



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

3301 Gum Club Road, West Palm Beach, Florida 33406 • (561) 686-8800 • FL WATS 1-800-432-2045 • TDD (561) 697-2574
Mailing Address: P.O. Box 24680, West Palm Beach, FL 33416-4680 • www.sfwmd.gov

PRO ERG

November 7, 2000

Dr. Garth Redfield
Lead Environmental Scientist
Environmental Monitoring & Assessment Department
South Florida Water Management District
P. O. Box 24680
West Palm Beach, FL 33416-4680

Dear Dr. Redfield:

**SUBJECT: Second Quarter 2000 Report to Technical Oversight Committee and
Quality Assessment Report for Water Quality Monitoring,
April -June 2000**

Enclosed please find the figures and tables for the second quarter 2000 displaying:

- 1) the geometric mean of the total phosphorus (TP) concentration levels measured from April through June 2000 at the marsh stations within the Arthur R. Marshall Loxahatchee National Wildlife Refuge (ARM) compared to the interim and long-term TP concentration levels (**Figure 1**) and individual total phosphorus concentrations (mg/L) collected in the Refuge from July 1999 through June 2000 (**Table 1**);
- 2) the Shark River Slough 12-month moving flow-weighted mean TP concentration data for water years 1989 through 1999 compared to the interim and long-term discharge limits (**Figure 2a**) and, for the last 18 months, the 12-month moving average with the composite TP sample concentrations for each sampling event (**Figure 2b**); and
- 8) the Taylor Slough and Coastal basins 12-month moving flow-weighted mean TP concentration data for water years 1989 through 1999 compared to the long-term 11 ppb discharge limit (**Figure 3a**) and, for the last 18 months, the 12-month moving average with the composite TP sample concentrations for each sampling event (**Figure 3b**).

Copies of individual TP sample data and daily average flow data are enclosed for this reporting period for Shark River Slough and Taylor Slough/Coastal Basin structures. Also included is the Quality Assessment Report for Water Quality Monitoring, April to June 2000.

Arthur R. Marshall Loxahatchee National Wildlife Refuge

The geometric means calculated from TP concentrations measured in water samples collected in April, May and June 2000 were 10.4, 9.1 and 12.4 ppb, respectively (**Figure 1**). These geometric mean concentrations were less than the calculated interim and long-term levels for April, 12.9 and 10.6 ppb and May, 14.6 and 11.9 ppb. The interim and long-term levels for June did not apply because the equation for calculating the limits is not applicable when the average stage is less than 15.42 feet. The average stage in June was 15.31 feet. For April and May the average stages were 16.30 and 16.09 feet, respectively (**Figure 1**).

GOVERNING BOARD

Michael Collins, *Chairman*
Michael D. Minton, *Vice Chairman*
Mitchell W. Berger

Vera M. Carter
Gerardo B. Fernandez
Patrick J. Gleason

Nicolas J. Gutierrez, Jr.
Harkley R. Thornton
Trudi K. Williams

EXECUTIVE OFFICE

Frank R. Finch, P.E., *Executive Director*
James E. Blount, *Chief of Staff*

Shark River Slough

The 12 month flow-weighted mean TP concentration of waters entering Shark River Slough for Water Year 1999 was 9.5 ppb (**Figure 2a**). This concentration was less than the interim limit of 9.8 ppb, but greater than the long-term limit of 8.2 ppb. The 12-month moving flow-weighted mean TP concentrations for April, May and June 2000 were 9.1, 9.6 and 9.8 ppb, respectively (**Figure 2b**). The April value was less than the interim limit of 9.4, but the May and June values were greater than the 9.4 ppb limit. All three months were above the long-term limit of 7.6 ppb. The interim limit becomes effective on October 1, 2003 and the long-term limit becomes effective on December 31, 2006.

Taylor Slough and the Coastal Basins

The Settlement Agreement established a single limit of 11 ppb for total phosphorus at the two inflow structures to Taylor Slough (S332+S175) and S18C, the inflow structure to the Coastal Basins. After a startup test for pump station S332D (August 30 to September 27, 1999), compliance monitoring sites for Taylor Slough inflows were changed from S332+S175 to S332D+S174 beginning October 1, 1999. For comparative purposes, the 12-month flow-weighted mean TP concentrations entering Taylor Slough and the Coastal Basins for Water Year 1999 are presented for both sets of compliance monitoring sites (**Figure 3a**). A concentration of 6.7 ppb was calculated for S332+S175+S18C. The diamond point value of 7.5 ppb in **Figure 3a** represents the TP concentrations for S174 and S18C from October 1, 1998 through September 30, 1999, plus the S332D concentrations from August 30 through September 30, 1999.

Figure 3b presents the monthly 12-month moving flow-weighted mean TP concentrations beginning with the 1999 water year. The composite total phosphorus concentrations for each sampling event using both the old and new combinations of compliance monitoring sites are also included. The concentrations for April, May and June 2000 were 9.0 ppb for all three months at the new combination of structures and 7.9, 8.0 and 7.9 ppb for April, May and June, respectively, for the old combination of structures.

Frequency of Composite Samples Exceeding 10 ppb

The frequency of composite samples for each sampling event exceeding 10 ppb within a given 12-month period was included in the Settlement Agreement as an additional aid in tracking compliance. For Shark River Slough, a frequency or percentage limit for samples greater than 10 ppb is based on observed flow. Taylor Slough and the Coastal Basins have a fixed limit of 53.1%. The following table presents the actual frequency exceedance and the calculated frequency limits for Shark River Slough and Taylor Slough for both the old and new site combinations.

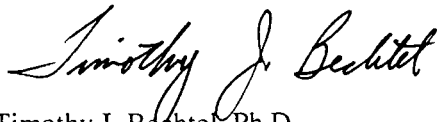
Year Ending	Shark River Frequency Exceedance		Taylor Slough Frequency Exceedance		
	Actual	Limit	Actual		Limit
			Old	New	
Jul 1999	41.7	46.7	25.0		53.1
Aug 1999	39.1	44.9	16.7		53.1
Sep 1999	39.1	42.9	12.1		53.1
Oct 1999	33.3	40.3	17.1	17.1	53.1
Nov 1999	33.3	40.1	15.4	15.4	53.1
Dec 1999	33.3	40.1	15.4	15.0	53.1
Jan 2000	47.8*	40.1	15.4	15.0	53.1
Feb 2000	50.0*	40.1	15.0	14.3	53.1
Mar 2000	60.9*	40.1	15.4	14.6	53.1
Apr 2000	59.1*	40.1	12.8	15.0	53.1
May 2000	64.0*	40.1	14.6	16.3	53.1
June 2000	66.7*	40.1	17.1	21.4	53.1

*exceeded frequency limit

TOC Report
November 7, 2000
Page 3

If you have questions regarding the reported results, please call me at 561-682-6392 or e-mail tbechtel@sfwmd.gov.

Sincerely,

A handwritten signature in black ink that reads "Timothy J. Bechtel". The signature is written in a cursive style with a large initial 'T'.

Timothy J. Bechtel, Ph.D.
Senior Supervising Environmental Scientist
Hydro Information Systems and Assessment Division
Environmental Monitoring and Assessment Department

Enclosure
TB/hm

c: T. Fontaine
M. Cheesman
L. Lindstrom
J. Merriam
R. Startzman

Monthly Total Phosphorus Concentration Levels for the Arthur R. Marshall Loxahatchee National Wildlife Refuge

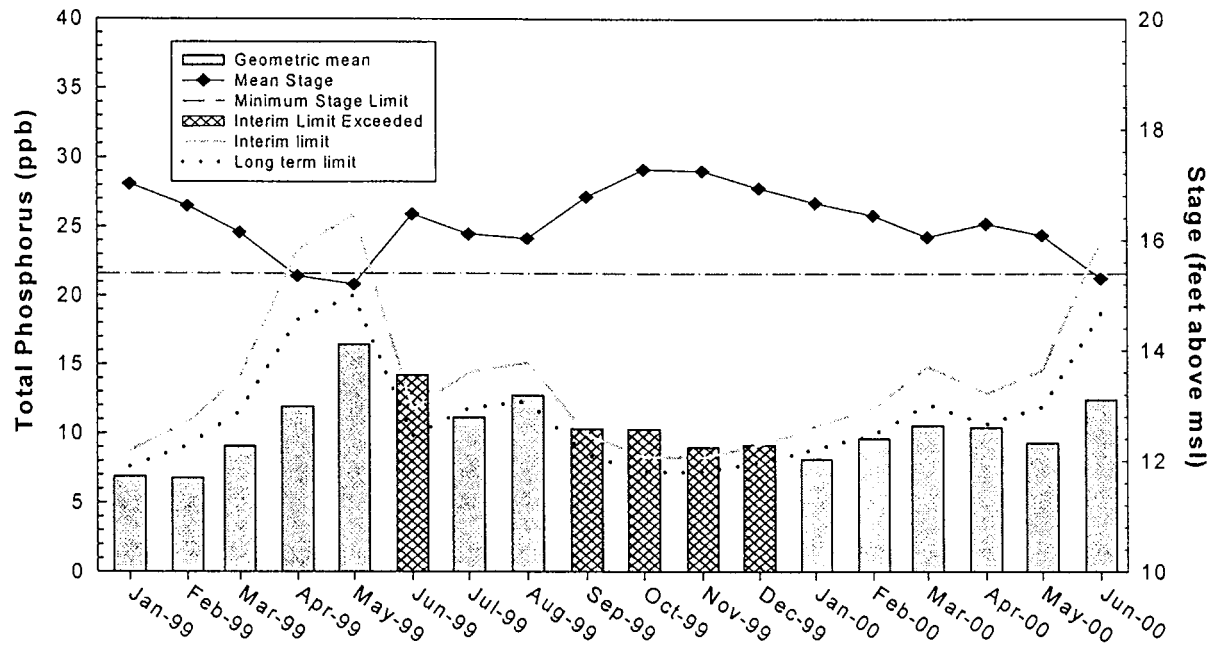


Figure 1. Monthly total phosphorus geometric mean concentration levels for ARM compared to the interim and long-term limits. The observed concentrations and limits are adjusted for fluctuations of water level.

Discharge Limits for Shark River Slough (S12A, B, C, D and S333)

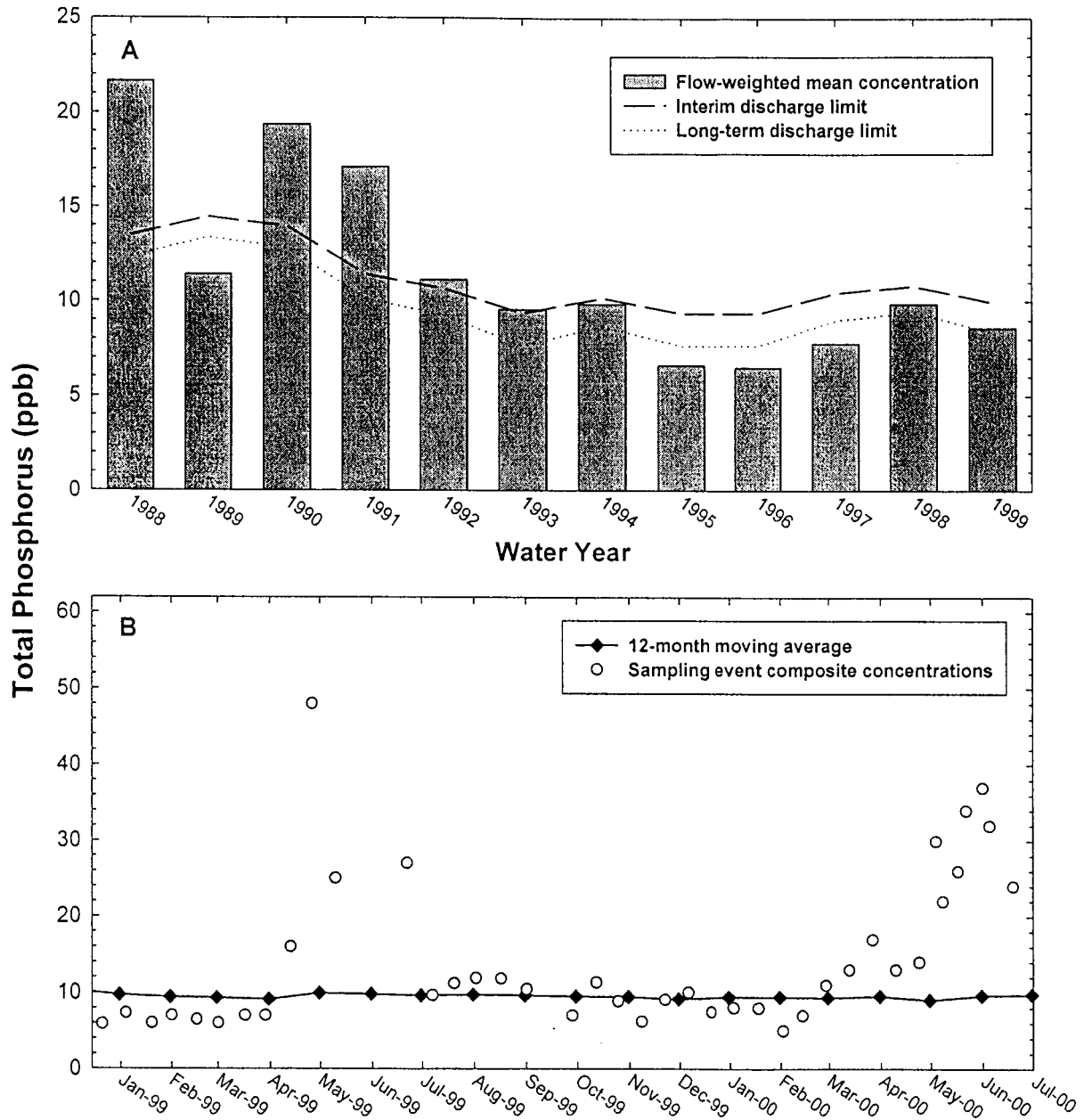


Figure 2. a. 12-month moving flow-weighted mean total phosphorus concentration at the end of each water year in inflows to Everglades National Park through Shark River Slough compared to the interim and long-term discharge limits.
 b. 12 month moving average concentration at the end of each month and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

Discharge Limits for Taylor Slough and the Coastal Basins

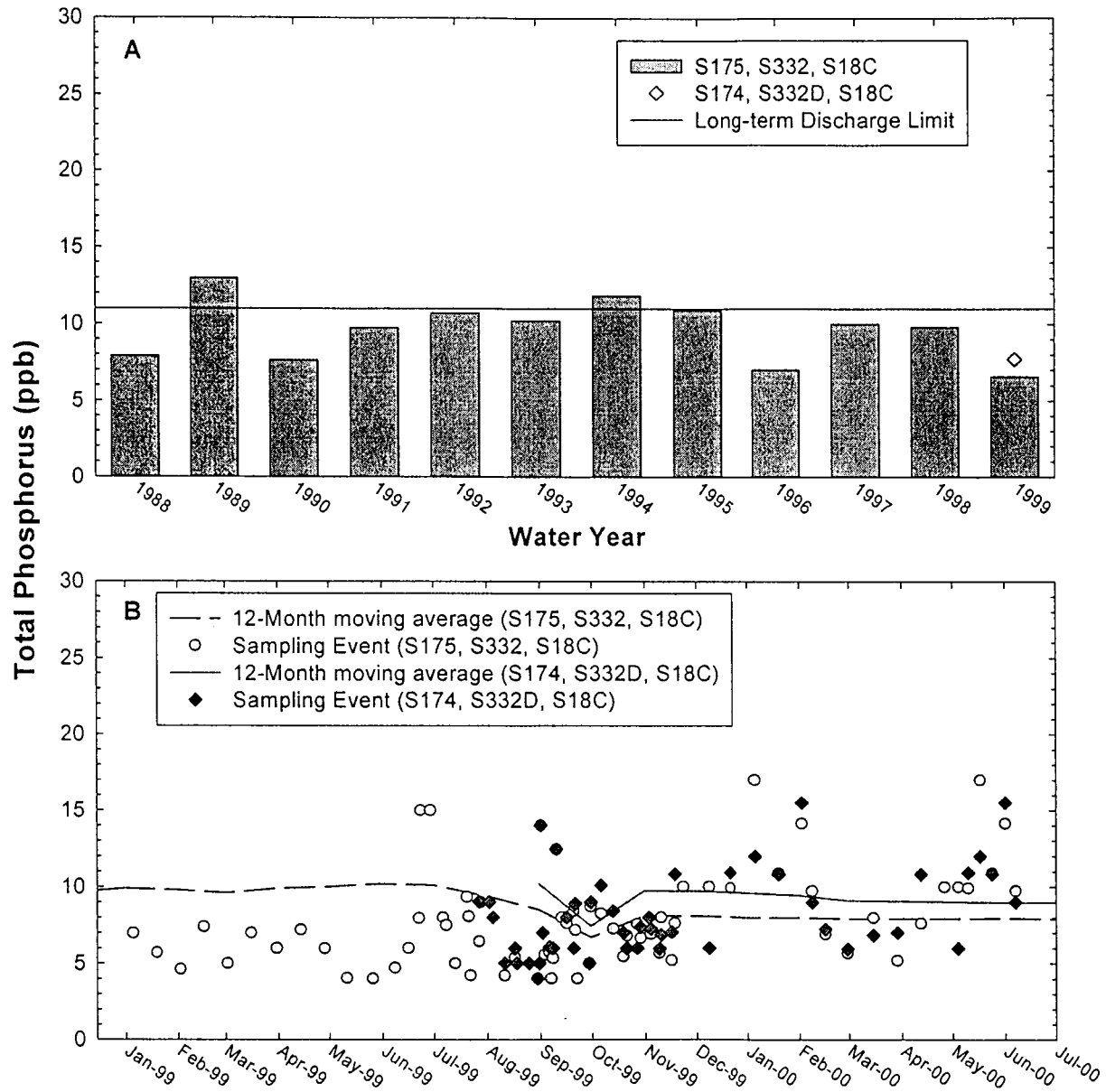


Figure 3. a. 12-month moving flow-weighted mean total phosphorus concentration at the end of each water year in inflows to Everglades National Park through Taylor Slough and the Coastal Basins compared to the long-term discharge limit.
 b. 12 month moving average concentration at the end of each month and the composite concentration for each sampling event.

Shark River Slough TP Concentration in mg/L

date	S12A	S12B	S12C	S12D	S333	S334
4/10/00	0.021	0.016	0.016	0.012	0.013	0.015
5/4/00	0.025	0.018	0.016	0.018	0.030	0.018
5/8/00	0.029	0.019	0.020	0.018	0.022	0.018
5/17/00	0.045	0.039	0.029	0.033	0.026	0.017
5/22/00	0.044	0.041	0.042	0.033	0.034	0.014
6/1/00	0.050	0.028	0.029	0.028	0.037	0.021
6/5/00			0.030	0.027	0.032	0.021
6/19/00	0.053	0.022	0.020		0.024	0.023
7/5/00	0.039	0.030	0.018	0.016	0.019	

Taylor Sough and Coastal Basins Daily Mean Flow Data in cfs

date	S175	S332	S18C	S332D	S174	S332D+S174	S175+S332
4/1/00	0.00	10.79	28.00	0.00	131.44	131.44	10.79
4/2/00	0.00	10.78	81.00	0.00	129.81	129.81	10.78
4/3/00	0.00	10.78	60.00	0.00	133.87	133.87	10.78
4/4/00	0.00	10.78	43.00	0.00	107.67	107.67	10.78
4/5/00	0.00	97.61	1.10	0.00	205.02	205.02	97.61
4/6/00	0.00	38.87	26.00	0.00	193.30	193.30	38.87
4/7/00	0.00	10.78	104.00	0.00	202.26	202.26	10.78
4/8/00	0.00	70.08	116.00	0.00	84.81	84.81	70.08
4/9/00	0.00	179.99	97.00	0.00	8.35	8.35	179.99
4/10/00	0.00	131.74	93.00	0.00	34.14	34.14	131.74
4/11/00	0.00	77.78	135.00	0.00	45.44	45.44	77.78
4/12/00	0.00	35.94	81.00	0.00	49.99	49.99	35.94
4/13/00	0.00	24.46	7.60	0.00	65.26	65.26	24.46
4/14/00	0.00	40.45	171.00	0.00	0.00	0.00	40.45
4/15/00	0.00	60.08	353.00	0.00	0.00	0.00	60.08
4/16/00	0.00	47.35	393.00	0.00	0.00	0.00	47.35
4/17/00	0.00	35.76	419.00	0.00	0.00	0.00	35.76
4/18/00	0.00	15.57	250.00	0.00	0.00	0.00	15.57
4/19/00	0.00	5.20	169.00	0.00	0.00	0.00	5.20
4/20/00	0.00	4.92	141.00	0.00	0.00	0.00	4.92
4/21/00	0.00	5.18	69.00	0.00	0.00	0.00	5.18
4/22/00	0.00	5.18	57.00	0.00	0.00	0.00	5.18
4/23/00	0.00	5.18	0.00	0.00	0.00	0.00	5.18
4/24/00	0.00	5.17	18.00	0.00	0.00	0.00	5.17
4/25/00	0.00	5.16	18.00	0.00	26.68	26.68	5.16
4/26/00	0.00	5.16	0.00	0.00	53.57	53.57	5.16
4/27/00	0.00	5.16	0.00	0.00	76.11	76.11	5.16
4/28/00	0.00	5.16	3.40	0.00	98.74	98.74	5.16
4/29/00	0.00	5.16	0.00	0.00	115.54	115.54	5.16
4/30/00	0.00	5.16	0.00	0.00	117.98	117.98	5.16
5/1/00	0.00	5.16	0.00	0.00	128.76	128.76	5.16
5/2/00	0.00	5.16	0.00	0.00	147.77	147.77	5.16
5/3/00	0.00	5.16	28.00	0.00	142.66	142.66	5.16
5/4/00	0.00	5.16	0.00	0.00	146.32	146.32	5.16
5/5/00	0.00	134.79	0.00	0.00	133.41	133.41	134.79
5/6/00	0.00	5.16	0.00	0.00	157.93	157.93	5.16
5/7/00	0.00	5.16	0.00	0.00	164.06	164.06	5.16
5/8/00	0.00	5.16	10.00	0.00	166.70	166.70	5.16
5/9/00	0.00	5.15	31.00	0.00	167.29	167.29	5.15
5/10/00	0.00	5.15	3.70	0.00	173.88	173.88	5.15
5/11/00	0.00	5.15	0.00	47.05	170.98	218.03	5.15
5/12/00	0.00	5.15	22.00	62.58	169.70	232.28	5.15
5/13/00	0.00	5.15	19.00	0.00	169.12	169.12	5.15
5/14/00	0.00	5.15	5.10	0.00	148.25	148.25	5.15
5/15/00	0.00	4.23	0.00	0.00	69.16	69.16	4.23
5/16/00	0.00	5.15	0.00	5.80	39.13	44.93	5.15
5/17/00	0.00	80.58	0.00	0.00	51.40	51.40	80.58
5/18/00	0.00	5.15	0.00	0.00	53.30	53.30	5.15
5/19/00	0.00	5.14	0.00	0.00	62.90	62.90	5.14
5/20/00	0.00	5.14	21.00	0.00	100.15	100.15	5.14
5/21/00	0.00	5.14	23.00	0.00	123.24	123.24	5.14

5/22/00	0.00	5.14	0.00	0.00	98.96	98.96	5.14
5/23/00	0.00	5.14	20.00	0.00	103.72	103.72	5.14
5/24/00	0.00	5.05	11.00	0.00	113.41	113.41	5.05
5/25/00	0.00	5.09	13.00	0.00	83.67	83.67	5.09
5/26/00	0.00	5.10	7.30	0.00	5.91	5.91	5.10
5/27/00	0.00	5.16	5.60	0.00	0.00	0.00	5.16
5/28/00	0.00	5.15	0.00	0.00	0.00	0.00	5.15
5/29/00	0.00	5.14	46.00	0.00	1.77	1.77	5.14
5/30/00	0.00	159.15	43.00	0.00	45.74	45.74	159.15
5/31/00	0.00	3.60	0.00	0.00	38.58	38.58	3.60
6/1/00	0.00	5.14	19.00	0.00	20.26	20.26	5.14
6/2/00	0.00	5.16	0.00	0.00	8.75	8.75	5.16
6/3/00	0.00	5.17	32.00	0.00	0.00	0.00	5.17
6/4/00	0.00	5.17	14.00	0.00	0.00	0.00	5.17
6/5/00	0.00	4.39	47.00	0.00	0.00	0.00	4.39
6/6/00	0.00	5.18	26.00	0.00	0.00	0.00	5.18
6/7/00	0.00	5.19	44.00	0.00	0.00	0.00	5.19
6/8/00	0.00	5.21	259.00	0.00	0.00	0.00	5.21
6/9/00	0.00	4.81	628.00	60.37	0.13	60.50	4.81
6/10/00	0.00	5.30	606.00	124.28	0.00	124.28	5.30
6/11/00	0.00	5.31	615.00	123.67	0.00	123.67	5.31
6/12/00	0.00	5.30	578.00	70.27	0.00	70.27	5.30
6/13/00	0.00	5.26	414.00	0.00	0.00	0.00	5.26
6/14/00	0.00	5.24	340.00	0.00	0.00	0.00	5.24
6/15/00	0.00	5.23	241.00	0.00	0.00	0.00	5.23
6/16/00	0.00	5.21	210.00	5.14	0.00	5.14	5.21
6/17/00	0.00	5.19	173.00	0.00	0.00	0.00	5.19
6/18/00	0.00	5.19	110.00	0.00	0.00	0.00	5.19
6/19/00	0.00	4.52	54.00	0.00	0.00	0.00	4.52
6/20/00	0.00	5.18	15.00	0.00	0.00	0.00	5.18
6/21/00	0.00	5.09	19.00	0.00	0.00	0.00	5.09
6/22/00	0.00	4.90	30.00	0.00	0.00	0.00	4.90
6/23/00	0.00	5.18	0.00	0.00	0.00	0.00	5.18
6/24/00	0.00	5.19	0.00	0.00	0.00	0.00	5.19
6/25/00	0.00	4.91	0.00	0.00	0.00	0.00	4.91
6/26/00	0.00	5.02	2.40	0.00	0.00	0.00	5.02
6/27/00	0.00	5.19	0.00	0.00	0.00	0.00	5.19
6/28/00	2.72	5.19	25.00	0.00	0.00	0.00	7.91
6/29/00	0.00	5.19	7.40	0.00	0.00	0.00	5.19
6/30/00	0.00	5.18	26.00	0.00	0.00	0.00	5.18

Taylor Sough and Coastal Basins TP Concentration in mg/L

date	S175	S332	S18C	S332D	S176/S174
4/4/00				0.016	
4/12/00	0.008	0.009	0.007	0.029	0.017
4/18/00				0.012	
4/26/00	0.009	0.010	0.007	0.009	
5/4/00	0.016	0.010	0.007		0.006
5/10/00	0.009	0.012	0.007	0.011	0.011
5/17/00	0.018	0.017	0.007	0.012	0.012
5/24/00		0.015	0.009	0.012	0.011
6/1/00	0.011	0.011	0.015	0.015	0.016
6/7/00	0.009	0.016	0.009	0.014	0.016
6/14/00				0.010	
6/28/00				0.008	

Shark River Slough Daily Mean Flow Data in cfs

date	S12A	S12B	S12C	S12D	S333	S334
4/1/00	0.00	0.00	0.00	0.00	221.00	0.00
4/2/00	0.00	0.00	0.00	0.00	220.00	0.00
4/3/00	0.00	0.00	0.00	0.00	219.00	0.00
4/4/00	0.00	0.00	0.00	0.00	229.00	264.63
4/5/00	0.00	0.00	0.00	0.00	399.00	576.51
4/6/00	0.00	0.00	0.00	0.00	467.00	422.48
4/7/00	0.00	0.00	0.00	0.00	449.00	305.45
4/8/00	0.00	0.00	0.00	0.00	435.00	257.92
4/9/00	0.00	0.00	0.00	0.00	434.00	245.90
4/10/00	0.00	0.00	0.00	0.00	299.00	89.38
4/11/00	0.00	0.00	0.00	0.00	210.00	0.00
4/12/00	0.00	0.00	0.00	0.00	209.00	0.00
4/13/00	0.00	0.00	0.00	0.00	212.00	0.00
4/14/00	0.00	0.00	0.00	0.00	222.00	0.00
4/15/00	0.00	0.00	0.00	0.00	225.00	0.00
4/16/00	0.00	0.00	0.00	0.00	227.00	0.00
4/17/00	0.00	0.00	0.00	0.00	453.00	0.00
4/18/00	0.00	0.00	0.00	0.00	658.00	0.00
4/19/00	0.00	0.00	0.00	0.00	752.00	0.00
4/20/00	0.00	0.00	0.00	0.00	816.00	0.00
4/21/00	0.00	0.00	0.00	0.00	809.00	0.00
4/22/00	0.00	0.00	0.00	0.00	797.00	0.00
4/23/00	0.00	0.00	0.00	0.00	783.00	0.00
4/24/00	0.00	0.00	0.00	0.00	763.00	0.00
4/25/00	0.00	0.00	0.00	0.00	753.00	0.00
4/26/00	0.00	0.00	0.00	0.00	816.00	0.00
4/27/00	0.00	0.00	0.00	0.00	935.39	0.00
4/28/00	0.00	0.00	0.00	0.00	938.64	0.00
4/29/00	0.00	0.00	0.00	0.00	883.11	0.00
4/30/00	0.00	0.00	0.00	0.00	832.21	0.00
5/1/00	0.00	0.00	0.00	0.00	893.02	0.00
5/2/00	0.00	0.00	0.00	0.00	855.14	0.00
5/3/00	0.00	0.00	0.00	0.00	788.44	0.00
5/4/00	0.00	0.00	0.00	0.00	660.75	0.00
5/5/00	0.00	0.00	0.00	0.00	560.61	0.00
5/6/00	0.00	0.00	0.00	0.00	410.51	0.00
5/7/00	0.00	0.00	0.00	0.00	389.00	0.00
5/8/00	0.00	0.00	0.00	0.00	380.00	0.00
5/9/00	0.00	0.00	0.00	0.00	369.00	0.00
5/10/00	0.00	0.00	0.00	0.00	354.00	0.00
5/11/00	0.00	0.00	0.00	0.00	250.00	0.00
5/12/00	0.00	0.00	0.00	0.00	224.00	0.00
5/13/00	0.00	0.00	0.00	0.00	224.00	0.00
5/14/00	0.00	0.00	0.00	0.00	230.00	0.00
5/15/00	0.00	0.00	0.00	0.00	230.00	0.00
5/16/00	0.00	0.00	0.00	0.00	232.00	0.00
5/17/00	0.00	0.00	0.00	0.00	231.00	0.00
5/18/00	0.00	0.00	0.00	0.00	231.00	0.00
5/19/00	0.00	0.00	0.00	0.00	241.00	0.00
5/20/00	0.00	0.00	0.00	0.00	251.00	0.00

5/21/00	0.00	0.00	0.00	0.00	255.00	0.00
5/22/00	0.00	0.00	0.00	0.00	261.00	35.53
5/23/00	0.00	0.00	0.00	0.00	272.00	96.08
5/24/00	0.00	0.00	0.00	0.00	270.00	126.96
5/25/00	0.00	0.00	0.00	0.00	262.00	125.33
5/26/00	0.00	0.00	0.00	0.00	262.00	120.04
5/27/00	0.00	0.00	0.00	0.00	264.00	113.01
5/28/00	0.00	0.00	0.00	0.00	263.00	111.53
5/29/00	0.00	0.00	0.00	0.00	262.00	111.69
5/30/00	0.00	0.00	0.00	0.00	263.00	110.63
5/31/00	0.00	0.00	0.00	0.00	267.00	107.85
6/1/00	0.00	0.00	0.00	0.00	148.00	39.75
6/2/00	0.00	0.00	0.00	0.00	79.00	0.00
6/3/00	0.00	0.00	0.00	0.00	74.00	0.00
6/4/00	0.00	0.00	0.00	0.00	71.00	0.00
6/5/00	0.00	0.00	0.00	0.00	70.00	0.00
6/6/00	0.00	0.00	0.00	0.00	63.00	0.00
6/7/00	0.00	0.00	0.00	0.00	52.00	0.00
6/8/00	0.00	0.00	0.00	0.00	56.00	0.00
6/9/00	0.00	0.00	0.00	0.00	59.00	0.00
6/10/00	0.00	0.00	0.00	0.00	59.00	0.00
6/11/00	0.00	0.00	0.00	0.00	60.00	0.00
6/12/00	0.00	0.00	0.00	0.00	110.00	0.00
6/13/00	0.00	0.00	0.00	0.00	152.00	0.00
6/14/00	0.00	0.00	0.00	0.00	151.00	0.00
6/15/00	0.00	0.00	0.00	0.00	284.00	0.00
6/16/00	0.00	0.00	0.00	0.00	425.00	0.00
6/17/00	0.00	0.00	0.00	0.00	403.00	0.00
6/18/00	0.00	0.00	0.00	0.00	390.00	0.00
6/19/00	0.00	0.00	0.00	0.00	392.00	0.00
6/20/00	0.00	0.00	0.00	0.00	379.00	0.00
6/21/00	0.00	0.00	0.00	0.00	372.00	0.00
6/22/00	0.00	0.00	0.00	0.00	298.00	0.00
6/23/00	0.00	0.00	0.00	0.00	214.00	0.00
6/24/00	0.00	0.00	0.00	0.00	213.00	0.00
6/25/00	0.00	0.00	0.00	0.00	222.00	0.00
6/26/00	0.00	0.00	0.00	0.00	228.00	0.00
6/27/00	0.00	0.00	0.00	0.00	230.00	0.00
6/28/00	0.00	0.00	0.00	0.00	228.00	0.00
6/29/00	0.00	0.00	0.00	0.00	226.00	0.00
6/30/00	0.00	0.00	0.00	0.00	229.00	0.00

