Settlement Agreement
Third Quarter 2000 Report
July – September 2000

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Technical Oversight Committee
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ARTHUR R. MARSHALL LOXAHATCHEE NATIONAL WILDLIFE REFUGE

Phosphorus Concentrations

The Settlement Agreement entered into by the federal government, the State of Florida and the South Florida Water Management District in 1991 to end the Everglades lawsuit stipulates interim and long-term phosphorus concentrations for the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Refuge). The interim and long-term concentrations must be met by February 1, 1999, and December 31, 2006, respectively. These stipulated concentrations vary monthly because they were computed as a function of water level measured at gaging stations 1-7, 1-8C and 1-9 within the Refuge. Total phosphorus concentrations are determined from water samples collected at 14 interior marsh stations.

Average stages in the Refuge were 15.83 feet in July, 16.14 feet in August and 16.22 feet in September (**Figure 1**). The geometric means calculated from total phosphorus concentrations measured in water samples collected in July, August and September were 10.8, 9.4 and 10.2 ppb, respectively. These geometric mean concentrations were less than the calculated interim and long-term limits for each respective month (**Figure 1**). The interim limits for July, August and September were 17.0, 14.1 and 13.5 ppb, respectively, while the long-term limits for these same months were 13.7, 11.6 and 11.1 ppb, respectively.

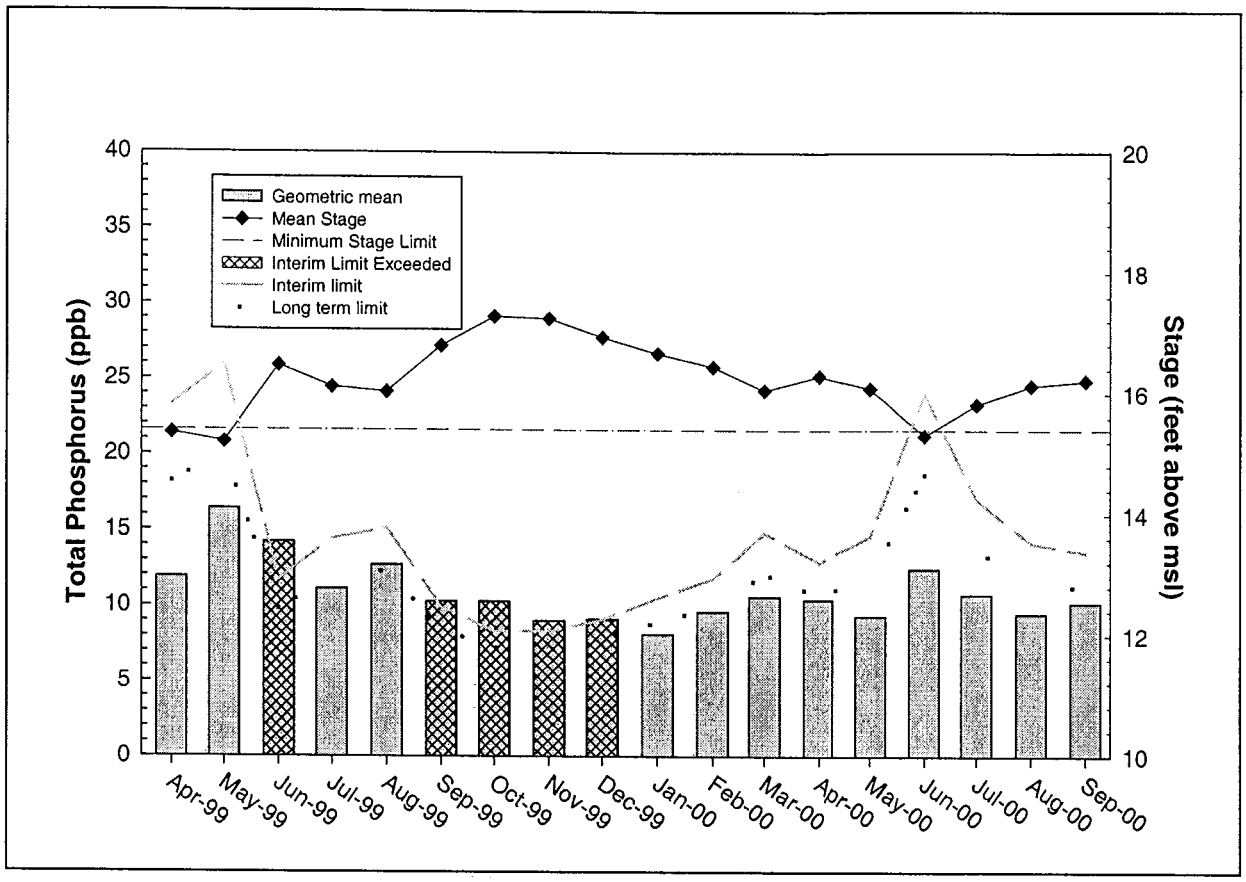


Figure 1. Monthly total phosphorus geometric mean concentrations for the Loxahatchee National Wildlife Refuge compared to the interim and long-term targets. The calculated target concentrations are adjusted for fluctuations in water level.

EVERGLADES NATIONAL PARK

Shark River Slough

The Settlement Agreement of 1991 set separate interim and long-term total phosphorus concentration limits for discharges into the Everglades National Park through Shark River Slough to be met by October 1, 2003, and December 31, 2006, respectively. The limits apply to the water year ending September 30. The long-term total phosphorus concentration limit for inflows to Shark River Slough through structures S12A, S12B, S12C, S12D and S333 represents the concentrations delivered during the Outstanding Florida Waters baseline period of March 1, 1978, to March 1, 1979, and is adjusted for variations in flow. In addition, the Settlement Agreement requires that phosphorus concentrations be presented as 12-month moving flow-weighted means.

Inflow concentrations of total phosphorus through Shark River Slough are compared to the interim and long-term limits at the end of each water year from 1989 to 2000 (**Figure 2a**). The 12-month moving flow-weighted mean total phosphorus concentration ending September 2000 was 10.0 ppb. Corresponding interim and long-term limits were 9.4 and 7.6 ppb, respectively. This is the first time since 1993 that both limits were exceeded for the water year ending in September.

Table 1 presents the moving flow-weighted mean concentrations for each 12-month period beginning with September 1998 as well as the corresponding interim and long-term total phosphorus concentration limits, which are calculated using the 12-month period flow. For the 12-month periods ending in July, August and September 2000, the flow-weighted mean total phosphorus concentrations were 9.8, 9.8 and 10.0 ppb, respectively. These concentrations were all greater than the interim and long-term limits for these respective months.

The Settlement Agreement stipulates that the percent of flow-weighted mean total phosphorus concentrations greater than 10 ppb from each sampling event in any 12-month period must not exceed an allowable value based on flow into Shark River Slough for the same 12-month period (**Figure 2b**). For the 12-month

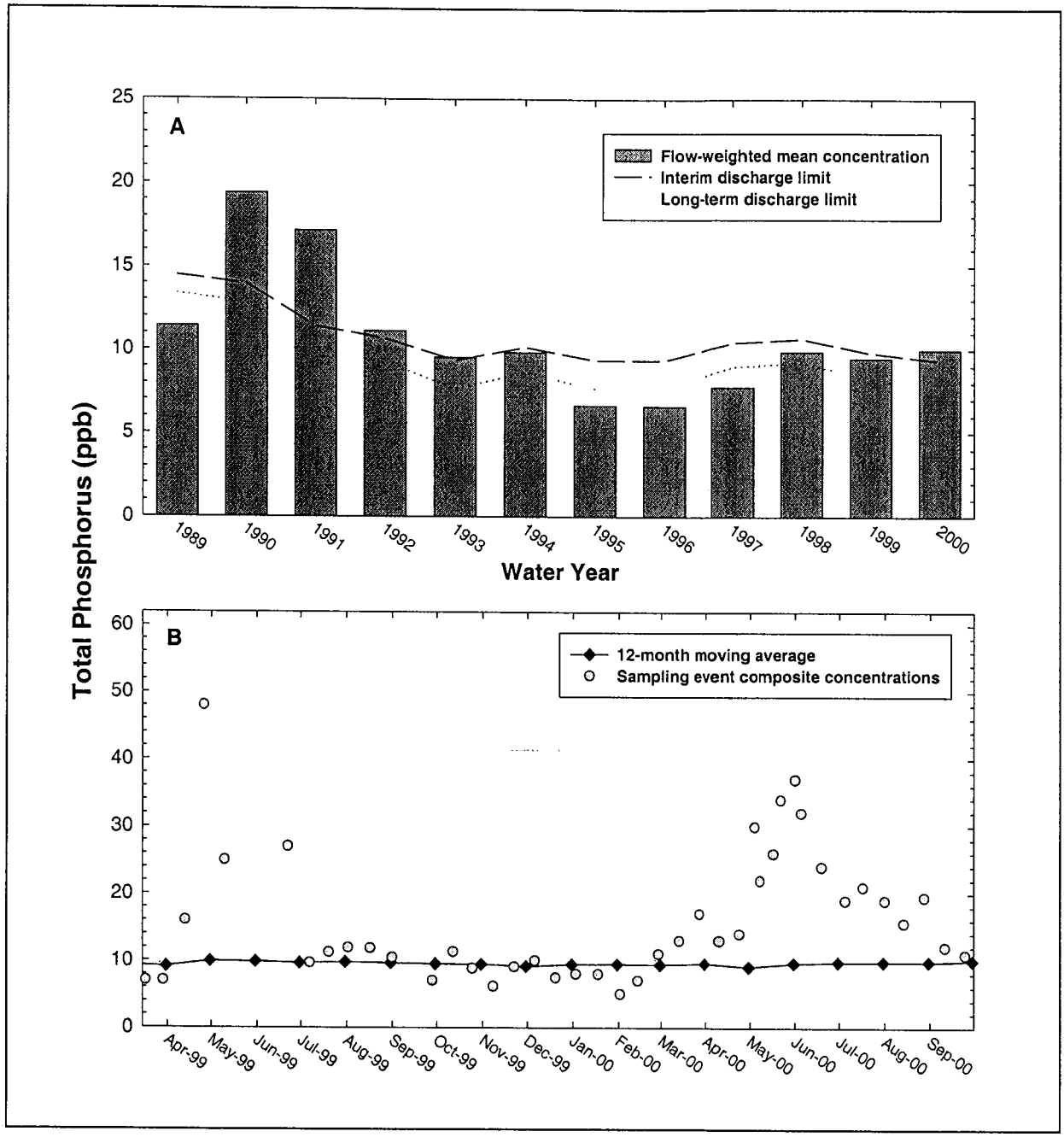


Figure 2. 12-month moving flow-weighted mean total phosphorus concentrations at the inflows to Everglades National Park (ENP) through Shark River Slough compared to the interim and long-term targets. **a.** Concentration at the end of each water year. **b.** 12-month moving average concentration at the end of each month and the composite concentration for each sampling event.

periods ending July, August and September 2000, the percent of flow-weighted mean total phosphorus concentrations greater than 10 ppb was 64.3, 65.5 and 72.4, respectively. These percentages exceeded the allowable limit of 40.1 percent for all three 12-month periods (**Table 1**).

Table 1. Shark River Slough Total Phosphorus Compliance Tracking.

12-Month Period Ending On	Total Period Flow (Kac-ft)	Flow Weighted Mean Total Phosphorus (ppb)	Limits (ppb)		Percent of Samples Greater Than 10 ppb (%)	
			Interim	Long Term	Observed	Allowed
9/30/98	737.6	9.8	10.7	9.2	***48.2***	48.1
10/31/98	728.2	10.4	10.7	9.3	***48.2***	48.3
11/30/98	772.4	10.3	10.5	9.1	***48.2***	47.1
12/31/98	871.4	9.7	10.1	8.6	***46.4***	44.5
1/31/99	852.7	9.4	10.2	8.7	42.9	45.0
2/28/99	842.9	9.3	10.2	8.7	44.4	45.3
3/31/99	826.7	9.1	10.3	8.8	40.7	45.7
4/30/99	750.3	9.9	10.6	9.2	***48.2***	47.7
5/31/99	674.6	9.8	11.0	9.6	48.0	49.9
6/30/99	680.2	9.6	10.9	9.6	40.9	49.7
7/31/99	788.4	9.7	10.4	9.0	45.8	46.7
8/31/99	857.6	9.6	10.1	8.6	43.5	44.9
9/30/99	939.9	9.5	9.8	8.2	43.5	42.9
10/31/99	1084	9.4	9.4	7.6	47.8	40.1
11/30/99	1298	9.1	9.4	7.6	47.8	40.1
12/31/99	1345	9.4	9.4	7.6	47.8	40.1
1/31/00	1395	9.4	9.4	7.6	47.8	40.1
2/29/00	1415	9.4	9.4	7.6	***50.0***	40.1
3/31/00	1386	9.6	9.4	7.6	***60.9***	40.1
4/30/00	1385	9.1	9.4	7.6	***59.1***	40.1
5/31/00	1401	9.6	9.4	7.6	***64.0***	40.1
6/30/00	1396	9.8	9.4	7.6	***66.7***	40.1
7/31/00	1295	9.8	9.4	7.6	***64.3***	40.1
8/31/00	1215	9.8	9.4	7.6	***65.5***	40.1
9/30/00	1096	10.0	9.4	7.6	***72.4***	40.1

Bold and italicized values exceeded allowed percentage

The daily mean flows through the individual Shark River Slough structures and S334 from April 1999 through September 2000 are presented in **Figure 3a**. As indicated in **Figure 3a**, the majority of flow in July entered northeastern Shark River Slough through S333. Flow through S12D began on July 23 and continued through September 30. S12C had flow from August 9 through August 25 and again from September 26 through 30. S12A and B only had flow from August 23 through 25. The relationship between the sum of the daily mean flows at Shark River Slough structures and the corresponding flow-weighted mean total phosphorus concentrations for individual sampling events is presented in **Figure 3b**. As described in the October edition of this report, the higher total phosphorus concentrations (up to 37 ppb) collected in samples at S333 in May and June 2000 reflected water released from Lake Okeechobee as the lake was being lowered. By the end of September 2000, flows entering Shark River Slough had decreasing composite total phosphorus concentrations approaching 10 ppb.

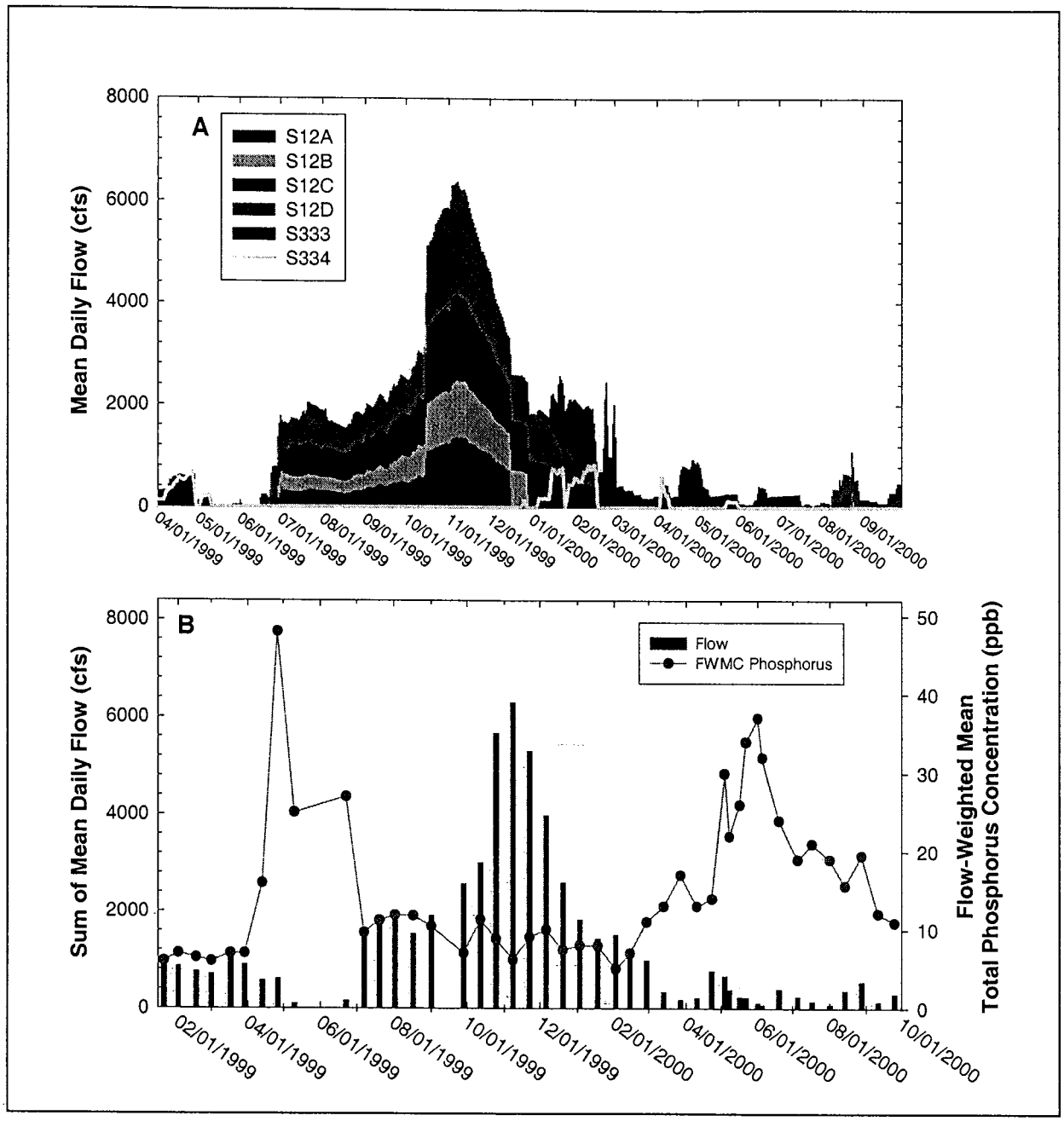


Figure 3. **a.** Mean daily flows into Shark River Slough by structure. **b.** The relationship between sum of mean daily flow at Shark River Slough structures and flow-weighted mean total phosphorus concentration for individual sampling events.

Taylor Slough and The Coastal Basins

Under the Settlement Agreement, a single total phosphorus long-term limit of 11 ppb, to be met by December 31, 2006, was set for the two points of inflow to Taylor Slough (S332 and S175) and the inflow point to the Coastal Basins (S18C). The 11 ppb limit applies to the water year ending September 30. Beginning in August 1999, structure S332D, a new pump station constructed by the U.S. Army Corps of Engineers, began operation. The structure is adjacent to spillway S174 and pumps water from the L31N canal into the L31W canal. The S332D and S174 structures became the new inflow compliance monitoring sites for Taylor Slough on October 1, 1999, replacing S332 and S175. However, the Settlement Agreement's Technical Oversight Committee requested that data from both the old and new pairs of inflow structures to Taylor Slough be presented for one year. This request was made to determine if the differences between the two data sets observed from August 1999 through March 2000 would continue throughout a complete wet season/dry season cycle and what implications this might have on future compliance with the 11 ppb limit.

Inflow concentrations of total phosphorus to the Everglades National Park through Taylor Slough and the Coastal Basins are compared to the 11 ppb limit at the end of each water year using data from both the old (S175, S332, S18C) and new (S174, S332D, S18C) combinations of structures for the 2000 water year (**Figure 4a**). The bars in **Figure 4a** represent the flow-weighted mean total phosphorus concentrations from S332, S175 and S18C for water years 1989 through 2000. The diamond point value for water year 1999 represents the total phosphorus concentrations for S174 and S18C from October 1, 1998, through September 30, 1999, plus the S332D data from August 30, 1999, through September 30, 1999. The diamond point value for 2000 represents total phosphorus concentrations for the entire year from S174, S332D and S18C.

Figure 4b presents the 12-month moving average and individual sampling event flow-weighted mean total phosphorus concentrations at both the old and new combinations of structures. The individual sampling event data for the new combination had been generally greater than those from the old combination through June 2000. From July through September 2000 the individual sampling event data from the new combination has been consistently lower than the old combination. As discussed below, flow into Taylor Slough after July 5 was only through S332D and the old combination was represented only by S18C.

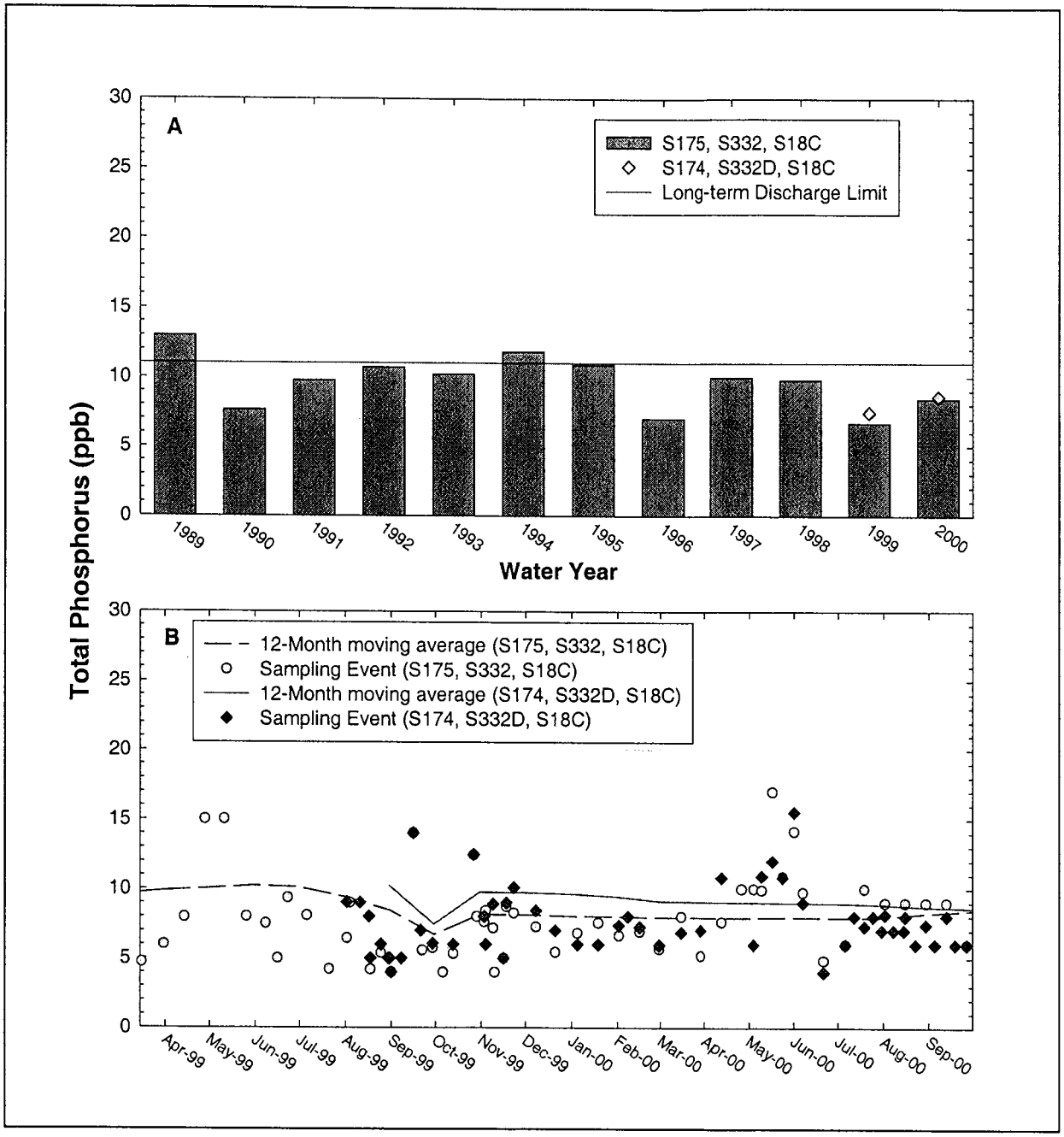


Figure 4. **a.** Flow-weighted mean total phosphorus concentration at the inflows to Everglades National Park through Taylor Slough and the Coastal Basins compared to the 11 ppb long-term total phosphorus limit for each water year. **b.** The 12-month moving average and individual sampling event flow-weighted mean total phosphorus concentrations at both the old and new combinations of compliance monitoring sites.

The 12-month flow-weighted mean concentrations for July, August and September 2000 were 8.9, 8.7 and 8.6 ppb, respectively, at the new combination of structures and 8.0, 8.3 and 8.4 ppb for July, August and September, respectively, for the old combination of structures (**Table 2**). The Settlement Agreement stipulates that the percent of flow-weighted mean total phosphorus concentrations greater than 10 ppb from each sampling event in any 12-month period must not exceed a fixed value of 53.1 percent. The percentage of flow-weighted mean total phosphorus concentrations greater than 10 ppb for the new combination was 18.2, 18.6 and 16.7 for the periods ending July, August and September, respectively. For these same periods, the percentage for the old combination was 17.1, 18.0 and 14.3, respectively (**Table 2**).

Table 2. Taylor Slough and Coastal Basins Total Phosphorus Compliance Tracking.

12-Month Period Ending On	Total Period Flow (ac-ft x 10^3)		Flow Weighted Mean Total Phosphorus (ppb)		Long Term Limit (ppb)	Percent of Samples Greater Than 10 ppb			
						Observed (%)		Allowed (%)	
	New	Old	New	Old		New	Old	New	Old
9/30/98	81.29	294.0	11.7	10.5	11.0	33.3	32.1	53.1	53.1
10/31/98	88.04	320.8	11.5	10.0	11.0	33.3	32.1	53.1	53.1
11/30/98	96.19	354.0	11.2	9.6	11.0	33.3	32.1	53.1	53.1
12/31/98	88.36	318.7	11.6	9.9	11.0	34.6	32.1	53.1	53.1
1/31/99	97.67	329.8	11.4	9.8	11.0	30.8	28.6	53.1	53.1
2/28/99	90.69	306.5	12.0	9.6	11.0	26.9	25.0	53.1	53.1
3/31/99	82.60	272.1	12.4	9.9	11.0	23.1	21.4	53.1	53.1
4/30/99	74.57	251.6	12.9	10.0	11.0	25.9	25.0	53.1	53.1
5/31/99	63.40	232.1	13.8	10.2	11.0	32.0	28.6	53.1	53.1
6/30/99	70.04	259.5	13.6	10.1	11.0	32.0	28.6	53.1	53.1
7/31/99	75.96	275.6	12.1	9.4	11.0	25.9	25.0	53.1	53.1
8/31/99	78.96	287.7	10.2	8.5	11.0	15.6	16.7	53.1	53.1
9/30/99	94.00	279.9	7.5	6.7	11.0	11.8	12.1	53.1	53.1
10/31/99	101.7	338.8	9.7	8.1	11.0	17.1	17.1	53.1	53.1
11/30/99	111.7	365.2	9.7	8.1	11.0	15.4	15.4	53.1	53.1
12/31/99	127.2	413.6	9.6	8.0	11.0	15.0	15.4	53.1	53.1
1/31/00	144.3	450.0	9.5	8.0	11.0	15.0	15.4	53.1	53.1
2/29/00	160.0	479.2	9.1	7.9	11.0	14.3	15.0	53.1	53.1
3/31/00	164.5	485.4	9.1	7.9	11.0	14.6	15.4	53.1	53.1
4/30/00	164.8	492.7	9.0	7.9	11.0	15.0	12.8	53.1	53.1
5/31/00	170.2	493.4	9.0	8.0	11.0	16.3	14.6	53.1	53.1
6/30/00	161.7	467.3	9.0	7.9	11.0	20.9	16.7	53.1	53.1
7/31/00	172.9	456.6	8.9	8.0	11.0	18.2	17.1	53.1	53.1
8/31/00	184.2	445.1	8.7	8.3	11.0	18.6	18.0	53.1	53.1
9/30/00	188.0	432.1	8.6	8.4	11.0	16.7	14.3	53.1	53.1

New= S174+S332D+S18C data
Old = S175+S332+S18C data

A comparison of flows between the old and new combination of structures is presented in **Figure 5**.

The flow through S18C, along with the combined flows through S332 plus S175 and S332D plus S174, is presented in **Figure 5a**. The water discharged from the downstream structures, S175 and S332, is supplied through the upstream structures, S174 and S332D. After July 5, 2000 S332 and S175 were closed. Thereafter, flow into Taylor Slough was through S322D. During this reporting period flow into Taylor Slough through S174 occurred only on July 9 and July 10. **Figure 5b** shows the relationship between the sum of the daily mean flows at S18C and the Taylor Slough structures and the corresponding flow-weighted mean total phosphorus concentrations for each sampling event at both the old and new combinations of structures. After July 5, 2000, the old combination of structures was represented only by S18C.

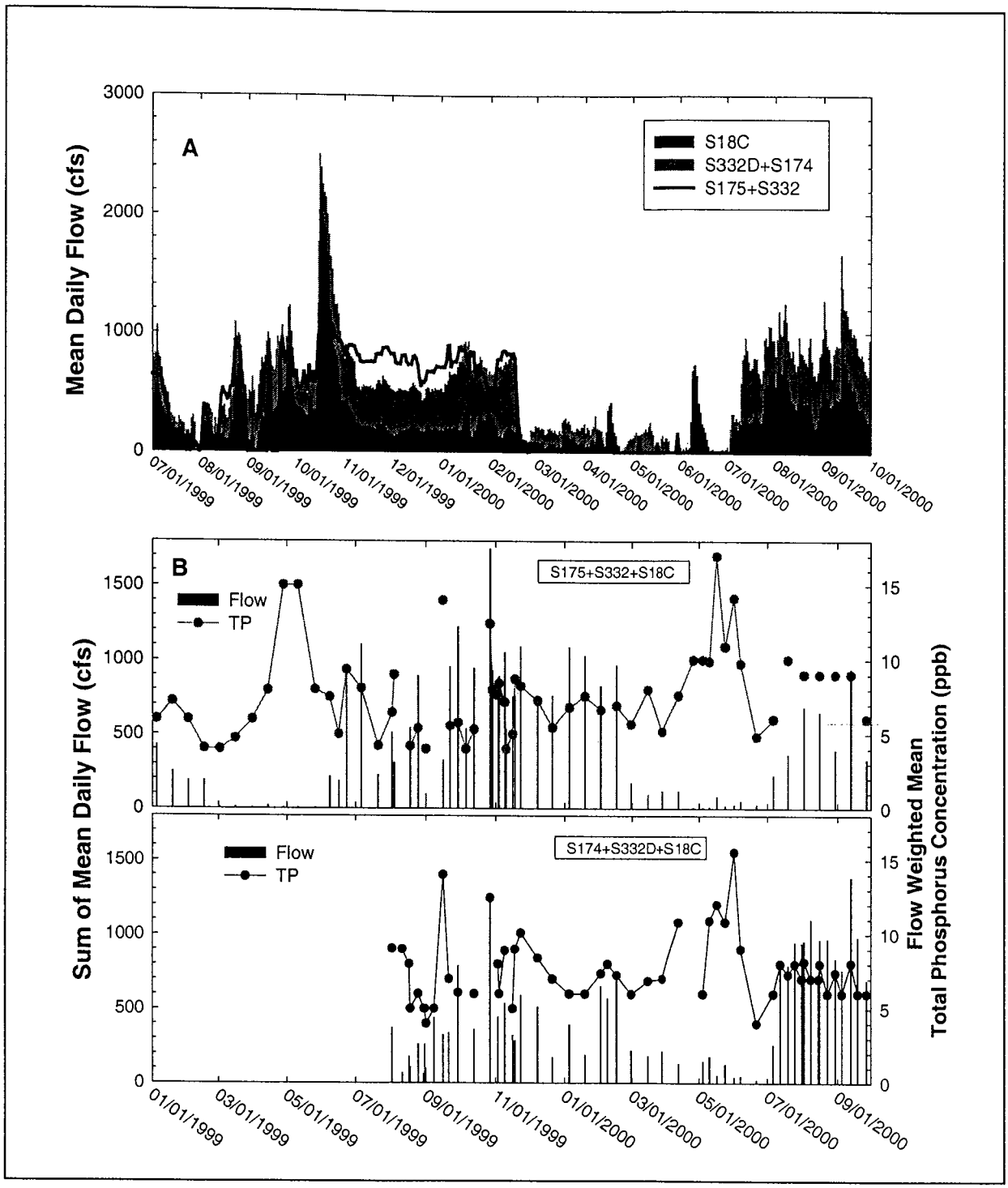


Figure 5. **a.** Daily mean flows into Everglades National Park through Taylor Slough and S18C, the Coastal Basins control structure. **b.** Mean daily flows and corresponding flow-weighted mean total phosphorus concentrations at old and new combinations of Taylor Slough and Coastal Basin structures.

Table A1. Loxahatchee National Wildlife Refuge TP Tracking Report

mm-yyyy	geometric mean	interim limit	long term limit	average stage	n TP data	n stage data
Oct-1998	8.5	10.1	8.6	16.74	10	3
Nov-1998	6.5	8.3	7.2	17.56	14	3
Dec-1998	7.5	8.3	7.2	17.28	14	3
Jan-1999	6.9	8.8	7.6	17.02	14	3
Feb-1999	6.8	10.8	9.1	16.62	11	3
Mar-1999	9.1	14.1	11.6	16.14	9	3
Apr-1999	11.9	N/A	N/A	15.35	3	3
May-1999	16.4	N/A	N/A	15.20	2	3
* Jun-1999	14.2	11.7	9.8	16.47	13	3
Jul-1999	11.1	14.4	11.8	16.11	10	3
Aug-1999	12.7	15.1	12.3	16.03	8	3
* Sep-1999	10.3	9.9	8.4	16.79	14	3
* Oct-1999	10.3	8.3	7.2	17.28	14	3
* Nov-1999	9.0	8.3	7.2	17.25	14	3
Dec-1999	9.1	9.1	7.9	16.94	14	3
Jan-2000	8.1	10.5	8.9	16.67	14	3
Feb-2000	9.6	11.8	9.9	16.45	13	3
Mar-2000	10.6	14.8	12.1	16.06	12	3
Apr-2000	10.409	12.854	10.637	16.3	14	3
May-2000	9.31	14.587	11.91	16.09	11	3
Jun-2000	12.434	N/A	N/A	15.31	6	3
Jul-2000	10.751	17.033	13.691	15.83	6	3
Aug-2000	9.444	14.131	11.577	16.14	10	3
Sep-2000	10.156	13.51	11.12	16.22	11	3

note: average stage is average of 3 stations on the sampling dates.

note: When Lake Ocheechobee Recess special sampling data are included, May 2000 is as following:

May-2000	10.969	14.962	12.184	16.05	14,11,13,12	3,3,3,3

Table A2. LNWR Stage Data

Station	WC1-7	WC1-8C	WC1-9	average
DBKEY	FE775	FE776	FE777	
07/02/00	15.77	15.14	15.63	15.51
07/03/00	15.77	15.21	15.64	15.54
07/04/00	15.76	15.28	15.65	15.56
07/05/00	15.76	15.35	15.65	15.59
07/06/00	15.74	15.38	15.63	15.58
07/07/00	15.75	15.41	15.61	15.59
07/08/00	15.84	15.50	15.63	15.66
07/09/00	15.83	15.71	15.63	15.72
07/10/00	15.82	15.85	15.62	15.76
07/11/00	15.82	15.95	15.63	15.80
07/12/00	15.81	16.00	15.69	15.83
07/13/00	15.82	16.02	15.69	15.84
07/14/00	15.80	16.05	15.69	15.85
07/15/00	15.83	16.05	15.68	15.85
07/16/00	15.81	16.04	15.66	15.84
07/17/00	15.79	16.06	15.66	15.84
07/18/00	15.76	16.07	15.67	15.83
07/19/00	15.75	16.08	15.65	15.83
07/20/00	15.73	16.10	15.67	15.83
07/21/00	15.73	16.19	15.82	15.91
07/22/00	15.75	16.19	15.85	15.93
07/23/00	15.74	16.19	15.85	15.93
07/24/00	15.73	16.19	15.85	15.92
07/25/00	15.72	16.23	15.85	15.93
07/26/00	15.71	16.29	15.88	15.96
07/27/00	15.72	16.35	15.94	16.00
07/28/00	15.72	16.37	15.97	16.02
07/29/00	15.73	16.38	15.98	16.03
07/30/00	15.71	16.39	15.99	16.03
07/31/00	15.69	16.38	15.99	16.02
08/01/00	15.68	16.40	16.00	16.03
08/02/00	15.69	16.45	16.05	16.06
08/03/00	15.72	16.50	16.09	16.10
08/04/00	15.74	16.52	16.11	16.12
08/05/00	15.72	16.55	16.13	16.13
08/06/00	15.70	16.56	16.15	16.14
08/07/00	15.68	16.57	16.17	16.14
08/08/00	15.65	16.58	16.18	16.14
08/09/00	15.64	16.61	16.20	16.15
08/10/00	15.63	16.64	16.22	16.16
08/11/00	15.60	16.62	16.24	16.15
08/12/00	15.58	16.61	16.25	16.15
08/13/00	15.56	16.61	16.26	16.14
08/14/00	15.55	16.61	16.27	16.14
08/15/00	15.56	16.58	16.28	16.14
08/16/00	15.78	16.58	16.30	16.22
08/17/00	15.94	16.56	16.30	16.27

08/18/00	15.99	16.55	16.30	16.28
08/19/00	16.03	16.55	16.31	16.30
08/20/00	16.06	16.52	16.31	16.30
08/21/00	16.09	16.52	16.31	16.31
08/22/00	16.10	15.52	16.31	15.98
08/23/00	16.10	16.48	16.29	16.29
08/24/00	16.10	16.48	16.27	16.28
08/25/00	16.10	16.29	16.25	16.21
08/26/00	16.09	16.21	16.22	16.17
08/27/00	16.08	16.18	16.21	16.16
08/28/00	16.07	16.19	16.25	16.17
08/29/00	16.07	16.17	16.27	16.17
08/30/00	16.07	16.20	16.24	16.17
08/31/00	16.08	16.18	16.23	16.16
09/01/00	16.08	16.18	16.22	16.16
09/02/00	16.07	16.19	16.20	16.15
09/03/00	16.06	16.19	16.17	16.14
09/04/00	16.05	16.20	16.14	16.13
09/05/00	16.04	16.19	16.12	16.12
09/06/00	16.04	16.19	16.11	16.11
09/07/00	16.08	16.22	16.13	16.14
09/08/00	16.13	16.29	16.17	16.20
09/09/00	16.14	16.33	16.20	16.22
09/10/00	16.15	16.34	16.19	16.23
09/11/00	16.16	16.34	16.17	16.22
09/12/00	16.15	16.34	16.15	16.21
09/13/00	16.14	16.34	16.14	16.21
09/14/00	16.12	16.32	16.12	16.19
09/15/00	16.11	16.34	16.17	16.21
09/16/00	16.13	16.40	16.28	16.27
09/17/00	16.21	16.45	16.29	16.32
09/18/00	16.29	16.51	16.34	16.38
09/19/00	16.34	16.60	16.39	16.44
09/20/00	16.37	16.66	16.40	16.48
09/21/00	16.37	16.73	16.40	16.50
09/22/00	16.36	16.75	16.40	16.50
09/23/00	16.36	16.76	16.42	16.51
09/24/00	16.37	16.75	16.43	16.52
09/25/00	16.38	16.75	16.45	16.53
09/26/00	16.41	16.75	16.46	16.54
09/27/00	16.45	16.76	16.48	16.56
09/28/00	16.48	16.79	16.51	16.59
09/29/00	16.53	16.83	16.55	16.64
09/30/00	16.56	16.90	16.60	16.69

Table A3. Individual Total Phosphorus Concentrations (mg/L) Collected in LNWR from October 1999 through September 2000.

yyyymmdd	LOX3	LOX4	LOX5	LOX6	LOX7	LOX8	LOX9	LOX10	LOX11	LOX12	LOX13	LOX14	LOX15	LOX16
10/12/1999	0.010	0.014	0.009	0.011	0.011	0.009	0.009	0.007						
10/13/1999									0.015	0.014	0.011	0.009	0.009	0.009
11/15/1999	0.013	0.008	0.011	0.006	0.007	0.009	0.012	0.006						
11/16/1999									0.014	0.007	0.013	0.007	0.009	0.009
12/6/1999	0.011	0.011	0.012	0.009	0.009	0.013	0.011	0.008						
12/7/1999									0.010	0.007	0.009	0.006	0.008	0.007
1/3/2000	0.010	0.008	0.012	0.008	0.008	0.008	0.008	0.008						
1/4/2000									0.009	0.006	0.011	0.006	0.007	0.007
2/14/2000		0.010	0.023	0.007	0.009	0.012	0.011	0.011						
2/15/2000									0.013	0.006	0.011	0.007	0.006	0.008
3/13/2000		0.010		0.011	0.011	0.016	0.013	0.009						
3/14/2000									0.011	0.008	0.011	0.010	0.008	0.011
4/10/2000		0.012	0.009	0.009	0.009	0.011	0.007	0.010						
4/11/2000									0.010	0.008	0.011	0.009	0.008	0.010
4/28/2000	0.013	0.013	0.012	0.007	0.012	0.010	0.015	0.007	0.016	0.007	0.017	0.010	0.008	0.014
5/8/2000			0.011	0.010	0.011	0.009	0.011							
5/9/2000									0.011	0.006	0.009	0.008	0.008	0.010
6/5/2000						0.011								
6/6/2000									0.019	0.008	0.017	0.013	0.010	
7/17/2000				0.013	0.010									
7/18/2000										0.011		0.012	0.009	0.010
8/14/2000		0.011		0.009	0.008		0.011	0.008						
8/15/2000									0.009	0.010		0.010	0.009	0.010
9/11/2000		0.015		0.007	0.009	0.015	0.009	0.012						
9/12/2000									0.011	0.011		0.008	0.008	0.010

Lake Ocheechobee Recession Special Sampling

5/5/2000	0.014	0.009	0.016	0.009	0.010	0.011	0.008	0.009	0.012	0.008	0.010	0.008	0.010	0.010
5/12/2000	0.020	0.008	0.011	0.008	0.011	0.011	0.016	0.018	0.014	0.008	0.012	0.014	0.011	
5/19/2000		0.011	0.011	0.009	0.012	0.012	0.013		0.011	0.009	0.018	0.010	0.008	0.011

Table A4. Shark River Slough Flow Data

date	S12A flow	S12B flow	S12C flow	S12D flow	S333 flow	S334 flow
07/01/00	0.00	0.00	0.00	0.00	231.00	0.00
07/02/00	0.00	0.00	0.00	0.00	230.00	0.00
07/03/00	0.00	0.00	0.00	0.00	234.00	0.00
07/04/00	0.00	0.00	0.00	0.00	237.00	0.00
07/05/00	0.00	0.00	0.00	0.00	240.00	0.00
07/06/00	0.00	0.00	0.00	0.00	240.00	0.00
07/07/00	0.00	0.00	0.00	0.00	239.00	0.00
07/08/00	0.00	0.00	0.00	0.00	239.00	0.00
07/09/00	0.00	0.00	0.00	0.00	243.00	0.00
07/10/00	0.00	0.00	0.00	0.00	245.00	0.00
07/11/00	0.00	0.00	0.00	0.00	246.00	0.00
07/12/00	0.00	0.00	0.00	0.00	247.00	0.00
07/13/00	0.00	0.00	0.00	0.00	247.00	0.00
07/14/00	0.00	0.00	0.00	0.00	249.00	0.00
07/15/00	0.00	0.00	0.00	0.00	253.00	0.00
07/16/00	0.00	0.00	0.00	0.00	255.00	0.00
07/17/00	0.00	0.00	0.00	0.00	144.00	0.00
07/18/00	0.00	0.00	0.00	0.00	48.00	0.00
07/19/00	0.00	0.00	0.00	0.00	40.00	0.00
07/20/00	0.00	0.00	0.00	23.00	41.00	0.00
07/21/00	0.00	0.00	0.00	40.00	42.00	0.00
07/22/00	0.00	0.00	0.00	40.00	42.00	0.00
07/23/00	0.00	0.00	0.00	40.00	42.00	0.00
07/24/00	0.00	0.00	0.00	38.00	16.00	0.00
07/25/00	0.00	0.00	0.00	41.00	0.00	0.00
07/26/00	0.00	0.00	0.00	45.00	0.00	2.85
07/27/00	0.00	0.00	0.00	48.00	0.00	0.00
07/28/00	0.00	0.00	0.00	58.00	0.00	0.00
07/29/00	0.00	0.00	0.00	63.00	0.00	0.00
07/30/00	0.00	0.00	0.00	66.00	0.00	0.00
07/31/00	0.00	0.00	0.00	68.00	0.00	0.00
08/01/00	0.00	0.00	0.00	70.00	0.00	0.00
08/02/00	0.00	0.00	0.00	69.00	28.00	0.00
08/03/00	0.00	0.00	0.00	64.00	47.00	0.00
08/04/00	0.00	0.00	0.00	51.00	48.00	0.00
08/05/00	0.00	0.00	0.00	50.00	48.00	0.00
08/06/00	0.00	0.00	0.00	50.00	48.00	0.00
08/07/00	0.00	0.00	0.00	50.00	26.00	0.00
08/08/00	0.00	0.00	0.00	51.00	0.00	0.00
08/09/00	0.00	0.00	82.00	160.00	4.40	0.00
08/10/00	0.00	0.00	136.00	232.00	0.00	0.00
08/11/00	0.00	0.00	135.00	232.00	0.00	1.52
08/12/00	0.00	0.00	135.00	231.00	0.00	0.00
08/13/00	0.00	0.00	134.00	229.00	0.00	0.00
08/14/00	0.00	0.00	134.00	230.00	0.00	0.00
08/15/00	0.00	0.00	135.00	188.00	237.00	0.00
08/16/00	0.00	0.00	136.00	161.00	140.00	0.00
08/17/00	0.00	0.00	238.00	318.00	0.00	0.00
08/18/00	0.00	0.00	299.00	372.00	0.00	0.00
08/19/00	0.00	0.00	298.00	364.00	0.00	0.00
08/20/00	0.00	0.00	296.00	357.00	0.00	0.00
08/21/00	0.00	0.00	292.00	357.00	0.00	0.13
08/22/00	0.00	0.00	288.00	357.00	0.00	0.00
08/23/00	43.00	53.00	274.00	259.00	0.00	0.00

08/24/00	138.00	183.00	363.00	262.00	147.00	0.00
08/25/00	51.00	101.00	125.00	261.00	270.00	0.00
08/26/00	0.00	0.00	0.00	263.00	269.00	0.00
08/27/00	0.00	0.00	0.00	268.00	270.00	0.00
08/28/00	0.00	0.00	0.00	274.00	271.00	0.00
08/29/00	0.00	0.00	0.00	164.00	179.00	0.00
08/30/00	0.00	0.00	0.00	71.00	93.00	0.00
08/31/00	0.00	0.00	0.00	72.00	94.00	0.00
09/01/00	0.00	0.00	0.00	73.00	92.00	0.00
09/02/00	0.00	0.00	0.00	73.00	92.00	0.00
09/03/00	0.00	0.00	0.00	73.00	92.00	0.00
09/04/00	0.00	0.00	0.00	72.00	92.00	0.00
09/05/00	0.00	0.00	0.00	73.00	93.00	0.00
09/06/00	0.00	0.00	0.00	64.00	81.00	0.00
09/07/00	0.00	0.00	0.00	60.00	68.00	0.00
09/08/00	0.00	0.00	0.00	60.00	69.00	0.00
09/09/00	0.00	0.00	0.00	60.00	69.00	0.00
09/10/00	0.00	0.00	0.00	60.00	69.00	0.00
09/11/00	0.00	0.00	0.00	61.00	69.00	0.00
09/12/00	0.00	0.00	0.00	46.00	53.00	0.00
09/13/00	0.00	0.00	0.00	38.00	43.00	0.00
09/14/00	0.00	0.00	0.00	42.00	43.00	0.00
09/15/00	0.00	0.00	0.00	43.00	43.00	0.00
09/16/00	0.00	0.00	0.00	44.00	43.00	0.00
09/17/00	0.00	0.00	0.00	44.00	42.00	0.00
09/18/00	0.00	0.00	0.00	44.00	42.00	0.00
09/19/00	0.00	0.00	0.00	45.00	42.00	0.00
09/20/00	0.00	0.00	0.00	91.00	112.00	0.00
09/21/00	0.00	0.00	0.00	115.00	178.00	0.00
09/22/00	0.00	0.00	0.00	114.00	178.00	0.00
09/23/00	0.00	0.00	0.00	114.00	178.00	0.00
09/24/00	0.00	0.00	0.00	113.00	178.00	0.00
09/25/00	0.00	0.00	0.00	113.00	178.00	0.00
09/26/00	0.00	0.00	43.00	112.00	233.00	0.00
09/27/00	0.00	0.00	79.00	113.00	286.00	0.00
09/28/00	0.00	0.00	79.00	113.00	284.00	0.00
09/29/00	0.00	0.00	75.00	114.00	283.00	0.00
09/30/00	0.00	0.00	73.00	116.00	284.00	0.00

Table A5. Shark River Slough TP Data

date	S12A	S12B	S12C	S12D	S333	S334
7/5/2000	0.039	0.03	0.018	0.016	0.019	
7/17/2000	0.031	0.025	0.022	0.018	0.021	0.024
8/1/2000	0.026	0.019	0.018	0.019	0.023	
8/14/2000	0.03	0.019	0.015	0.016	0.017	
8/28/2000	0.015	0.015	0.015	0.018	0.021	0.03
9/11/2000	0.017	0.012	0.011	0.011	0.013	
9/25/2000	0.015	0.017	0.012	0.006	0.014	0.006

Table A6. Taylor Slough and Coastal Basins Flow Data

date	S175	S332	S18C	S332D	S174
7/1/2000	0	5.18	0	0	0
7/2/2000	0	5.18	0	0	0
7/3/2000	0	5.23	138	58.8	0
7/4/2000	0	5.24	246	77.56	0
7/5/2000	0	2.45	242	77.98	0
7/6/2000	0	0	223	34.68	0
7/7/2000	0	0	226	63.32	0
7/8/2000	0	0	191	68.98	0
7/9/2000	0	0	252	0	18.16
7/10/2000	0	0	241	320.83	21.51
7/11/2000	0	0	283	494.81	0
7/12/2000	0	0	324	501.7	0
7/13/2000	0	0	461	501.76	0
7/14/2000	0	0	367	494.15	0
7/15/2000	0	0	263	500.1	0
7/16/2000	0	0	259	437.38	0
7/17/2000	0	0	267	445.6	0
7/18/2000	0	0	302	488.58	0
7/19/2000	0	0	364	426.81	0
7/20/2000	0	0	348	437.81	0
7/21/2000	0	0	293	376.17	0
7/22/2000	0	0	272	354.99	0
7/23/2000	0	0	256	327.2	0
7/24/2000	0	0	336	355.36	0
7/25/2000	0	0	550	395.99	0
7/26/2000	0	0	631	332.78	-0.03
7/27/2000	0	0	582	311.14	0
7/28/2000	0	0	670	387.97	-0.02
7/29/2000	0	0	682	371.19	0
7/30/2000	0	0	693	250.72	0
7/31/2000	0	0	690	250.61	0
8/1/2000	0	0	563	245.35	0
8/2/2000	0	0	682	272.28	0
8/3/2000	0	0	869	318.77	0
8/4/2000	0	0	678	318.71	0
8/5/2000	0	0	660	318.72	0
8/6/2000	0	0	803	319.12	0
8/7/2000	0	0	929	318.91	0
8/8/2000	0	0	780	318.69	0
8/9/2000	0	0	627	313.47	0
8/10/2000	0	0	530	318.69	0
8/11/2000	0	0	437	360.66	0
8/12/2000	0	0	426	429.89	0
8/13/2000	0	0	421	324.98	0
8/14/2000	0	0	374	312.55	0
8/15/2000	0	0	417	318.66	0
8/16/2000	0	0	646	318.72	0
8/17/2000	0	0	573	261.26	0
8/18/2000	0	0	443	379.71	0
8/19/2000	0	0	415	373.25	0
8/20/2000	0	0	437	318.67	0
8/21/2000	0	0	411	318.64	0
8/22/2000	0	0	506	386.07	0
8/23/2000	0	0	538	428.45	0

8/24/2000	0	0	332	435.19	0
8/25/2000	0	0	264	384.13	0
8/26/2000	0	0	207	443.31	0
8/27/2000	0	0	220	390.26	0
8/28/2000	0	0	283	392.1	0
8/29/2000	0	0	383	426.99	0
8/30/2000	0	0.6	392	443.96	-0.04
8/31/2000	0	0	518	444.17	0
9/1/2000	0	0	829	444.1	0
9/2/2000	0	0	594	444.03	0
9/3/2000	0	0	456	443.99	0
9/4/2000	0	0	427	443.91	0
9/5/2000	0	0	388	371.9	0
9/6/2000	0	0	404	218.53	0
9/7/2000	0	0	585	242.96	0
9/8/2000	0	0	490	381.15	0
9/9/2000	0	0	455	444.02	0
9/10/2000	0	0	440	443.99	0
9/11/2000	0	0	468	418.44	0
9/12/2000	0	0	1220	440.4	0
9/13/2000	0	0	937	443.99	0
9/14/2000	0	0	760	444.02	0
9/15/2000	0	0	755	444	0
9/16/2000	0	0	707	444	0
9/17/2000	0	0	603	444.03	0
9/18/2000	0	0	601	444.03	0
9/19/2000	0	0	534	444.03	0
9/20/2000	0.62	0	556	442.94	0
9/21/2000	0	0	525	444.06	0
9/22/2000	0	0	441	444.03	0
9/23/2000	0	0	376	444	0
9/24/2000	0	0	357	443.79	0
9/25/2000	0	0	375	443.69	0
9/26/2000	0	0	363	410.17	0
9/27/2000	0	0	329	360.09	0
9/28/2000	0	0	287	375.81	0
9/29/2000	0	0	262	376.13	0
9/30/2000	0	0	564	376.17	0

Table A7. Taylor Slough and Coastal Basins TP Data

date	S175	S332	S18C	S332D	S176/S174
7/6/2000	0.007	0.007	0.006	0.006	
7/12/2000				0.008	
7/19/2000	0.008	0.005	0.01	0.005	0.006
7/25/2000				0.008	
7/31/2000				0.007	
8/2/2000	0.008	0.007	0.009	0.006	0.008
8/8/2000				0.007	
8/15/2000				0.007	
8/16/2000	0.007	0.006	0.009	0.006	0.006
8/23/2000				0.006	
8/30/2000	0.006	0.006	0.009	0.006	
9/5/2000				0.006	
9/13/2000	0.006	0.007	0.009	0.006	0.007
9/19/2000				0.006	
9/27/2000	0.006	0.006	0.006	0.006	
10/3/2000				0.009	

Table A8. Coastal Basins Water Quality Summary

S197 for 10/1/ 1998 through 9/30/2000

Parameter		unit	sample type	n	min	max	average	S.D.
Physical	Dissolved Oxygen	mg/l	grab	15	2.22	7.93	5.92	1.84
	Field Specific Conductivity	umhos/cm	grab	15	398	657	500	57
	Field pH	SU	grab	15	6.68	8.05	7.41	0.46
	Turbidity	NTU	grab	14	0.16	4.03	1.11	0.95
	Total Suspended Solids	mg/l	grab	14	<3	<3	<3	0.134
	Hardness (as CaCO3)	mgCACO3/l	grab	5	187.034	215.902	203.342	12.842
	Alkalinity (as CACO3)	mg/l	grab	14	157.500	201.200	189.350	11.208
Nutrients	Total Nitrogen	mgN/l	grab	14	<0.5	0.776	<0.5	0.217
	Nitrate+Nitrite (as N)	mg/l	grab	14	<0.004	0.103	0.045	0.030
	Ammonia (as N)	mg/l	grab	14	<0.009	0.130	0.049	0.044
	Total Phosphorus	mg/l	grab	14	0.005	0.012	0.008	0.002
	Ortho Phosphate (as P)	mg/l	grab	14	<0.004	0.005	<0.004	0.001
	Dissolved Silica	mg/l	grab	4	3.764	7.006	5.200	1.452
Major Ions	Dissolved Sodium	mg/l	grab	5	16.187	31.746	22.732	5.870
	Dissolved Potassium	mg/l	grab	5	2.275	4.346	3.738	0.848
	Dissolved Calcium	mg/l	grab	5	64.451	77.708	71.549	4.829
	Dissolved Magnesium	mg/l	grab	5	4.224	8.798	5.994	1.764
	Total Chlorides	mg/l	grab	14	23.790	65.640	35.701	10.779
	Total Sulfate	mg/l	grab	4	7.700	13.510	9.940	2.668
Trace Elements	Total Cadmium	ug/l	grab	3	<0.3	<0.3	<0.3	0.000
	Total Copper	ug/l	grab	3	<1.2	<1.2	<1.2	0.000
	Total Zinc	ug/l	grab	3	<4	<4	<4	0.000
	Total Iron	ug/l	grab	5	43.332	145.049	87.839	44.696

S18C for 10/1/ 1998 through 9/30/2000

Parameter		unit	sample type	n	min	max	average	S.D.
Physical	Dissolved Oxygen	mg/l	grab	54	0.68	9.96	4.17	2.55
	Field Specific Conductivity	umhos/cm	grab	54	184	679	513	58
	Field pH	SU	grab	54	5.35	8.11	7.47	0.47
	Turbidity	NTU	grab	43	0.64	5.20	1.93	0.98
	Total Suspended Solids	mg/l	grab	43	<3	5.000	1.570	0.563
	Hardness (as CaCO3)	mgCACO3/l	grab	43	195.320	339.444	216.295	21.159
	Alkalinity (as CACO3)	mg/l	grab	43	182.400	234.700	200.565	9.544
Nutrients	Total Nitrogen	mgN/l	grab	42	<0.5	1.193	<0.5	0.269
	Nitrate+Nitrite (as N)	mg/l	grab	42	<0.004	0.107	0.041	0.027
	Ammonia (as N)	mg/l	grab	42	<0.009	0.254	0.090	0.062
	Total Phosphorus	mg/l	grab	55	<0.004	0.016	0.008	0.003
	Ortho Phosphate (as P)	mg/l	grab	42	<0.004	0.007	<0.004	0.001
	Dissolved Silica	mg/l	grab	7	4.362	7.186	5.468	1.092
Major Ions	Dissolved Sodium	mg/l	grab	43	17.360	280.934	28.343	39.617
	Dissolved Potassium	mg/l	grab	43	2.177	12.276	4.149	1.600
	Dissolved Calcium	mg/l	grab	43	65.266	83.600	75.781	4.225
	Dissolved Magnesium	mg/l	grab	43	4.260	37.462	6.574	4.994
	Total Chlorides	mg/l	grab	43	17.098	483.560	44.237	68.873
	Total Sulfate	mg/l	grab	7	<0.1	15.750	9.439	5.604
Trace Elements	Total Mercury	ug/l	grab	18	<0.1	<0.1	<0.1	0.012
	Total Cadmium	ug/l	grab	25	<0.5	0.350	<0.3	0.047
	Total Copper	ug/l	grab	25	<1.2	1.496	<1.2	0.223
	Total Zinc	ug/l	grab	22	<4	8.930	<4	1.710
	Total Arsenic	ug/l	grab	26	<2	2.220	<1.5	0.292
	Total Lead	ug/l	grab	26	<1	76.000	3.384	14.815
	Total Iron	ug/l	grab	41	24.700	610.000	231.316	121.641

Table A9. Coastal Basins Total Phosphorus Summary
(For the period: 10/1/1998 - 9/30/2000)

S18C:	wq data	flow dbkey
	S18C	15760

Grab sample n = 55
first datum : 1998/10/13
last datum : 2000/09/27
average value (arithmetic mean) = 8 ppb
range = <4 to 16 ppb

Grab sample w/ positive flow n = 46
first datum : 1998/10/13
last datum : 2000/09/27
average value (arithmetic mean) = 7 ppb
range = <4 to 16 ppb
flow weighted mean for data = 8 ppb

Flow
number of no flow days = 75
number of positive flow days = 626
total positive flow = 167161.47 cfs-d
number of reverse flow days = 30
total negative (reverse) flow = -443.13 cfs-d

S197:	wq data	flow dbkey
	S197	HA458

Grab sample n = 14
first datum : 1999/09/22
last datum : 2000/09/13
average value (arithmetic mean) = 8 ppb
range = 5 to 12 ppb

Grab sample w/ positive flow = 3
first datum : 1999/09/22
last datum : 2000/09/13
average value (arithmetic mean) = 9 ppb
range = 7 to 10 ppb
flow weighted mean for data = 9 ppb

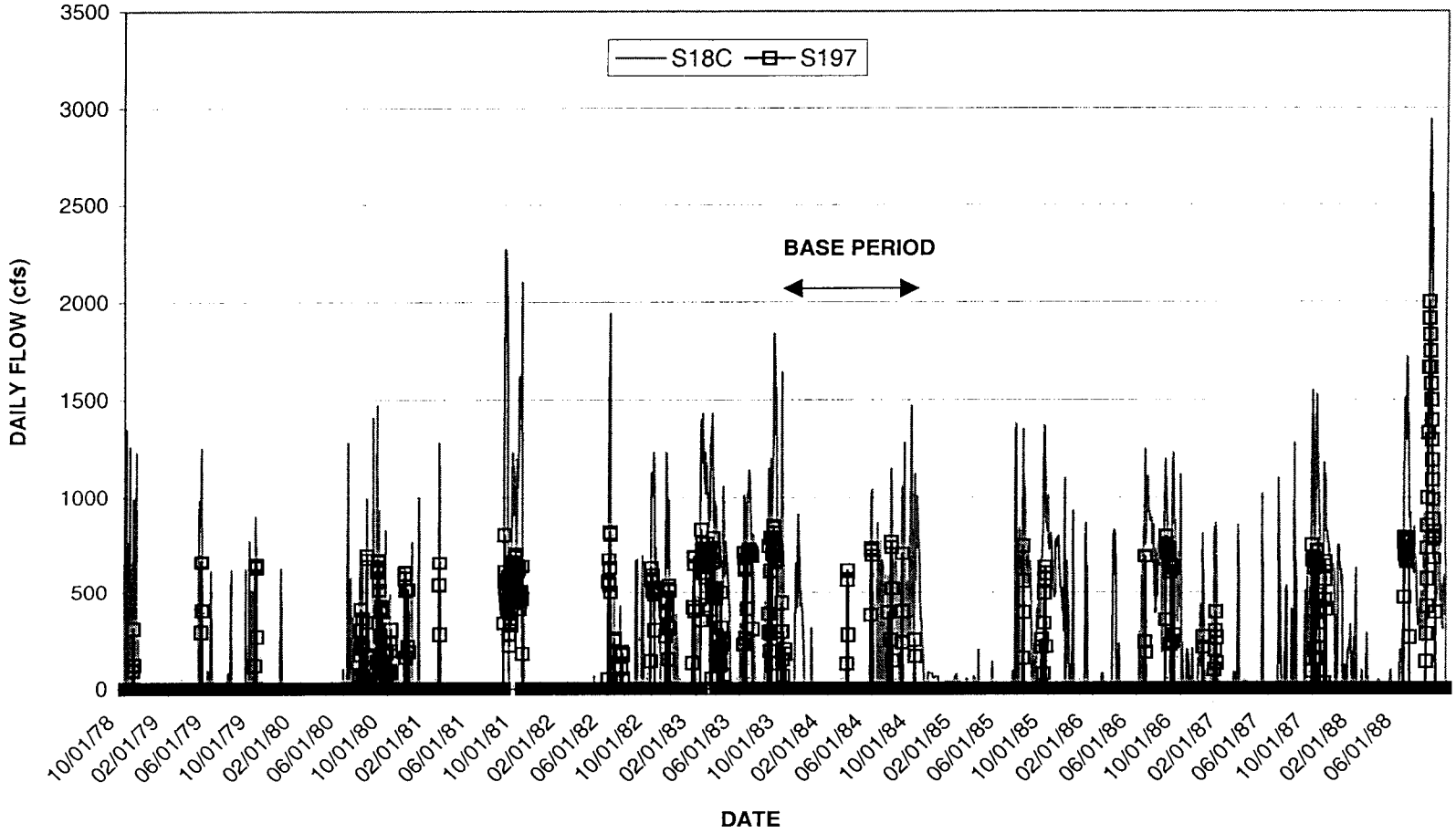
Flow
number of no flow days = 706
number of positive flow days = 25
total positive flow = 22585.83 cfs-d
number of reverse flow days = 0
number of missing flow data: 0

TP Loads for 10/1/1998 - 9/30/2000

Term	Flow in millon cubic meters	Load in kg	load/flow (ppb)
S18C	409.0	3363	8
S197	55.3	531	10

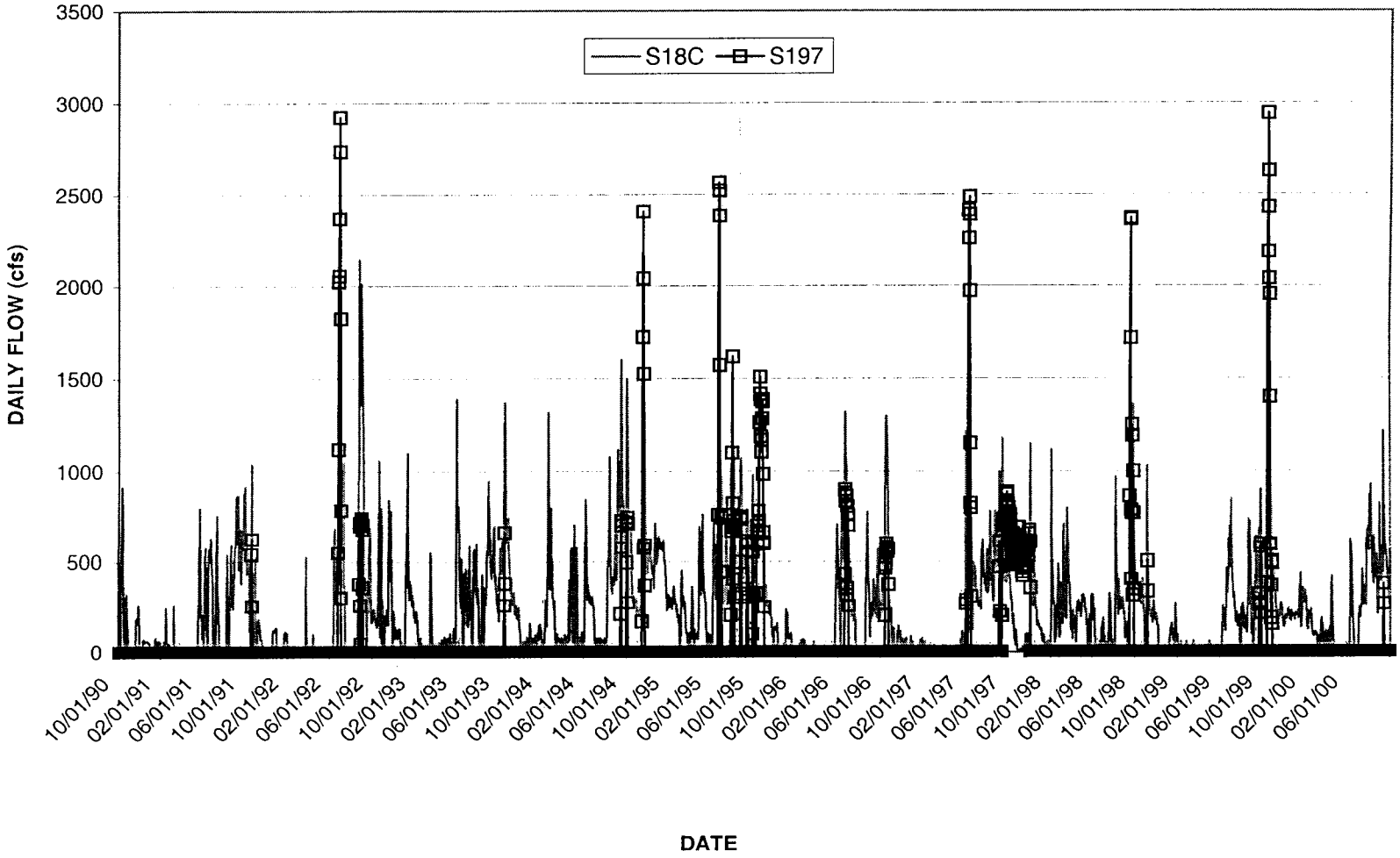
Comparison of S18C Flow and S197 Flow

10/1/1978-9/30/1988 total:
S18C 1653 thousand acre-feet
S197 413 thousand acre-feet

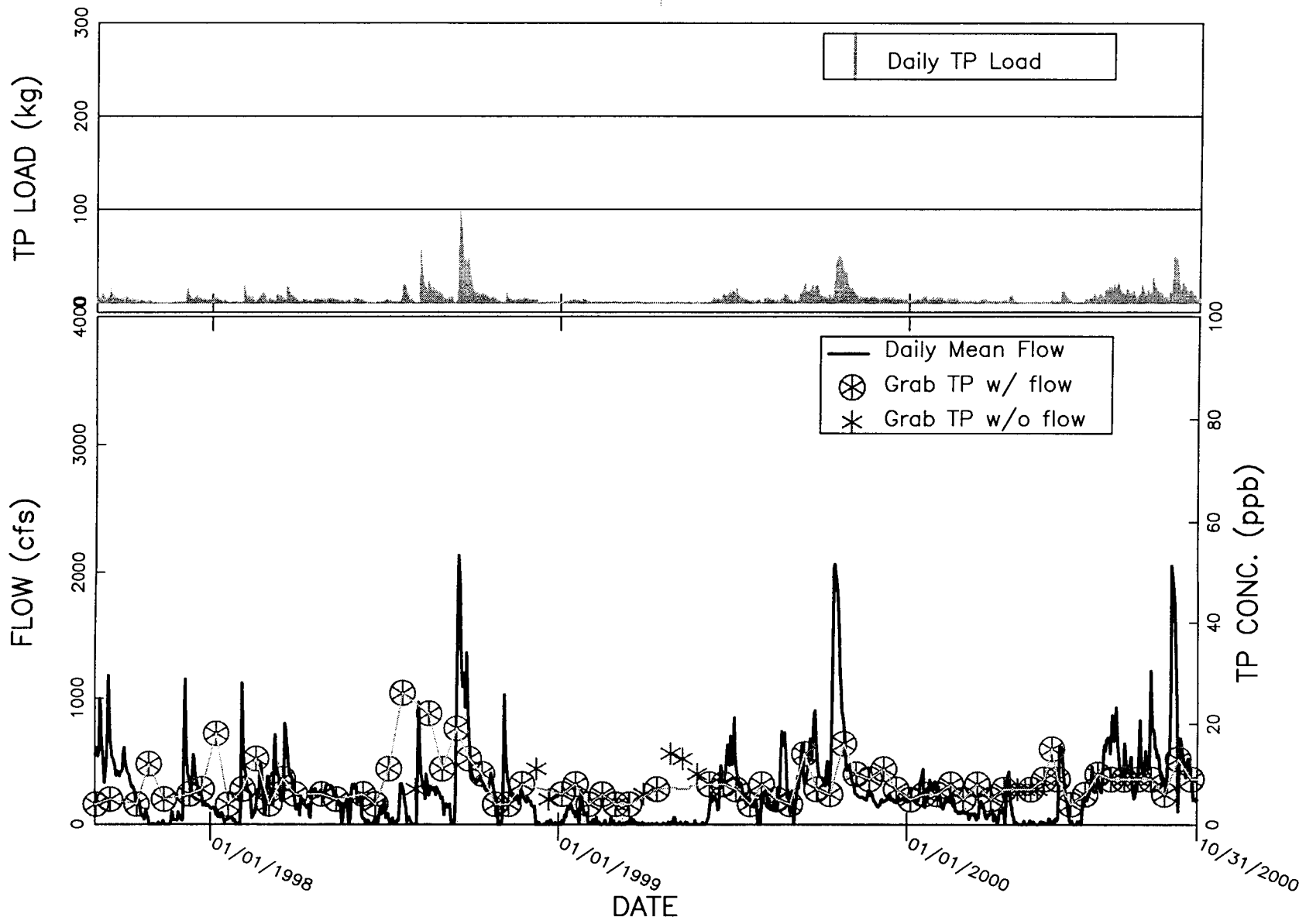


Comparison of S18C Flow and S197 Flow

10/1/1990-9/30/2000 total:
S18C 1843 thousand acre-feet
S197 410 thousand acre-feet



S18C TP Load, Flow and TP Concentration



S197 TP Load, Flow and TP Concentration