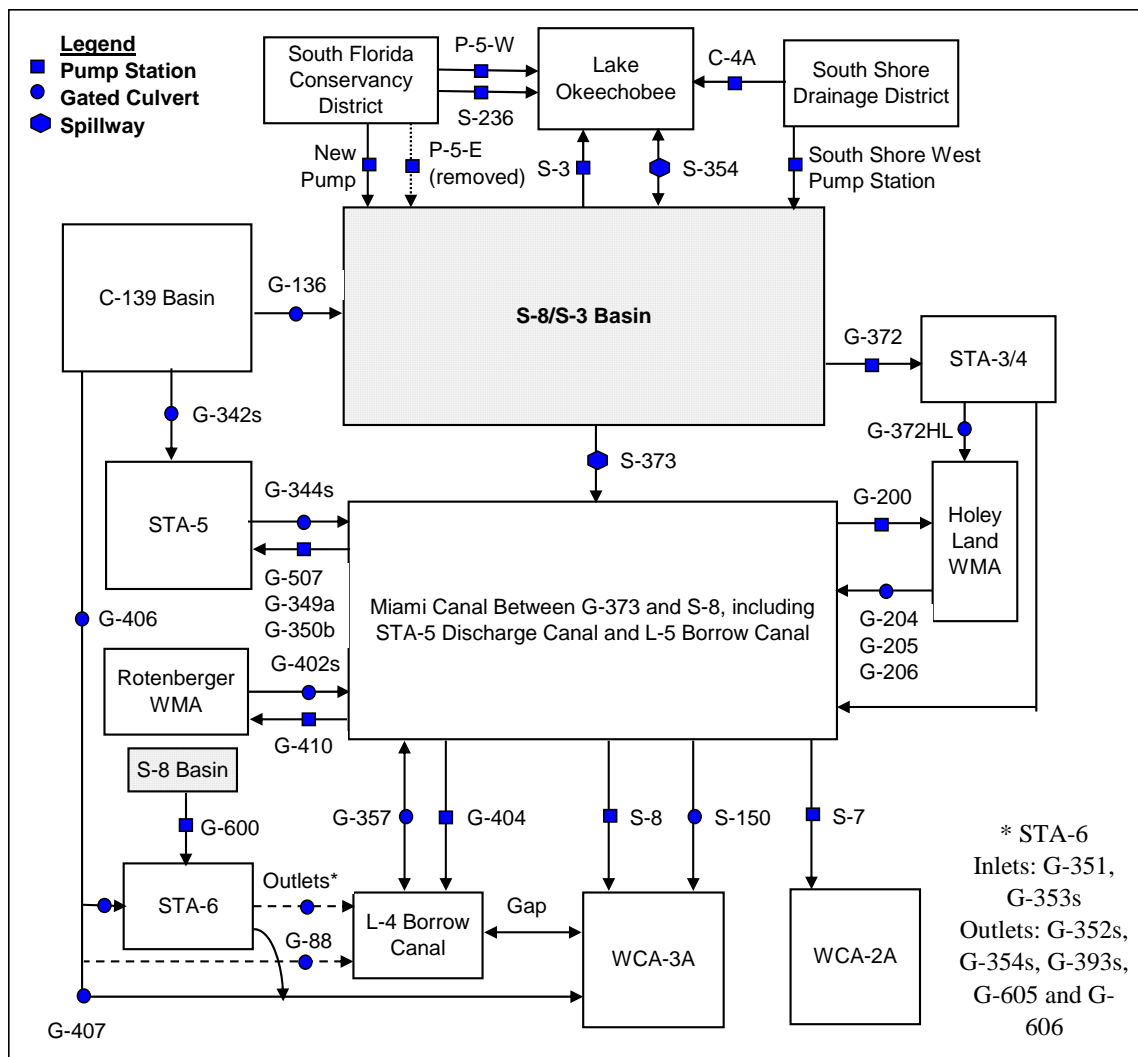


Figure 8-1: S-3/S-8 Basin Schematic.



### 8.1. S-3 Pump Station and S-354 Spillway

The original design and initial operation of the S-3 pump station called for the pump station to provide flood protection to the northern area of the Miami Canal Basin. Two significant regional actions have modified the operation of S-3. In 1979, the District implemented the Interim Action Plan, designed to reduce the amount of nitrogen entering Lake Okeechobee from the EAA. Since that time, the vast majority of the basin runoff has been discharged south through the southern pump stations. The table below presents the annual and monthly summaries of flow and TP for the S-3 pump station.

**Table 8-1: Discharge Summary for Pump Station S-3.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
<b>1995</b>	12,785	15.771	2,741	174	<b>Jan</b>	81	0.100	21	214
<b>1996</b>	20,198	24.913	3,576	144	<b>Feb</b>	80	0.099	15	154
<b>1997</b>	7,196	8.876	760	86	<b>Mar</b>	244	0.301	23	76
<b>1998</b>	4,457	5.497	954	174	<b>Apr</b>	155	0.191	20	105
<b>1999</b>	22,026	27.169	9,300	342	<b>May</b>	205	0.252	27	108
<b>2000</b>	7,746	9.555	1,250	131	<b>Jun</b>	1,214	1.498	162	108
<b>2001</b>	11,597	14.305	2,051	143	<b>Jul</b>	3,355	4.139	277	67
<b>2002</b>	133,492	164.660	14,868	90	<b>Aug</b>	3,760	4.638	539	116
<b>2003</b>	1,900	2.344	394	168	<b>Sep</b>	3,961	4.886	595	122
<b>2004</b>	261	0.322	91	281	<b>Oct</b>	1,662	2.050	245	120
<b>2005</b>	538	0.664	195	293	<b>Nov</b>	2,076	2.560	808	316
<b>2006</b>	1,988	2.453	566	231	<b>Dec</b>	476	0.587	102	173
<b>2007</b>	312	0.384	113	295	<b>Annual</b>	17,269	21.301	2,835	133
<b>Min.</b>	261	0.322	91	-					
<b>Max.</b>	133,492	164.660	14,868	-					
<b>Ave.</b>	17,269	21.301	2,835	133					

The S-354 spillway is operated to release water from Lake Okeechobee for EAA irrigation, and make water supply and regulatory releases downstream. The table below presents the annual and monthly summaries of flow and TP for the S-354 gated spillway allocated to the S-8/S-3 Basin.



**Table 8-2: Discharge Summary for Lake Releases at Spillway S-354.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	92,254	113.794	9,899	87	Jan	8,120	10.016	1,626	162
1996	84,765	104.555	13,054	125	Feb	6,204	7.653	1,161	152
1997	114,907	141.736	10,801	76	Mar	12,090	14.912	1,739	117
1998	48,621	59.973	5,495	92	Apr	26,933	33.222	4,251	128
1999	242,831	299.528	25,385	85	May	29,696	36.629	3,934	107
2000	102,771	126.766	20,869	165	Jun	12,102	14.928	1,599	107
2001	158,281	195.237	17,828	91	Jul	4,842	5.972	449	75
2002	62,063	76.554	6,334	83	Aug	2,621	3.233	484	150
2003	70,090	86.455	6,805	79	Sep	2,202	2.717	274	101
2004	105,840	130.551	12,899	99	Oct	2,307	2.845	306	108
2005	183,338	226.143	34,909	154	Nov	4,618	5.697	491	86
2006	130,780	161.314	35,092	218	Dec	7,928	9.779	1,128	115
2007	159,087	196.231	27,365	139	Annual	119,664	147.603	17,441	118
Min.	48,621	59.973	5,495	-					
Max.	242,831	299.528	35,092	-					
Ave.	119,664	147.603	17,441	118					

Approximately 32% of the Lake water released at S-354 flows through the EAA and is discharged to the EPA or STAs to satisfy downstream water supply demands and for Lake regulatory releases. The table below quantifies the Lake flow-through at S-8 through January 2005 and G-373 after that date, and uses the TP concentration at S-8/G-373, consistent with the method used in the EAA Regional Feasibility Study (ADA/Burns & McDonnell 2005).





**Table 8-3: Discharge Summary for Lake Flow-through Releases at S-8 and G-373.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	29,273	36.108	3,646	101	Jan	2,039	2.515	139	55
1996	38,263	47.196	3,676	78	Feb	977	1.205	53	44
1997	54,004	66.613	3,887	58	Mar	2,557	3.154	138	44
1998	16,545	20.407	1,163	57	Apr	7,426	9.160	613	67
1999	136,621	168.519	14,048	83	May	9,870	12.175	1,082	89
2000	37,754	46.569	4,480	96	Jun	4,930	6.082	524	86
2001	57,957	71.489	6,594	92	Jul	1,880	2.319	171	74
2002	18,849	23.249	733	32	Aug	928	1.145	118	104
2003	12,537	15.464	644	42	Sep	1,075	1.326	137	103
2004	40,017	49.360	2,443	49	Oct	888	1.096	119	108
2005	35,434	43.707	2,152	49	Nov	1,920	2.368	160	67
2006	4,402	5.429	736	136	Dec	3,325	4.102	231	56
2007	9,953	12.277	1,123	91	Annual	37,816	46.645	3,486	75
Min.	4,402	5.429	644	-					
Max.	136,621	168.519	14,048	-					
Ave.	37,816	46.645	3,486	75					

## 8.2. South Shore Drainage District

The South Shore Drainage District is located along the south shore of Lake Okeechobee, and prior to the ECP, runoff was discharged into Lake Okeechobee (through the Bean City Pump Station and culvert C4A) and the North New River Canal. As part of the ECP Ch. 298 Districts Diversion project, a new pump station was constructed on the Miami Canal to re-direct runoff from the Lake to the Miami Canal. The new pump station (South Shore West), SFWMD designation MC25.7TE (permit 50-00081-E), consists of two 40,000 gpm pumping units, and began operations in July 2004. The table below presents the annual and monthly summaries of flow and TP for this new pump station.



**Table 8-4: Discharge Summary for the South Shore West Pump Station.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995					Jan	49	0.061	7	117
1996					Feb	483	0.595	92	154
1997					Mar	861	1.062	163	153
1998					Apr	16	0.020	1	43
1999					May	597	0.736	117	159
2000					Jun	2,853	3.519	514	146
2001					Jul	1,254	1.547	176	114
2002					Aug	1,821	2.246	272	121
2003					Sep	2,168	2.674	351	131
2004					Oct	1,330	1.641	216	132
2005<	10,985	13.550	1,877	139	Nov	248	0.306	50	162
2006	14,717	18.153	2,427	134	Dec	76	0.094	7	74
2007	6,116	7.544	961	127	Annual	11,756	14.500	1,965	136
Min.	6,116	7.544	961	-					
Max.	14,717	18.153	2,427	-					
Ave.	10,416	12.848	1,694	132					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.

### 8.3. South Florida Conservancy District

The South Florida Conservancy District (SFCD) is located along the south shore of Lake Okeechobee, and prior to the ECP, runoff was discharged into Lake Okeechobee (through pump station S-236), the Miami Canal (through pump station P-5-E), and the Industrial Canal through pump station P-5-W. As part of the ECP Ch. 298 Districts Diversion project, a new pump station was constructed on the Miami Canal to re-direct runoff from the Lake to the Miami Canal. The new pump station (SFWMD designation MC25.7TW) replaces the old facility (SFWMD designation MC26.1TW; permit 50-001-E), and was enlarged to 504 cfs to convey the flow historically discharged through S-236. The old pump station was removed from service in August 2005, when the new pump was in operation 60 days. Data records available to the District began November 1997. Missing monthly data prior to that were generated as the long-term monthly average percentage of the discharges from S-236 and P-5-W. The table below presents the annual and monthly summaries of flow and TP for the old and new pump stations that discharge to the Miami Canal.



**Table 8-5: Discharge Summary for SFCD into Miami Canal.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	5,409	6.672	762	114	Jan	141	0.174	8	48
1996	4,774	5.888	403	68	Feb	494	0.610	41	68
1997	2,754	3.397	233	69	Mar	314	0.388	21	55
1998	7,413	9.144	454	50	Apr	130	0.161	18	109
1999	9,947	12.269	1,196	97	May	362	0.446	44	98
2000	6,899	8.509	634	74	Jun	622	0.767	59	77
2001	958	1.182	93	79	Jul	767	0.947	72	76
2002	1,765	2.177	169	78	Aug	889	1.096	104	95
2003	2,354	2.904	233	80	Sep	985	1.216	110	90
2004	3,186	3.930	173	44	Oct	924	1.140	164	144
2005	2,490	3.072	104	34	Nov	465	0.574	106	185
2006	20,163	24.871	3,489	140	Dec	300	0.370	23	61
2007	14,887	18.362	2,044	111	Annual	6,395	7.888	769	98
Min.	958	1.182	93	-					
Max.	20,163	24.871	3,489	-					
Ave.	6,384	7.875	768	98					

\*Missing data prior to November 1997 were replaced with average long-term monthly percentage of other SFCD discharges.

#### 8.4. G-88 and G-136

Two structures – G-88 and G-136 – convey runoff from the adjacent C-139 Basin into the S-8/S-3 Basin. G-88 is a culvert structure with flashboards located at the confluence of the L-3 and L-4 borrow canals. As a result of the EAA boundary changes resulting from ECP construction, as of July 2000, the G-88 structure was no longer considered on the boundary of the EAA, and discharges were no longer considered to contribute to/from the S-8/S-3 Basin. The table below presents the annual and monthly summaries of flow and TP for G-88. The negative flow for WY2001 reflects discharge from the S-8/S-3 Basin to the L-3 Borrow Canal through G-88.



**Table 8-6: Discharge Summary for Culvert G-88 (into S-8 Basin).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	79,325	97.846	27,771	284	Jan	1,663	2.051	341	166
1996	80,084	98.782	24,032	243	Feb	21	0.026	3	122
1997	10,068	12.419	3,636	293	Mar	81	0.100	12	122
1998	2,500	3.083	415	135	Apr	42	0.052	6	118
1999	6,641	8.192	779	95	May	125	0.155	24	153
2000	35,273	43.508	11,919	274	Jun	112	0.138	146	1065
2001<	-2,308	-2.847	-501	176	Jul	2,859	3.527	1,130	320
2002					Aug	2,698	3.328	1,043	313
2003					Sep	9,638	11.888	3,629	305
2004					Oct	11,952	14.742	3,413	232
2005					Nov	2,637	3.252	596	183
2006					Dec	3,096	3.819	909	238
2007					Annual	34,923	43.077	11,253	261
Min.	2,500	3.083	415	-					
Max.	80,084	98.782	27,771	-					
Ave.	35,648	43.972	11,425	260					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.

G-136 is a culvert with flashboards located at the confluence of the L-1 Canal and the L-1 East Canal. C-139 Basin runoff passing east through G-136 is conveyed to the Miami Canal, where it flows north to S-3 or south to STA-3/4 depending on the Miami Canal's pumping operations. The table below presents the annual and monthly summaries of flow and TP for G-136.



**Table 8-7: Discharge Summary for Culvert G-136 (into S-8 Basin).**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	35,986	44.388	5,799	131	Jan	446	0.550	49	89
1996	20,790	25.644	3,503	137	Feb	757	0.933	242	259
1997	13,091	16.147	2,463	153	Mar	278	0.343	40	115
1998	20,776	25.627	5,452	213	Apr	61	0.075	5	67
1999	13,734	16.941	4,190	247	May	205	0.253	17	67
2000	24,859	30.663	7,950	259	Jun	2,089	2.577	657	255
2001	3,294	4.063	244	60	Jul	2,926	3.609	874	242
2002	17,062	21.046	4,252	202	Aug	2,906	3.585	765	213
2003	15,154	18.692	5,396	289	Sep	3,463	4.272	873	204
2004	13,221	16.308	3,625	222	Oct	2,648	3.266	597	183
2005	17,379	21.437	5,661	264	Nov	1,168	1.441	341	237
2006	30,587	37.728	9,671	256	Dec	855	1.054	89	84
2007	5,489	6.770	926	137	Annual	17,802	21.958	4,549	207
Min.	3,294	4.063	244	-					
Max.	35,986	44.388	9,671	-					
Ave.	17,802	21.958	4,549	207					

### 8.5. Rotenberger Wildlife Management Area Structures

The Rotenberger Wildlife Management Area (RWMA) is approximately 29,000 acres in size and is located immediately west of the Miami Canal, and northwest of S-8. Subsequent to the construction of the Central and Southern Florida Project for Flood Control and Other Purposes (C&SF Project), the area was cut off from historic sheetflow, and began to undergo adverse ecological impacts. As part of the ECP, an inflow pump station, G-410, was constructed to convey treated water from STA-5 into the RWMA to help restore the hydropattern. Operations began in May 2001, and until the STA-5 discharge canal was re-routed south of the G-373 divide structure on July 22, 2005, discharges conveyed by G-410 into the RWMA were considered out of the S-8/S-3 Basin. Table 8-8 below presents the annual and monthly summaries of flow and TP for the G-410 pump station through July 22, 2005.

As part of the ECP, RWMA discharge structures were constructed to allow overflow from RWMA to discharge into the Miami Canal. Operations began in May 2001, and until the S-8/S-3 boundary was changed in January 2005, discharges through the G-402 structures from the RWMA were considered into the S-8/S-3 Basin. Table 8-9 below presents the annual and monthly summaries of flow and TP for the G-410 pump station through July 22, 2005.



**Table 8-8: Discharge Summary for Pump Station G-410 (out of S-8 Basin).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	5,398	6.658	427	64
1996					Feb	1,911	2.357	127	54
1997					Mar	806	0.994	50	50
1998					Apr	394	0.486	18	38
1999					May	193	0.238	10	43
2000					Jun	741	0.914	199	218
2001					Jul	3,930	4.847	323	67
2002	33,169	40.913	2,374	58	Aug	6,236	7.692	445	58
2003	54,307	66.987	6,560	98	Sep	5,163	6.368	549	86
2004	16,849	20.782	929	45	Oct	6,669	8.226	794	97
2005	44,413	54.783	3,905	71	Nov	2,567	3.166	202	64
2006<	1,137	1.402	60	43	Dec	3,228	3.981	259	65
2007					Annual	37,235	45.929	3,405	74
Min.	16,849	20.782	929	-					
Max.	54,307	66.987	6,560	-					
Ave.	37,184	45.866	3,442	75					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.

**Table 8-9: Discharge Summary for G-402 Structures (into S-8 Basin).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	247	0.305	6	21
1996					Feb	31	0.039	2	48
1997					Mar	46	0.057	3	47
1998					Apr	22	0.027	1	49
1999					May	4	0.005	0	47
2000					Jun	1	0.001	0	38
2001					Jul	4,474	5.518	109	20
2002	12,799	15.787	344	22	Aug	4,769	5.882	155	26
2003	25,406	31.338	780	25	Sep	5,709	7.042	148	21
2004	353	0.435	21	48	Oct	4,305	5.310	109	20
2005	34,049	41.999	926	22	Nov	8	0.010	1	58
2006<	10,345	12.761	176	14	Dec	3	0.004	0	51
2007					Annual	19,619	24.199	534	22
Min.	353	0.435	21	-					
Max.	34,049	41.999	926	-					
Ave.	18,152	22.390	518	23					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.



### 8.6. Holey Land Wildlife Management Area Structures

The Holey Land Wildlife Management Area (HLWMA) is approximately 35,000 acres in size and is located immediately east of the Miami Canal, and northeast of S-8. Subsequent to the construction of the Central and Southern Florida Project for Flood Control and Other Purposes (C&SF Project), the area was cut off from historic sheetflow, and began to undergo adverse ecological impacts. The District constructed water control facilities to restore the hydropattern of the HLWMA, and until the S-8/S-3 boundary was changed in January 2005, discharges conveyed by G-200 into the HLWMA were considered out of the S-8/S-3 Basin. The table below presents the annual and monthly summaries of flow and TP for the G-200 pump station.

**Table 8-10: Discharge Summary for Pump Station G-200.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	61,831	76.267	11,957	157	Jan	3,336	4.115	245	59
1996	15,560	19.192	1,005	52	Feb	1,682	2.074	163	79
1997	60,509	74.636	4,190	56	Mar	1,780	2.195	122	56
1998	55,199	68.087	7,486	110	Apr	4,962	6.121	317	52
1999	52,951	65.314	5,703	87	May	4,535	5.593	875	156
2000	33,072	40.794	3,486	85	Jun	4,016	4.954	351	71
2001	47,329	58.379	5,300	91	Jul	2,137	2.636	284	108
2002	8,475	10.454	435	42	Aug	2,647	3.265	707	217
2003	45,889	56.603	4,326	76	Sep	2,058	2.539	236	93
2004	20,956	25.849	1,898	73	Oct	1,827	2.253	188	84
2005<	11,942	14.730	1,929	131	Nov	4,614	5.692	423	74
2006					Dec	5,085	6.273	503	80
2007					Annual	38,679	47.710	4,415	93
Min.	8,475	10.454	435	-					
Max.	61,831	76.267	11,957	-					
Ave.	40,177	49.558	4,579	92					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.

Outflows from the HLWMA are regulated by the G-204, G-205 and G-206 structures. Prior to the construction of STA-3/4, discharges through these structures were conveyed directly to WCA-3A. With the enlargement of the L-5 Borrow Canal to serve as the discharge canal for STA-3/4, these structures were connected to the L-5, and hence, to the S-8/S-3 Basin, until the EAA boundary change in January 2005. However, no flow was recorded during the time these structures were part of the S-8/S-3 Basin.





### 8.7. STA-3/4 Structures

Pump station G-372 moves water from the Miami Canal into STA-3/4, and began operating in October 2003. The table below presents the annual and monthly summaries of flow and TP for the G-372 pump station.

**Table 8-11: Discharge Summary for Pump Station G-372.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995					Jan	6,682	8.243	1,203	146
1996					Feb	9,872	12.177	2,283	187
1997					Mar	20,172	24.882	2,219	89
1998					Apr	7,235	8.925	1,755	197
1999					May	12,278	15.145	2,424	160
2000					Jun	56,736	69.982	8,553	122
2001					Jul	46,808	57.737	5,227	91
2002					Aug	56,814	70.079	6,387	91
2003					Sep	69,039	85.158	9,300	109
2004<	12,547	15.476	906	59	Oct	24,484	30.200	2,662	88
2005	366,203	451.705	40,669	90	Nov	6,913	8.526	1,018	119
2006	445,579	549.612	65,854	120	Dec	1,628	2.008	142	71
2007	208,638	257.351	33,374	130	<b>Annual</b>	<b>318,660</b>	<b>393.062</b>	<b>43,174</b>	<b>110</b>
Min.	208,638	257.351	33,374	-					
Max.	445,579	549.612	65,854	-					
Ave.	340,140	419.556	46,632	111					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.

### 8.8. STA-5 Structures

The STA-5 Discharge Canal conveys treated water from the STA-5 outlet structures (G-344s) to the Miami Canal. The S-8 pump station provides the hydraulic control of the STA-5 Discharge Canal. With the re-routing of the STA-5 Discharge Canal south of G-373 on July 22, 2005, discharges from STA-5 were no longer considered as tributary to the EAA and the S-8/S-3 Basin. The table below presents the annual and monthly summaries of flow and TP for the G-344 structures from the period October 1999 – July 22, 2005.





**Table 8-12: Discharge Summary for G-344 Structures (into the S-8 basin).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
<b>1995</b>					<b>Jan</b>	2,157	2.660	302	113
<b>1996</b>					<b>Feb</b>	1,619	1.998	195	98
<b>1997</b>					<b>Mar</b>	2,436	3.004	279	93
<b>1998</b>					<b>Apr</b>	684	0.843	46	55
<b>1999</b>					<b>May</b>	542	0.669	42	63
<b>2000&lt;</b>	13,343	16.459	2,741	167	<b>Jun</b>	10,214	12.598	1,198	95
<b>2001</b>	39,977	49.311	4,907	100	<b>Jul</b>	18,392	22.686	2,544	112
<b>2002</b>	131,006	161.593	13,111	81	<b>Aug</b>	26,440	32.613	3,424	105
<b>2003</b>	160,519	197.997	26,480	134	<b>Sep</b>	31,427	38.765	3,704	96
<b>2004</b>	136,466	168.328	16,403	97	<b>Oct</b>	19,121	23.585	2,572	109
<b>2005</b>	121,427	149.778	12,201	81	<b>Nov</b>	3,788	4.672	368	79
<b>2006&lt;</b>	61,528	75.894	7,225	95	<b>Dec</b>	3,537	4.363	359	82
<b>2007</b>					<b>Annual</b>	120,356	148.457	15,033	101
<b>Min.</b>	39,977	49.311	4,907	-					
<b>Max.</b>	160,519	197.997	26,480	-					
<b>Ave.</b>	117,879	145.402	14,620	101					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.

Supplemental water is delivered to STA-5 through the small pumps G-249A, G-250B, and G-507, all located along the perimeter of the STA. Up until the re-routing of the STA-5 Discharge Canal south of G-373 on July 22, 2005, flow through these pumps were considered as discharges from the S-8/S-3 Basin. The table below presents the annual and monthly summaries of flow and TP for these supplemental pumps through July 22, 2005.



**Table 8-13: Discharge Summary for STA-5 Supplemental Pumps (out of S-8 Basin).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995					Jan	7	0.008	0	60
1996					Feb	74	0.092	4	41
1997					Mar	180	0.223	10	44
1998					Apr	617	0.761	37	49
1999					May	525	0.648	38	58
2000<					Jun	272	0.335	20	60
2001	4,503	5.554	326	59	Jul	11	0.013	1	53
2002	29	0.036	3	70	Aug	30	0.037	2	59
2003	14	0.017	1	56	Sep	8	0.010	1	51
2004	4,564	5.629	256	46	Oct	2	0.002	0	83
2005	1,678	2.070	99	48	Nov	0	0.000	0	65
2006<					Dec	78	0.096	2	16
2007					Annual	1,804	2.226	114	51
Min.	14	0.017	1	-					
Max.	4,564	5.629	326	-					
Ave.	2,158	2.661	137	51					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.

### 8.9. STA-6 Structures

STA-6 received runoff from approximately 10,400 acres located within the S-8/S-3 Basin up until the construction of the 3<sup>rd</sup> flow-way of STA-5 and STA-6 Section 2 in 2006. The G-600 pump station discharged this runoff into the STA. With the completion of the initial STA expansions, the G-600 contributing area decreased to approximately 6,250 acres. Flow records for G-600 became available to the District in March 1997, coincident with the beginning of construction of STA-6. Table 8-14 below presents the annual and monthly summaries of flow and TP for G-600.

Up until the construction of G-404 and the L-4 gap, discharges from STA-6, as measured at the G-606 structure, were conveyed to S-8 and were included in the cumulative pumped volume and phosphorus load at that pump station. After June 30, 2000, discharges from STA-6 no longer contributed to the S-8 flows and loads. Table 8-15 presents the annual and monthly summaries of flow and TP for G-606.



**Table 8-14: Discharge Summary for Pump Station G-600.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
<b>1995</b>					<b>Jan</b>	2,058	2.538	101	40
<b>1996</b>					<b>Feb</b>	2,491	3.073	144	47
<b>1997&lt;</b>	2,040	2.517	59	24	<b>Mar</b>	2,330	2.874	158	55
<b>1998</b>	48,194	59.447	2,519	42	<b>Apr</b>	834	1.028	56	54
<b>1999</b>	40,120	49.487	3,102	63	<b>May</b>	573	0.706	51	72
<b>2000</b>	59,847	73.820	5,383	73	<b>Jun</b>	3,744	4.618	360	78
<b>2001</b>	39,395	48.593	6,821	140	<b>Jul</b>	5,131	6.329	575	91
<b>2002</b>	53,437	65.913	4,506	68	<b>Aug</b>	6,009	7.412	535	72
<b>2003</b>	56,251	69.385	5,474	79	<b>Sep</b>	7,493	9.243	729	79
<b>2004</b>	52,673	64.972	3,429	53	<b>Oct</b>	7,046	8.691	1,080	124
<b>2005</b>	34,033	41.979	3,304	79	<b>Nov</b>	4,423	5.455	407	75
<b>2006</b>	40,466	49.914	5,183	104	<b>Dec</b>	3,442	4.246	197	46
<b>2007</b>	32,442	40.016	4,360	109	<b>Annual</b>	45,573	56.214	4,393	78
<b>Min.</b>	32,442	40.016	2,519	-					
<b>Max.</b>	59,847	73.820	6,821	-					
<b>Ave.</b>	45,686	56.353	4,408	78					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.

**Table 8-15: Discharge Summary for Structure G-606.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
<b>1995</b>					<b>Jan</b>	1,480	1.826	26	14
<b>1996</b>					<b>Feb</b>	1,764	2.175	47	22
<b>1997</b>					<b>Mar</b>	1,755	2.165	40	19
<b>1998&lt;</b>	23,984	29.583	480	16	<b>Apr</b>	190	0.234	6	24
<b>1999</b>	24,035	29.647	636	21	<b>May</b>	0	0.000	0	
<b>2000</b>	59,261	73.097	1,090	15	<b>Jun</b>	3,819	4.711	85	18
<b>2001&lt;</b>					<b>Jul</b>	4,994	6.160	151	25
<b>2002</b>					<b>Aug</b>	6,082	7.502	140	19
<b>2003</b>					<b>Sep</b>	7,039	8.683	127	15
<b>2004</b>					<b>Oct</b>	9,667	11.924	164	14
<b>2005</b>					<b>Nov</b>	6,761	8.340	127	15
<b>2006</b>					<b>Dec</b>	3,723	4.593	58	13
<b>2007</b>					<b>Annual</b>	47,274	58.312	971	17
<b>Min.</b>	24,035	29.647	636	-					
<b>Max.</b>	59,261	73.097	1,090	-					
<b>Ave.</b>	41,648	51.372	863	17					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.



### 8.10. G-373 Spillway

The G-373 divide structure is located just south of the intake canal for the G-372 STA-3/4 inflow pump station, and just north of the G-200 HLWMA inflow pump station. The structure began operating in January 2005 to segregate untreated water in the Miami Canal from treated discharges from STA-3/4. G-373 is normally closed, but can be opened to allow movement of water for the following purposes:

4. to allow untreated diversion of runoff from the S-8/S-3 basin when the capacity of STA-3/4 is exceeded;
5. to allow Lake water supply releases to move south into WCA-3A (via S-8, G-4-4 or G-357), or west to serve the Big Cypress Basin Seminole Indian Reservation pump station G-409;
6. to allow water from points south to move into the EAA for water supply.

The tables below present the annual and monthly summaries of flow and TP for G-373 for flow out of and into the S-8/S-3 basin.

**Table 8-16: Discharge Summary for G-373 (out of S-8 basin).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	0	0.000	0	
1996					Feb	4	0.005	0	72
1997					Mar	244	0.301	23	75
1998					Apr	5,080	6.266	766	122
1999					May	5,046	6.225	787	126
2000					Jun	2,309	2.848	260	91
2001					Jul	0	0.000	0	
2002					Aug	0	0.000	0	94
2003					Sep	0	0.000	0	
2004					Oct	0	0.000	0	
2005<	0	0.000	0		Nov	0	0.000	0	41
2006	12,829	15.824	2,145	136	Dec	0	0.000	0	
2007	17,866	22.038	2,315	105	<b>Annual</b>	12,684	15.645	1,836	117
Min.	12,829	15.824	2,145	-					
Max.	17,866	22.038	2,315	-					
Ave.	15,348	18.931	2,230	118					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.



**Table 8-17: Discharge Summary for G-373 (into S-8 Basin).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	698	0.862	19	22
1996					Feb	0	0.000	0	
1997					Mar	36	0.045	1	22
1998					Apr	0	0.000	0	
1999					May	0	0.000	0	
2000					Jun	40	0.049	3	69
2001					Jul	0	0.000	0	
2002					Aug	10	0.012	1	69
2003					Sep	0	0.000	0	
2004					Oct	6,899	8.510	651	77
2005<	0	0.000	0		Nov	6,512	8.032	212	26
2006	0	0.000	0		Dec	991	1.222	29	24
2007	31,107	38.370	1,853	48	Annual	15,186	18.732	917	49
Min.	0	0.000	0	-					
Max.	31,107	38.370	1,853	-					
Ave.	15,554	19.185	927	48					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.

2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.

### 8.11. S-8 Pump Station

With the construction and operation of the STAs, the function and operation of the southern pump stations has been modified to integrate with the ECP. Beginning in October 2003, runoff from the Miami Canal basin has been introduced to STA-3/4 through G-372, and the function and operation of S-8 has been modified to serve as one of the outflow pump stations for STA-3/4. G-373 began operating January 8, 2005 and all flows/loads through S-8 and other structures in vicinity (except for intentional Lake deliveries to the WCAs) after that date came from STA-3/4. STA-3/4 discharge records were evaluated to parse out S-8 flows and loads that originated within STA-3/4. For WY2005 prior to January 8, 2005, Table 2C-3 of the SFER (page 2C-25) identifies that 124,657 AF and 791 kg of the discharge at S-8 was attributable to STA-3/4 discharges. This represents 47.8% of the flow and 11.8% of the load, and hence this percentage was backed out of the DBHYDRO values for that period. The table below presents the annual and monthly summaries of flow and TP for S-8.



**Table 8-18: Discharge Summary for Pump Station S-8 (Excluding STA-3/4 Discharges).**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	535,265	660.239	78,258	119	Jan	8,930	11.015	642	58
1996	473,494	584.046	68,358	117	Feb	12,991	16.024	732	46
1997	345,433	426.085	38,550	90	Mar	8,267	10.197	460	45
1998	387,441	477.901	24,500	51	Apr	11,178	13.788	1,030	75
1999	305,522	376.856	36,728	97	May	16,426	20.262	1,455	72
2000	445,122	549.049	64,339	117	Jun	40,954	50.516	3,801	75
2001	168,949	208.396	17,990	86	Jul	40,589	50.065	5,681	113
2002	136,120	167.902	9,735	58	Aug	46,217	57.007	5,021	88
2003	291,688	359.791	29,271	81	Sep	53,687	66.221	6,977	105
2004	350,171	431.929	30,833	71	Oct	48,333	59.618	6,944	116
2005<	77,707	95.850	1,966	21	Nov	17,993	22.194	2,486	112
2006					Dec	17,917	22.100	1,444	65
2007					Annual	323,480	399.006	36,672	92
Min.	136,120	167.902	9,735	-					
Max.	535,265	660.239	78,258	-					
Ave.	343,921	424.219	39,856	94					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.

Reverse flow at S-8, i.e., to the north, has occurred during periods of water supply. The table below presents the annual and monthly summaries of flow and TP for releases north through S-8.



**Table 8-19. Discharge Summary Reverse Flow at Pump Station S-8.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	93	0.115	22	188	Jan	1	0.001	0	43
1996	0	0.000	0		Feb	0	0.000	0	
1997	966	1.191	85	72	Mar	0	0.000	0	82
1998	1,333	1.644	142	86	Apr	13	0.016	2	94
1999	480	0.592	82	138	May	3	0.003	0	50
2000	0	0.000	0		Jun	26	0.033	2	56
2001	0	0.000	0		Jul	138	0.171	15	87
2002	4,194	5.174	737	142	Aug	126	0.155	29	189
2003	0	0.000	0	82	Sep	70	0.086	10	115
2004	19	0.024	2	70	Oct	16	0.020	2	104
2005	254	0.314	10	33	Nov	113	0.140	13	91
2006	0	0.000	0		Dec	58	0.071	11	149
2007	0	0.000	0		Annual	565	0.696	83	119
Min.	0	0.000	0	-					
Max.	4,194	5.174	737	-					
Ave.	565	0.696	83	119					

### 8.12. G-357 Culvert and G-404 Pump Station

As part of the ECP, control structures G-357 and G-404 were constructed and are located directly west of S-8 at the intersection of the Miami Canal and the L-4 Borrow Canal. Flow records began in May 2000, and up until the completion of the G-373 divide structure in January 2005 and, flow through these structures were considered as discharges from the S-8/S-3 Basin. The tables below present the annual and monthly summaries of flow and TP for G-357 and G-404.





**Table 8-20: Discharge Summary for Culvert G-357.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	0	0.000	0	
1996					Feb	0	0.000	0	
1997					Mar	275	0.339	12	35
1998					Apr	6	0.008	0	30
1999					May	2,995	3.694	137	37
2000					Jun	151	0.186	8	45
2001<	1,099	1.355	48	35	Jul	0	0.000	0	
2002					Aug	0	0.000	0	
2003					Sep	0	0.000	0	
2004	983	1.213	32	26	Oct	0	0.000	0	
2005<	11,624	14.337	552	39	Nov	0	0.000	0	
2006					Dec	0	0.000	0	
2007					Annual	3,426	4.226	158	37
Min.	983	1.213	32	-					
Max.	983	1.213	32	-					
Ave.	983	1.213	32	26					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.

**Table 8-21: Discharge Summary for Pump Station G-404.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	11,653	14.373	489	34
1996					Feb	12,887	15.896	687	43
1997					Mar	6,290	7.758	226	29
1998					Apr	3,005	3.706	102	28
1999					May	1,712	2.112	80	38
2000					Jun	5,148	6.350	257	41
2001	7,001	8.635	383	44	Jul	5,545	6.839	350	51
2002	129,973	160.319	6,685	42	Aug	4,725	5.828	395	68
2003	92,603	114.224	6,616	58	Sep	8,546	10.542	605	57
2004	72,148	88.993	3,734	42	Oct	10,254	12.648	577	46
2005<	39,961	49.292	1,169	24	Nov	1,924	2.374	60	25
2006					Dec	3,416	4.213	190	45
2007					Annual	75,104	92.639	4,018	43
Min.	7,001	8.635	383	-					
Max.	129,973	160.319	6,685	-					
Ave.	68,337	84.293	3,717	44					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years therefore, annual total of monthly averages may not match average of annual totals.





### 8.13. S-8/S-3 Basin Runoff

The S-8/S-3 Basin runoff was estimated as the net result of the various flow components described above:

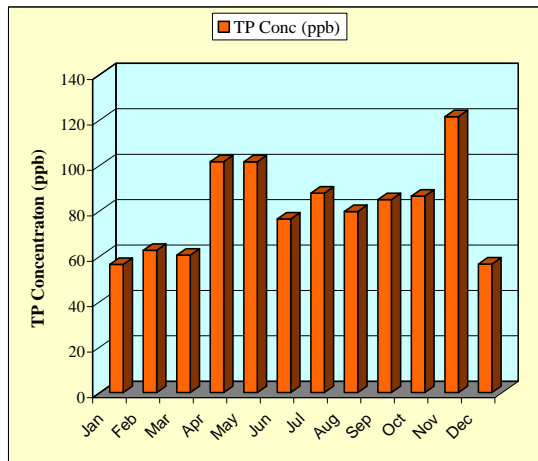
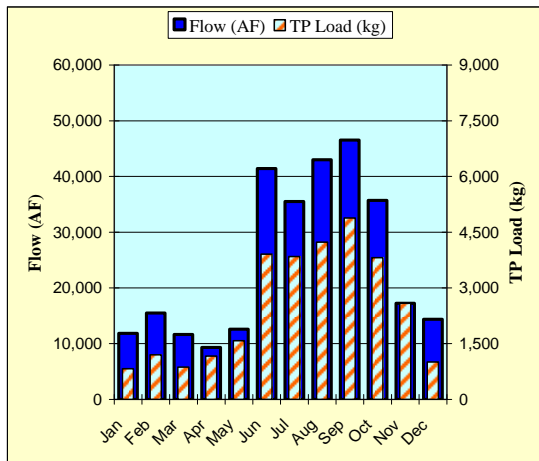
- S-8 discharges to WCA-3A (through January 8, 2005, when the earthen plug at G-373 was installed)
- Plus discharges to points south through the G-373 divide structure (beginning January 9, 2005)
- Plus discharges to Lake Okeechobee at S-3 and S-354
- Plus discharges to STA-3/4 at G-372 (beginning October 2003)
- Plus G-357 discharges to WCA-3A (via the gap) or C-139 basin (via G-88) (through January 8, 2005)
- Plus G-404 discharges to WCA-3A (via the gap) or C-139 basin (via G-88) (through January 8, 2005)
- Plus discharges to STA-5 from G-349a, G-350b and G-507 (through January 8, 2005)
- Plus discharges to Rotenberger WMA at G-410 (through January 8, 2005)
- Plus discharges to Holey Land WMA at G-200 (through January 8, 2005)
- Minus flow-through releases from the Lake at S-354
- Minus inflows from South Shore Drainage District and South Florida Conservancy District
- Minus inflows from the C-139 Basin at G-136
- Minus inflows from the C-139 Basin at G-88 (through July 2000)
- Minus inflows from STA-5 at G-344s (through January 8, 2005)
- Minus discharges from STA-6 at G-606 (through June 2000)
- Minus inflows from Rotenberger WMA at G-402s (through January 8, 2005)

The table below presents the annual and monthly summaries of flow and TP for the S-8/S-3 Basin runoff. The figures present the monthly and annual variability associated with the S-8/S-3 Basin runoff.



**Table 8-22: Discharge Summary for S-8/S-3 Basin Runoff.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	459,888	567.263	54,978	97	Jan	11,876	14.648	827	56
1996	365,341	450.640	41,326	92	Feb	15,479	19.093	1,197	63
1997	333,221	411.022	33,281	81	Mar	11,652	14.372	870	61
1998	375,879	463.640	24,975	54	Apr	9,301	11.473	1,167	102
1999	189,522	233.772	30,883	132	May	12,598	15.540	1,580	102
2000	308,553	380.594	40,261	106	Jun	41,415	51.085	3,907	76
2001	140,600	173.427	14,760	85	Jul	35,497	43.785	3,846	88
2002	259,778	320.431	15,492	48	Aug	43,005	53.046	4,232	80
2003	270,430	333.570	13,634	41	Sep	46,542	57.408	4,881	85
2004	285,235	351.831	16,014	46	Oct	35,714	44.053	3,814	87
2005	332,302	409.888	27,563	67	Nov	17,243	21.269	2,585	122
2006	319,790	394.455	44,901	114	Dec	14,364	17.718	1,004	57
2007	190,372	234.820	30,748	131	Annual	294,685	363.489	29,909	82
Min.	140,600	173.427	13,634	-					
Max.	459,888	567.263	54,978	-					
Ave.	294,685	363.489	29,909	82					



**Figure 8-2: Average Monthly Flows and Phosphorus Levels for S-8/S-3 Basin Runoff.**



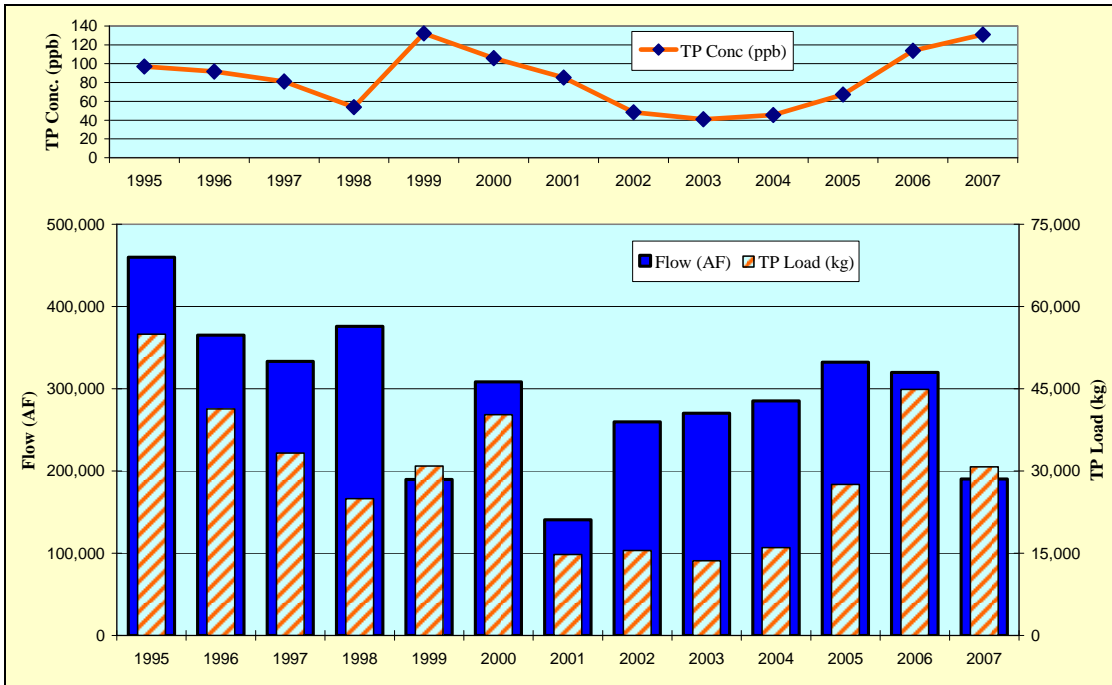
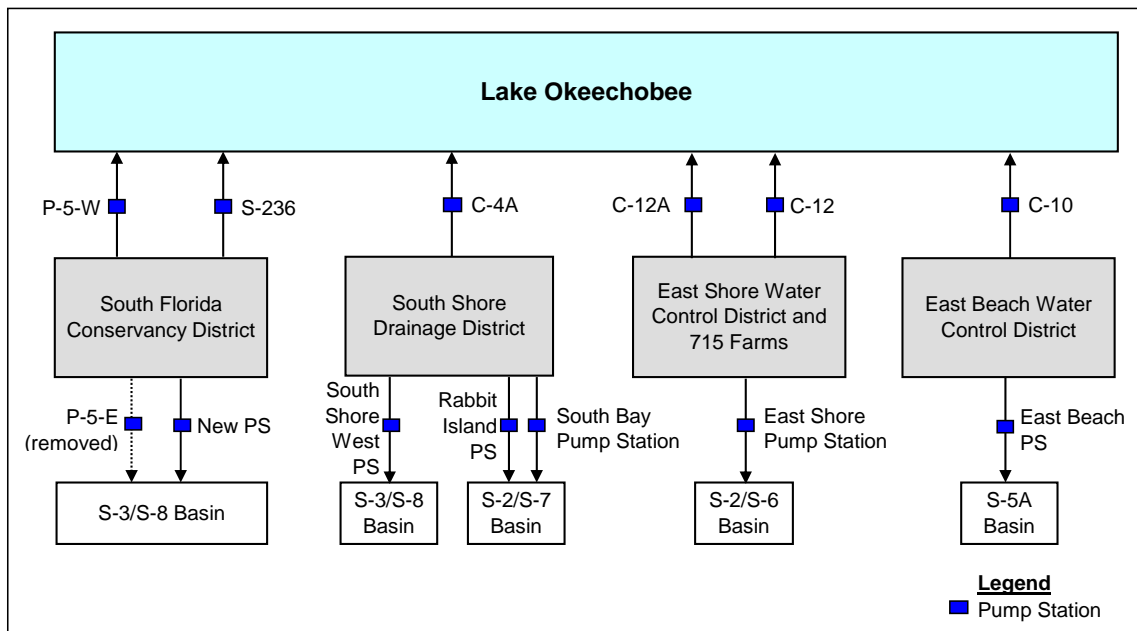


Figure 8-3: WY1995-2007 Flows and Phosphorus Levels for S-8/S-3 Basin Runoff.



## 9. Chapter 298 Districts

Runoff from four Ch. 298 Districts and a state lease currently known as 715 Farms currently discharge into the EAA for treatment in the STAs. A schematic of the basin showing the primary conveyance features, water control structures and receiving waters is presented in the figure below. The flow and TP levels through each of the principal water control structures are described in the following sections.



**Figure 9-1: Chapter 298 Districts Schematic.**

### 9.1. East Beach Water Control District

The East Beach Water Control District (EBWCD) is located along the south east shore of Lake Okeechobee and during the WY1995-2007 period discharged to the Lake via a pump station upstream of culvert C10 and to the West Palm Beach Canal via the East Beach Pump Station. The East Beach Pump Station was enlarged as part of the ECP Ch. 298 Districts Diversion project. The enlarged capacity functions to divert into the S-5A Basin runoff from the EBWCD that previously entered Lake Okeechobee via C-10. The tables below present the annual and monthly summaries of flow and TP for C-10 and the East Beach Pump Station.



**Table 9-1: Discharge Summary for C-10.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995	12,857	15.858	8,917	562	Jan	76	0.094	32	343
1996	11,269	13.900	10,869	782	Feb	277	0.342	186	544
1997	3,551	4.380	677	155	Mar	263	0.325	111	340
1998	10,040	12.385	6,707	542	Apr	210	0.259	210	812
1999	18,596	22.938	16,643	726	May	80	0.099	30	302
2000	29,283	36.120	21,058	583	Jun	1,027	1.267	690	544
2001	5,227	6.447	6,546	1015	Jul	762	0.940	522	555
2002	8,006	9.875	5,499	557	Aug	908	1.120	724	646
2003	536	0.661	455	688	Sep	1,442	1.779	913	513
2004	265	0.327	49	150	Oct	1,443	1.780	1,394	783
2005	1,715	2.115	241	114	Nov	1,092	1.347	1,030	765
2006	230	0.284	32	114	Dec	254	0.313	139	443
2007	295	0.363	41	114	Annual	7,836	9.666	5,980	619
Min.	230	0.284	32	-					
Max.	29,283	36.120	21,058	-					
Ave.	7,836	9.666	5,980	619					

**Table 9-2: Discharge Summary for East Beach Pump Station.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	612	0.756	149	198
1996					Feb	1,131	1.395	309	222
1997					Mar	935	1.153	349	303
1998					Apr	495	0.610	116	190
1999					May	977	1.205	220	183
2000					Jun	3,111	3.837	1,299	338
2001					Jul	2,482	3.061	1,034	338
2002<	12,323	15.200	3,932	259	Aug	3,306	4.078	1,556	381
2003	19,883	24.525	7,569	309	Sep	3,230	3.984	1,990	500
2004	23,479	28.961	8,661	299	Oct	1,620	1.998	1,288	644
2005	26,500	32.688	15,041	460	Nov	715	0.883	320	363
2006	17,932	22.118	10,738	485	Dec	777	0.958	199	207
2007	12,143	14.979	5,516	368	Annual	19,391	23.919	8,829	369
Min.	12,143	14.979	5,516	-					
Max.	26,500	32.688	15,041	-					
Ave.	19,988	24.654	9,505	386					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.

The table below presents the annual and monthly summaries of flow and TP for the EBWCD. The figures present the monthly and annual variability associated with the EBWCD runoff.

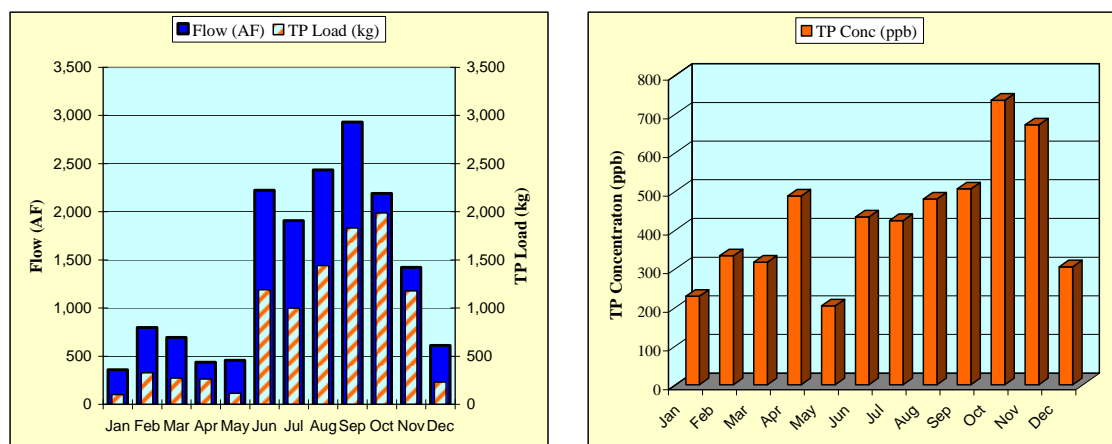


**Table 9-3: Discharge Summary for EBWCD.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995	12,857	15.858	8,917	562	Jan	359	0.443	101	229
1996	11,269	13.900	10,869	782	Feb	799	0.985	328	333
1997	3,551	4.380	677	155	Mar	695	0.857	272	317
1998	10,040	12.385	6,707	542	Apr	438	0.541	264	488
1999	18,596	22.938	16,643	726	May	456	0.563	115	204
2000	29,283	36.120	21,058	583	Jun	2,224	2.743	1,190	434
2001	5,227	6.447	6,546	1015	Jul	1,908	2.353	999	424
2002<	20,328	25.074	9,431	376	Aug	2,434	3.003	1,442	480
2003	20,419	25.186	8,024	319	Sep	2,933	3.617	1,831	506
2004	23,744	29.288	8,710	297	Oct	2,191	2.703	1,988	736
2005	28,215	34.803	15,282	439	Nov	1,422	1.754	1,178	672
2006	18,162	22.402	10,770	481	Dec	613	0.756	230	305
2007	12,438	15.342	5,557	362	Annual	16,471	20.317	9,938	489
Min.	3,551	4.380	677	-					
Max.	29,283	36.120	21,058	-					
Ave.	16,150	19.921	9,980	501					

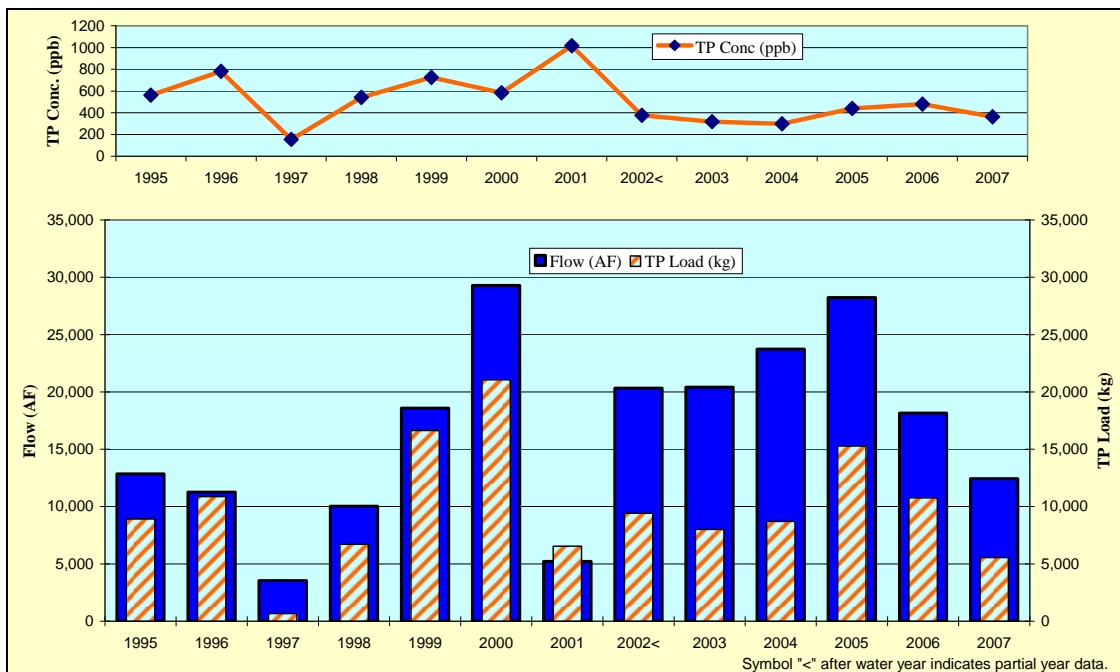
\*Runoff for this basin is underreported prior to July 2001.

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.



**Figure 9-2: Average Monthly Flows and Phosphorus Levels in EBWCD Runoff.**





**Figure 9-3: WY1995-2007 Flows and Phosphorus Levels for EBWCD Runoff.**

## 9.2. East Shore Water Control District and 715 Farms

The East Shore Water Control District (ESWCD) lies east of Lake Okeechobee between the West Palm Beach Canal and the Hillsboro Canal. State lease No. 3420, currently known as 715 Farms, lies west of the ESWCD and EBWCD. Discharges from these area historically flowed into Lake Okeechobee through the C-12 and C-12A facilities. The East Shore Pump Station (ESPS) was constructed along with conveyance facilities as part of the Everglades Construction Project (ECP) Ch. 298 Districts Diversion project. The new pump station functions to divert into the S-6 Basin runoff from the ESWCD and 715 Farms that previously entered Lake Okeechobee. The tables below present the annual and monthly summaries of flow and TP for C-12, C-12A and the new East Shore Pump Station.





**Table 9-4: Discharge Summary for Culvert C-12.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995	20,156	24.862	5,098	205	Jan	49	0.060	11	175
1996	16,855	20.791	3,466	167	Feb	423	0.522	82	157
1997	9,199	11.347	1,554	137	Mar	485	0.599	84	141
1998	11,283	13.917	3,806	273	Apr	243	0.300	60	199
1999	15,065	18.582	1,990	107	May	96	0.118	13	108
2000	26,025	32.101	4,658	145	Jun	1,406	1.734	302	174
2001	6,298	7.769	1,583	204	Jul	1,044	1.287	238	185
2002	9,851	12.151	1,690	139	Aug	1,198	1.478	250	169
2003	18	0.022	2	98	Sep	1,690	2.084	278	134
2004	470	0.579	37	64	Oct	1,368	1.688	323	192
2005	6,696	8.260	847	103	Nov	1,174	1.448	188	130
2006	3,486	4.300	664	154	Dec	479	0.591	126	214
2007	116	0.143	24	171	Annual	9,655	11.909	1,955	164
Min.	18	0.022	2	-					
Max.	26,025	32.101	5,098	-					
Ave.	9,655	11.909	1,955	164					

**Table 9-5: Discharge Summary for Culvert C-12A.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995	14,171	17.479	2,122	121	Jan	458	0.565	38	68
1996	14,414	17.779	2,013	113	Feb	464	0.573	45	79
1997	10,591	13.063	958	73	Mar	345	0.425	36	84
1998	15,095	18.619	1,520	82	Apr	274	0.338	38	112
1999	9,995	12.328	1,009	82	May	205	0.253	21	84
2000	19,146	23.617	2,669	113	Jun	631	0.779	77	98
2001	6,379	7.868	839	107	Jul	882	1.088	125	115
2002	6,940	8.561	793	93	Aug	1,144	1.411	153	108
2003	68	0.084	9	103	Sep	834	1.028	91	89
2004	0		0		Oct	1,214	1.497	183	122
2005	187	0.231	32	140	Nov	596	0.735	81	111
2006	56	0.070	11	152	Dec	572	0.706	66	93
2007	1,991	2.456	422	172	Annual	7,618	9.397	954	101
Min.	0	0.070	0	-					
Max.	19,146	23.617	2,669	-					
Ave.	7,618	10.180	954	94					



**Table 9-6: Discharge Summary for East Shore Pump Station.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	687	0.847	55	65
1996					Feb	1,522	1.877	146	78
1997					Mar	1,117	1.378	124	90
1998					Apr	495	0.610	41	67
1999					May	1,389	1.713	137	80
2000					Jun	3,671	4.528	447	99
2001					Jul	3,782	4.664	595	127
2002<	4,893	6.036	404	67	Aug	4,486	5.533	651	118
2003	32,606	40.219	3,607	90	Sep	3,246	4.003	739	185
2004	29,812	36.773	2,988	81	Oct	2,442	3.012	807	268
2005	34,326	42.341	6,124	145	Nov	817	1.008	182	181
2006	26,800	33.058	6,884	208	Dec	907	1.118	62	55
2007	18,913	23.329	3,902	167	Annual	24,558	30.292	3,985	132
Min.	18,913	23.329	2,988	-					
Max.	34,326	42.341	6,884	-					
Ave.	28,491	35.144	4,701	134					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.

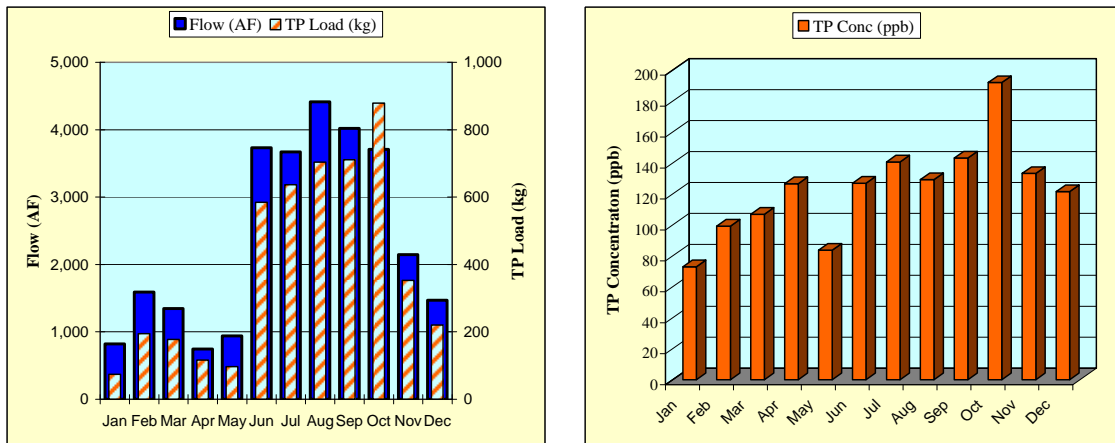
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.

The table below presents the annual and monthly summaries of flow and TP for the ESWCD. The figures present the monthly and annual variability associated with the ESWCD runoff.

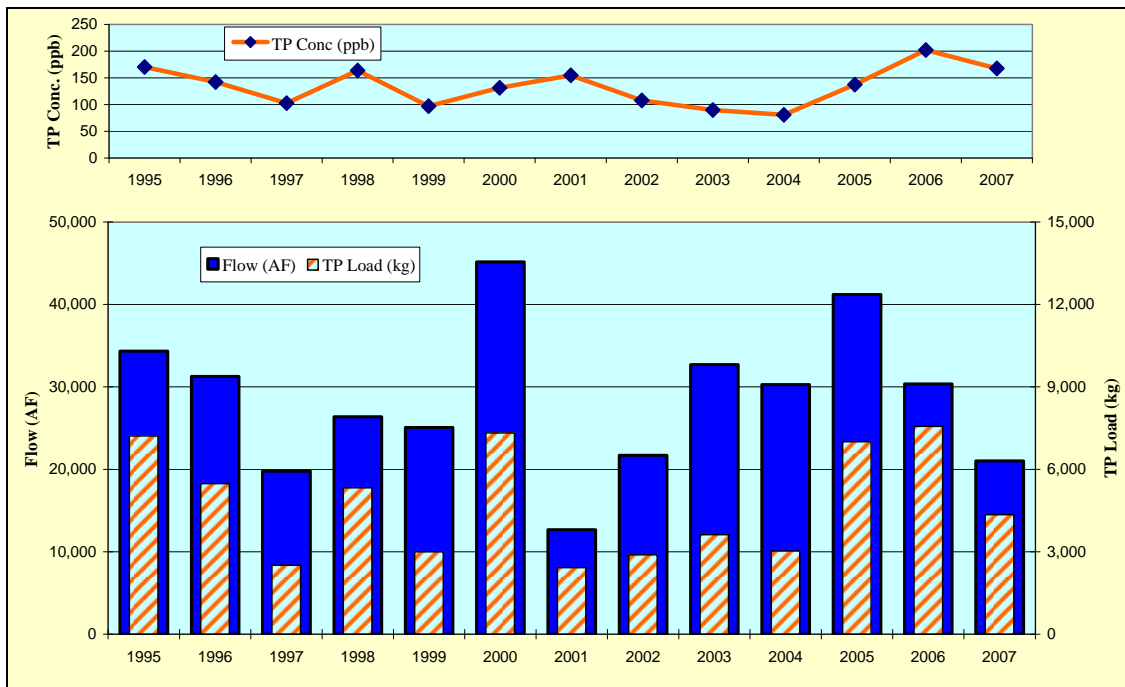
**Table 9-7: Discharge Summary for ESWCD and 715 Farms.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995	34,326	42.341	7,220	171	Jan	824	1.016	74	73
1996	31,269	38.570	5,479	142	Feb	1,590	1.961	195	99
1997	19,790	24.410	2,512	103	Mar	1,346	1.660	178	107
1998	26,377	32.536	5,325	164	Apr	745	0.919	116	127
1999	25,059	30.910	2,999	97	May	942	1.162	97	84
2000	45,171	55.718	7,328	132	Jun	3,732	4.603	585	127
2001	12,677	15.637	2,422	155	Jul	3,671	4.528	637	141
2002	21,685	26.748	2,887	108	Aug	4,412	5.442	704	129
2003	32,692	40.325	3,618	90	Sep	4,021	4.960	711	143
2004	30,282	37.352	3,025	81	Oct	3,709	4.575	879	192
2005	41,209	50.831	7,003	138	Nov	2,146	2.648	353	133
2006	30,343	37.427	7,559	202	Dec	1,470	1.813	220	122
2007	21,020	25.928	4,349	168	Annual	28,608	35.287	4,748	135
Min.	12,677	15.637	2,422	-					
Max.	45,171	55.718	7,559	-					
Ave.	28,608	35.287	4,748	135					





**Figure 9-4: Average Monthly Flows and Phosphorus Levels in ESWCD and 715 Farms Runoff.**



**Figure 9-5: WY1995-2007 Flows and Phosphorus Levels for ESWCD and 715 Farms Runoff.**



### ***9.3. South Shore Drainage District***

The South Shore Drainage District (SSDD) lies south of Lake Okeechobee between the North New River Canal and the Miami Canal. Discharges from this area historically flowed into Lake Okeechobee through the Bean City pump station via C-4 and discharged to the North New River Canal through the South Bay Pump Station and the Rabbit Island Pump Station. A new pump station was constructed along with conveyance facilities as part of the Everglades Construction Project (ECP) Ch. 298 Districts Diversion project to re-direct this water to the Miami Canal. The new pump station (South Shore West), SFWMD designation MC25.7TE (permit 50-00081-E), consists of two 40,000 gallons per minute (gpm) pumping units, and began operations in July 2004. The Rabbit Island Pump Station, SFWMD designation NR25.7TW (permit 50-00081-E), consists of two pumping units with a combined capacity of 27,273 gpm and discharges to the North New River Canal. The South Bay Pump Station (SBPS), SFWMD designation NR25.8TW (permit 50-00081-E), consists of 2 pumps totaling 13,075 gpm and discharges to the North New River Canal. Data records for SBPS available to the District began May 2001. Missing monthly data prior to that were generated as the long-term monthly average percentage of the combined discharges from the other two sites (Rabbit Island Pump Station and C-4A). For example, during January 2001-2007, the flow at SBPS averaged 9% of the combined discharges from the Rabbit Island Pump Station and C-4A. Thus, for the period May 1995-April 2001, the flows during each January were estimated as 9% of the flows from the other structures during the same month. The new pump station began operating in July 2004 to divert into the Miami Canal runoff from the SSDD that previously entered Lake Okeechobee. The tables below present the annual and monthly summaries of flow and TP for C-4A, the new South Shore West Pump Station, the Rabbit Island Pump Station and the South Bay Pump Station.



**Table 9-8: Discharge Summary for Culvert C-4A.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	11,331	13.977	1,375	98	Jan	140	0.173	17	96
1996	8,882	10.955	927	85	Feb	299	0.368	33	88
1997	7,471	9.215	575	62	Mar	254	0.313	28	89
1998	7,522	9.278	917	99	Apr	154	0.190	20	107
1999	7,196	8.876	1,108	125	May	234	0.288	26	90
2000	11,413	14.078	1,701	121	Jun	884	1.090	105	97
2001	2,968	3.661	604	165	Jul	651	0.803	81	101
2002	3,156	3.893	518	133	Aug	820	1.011	103	102
2003	6,695	8.258	986	119	Sep	916	1.130	136	120
2004	5,534	6.826	581	85	Oct	513	0.633	75	118
2005	0		0		Nov	481	0.593	68	114
2006	404	0.499	33	67	Dec	242	0.299	27	89
2007	60	0.074	5	67	Annual	5,587	6.891	718	104
Min.	0	0.074	0	-					
Max.	11,413	14.078	1,701	-					
Ave.	5,587	7.466	718	96					

**Table 9-9: Discharge Summary for the South Shore West Pump Station.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995					Jan	49	0.061	7	117
1996					Feb	483	0.595	92	154
1997					Mar	861	1.062	163	153
1998					Apr	16	0.020	1	43
1999					May	597	0.736	117	159
2000					Jun	2,853	3.519	514	146
2001					Jul	1,254	1.547	176	114
2002					Aug	1,821	2.246	272	121
2003					Sep	2,168	2.674	351	131
2004					Oct	1,330	1.641	216	132
2005<	10,985	13.550	1,877	139	Nov	248	0.306	50	162
2006	14,717	18.153	2,427	134	Dec	76	0.094	7	74
2007	6,116	7.544	961	127	Annual	11,756	14.500	1,965	136
Min.	6,116	7.544	961	-					
Max.	14,717	18.153	2,427	-					
Ave.	10,416	12.848	1,694	132					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.

2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.



**Table 9-10: Discharge Summary for Rabbit Island Pump Station.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	3,894	4.804	394	82	Jan	215	0.266	16	61
1996	3,045	3.755	224	60	Feb	257	0.317	31	99
1997	2,255	2.781	333	120	Mar	198	0.244	27	111
1998	3,061	3.776	613	162	Apr	128	0.158	22	137
1999	3,090	3.812	355	93	May	239	0.295	27	91
2000	5,362	6.614	461	70	Jun	414	0.511	42	83
2001	1,253	1.545	165	107	Jul	360	0.444	43	97
2002	2,270	2.800	131	47	Aug	375	0.463	48	104
2003	3,268	4.031	382	95	Sep	387	0.477	49	104
2004	2,710	3.343	112	34	Oct	265	0.327	32	97
2005	4,618	5.697	465	82	Nov	174	0.215	31	144
2006	4,697	5.794	1,095	189	Dec	205	0.252	26	103
2007	2,297	2.833	403	142	Annual	3,217	3.968	395	99
Min.	1,253	1.545	112	-					
Max.	5,362	6.614	1,095	-					
Ave.	3,217	3.968	395	99					

**Table 9-11: Discharge Summary for South Bay Pump Station\*.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	2,977	3.672	264	72	Jan	29	0.036	1	39
1996	2,134	2.632	127	48	Feb	89	0.110	7	66
1997	1,516	1.870	67	36	Mar	32	0.039	2	61
1998	2,464	3.039	314	103	Apr	7	0.009	1	101
1999	1,518	1.873	142	76	May	60	0.074	7	88
2000	3,004	3.705	211	57	Jun	293	0.362	13	36
2001	688	0.849	80	95	Jul	239	0.294	11	36
2002	1,131	1.396	61	44	Aug	268	0.331	25	76
2003	1,270	1.566	76	48	Sep	231	0.285	25	87
2004	537	0.662	33	50	Oct	54	0.066	5	73
2005	720	0.888	78	88	Nov	60	0.075	5	67
2006	917	1.131	100	89	Dec	170	0.210	25	117
2007	1,059	1.306	96	73	Annual	1,533	1.891	127	67
Min.	537	0.662	33	-					
Max.	3,004	3.705	314	-					
Ave.	1,533	1.891	127	67					

\*Missing data prior to May 2001 were replaced with average long-term monthly percentage of other SSDD discharges.

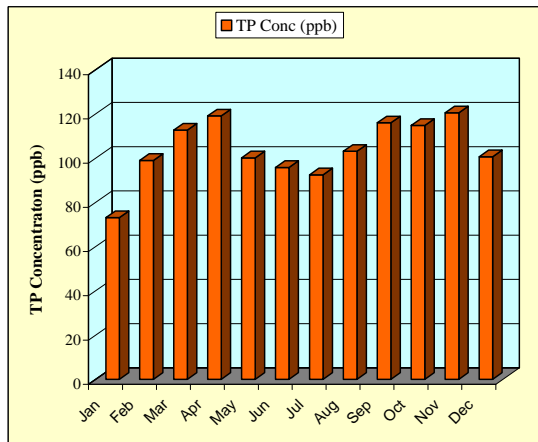
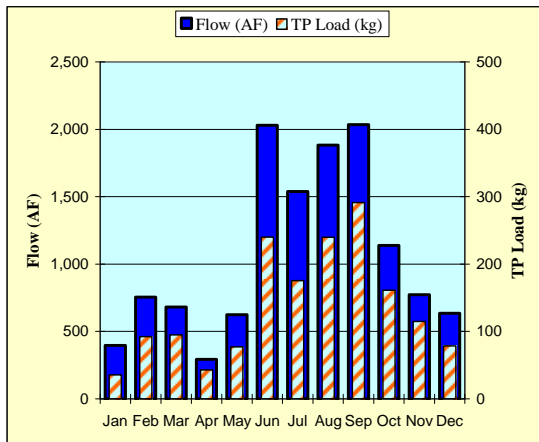
The table below presents the annual and monthly summaries of flow and TP for the SSDD. The figures present the monthly and annual variability associated with the SSDD runoff.



**Table 9-12: Discharge Summary for South Shore Drainage District\*.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
<b>1995</b>	18,202	22.452	2,033	91	<b>Jan</b>	396	0.488	36	73
<b>1996</b>	14,060	17.342	1,278	74	<b>Feb</b>	756	0.933	92	99
<b>1997</b>	11,242	13.867	975	70	<b>Mar</b>	682	0.841	95	113
<b>1998</b>	13,046	16.092	1,843	115	<b>Apr</b>	293	0.362	43	119
<b>1999</b>	11,804	14.560	1,605	110	<b>May</b>	625	0.770	77	100
<b>2000</b>	19,779	24.397	2,373	97	<b>Jun</b>	2,030	2.504	240	96
<b>2001</b>	4,909	6.055	850	140	<b>Jul</b>	1,538	1.898	176	93
<b>2002</b>	6,558	8.089	710	88	<b>Aug</b>	1,883	2.323	240	103
<b>2003</b>	11,232	13.855	1,444	104	<b>Sep</b>	2,035	2.510	291	116
<b>2004</b>	8,781	10.832	726	67	<b>Oct</b>	1,139	1.405	161	115
<b>2005</b>	16,323	20.134	2,419	120	<b>Nov</b>	773	0.954	115	121
<b>2006</b>	20,735	25.576	3,656	143	<b>Dec</b>	634	0.783	79	101
<b>2007</b>	9,531	11.757	1,464	125	<b>Annual</b>	12,785	15.770	1,644	104
<b>Min.</b>	4,909	6.055	710	-					
<b>Max.</b>	20,735	25.576	3,656	-					
<b>Ave.</b>	12,785	15.770	1,644	104					

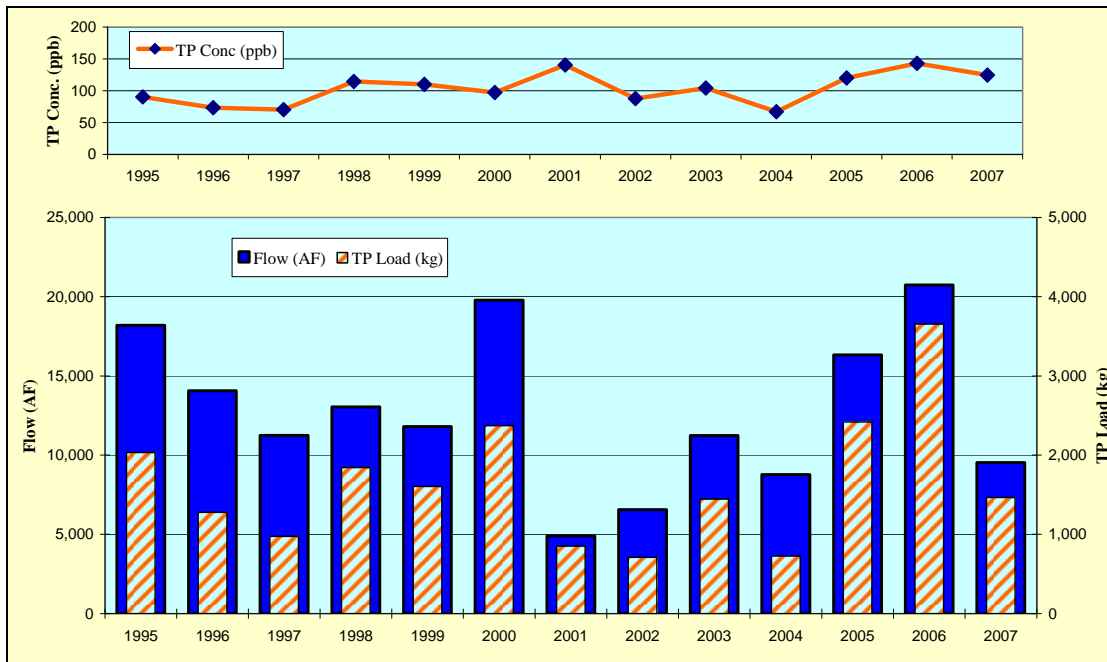
\*Missing data for SBPS prior to May 2001 are long-term monthly averages were replaced with long-term average percentage of other discharges.



**Figure 9-6: Average Monthly Flows and Phosphorus Levels in SSDD Runoff.**







**Figure 9-7: WY1995-2007 Flows and Phosphorus Levels for SSDD Runoff.**

#### 9.4. South Florida Conservancy District

The South Florida Conservancy District (SFCDD) is located along the south shore of Lake Okeechobee, and prior to the ECP, runoff was discharged into Lake Okeechobee (through pump station S-236 and via the Industrial Canal through pump station P-5-W), and to the Miami Canal (through pump station P-5-E, also known as the Lake Harbor pump station). As part of the ECP Ch. 298 Districts Diversion project, a new pump station was constructed on the Miami Canal to re-direct runoff from the Lake to the Miami Canal. The new pump station (SFWMD designation MC25.7TW, or SFCDD5E) replaces the old P-5-E facility (SFWMD designation MC26.1TW; permit 50-00010-E), and was enlarged to 504 cfs to convey the flow historically discharged through S-236. The old pump station (P-5-E) was removed from service in August 2005, when the new pump was in operation 60 days. Data records available to the District began November 1997 for P-5-E. Missing monthly data prior to that were generated as the long-term monthly average percentage of the discharges from S-236 and P-5-W. The tables below present the annual and monthly summaries of flow and TP for S-236, pump station P-5-E, replacement pump station SFCDD5E, and pump station P-5-W.



**Table 9-13: Discharge Summary for Pump Station S-236.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	4,651	5.737	494	86	Jan	364	0.449	40	89
1996	6,695	8.259	679	82	Feb	621	0.766	83	108
1997	5,031	6.206	363	58	Mar	467	0.576	52	90
1998	11,784	14.535	2,034	140	Apr	421	0.520	53	102
1999	21,971	27.101	3,542	131	May	615	0.759	80	105
2000	36,175	44.621	4,563	102	Jun	2,105	2.596	286	110
2001	4,762	5.874	645	110	Jul	1,992	2.457	241	98
2002	14,702	18.134	1,868	103	Aug	1,734	2.139	223	104
2003	16,740	20.649	1,773	86	Sep	2,006	2.475	281	113
2004	15,304	18.877	2,183	116	Oct	1,193	1.472	144	98
2005	20,136	24.838	2,269	91	Nov	1,051	1.297	164	127
2006	13,188	16.267	2,041	125	Dec	601	0.741	81	110
2007	85	0.105	11	101	Annual	13,171	16.246	1,728	106
Min.	85	0.105	11	-					
Max.	36,175	44.621	4,563	-					
Ave.	13,171	16.246	1,728	106					

**Table 9-14: Discharge Summary for Pump Station P-5-E.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	5,409	6.672	762	114	Jan	121	0.149	5	31
1996	4,774	5.888	403	68	Feb	346	0.427	21	50
1997	2,754	3.397	233	69	Mar	252	0.311	12	39
1998	7,413	9.144	454	50	Apr	142	0.175	19	109
1999	9,947	12.269	1,196	97	May	307	0.379	35	91
2000	6,899	8.509	634	74	Jun	596	0.735	53	72
2001	958	1.182	93	79	Jul	462	0.570	30	53
2002	1,765	2.177	169	78	Aug	615	0.759	66	86
2003	2,354	2.904	233	80	Sep	572	0.705	48	68
2004	3,186	3.930	173	44	Oct	467	0.576	36	62
2005	2,490	3.072	104	34	Nov	304	0.375	62	165
2006<	3,082	3.802	158	42	Dec	275	0.339	17	49
2007					Annual	4,459	5.500	403	73
Min.	958	1.182	93	-					
Max.	9,947	12.269	1,196	-					
Ave.	4,359	5.377	405	75					

\*Missing data prior to November 1997 were replaced with average long-term monthly percentage of other SFCD discharges.

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.



**Table 9-15: Discharge Summary for the New Pump Station SFCD5E.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	255	0.314	29	93
1996					Feb	1,309	1.614	150	93
1997					Mar	657	0.811	70	86
1998					Apr	3	0.003	0	114
1999					May	1,021	1.259	155	123
2000					Jun	933	1.151	133	115
2001					Jul	4,426	5.459	575	105
2002					Aug	2,083	2.569	281	109
2003					Sep	3,262	4.023	452	112
2004					Oct	3,438	4.241	868	205
2005					Nov	1,351	1.666	349	209
2006<	17,081	21.069	3,330	158	Dec	437	0.539	56	104
2007	14,887	18.362	2,044	111	Annual	19,174	23.650	3,118	132
Min.	14,887	18.362	2,044	-					
Max.	14,887	18.362	2,044	-					
Ave.	14,887	18.362	2,044	111					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.

**Table 9-16: Discharge Summary for Pump Station P-5-W.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995	26,554	32.754	5,691	174	Jan	464	0.572	50	88
1996	21,037	25.949	3,086	119	Feb	693	0.855	141	165
1997	12,350	15.234	2,053	135	Mar	454	0.561	88	157
1998	7,755	9.566	1,109	116	Apr	330	0.407	44	109
1999	7,902	9.747	2,324	238	May	392	0.484	62	127
2000	6,921	8.537	1,347	158	Jun	1,398	1.724	215	125
2001	232	0.286	50	176	Jul	1,109	1.367	162	119
2002	3,008	3.710	683	184	Aug	1,258	1.552	214	138
2003	8,409	10.372	1,036	100	Sep	1,334	1.645	241	147
2004	9,036	11.146	1,129	101	Oct	980	1.209	234	194
2005	12,615	15.561	2,086	134	Nov	692	0.854	199	233
2006	10,626	13.107	2,162	165	Dec	686	0.846	114	135
2007	414	0.510	114	223	Annual	9,789	12.074	1,764	146
Min.	232	0.286	50	-					
Max.	26,554	32.754	5,691	-					
Ave.	9,758	12.037	1,759	146					

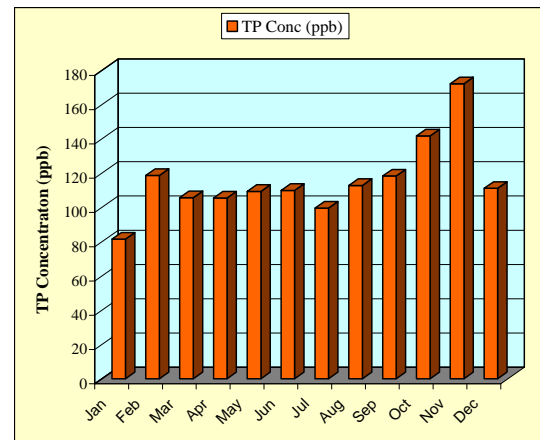
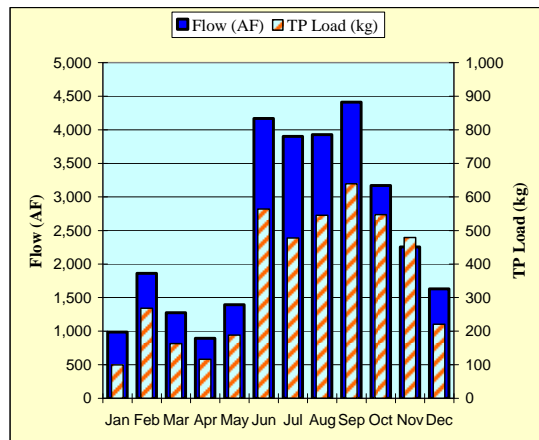


The table below presents the annual and monthly summaries of flow and TP for the SFCD runoff. The figures present the monthly and annual variability associated with the SFCD runoff.

**Table 9-17: Discharge Summary for South Florida Conservancy District\*.**

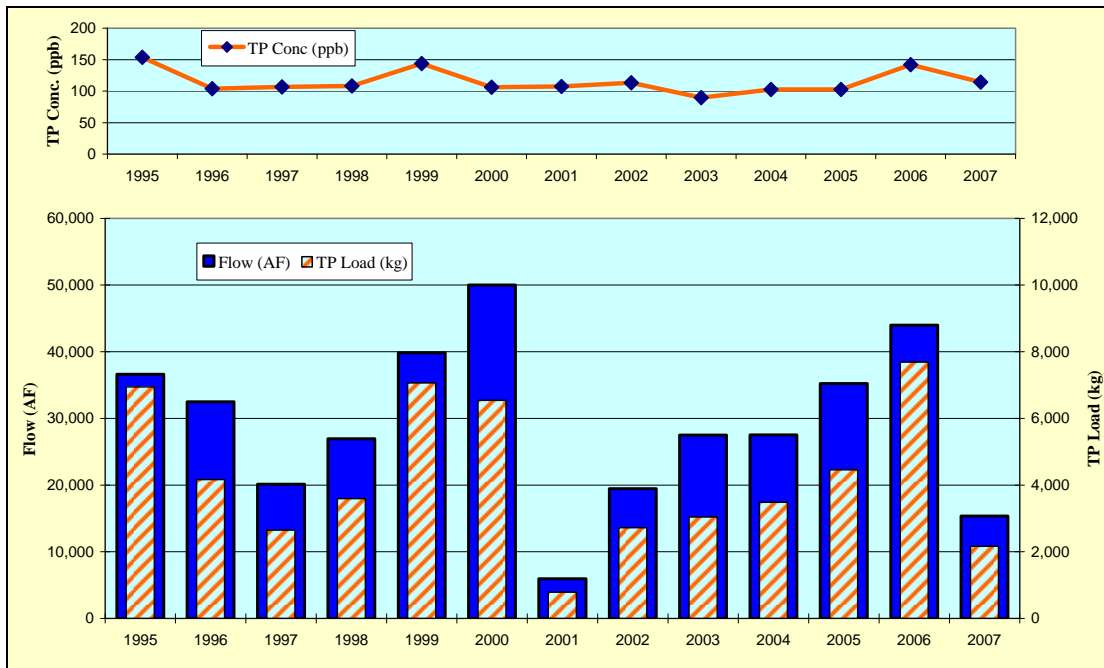
Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	kg	ppb
1995	36,614	45.163	6,946	154	Jan	987	1.218	99	82
1996	32,507	40.096	4,167	104	Feb	1,861	2.296	268	119
1997	20,135	24.836	2,649	107	Mar	1,274	1.572	163	106
1998	26,952	33.245	3,597	108	Apr	894	1.102	116	106
1999	39,820	49.117	7,061	144	May	1,393	1.718	188	109
2000	49,994	61.667	6,544	106	Jun	4,169	5.143	564	110
2001	5,953	7.343	788	107	Jul	3,904	4.815	478	100
2002	19,474	24.021	2,720	113	Aug	3,928	4.845	545	113
2003	27,503	33.925	3,042	90	Sep	4,413	5.444	639	118
2004	27,527	33.954	3,485	103	Oct	3,170	3.910	547	142
2005	35,242	43.471	4,460	103	Nov	2,255	2.782	479	172
2006	43,977	54.245	7,692	142	Dec	1,629	2.010	220	111
2007	15,385	18.977	2,169	114	Annual	29,878	36.854	4,308	117
Min.	5,953	7.343	788	-					
Max.	49,994	61.667	7,692	-					
Ave.	29,314	36.158	4,255	118					

\*Missing data for P-5-E prior to November 1997 were replaced with average long-term monthly percentage of other SFCD discharges.



**Figure 9-8: Average Monthly Flows and Phosphorus Levels in SFCD Runoff.**





**Figure 9-9: WY1995-2007 Flows and Phosphorus Levels for SFCD Runoff.**



## 10. C-139 and C-139 Annex Basins

Stormwater runoff from the C-139 Basin and the C-139 Annex Basin constitutes the primary inflow to STA-5 and STA-6. Historic flows and TP loads from these basins, located in Hendry County, are described in the following sections.

### 10.1. C-139 Basin

The C-139 Basin covers approximately 257 square miles in eastern Hendry County (Goforth and Piccone 2001). A schematic of the basin showing the primary conveyance features, water control structures and receiving waters is presented in the figure below. The flow and TP levels through each of the principal water control structures are described in the following sections.

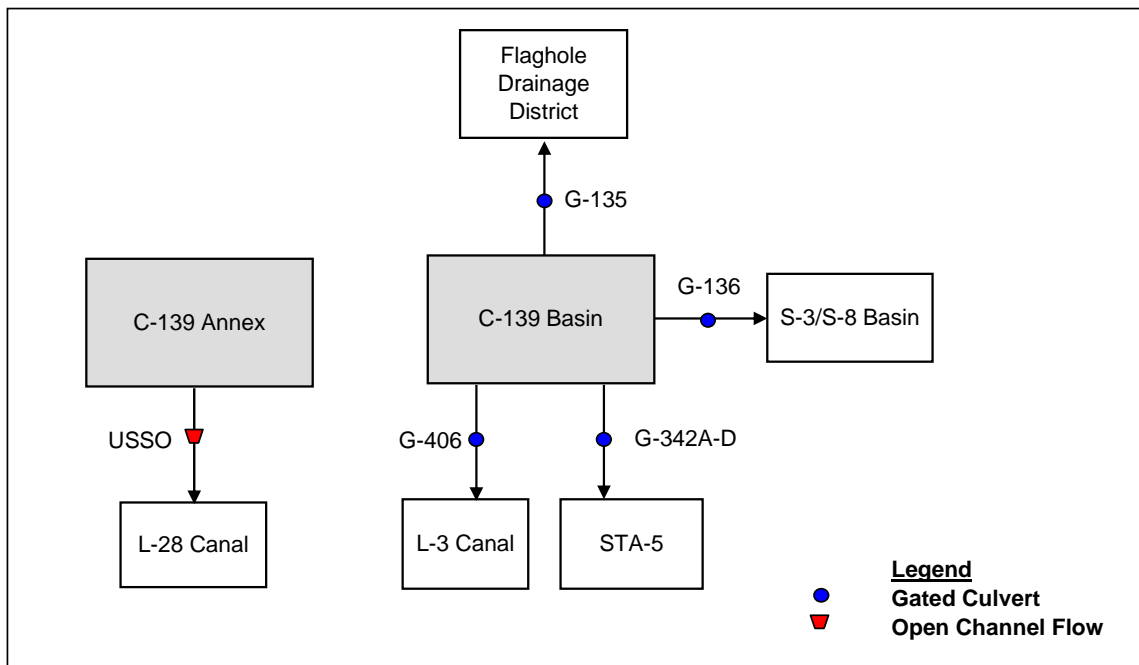


Figure 10-1: C-139 Basin and C-139 Annex Schematic.

#### 10.1.1. Culvert G-135

Structure G-135 is a gated culvert that controls discharges from the C-139 Basin north into the Flaghole Drainage District. The structure is located in the very northern reach of the



L-1 Borrow Canal. The table below presents the annual and monthly summaries of flow and TP for G-135.

**Table 10-1: Discharge Summary for G-135.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995	1,847	2.278	55	24	Jan	679	0.837	28	33
1996	857	1.057	27	25	Feb	539	0.664	33	49
1997	4,582	5.652	1,042	184	Mar	342	0.422	24	58
1998	4,760	5.872	752	128	Apr	158	0.195	9	46
1999	5,375	6.629	1,334	201	May	119	0.146	9	63
2000	10,746	13.255	1,879	142	Jun	829	1.023	149	146
2001	386	0.476	21	45	Jul	810	0.999	204	204
2002	4,993	6.159	1,632	265	Aug	1,068	1.317	219	166
2003	4,841	5.972	1,269	213	Sep	1,336	1.648	384	233
2004	5,488	6.770	993	147	Oct	719	0.887	138	156
2005	28,380	35.006	4,382	125	Nov	496	0.612	64	104
2006	20,040	24.718	2,261	91	Dec	668	0.824	37	45
2007	8,611	10.622	1,227	116	Annual	7,762	9.574	1,298	136
Min.	386	0.476	21	-					
Max.	28,380	35.006	4,382	-					
Ave.	7,762	9.574	1,298	136					

### 10.1.2. Culvert G-136

G-136 is a culvert with flashboards located at the confluence of the L-1 Canal and the L-1 East Canal. C-139 runoff passing east through G-136 is conveyed to the Miami Canal, where it flows north to S-3 or south to STA-3/4 depending on the Miami Canal's pumping operations. The table below presents the annual and monthly summaries of flow and TP for G-136.





**Table 10-2: Discharge Summary for G-136.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995	35,986	44.388	5,799	131	Jan	446	0.550	49	89
1996	20,790	25.644	3,503	137	Feb	757	0.933	242	259
1997	13,091	16.147	2,463	153	Mar	278	0.343	40	115
1998	20,776	25.627	5,452	213	Apr	61	0.075	5	67
1999	13,734	16.941	4,190	247	May	205	0.253	17	67
2000	24,859	30.663	7,950	259	Jun	2,089	2.577	657	255
2001	3,294	4.063	244	60	Jul	2,926	3.609	874	242
2002	17,062	21.046	4,252	202	Aug	2,906	3.585	765	213
2003	15,154	18.692	5,396	289	Sep	3,463	4.272	873	204
2004	13,221	16.308	3,625	222	Oct	2,648	3.266	597	183
2005	17,379	21.437	5,661	264	Nov	1,168	1.441	341	237
2006	30,587	37.728	9,671	256	Dec	855	1.054	89	84
2007	5,489	6.770	926	137	Annual	17,802	21.958	4,549	207
Min.	3,294	4.063	244	-					
Max.	35,986	44.388	9,671	-					
Ave.	17,802	21.958	4,549	207					

### 10.1.3.STA-5 Inflow Structures

STA-5 began accepting inflow from the C-139 Basin during October 1999 as part of emergency operations associated with Hurricane Irene. The G-342A-D structures control inflow to the STA, and are box culverts with vertical lift gates. The table below presents the annual and monthly summaries of flow and TP for the STA-5 inlet structures.

**Table 10-3: Discharge Summary for STA-5 Inflow Structures.**

Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
1995					Jan	2,648	3.266	246	75
1996					Feb	1,994	2.460	186	75
1997					Mar	3,050	3.762	412	109
1998					Apr	904	1.115	152	136
1999					May	2,124	2.619	331	126
2000<	8,088	9.977	2,260	227	Jun	12,246	15.106	4,149	275
2001	50,459	62.241	15,669	252	Jul	17,967	22.162	6,196	280
2002	159,259	196.443	49,071	250	Aug	26,880	33.156	7,914	239
2003	170,204	209.943	57,208	272	Sep	29,782	36.735	10,562	288
2004	153,080	188.821	48,078	255	Oct	17,718	21.855	4,745	217
2005	119,910	147.907	24,457	165	Nov	6,998	8.632	1,686	195
2006	216,514	267.066	53,027	199	Dec	6,035	7.444	1,021	137
2007	60,253	74.321	21,875	294	Annual	128,346	158.312	37,600	237
Min.	50,459	62.241	15,669	-					
Max.	216,514	267.066	57,208	-					
Ave.	132,811	163.820	38,484	235					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.



### 10.1.4. Discharge South of STA-5

The predominant flow path for C-139 Basin runoff has historically been south. To develop the WY1995-2007 period of record flows and TP loads, data from multiple structures and monitoring stations had to be compiled. For the period May 1, 1994 – December 1995, the net flow through structures G-88, G-89 and G-155 was accumulated. A discrepancy was identified between the flows and loads developed from DBHYDRO 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 reduced to better represent the runoff from the C-139 Basin (Walker 2000). For consistency with the regulatory program, the data set used in this work effort for the C-139 Basin incorporated the revised flows and loads. For the period January 1996 – June 2000, records from L3DF were utilized. For the period June 27, 2000 – April 30, 2007, estimates of flow and TP loads were obtained from the G-406 divide structure. The table below presents the annual and monthly summaries of flow and TP for the cumulative flow south of STA-5.

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

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

### 10.1.5. C-139 Basin Runoff

The C-139 Basin runoff was estimated as the net result of the various flow components described above:

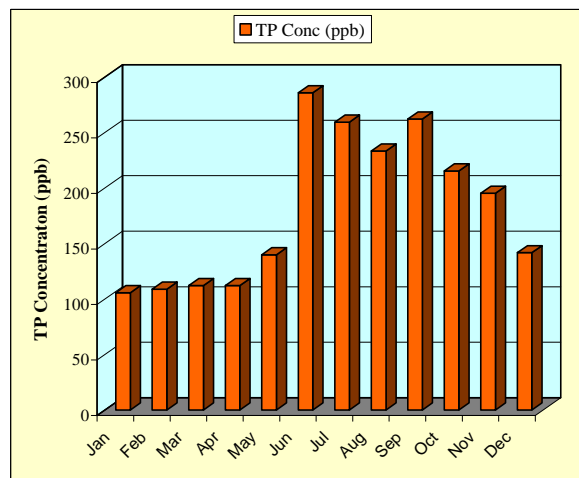
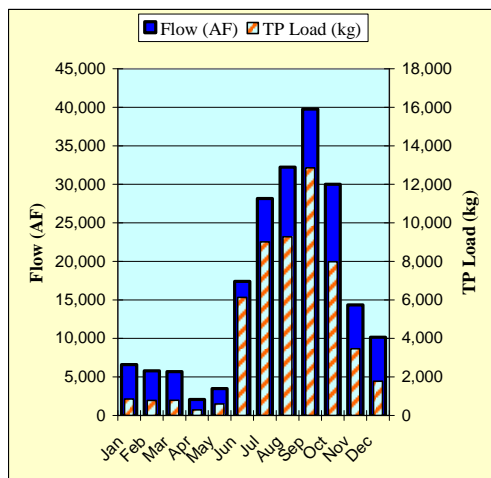
- Discharges to the Flaghole Drainage District through G-135
- Plus discharges to the EAA through G-136
- Plus inflows to STA-5 through the G-342A-D structures
- Plus discharges south of STA-5



The table below presents the annual and monthly summaries of flow and TP for the C-139 Basin. The figures present the monthly and annual variability associated with the C-139 Basin runoff.

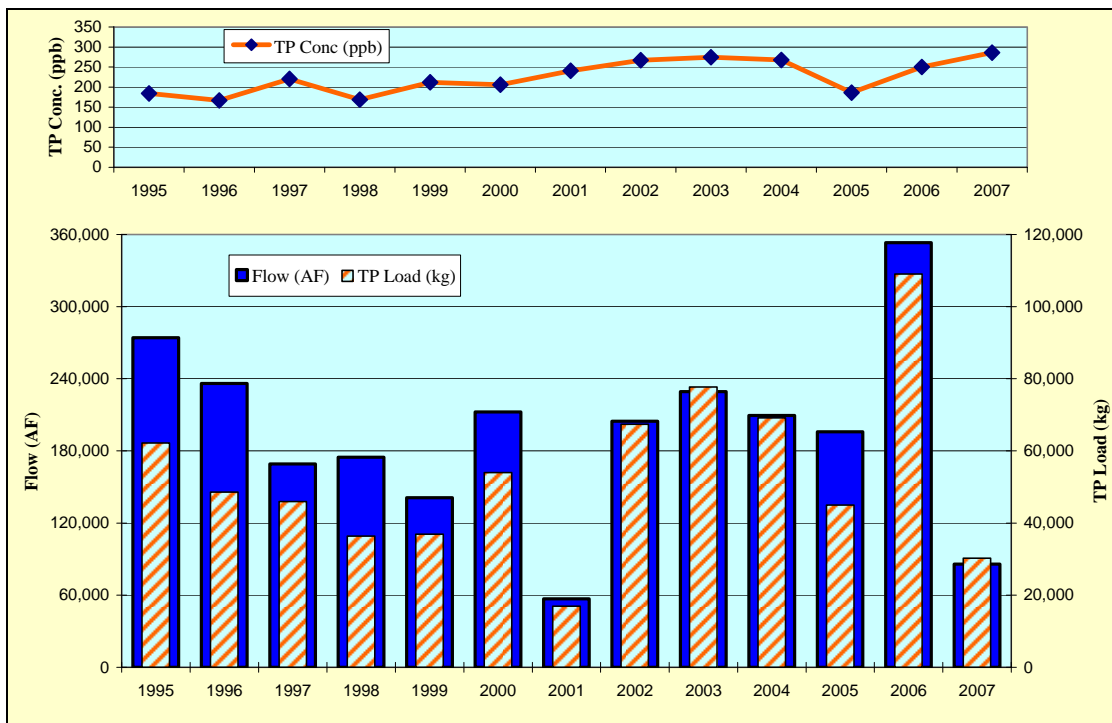
**Table 10-5: Discharge Summary for C-139 Basin.**

Water Year	Annual Data				Month	Monthly Data			
	Volume		TP Load	TP Conc		Volume		TP Load	TP Conc
	ac-ft	hm <sup>3</sup>	kg	ppb		ac-ft	hm <sup>3</sup>	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.**

### 10.2. C-139 Annex Basin

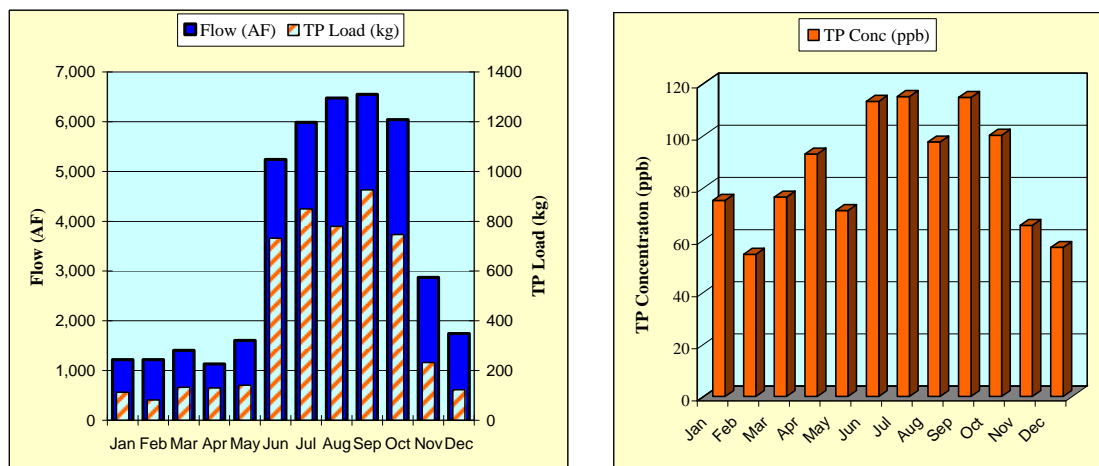
The C-139 Annex covers approximately 17,900 acres of Hendry County. During the WY1995-2007 period, discharges from this basin were transmitted through the L-28 Borrow Canal to the S-140 pump station. Flows and TP loads were obtained from the District’s USSO monitoring station, located in the L-28 Borrow Canal. During WY2008, discharges are anticipated to be re-directed to the L-3 Borrow Canal. The table below presents the annual and monthly summaries of flow and TP for the C-139 Annex.



**Table 10-6: Discharge Summary for C-139 Annex Basin.**

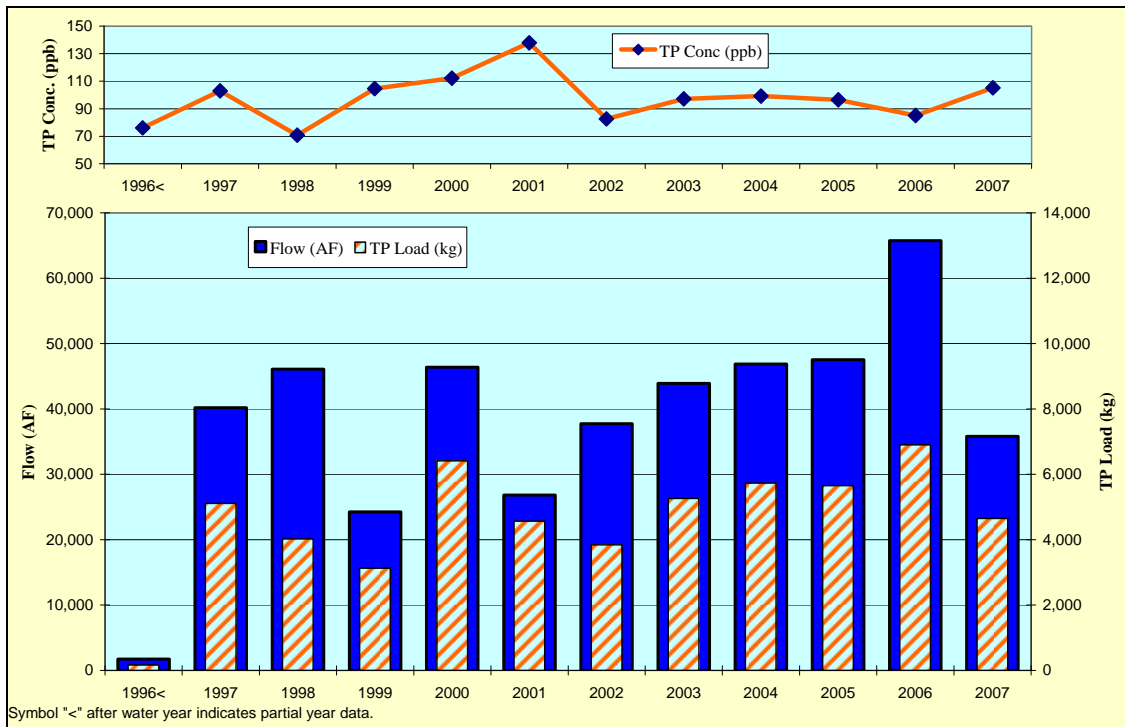
Water Year	Annual Data <sup>1</sup>				Month	Monthly Data <sup>2</sup>			
	Volume		TP Load kg	TP Conc ppb		Volume		TP Load kg	TP Conc ppb
	ac-ft	hm <sup>3</sup>				ac-ft	hm <sup>3</sup>		
<b>1995</b>					<b>Jan</b>	1,217	1,501	113	75
<b>1996&lt;</b>	1,742	2.149	164	76	<b>Feb</b>	1,218	1,502	82	55
<b>1997</b>	40,195	49.580	5,107	103	<b>Mar</b>	1,406	1,735	133	76
<b>1998</b>	46,081	56.840	4,022	71	<b>Apr</b>	1,133	1,397	130	93
<b>1999</b>	24,270	29.936	3,131	105	<b>May</b>	1,605	1,980	141	71
<b>2000</b>	46,365	57.190	6,416	112	<b>Jun</b>	5,241	6,465	732	113
<b>2001</b>	26,831	33.095	4,564	138	<b>Jul</b>	5,987	7,385	850	115
<b>2002</b>	37,721	46.529	3,846	83	<b>Aug</b>	6,475	7,987	780	98
<b>2003</b>	43,921	54.176	5,261	97	<b>Sep</b>	6,547	8,075	926	115
<b>2004</b>	46,858	57.799	5,731	99	<b>Oct</b>	6,042	7,452	747	100
<b>2005</b>	47,518	58.612	5,651	96	<b>Nov</b>	2,872	3,543	232	66
<b>2006</b>	65,731	81.077	6,901	85	<b>Dec</b>	1,743	2,150	123	57
<b>2007</b>	35,826	44.191	4,649	105	<b>Annual</b>	41,486	51,172	4,987	97
<b>Min.</b>	24,270	29.936	3,131	-					
<b>Max.</b>	65,731	81.077	6,901	-					
<b>Ave.</b>	41,938	51.730	5,025	97					

1. Symbol "<" after water year indicates partial year data. Missing and partial year data are excluded from annual statistic calculations.
2. Average monthly statistics are calculated using all available data, including those for partial water years; therefore, annual total of monthly averages may not match average of annual totals.



**Figure 10-4: Average Monthly Flow and Phosphorus Levels for C-139 Annex Runoff.**





**Figure 10-5: WY1995-2007 Flows and Phosphorus Levels for C-139 Annex Runoff.**



## 11. Comparison to 2005 Updated Data Set

A comparison of the annual average flow and phosphorus data developed herein is compared to the 2005 update in **Table 11-1**. In general, flows decreased slightly, with notable exceptions observed in the C-139 Basin (reduction of 26%), South Shore Drainage District (increase of 37%) and East Beach Water Control District (increase of 14%). Annual average phosphorus concentrations increased an average of 10%, while four basins exhibited an increase of greater than 10% (S-6/S-2, S-7/S-2, C-51W, and C-139).

**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
<b>Total</b>	<b>1,735,112</b>	<b>284,188</b>	<b>133</b>	<b>1,830,473</b>	<b>275,240</b>	<b>122</b>	<b>-95,361</b>	<b>8,948</b>	<b>11</b>
							<b>-5%</b>	<b>3%</b>	<b>9%</b>





## 12. References

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- Mo, Cheol 2007. Personal communication, e-mail dated August 16, 2007.
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## Appendix A. DBKEYs and Station Names

Basin	Structure or Station	Flow Data Sources(s)			Water Quality Data Source(s)		
		DBKEY	Type	Period of Record	Station	Sample Type(s)	
Acme Basin B	ACME1	PI317	MOD1	5/1/1994-12/31/2004	L40-1	Grab	
		OH647	PREF	1/1/2005-12/31/2006	ACME1DS	Grab	
		JO088	CR10	1/1/2007-1/18/2007	VOW1	Grab, Composite	
	ACME2	PI318	MOD1	5/1/1994-12/31/2004	L40-2	Grab	
		OH648	PREF	1/1/2005-12/31/2006	G94D	Grab	
		JO089	CR10	1/1/2007-1/18/2007	VOW2	Grab, Composite	
C-139	G-88	P1052	MOD1	5/1/1994-12/31/2004	L3BRS, G409	Grab	
		15974	PREF	1/1/2005-4/30/2007			
	G-89	P1053	MOD1	5/1/1994-12/31/2000	L3BRS, G409	Grab	
		TA285	MOD1	5/1/1994-12/31/2005			
	G-135	06932	N/A	1/1/2006-4/30/2007	L3BRS, G409	Grab	
		P1038	MOD1	5/1/1994-12/31/2004			
	G-136	15195	PREF	1/1/2005-4/30/2007	L3BRS, G409	Grab	
		P1039	MOD1	5/1/1994-12/31/2004			
	G-155	15976	USGS	1/1/2005-8/13/2006	L3BRS, G409	Grab	
		J6406	PREF	10/1/1999-4/30/2007			
	G-342A	J6398	PREF	10/1/1999-4/30/2007	G342A	Grab, Composite	
	G-342B	J6407	PREF	10/1/1999-4/30/2007	G342B	Grab, Composite	
	G-342C	J6405	PREF	10/1/1999-4/30/2007	G342C	Grab, Composite	
	G-342D	P1977	MOD1	6/26/2000 - 12/31/2004	G406	Grab, Composite	
		JU789	PREF	1/1/2005 - 4/30/2007			
L3DF	16243	UVM	5/1/1994-6/26/2000	L3DF	Grab		
				C139DCF	Composite		
C-139 Annex	USSO	TA425	PREF	12/5/1995-12/31/2006	USSO	Grab, Composite	
		16749	UVM	1/1/2007-4/30/2007			
East Beach Water Control	C-10	15645	PREF	5/1/1994-4/30/2007	CULV10	Grab	
		EBPS	LX275	PREF			7/1/2001-4/30/2007
East Shore Water Control District	C-12	15646	PREF	5/1/1994-4/30/2007	CULV12	Grab	
		C-12A	15647	PREF			5/1/1994-4/30/2007
	ESPS	LX273	PREF	12/1/2001-4/30/2007	ESHORE2	Composite	
		S-236	15644	PREF			5/1/1994-4/30/2007
South Florida Conservancy District	P-5-W (EDP-07)	Monitoring Data		5/1/1994 - 4/30/2007	EPD-07	Composite	
	P-5-E (Lake Harbor PS)	Monitoring Data for Permit 50-00010-E, Structure MC26.1TW					
	SFCD5E	Monitoring Data for Permit 50-00010-E, Structure MC25.7TW					
South Shore Drainage District	C-4A	15648	PREF	5/1/1994-4/30/2007	CULV4A	Grab	
	South Shore West PS	Monitoring Data for Permit 50-00081-E, Structure MC25.7TE					
	South Bay PS	Monitoring Data for Permit 50-00081-E, Structure NR25.8TW					
	Rabbit Island PS	Monitoring Data for Permit 50-00081-E, Structure NR25.7TW					
S-5A	S-5A Pump Station	TA383	MOD1	5/1/1994-12/31/2002	S5A	Grab, Composite	
		JW226	PREF	1/1/2003-4/30/2007			
	S-352	P0794	MOD1	5/1/1994-12/31/2004	HGS5, S352	Grab, Composite	
		15068	PREF	5/1/2005-4/30/2007			
G-250	P1046	MOD1	5/1/1994-7/1/1999	ENR002	Grab, Composite		
	TA816	TELE	9/9/2005-4/30/2007				
G-341	TA379	MOD1	5/1/1994-12/31/2005	S5A, S5AW	Grab, Composite		
	MG614	N/A	1/1/2006-4/30/2007				
S-5A, L-8	S-5AW	12899	COMP	5/1/1994-5/31/1999	S5AS	Grab	
		TA410	PREF	6/1/1999-4/30/2007			
L-8	S-5AS	P1055	MOD1	5/1/1994-4/30/2004	CULV10A	Grab	
		15640	PREF	1/1/2005-10/23/2006			
	CULV10A	02855	USGS	10/24/2006-4/30/2007			
		City of WPB No. 2	Provided by CH2M-Hill				5/1/1994 - 4/30/2007
L-8, C-51W	S-5AE	P1018	MOD1	5/1/1994-12/31/2004	S5AE, C51S5AE	Grab, Composite	
		L7443	N/A	1/1/2005-4/30/2007			
C-51W	S-319	TP366	PREF	10/20/2004-4/30/2007	S319	Grab, Composite	
		C51SR7	FI280	UVM			7/24/1997-7/5/2001
		S-155A	SC189	TELE			3/25/2004-4/30/2007



Basin	Structure or Station	Flow Data Source(s)			Water Quality Data Source(s)		
		DBKEY	Type	Period of Record	Station	Sample Type(s)	
S-6/S-2	S-6	15034	MOD1	5/1/1994 -12/31/2004	S6	Grab, Composite	
		P1019	PREF	1/1/2005 -4/30/2007			
	G-328	J0718	PREF	4/1/2000-4/30/2007	G328	Grab, Composite	
S-6/S-2, S-7/S-2	S-2/S-351	15021	PREF	5/1/1994 -4/30/2007	S351	Grab, Composite	
S-7/S-2	G-370	TA438	PREF	10/1/2003 -4/30/2007	G370	Grab, Composite	
		G-371	TS261	PREF	2/1/2006 -4/30/2007	G371	Grab, Composite
	S-150	P0961	MOD1	5/1/1994 -12/31/2004	S150	Grab, Composite	
		15041	PREF	1/1/2005 -4/30/2007			
	S-7	P1021	MOD1	5/1/1994 -12/31/2004	S7	Grab, Composite	
		15037	PREF	1/1/2005 -4/30/2007			
S-8/S-3	S-3	PO989	MOD1	5/1/1994 -12/31/2004	S3	Grab, Composite	
		15018	PREF	1/1/2005 -4/30/2007			
	G-344A	J0719	PREF	10/1/1999 -4/30/2007	G344A	Grab, Composite	
	G-344B	J0720	PREF	10/1/1999 -4/30/2007	G344B	Grab, Composite	
	G-344C	J0721	PREF	10/1/1999 -4/30/2007	G344C	Grab, Composite	
	G-344D	J0722	PREF	10/1/1999 -4/30/2007	G344D	Grab, Composite	
	G-410	LX270	PREF	5/1/2001-4/30/2007	G410	Grab, Composite	
	G-349B	JA353	PREF	10/1/1999 -4/30/2007	G349B	Grab, Composite	
	G-350B	JA352	PREF	10/1/1999 -4/30/2007	G350B	Grab, Composite	
	G-507	SJ382	PREF	12/1/2003-4/30/2007	G507		
	G-357	LX263	PREF	1/3/2001-4/30/2007	G357	Grab, Composite	
		P1976	MOD1	5/6/2000-12/31/2002	G404	Grab, Composite	
	LX269	PREF	1/1/2003-4/30/2007				
	G-402A	LX264	PREF	5/1/2001-4/30/2007	G402A	Grab, Composite	
	G-402B	LX265	PREF	5/1/2001-4/30/2007	G402B	Grab, Composite	
	G-402C	LX266	PREF	5/1/2001-4/30/2007	G402C	Grab, Composite	
	G-402D	LX267	PREF	5/1/2001-4/30/2007	G402D	Grab, Composite	
	G-200A	P1040	MOD1	5/1/1994-12/31/2002	G200	Grab, Composite	
		15736	PREF	1/1/2003-4/30/2007			
	G-204	SG578	PREF	5/1/2003-4/30/2007	G204	Grab	
	G-205	SG579	PREF	5/1/2003-4/30/2007	G205	Grab	
	G-206	SG580	PREF	5/1/2003-4/30/2007	G206	Grab	
	G-372	TA4387	PREF	10/1/2003 -4/30/2007	G372	Grab, Composite	
	G-373	TS260	PREF	2/15/2006 -4/30/2007	G373	Grab, Composite	
	G-600	GG955	PREF	3/6/1997-4/30/2007	G600	Grab, Composite	
	G-606	HD889	PREF	11/24/1997-6/30/2000	G606	Grab, Composite	
	S-3/S-354	15018	PREF	5/1/1994 -4/30/2007	S354	Grab, Composite	
	S-8	S-8	P1024	MOD1	5/1/1994 -12/31/2004	S8	Grab, Composite
			15040	PREF	1/1/2005 -4/30/2007		

