



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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PRO ERG

July 25, 2000

Mr. Robert Barron
Regulatory Branch
U.S. Army Corps of Engineers
P. O. Box 4970
Jacksonville, FL 32232-0019

Dear Mr. Barron:

SUBJECT: First Quarter 2000 Report to Technical Oversight Committee and Quality Assessment Report for Water Quality Monitoring, January -March 2000

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

- 1) the geometric mean of the total phosphorus (TP) concentration levels measured from January through March 2000 at the marsh stations within the Arthur R. Marshall Loxahatchee National Wildlife Refuge compared to the interim and long-term TP concentration levels (**Figure 1**) and individual total phosphorus concentrations (mg/L) collected in the Refuge from April 1999 through March 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
- 3) 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 for January through March 2000.

Loxahatchee National Wildlife Refuge

The geometric means calculated from TP concentrations measured in water samples collected in January, February and March 2000 were 8.1, 9.6 and 10.6 ppb, respectively (**Figure 1**). These geometric mean concentrations were less than the calculated interim and long-term levels for each respective sampling event (**Figure 1**). The interim levels for January, February and March were 10.5, 11.8 and 14.8 ppb, respectively, while the long-term levels for these same months were 8.9, 9.9 and 12.1 ppb, respectively. Average stages in the Refuge for this quarter's sampling events were 16.67 feet in January, 16.45 feet in February and 16.06 feet in March.

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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 January, February and March 2000 were 9.4, 9.3 and 9.5 ppb, respectively (**Figure 2b**). The January and February values were the same as or below the interim discharge limits of 9.4 and 9.3, respectively, but the March value of 9.5 was greater than the 9.4 ppb interim 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 and the composite total phosphorus concentrations for each sampling event using both the old and new combinations of compliance monitoring sites. The results for January, February and March 2000 were 8.0, 7.9 and 7.9 ppb, respectively, for the old S332+S175 +S18C combination. The concentrations for the new combination of S332D+S174+S18C for these same months were 9.5, 9.1 and 9.1, respectively.

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	
Apr 1999	51.9*	47.7	25.0		53.1
May 1999	48.0	49.9	28.6		53.1
Jun 1999	40.9	49.7	28.6		53.1
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

*exceeded frequency limit

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July 25, 2000
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If you have questions regarding the reported results, please call me at 561-682-6392.

Sincerely,



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Monthly Total Phosphorus Concentration Levels for Loxahatchee National Wildlife Refuge

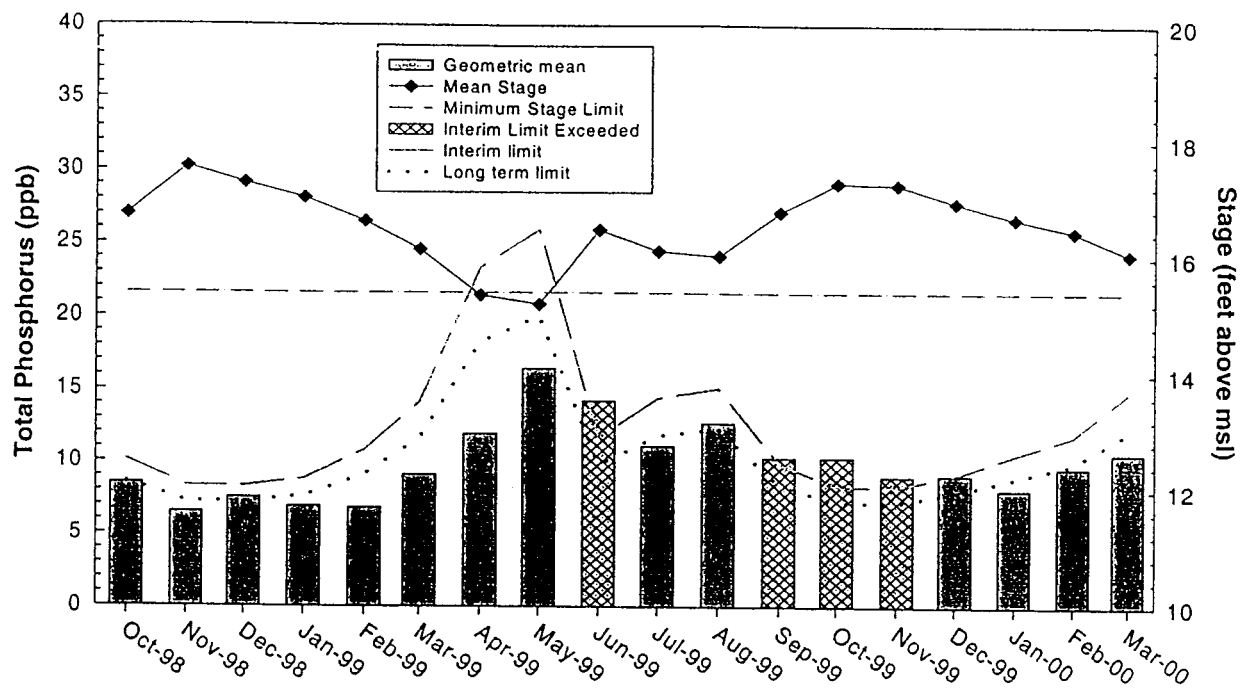


Figure 1. Monthly total phosphorus geometric mean concentration levels for the Loxahatchee National Wildlife Refuge compared to the interim and long-term targets. The observed concentrations and targets are adjusted for fluctuations of water level.

	LOX3	LOX4	LOX5	LOX6	LOX7	LOX8	LOX9	LOX10	LOX11	LOX12	LOX13	LOX14	LOX15	LOX16
4/12/99						0.014								
4/13/99										0.011			0.011	
5/10/99										0.018			0.015	
6/21/99		0.046	0.011	0.016	0.009	0.017	0.015	0.016	0.011	0.013	0.015	0.014	0.009	0.012
6/22/99			0.012	0.01	0.016	0.012	0.012		0.012	0.009		0.011	0.01	0.009
7/19/99														
7/20/99					0.011	0.013	0.016							
8/16/99									0.015	0.011		0.012	0.01	0.015
8/17/99														
9/27/99	0.01	0.012	0.009	0.01	0.013	0.011	0.008	0.007	0.014	0.009	0.01	0.017	0.009	0.009
9/28/99	0.01	0.014	0.009	0.011	0.011	0.009	0.009	0.007	0.015	0.014	0.011	0.009	0.009	0.009
10/12/99														
10/13/99	0.013	0.008	0.011	0.006	0.007	0.009	0.012	0.006	0.014	0.014	0.011	0.009	0.009	0.009
11/15/99														
11/16/99									0.014	0.007	0.013	0.007	0.009	0.009
12/6/99	0.011	0.011	0.012	0.009	0.009	0.013	0.011	0.008	0.01	0.007	0.009	0.006	0.008	0.007
12/7/99														
1/3/00	0.01	0.008	0.012	0.008	0.008	0.008	0.008	0.008	0.009	0.006	0.011	0.006	0.007	0.007
1/4/00														
2/14/00		0.01	0.023	0.007	0.009	0.012	0.011	0.011	0.013	0.006	0.011	0.007	0.006	0.008
2/15/00														
3/13/00		0.01		0.011	0.011	0.016	0.013	0.009	0.011	0.008	0.011	0.01	0.008	0.011
3/14/00														

Table 1. Individual Total Phosphorus Concentrations (mg/L) Collected in LNWR from April 1999 through March 2000.

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Discharge Limits for Shark River Slough (S12A, S12B, S12C, S12D, and S333)

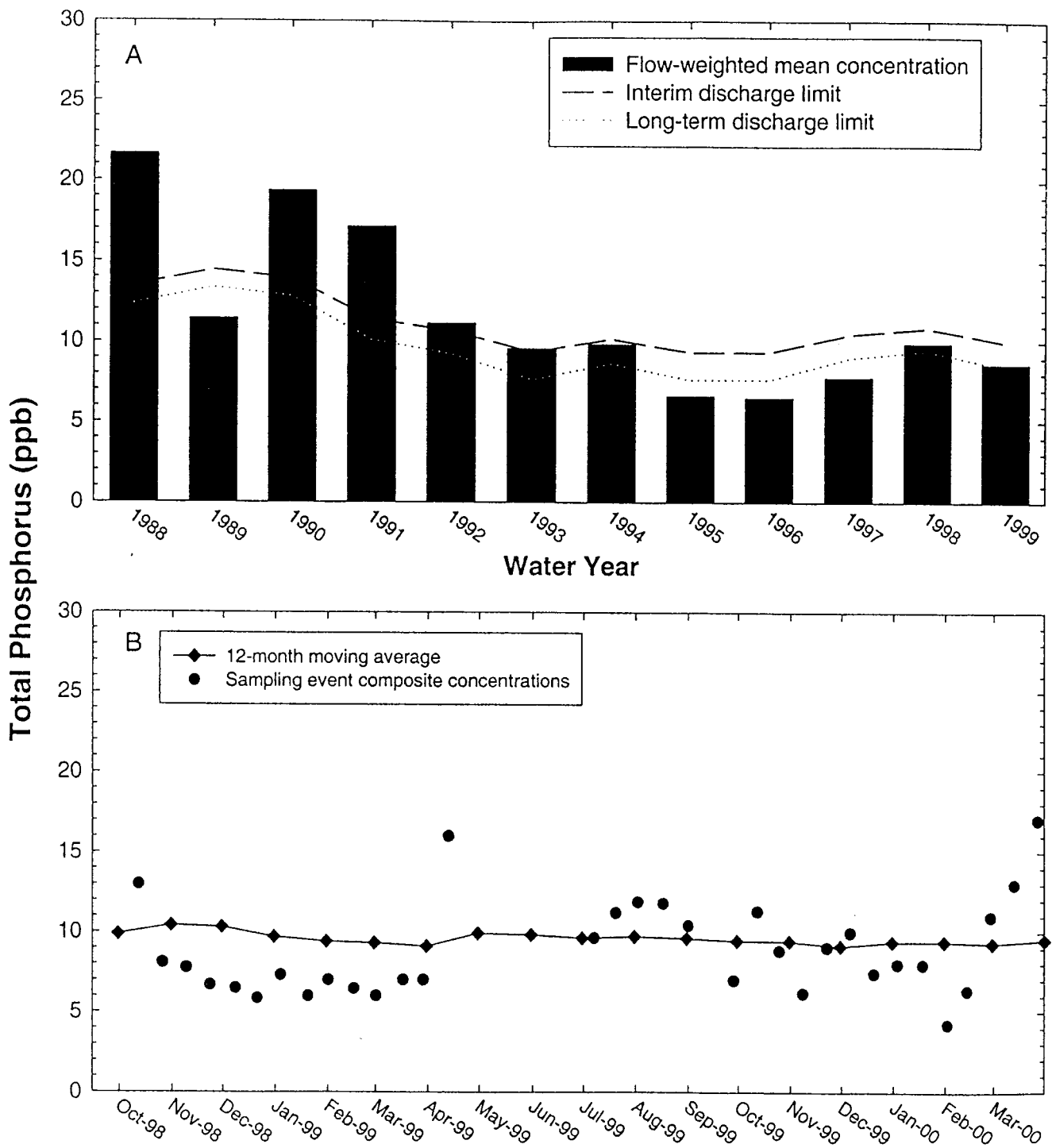


Figure 2. 12-month moving flow-weighted mean total phosphorus concentrations in the inflows to Everglades National Park (ENP) through Shark River Slough compared to the interim and long-term targets. a. Concentrations at the end of each water year. b. 12-month moving average concentration at the end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

Discharge Limits for Taylor Slough (S332 and S175) and the Coastal Basins (S18C)

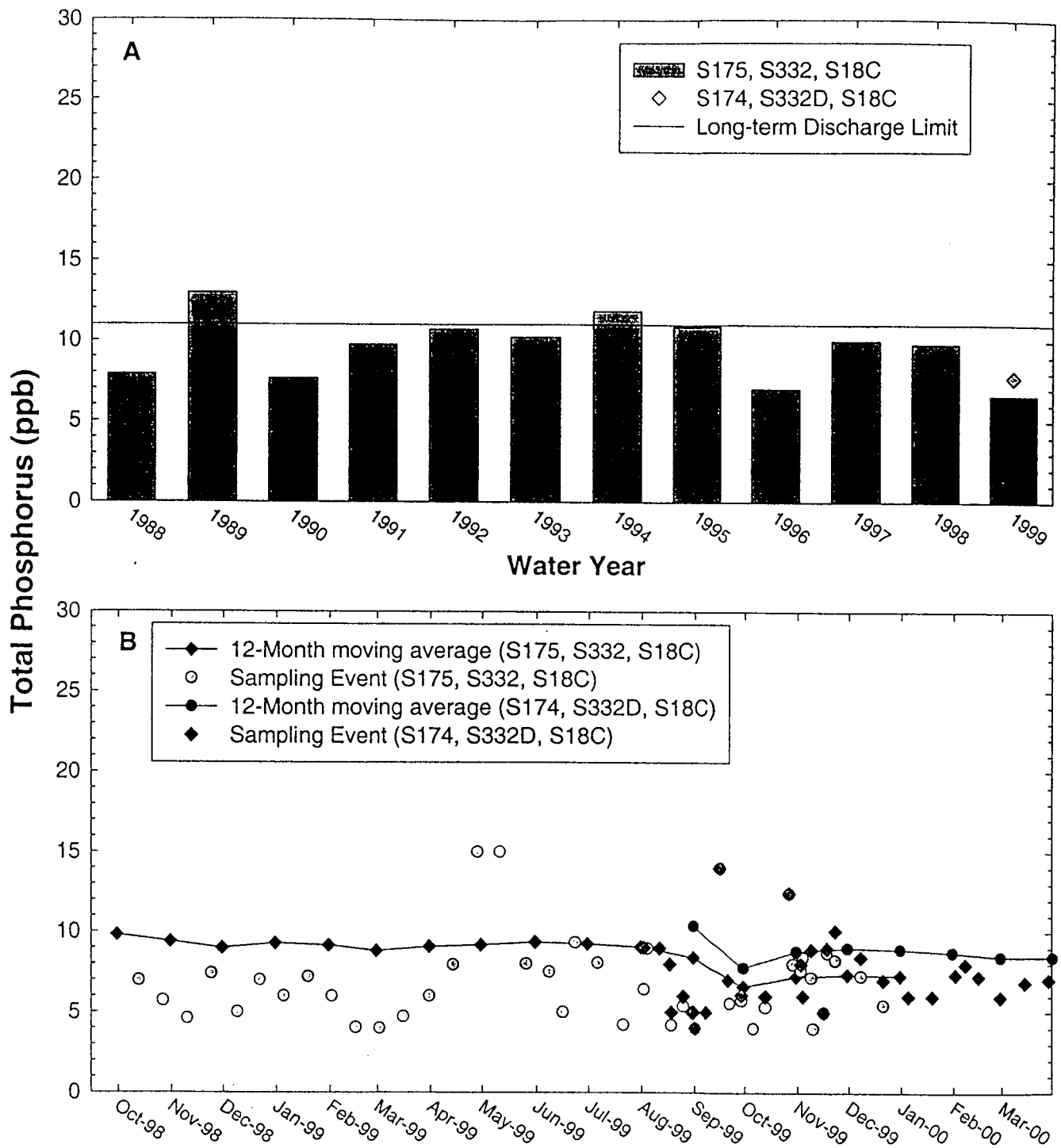


Figure 3. 12-month moving flow-weighted mean total phosphorus concentrations in the inflows to Everglades National Park (ENP) through Taylor Slough and the Coastal Basins compared to the long-term target. a. Concentrations at the end of each water year. b. 12-month moving average concentration at the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

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Shark River Slough TP Concentration Data in mg/L

date	S12A	S12B	S12C	S12D	S333	S334
1/3/00	0.01	0.01	0.01	0.01	0.01	
1/18/00	0.01	0.01	0.01	0.01	0.01	0.01
2/2/00	0.01	0.01	0.00	0.01	0.01	0.01
2/14/00	0.01	0.01	0.01	0.01	0.01	0.01
2/28/00	0.02	0.01	0.01	0.01	0.01	
3/13/00	0.02	0.01	0.01	0.01	0.01	
3/27/00	0.02	0.02	0.02	0.02	0.02	0.02

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Shark River Slough Flow Data in cfs

date	S12A	S12B	S12C	S12D	S333	S334
1/1/00	0	0	921	904	0	0
1/2/00	0	0	921	907	0	0
1/3/00	0	0	914	906	0	0
1/4/00	0	0	906	905	0	0
1/5/00	0	0	909	900	69	75.49
1/6/00	0	0	892	878	139	172.38
1/7/00	0	0	884	870	139	173.88
1/8/00	0	0	875	862	139	174.35
1/9/00	0	0	867	847	139	175.11
1/10/00	0	0	854	832	138	176.04
1/11/00	0	0	851	822	138	176.18
1/12/00	0	0	843	810	138	175.9
1/13/00	0	0	833	798	138	176.31
1/14/00	0	0	832	792	303	315.01
1/15/00	0	0	801	753	632	641.65
1/16/00	0	0	767	722	735	752.3
1/17/00	0	0	755	711	664	736.91
1/18/00	0	0	735	695	661	706.16
1/19/00	0	0	719	674	654	671.56
1/20/00	0	0	680	626	1110	690.31
1/21/00	0	0	645	588	1330	736.64
1/22/00	0	0	620	562	1320	742.91
1/23/00	0	0	597	538	1300	767.54
1/24/00	0	0	615	549	1030	501.11
1/25/00	0	0	647	572	669	19.24
1/26/00	0	0	645	560	736	135.22
1/27/00	0	0	630	538	862	312.03
1/28/00	0	0	608	513	989	450.01
1/29/00	0	0	589	491	1030	452.26
1/30/00	0	0	573	473	1020	452.75
1/31/00	0	0	561	457	1080	492.1
2/1/00	0	0	550	441	1120	578.25
2/2/00	0	0	539	430	1110	570.14
2/3/00	0	0	527	421	1100	551.51
2/4/00	0	0	520	415	1080	511.21
2/5/00	0	0	511	401	1070	510.63
2/6/00	0	0	497	391	1070	511.7
2/7/00	0	0	483	378	1070	594.13
2/8/00	0	0	483	374	1070	697.34
2/9/00	0	0	501	382	1080	698.3
2/10/00	0	0	482	365	1130	728.8
2/11/00	0	0	462	348	1170	814.14
2/12/00	0	0	448	336	1160	811.83
2/13/00	0	0	435	325	1150	743.75
2/14/00	0	0	414	304	1210	744.92
2/15/00	0	0	206	150	1290	830.53
2/16/00	0	0	0	0	1300	831.93
2/17/00	0	0	0	0	903	457.01
2/18/00	0	0	0	0	600	0
2/19/00	0	0	0	0	694	0
2/20/00	0	0	0	0	697	0
2/21/00	0	0	0	0	694	0

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2/22/00	0	0	0	0	1160	0
2/23/00	0	0	0	0	2110	0
2/24/00	0	0	0	0	2450	0
2/25/00	0	0	0	0	1610	0
2/26/00	0	0	0	0	990	0
2/27/00	0	0	0	0	989	0
2/28/00	0	0	0	0	987	0
2/29/00	0	0	0	0	1640	0
3/1/00	0	0	0	0	2010	0
3/2/00	0	0	0	0	1380	0
3/3/00	0	0	0	0	398	0
3/4/00	0	0	0	0	408	0
3/5/00	0	0	0	0	414	0
3/6/00	0	0	0	0	418	0
3/7/00	0	0	0	0	419	0
3/8/00	0	0	0	0	360	0
3/9/00	0	0	0	0	323	0
3/10/00	0	0	0	0	328	0
3/11/00	0	0	0	0	330	0
3/12/00	0	0	0	0	334	0
3/13/00	0	0	0	0	333	0
3/14/00	0	0	0	0	334	0
3/15/00	0	0	0	0	282	0
3/16/00	0	0	0	0	248	0
3/17/00	0	0	0	0	251	0
3/18/00	0	0	0	0	251	0
3/19/00	0	0	0	0	250	0
3/20/00	0	0	0	0	252	0
3/21/00	0	0	0	0	203	0
3/22/00	0	0	0	0	170	0
3/23/00	0	0	0	0	178	0
3/24/00	0	0	0	0	178	0
3/25/00	0	0	0	0	177	0
3/26/00	0	0	0	0	176	0
3/27/00	0	0	0	0	175	0
3/28/00	0	0	0	0	175	0
3/29/00	0	0	0	0	175	0
3/30/00	0	0	0	0	207	0
3/31/00	0	0	0	0	224	0

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Taylor Slough and Coastal Basin TP Concentration Data in mg/L

date	S175	S332	S18C	S332D	S176/S174
1/5/00	0.006	0.008	0.005		0.007
1/19/00	0.006	0.009	0.006		0.009
2/2/00	0.007	0.007	0.006	0.008	0.012
2/8/00				0.008	
2/16/00	0.006	0.007	0.008	0.007	0.007
2/22/00				0.009	
2/29/00	0.008	0.007	0.005	0.006	0.007
3/8/00				0.008	
3/15/00	0.008	0.008	0.008	0.006	0.006
3/21/00				0.006	
3/29/00	0.007	0.007	0.005	0.005	0.009

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Taylor Sough and Coastal Basin Flows in cfs

date	S175	S332	S18C	S332D	S174	S332D+S174	S175+S332
1/1/00	175.43	537.11	195	0	333.99	333.99	712.54
1/2/00	175.86	537.07	179	0	324.18	324.18	712.93
1/3/00	177.43	537.13	208	0	358.84	358.84	714.56
1/4/00	219.31	536.95	214	0	341.07	341.07	756.26
1/5/00	352.85	536.34	197	203.47	196.6	400.07	889.19
1/6/00	357.71	536.27	212	444.08	13.81	457.89	893.98
1/7/00	182.37	536.7	202	444.02	0	444.02	719.07
1/8/00	217.74	536.95	201	444	0	444	754.69
1/9/00	218.69	536.96	212	444.03	0	444.03	755.65
1/10/00	219.4	536.97	211	438.91	0	438.91	756.37
1/11/00	264.03	536.99	226	484.4	0	484.4	801.02
1/12/00	340.05	536.92	187	569.38	0	569.38	876.97
1/13/00	347.14	534.2	188	567.08	0	567.08	881.34
1/14/00	316.68	536.66	233	568.47	0	568.47	853.34
1/15/00	315.51	536.99	341	567.83	0	567.83	852.5
1/16/00	299.86	537.02	361	562.64	0	562.64	836.88
1/17/00	224	536.95	397	490.81	0	490.81	760.95
1/18/00	183.43	537	439	489.72	0	489.72	720.43
1/19/00	304.81	536.94	188	568.5	0	568.5	841.75
1/20/00	280.47	533.75	137	551.6	0	551.6	814.22
1/21/00	298.56	536.97	208	566.33	0	566.33	835.53
1/22/00	134.91	537	186	464.61	0	464.61	671.91
1/23/00	97.38	537.01	236	441.06	0	441.06	634.39
1/24/00	188.87	536.97	297	443.8	0	443.8	725.84
1/25/00	177.02	536.97	353	443.76	0	443.76	713.99
1/26/00	119.22	537.03	328	443.8	0	443.8	656.25
1/27/00	115.21	536.97	274	443.87	0	443.87	652.18
1/28/00	90.84	536.97	272	436.02	0	436.02	627.81
1/29/00	37.73	536.9	307	396.73	0	396.73	574.63
1/30/00	0	536.58	341	298.04	14.87	312.91	536.58
1/31/00	0	536.47	341	283.83	49.75	333.58	536.47
2/1/00	0	536.51	312	283.76	55.13	338.89	536.51
2/2/00	0	531.85	295	310.75	44.78	355.53	531.85
2/3/00	0	535.66	305	344.22	21.08	365.3	535.66
2/4/00	120.21	537.15	239	501.06	0	501.06	657.36
2/5/00	232.47	537.17	221	568.89	0	568.89	769.64
2/6/00	239.34	537.18	140	569.01	0	569.01	776.52
2/7/00	240.62	537.18	148	568.94	0	568.94	777.8
2/8/00	303.8	537.11	125	569.07	0	569.07	840.91
2/9/00	311.27	536.3	158	569.1	0	569.1	847.57
2/10/00	306.83	537.02	188	569	-0.06	568.94	843.85
2/11/00	282.15	537.14	207	533	0	533	819.29
2/12/00	289.83	536.69	224	554.91	0.47	555.38	826.52
2/13/00	289.33	533.82	220	565.98	-0.2	565.78	823.15
2/14/00	252.61	536.97	203	554.71	0	554.71	789.58
2/15/00	287.52	536.98	180	568.98	0	568.98	824.5
2/16/00	252.66	535.62	177	513.85	0	513.85	788.28
2/17/00	0	504.85	237	221.5	17.84	239.34	504.85
2/18/00	0	258.86	154	0	34.38	34.38	258.86
2/19/00	0	151.98	202	0	0	0	151.98
2/20/00	0	91.17	151	0	0	0	91.17
2/21/00	0	52.65	107	0	0	0	52.65

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2/22/00	0	29.51	104	0	0	0	29.51
2/23/00	0	17.6	100	0	0	0	17.6
2/24/00	0	5.24	87	0	0	0	5.24
2/25/00	0	5.22	90	0	8.4	8.4	5.22
2/26/00	0	78.56	90	0	96.01	96.01	78.56
2/27/00	0	57.85	90	0	84.84	84.84	57.85
2/28/00	0	57.85	99	0	74.22	74.22	57.85
2/29/00	0	57.85	112	0	105.94	105.94	57.85
3/1/00	0	57.85	92	0	113.13	113.13	57.85
3/2/00	0	57.85	96	0	112.94	112.94	57.85
3/3/00	0	36.1	88	0	104.34	104.34	36.1
3/4/00	0	24.41	103	0	94.21	94.21	24.41
3/5/00	0	24.41	95	0	95.47	95.47	24.41
3/6/00	0	24.42	41	0	104.57	104.57	24.42
3/7/00	0	24.42	55	0	101.42	101.42	24.42
3/8/00	0	24.43	86	0	107.5	107.5	24.43
3/9/00	8.49	24.42	88	0	110.52	110.52	32.91
3/10/00	0	24.42	80	0	105.77	105.77	24.42
3/11/00	0	24.43	73	0	94.02	94.02	24.43
3/12/00	0	24.43	89	0	94.56	94.56	24.43
3/13/00	0	24.43	54	0	104.4	104.4	24.43
3/14/00	0	24.43	35	0	108.44	108.44	24.43
3/15/00	0	15.71	78	0	102.79	102.79	15.71
3/16/00	0	10.81	51	0	100.06	100.06	10.81
3/17/00	0	10.81	151	0	99.77	99.77	10.81
3/18/00	0	10.81	180	0	90.67	90.67	10.81
3/19/00	0	10.8	186	0	97.44	97.44	10.8
3/20/00	0	10.8	153	0	94.7	94.7	10.8
3/21/00	0	10.8	160	0	102.31	102.31	10.8
3/22/00	0	10.75	126	0	105.76	105.76	10.75
3/23/00	0	31.66	72	0	112.94	112.94	31.66
3/24/00	0	116	51	0	121.53	121.53	116
3/25/00	0	64.97	45	0	129.87	129.87	64.97
3/26/00	0	10.8	78	0	125.46	125.46	10.8
3/27/00	0	10.79	70	0	124.6	124.6	10.79
3/28/00	0	10.8	82	0	102.26	102.26	10.8
3/29/00	0	10.79	105	0	107.27	107.27	10.79
3/30/00	0	10.78	90	0	120.4	120.4	10.78
3/31/00	0	10.79	116	0	122.46	122.46	10.79

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