LAKE OKEECHOBEE WATER SUPPLY BACKPUMPING AND WATER SUPPLY AUGMENTATION AFTER ACTION REPORT

July 2001

Prepared for
Florida Department of Environmental Protection
by
Environmental Monitoring and Assessment Department
and
Everglades Regulation Department
SFWMD

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Table 1. July 2001 Water Supply Backpumping and Water Supply Augmentation Summary.

STATION	FLOW		Total Phosphorus (TP)		Total Nitrogen (TN)	
	cfs	acre-feet	loads (metric tons)	FWMC (ppb)	loads (metric tons)	FWMC (ppb)
S2	32393	64251	7	93	301	3800
S3	20374	40411	3	58	173	3384
CULV10A (L8)	7193	14267	2	111	32	1806
S77	13904	27578	6	180	66	1951
S308	14308	28380	9	260	60	1717
S4	0	0	0	N/A	0	N/A
S352	0	0	0	N/A	0	N/A
sum	88172	174886	27	N/A	633	N/A

N/A: not applicable due to no flow at the site in July 2001.

notes on flow: For S2 and S3 flow data refer to Table 2a and 2b.
CULV10A flow data are preliminary estimations.
S77 flow data are from COE.
S308 flow data through July 17th are from COE.
S308 flow data for July 18th through 31st are preliminary estimations.

notes on loads: S2 and S3 loads are calculated using the auto sampler concentrations.
CULV10A, S77, and S308 loads are calculated interpolating grab concentrations.

Table 2a. Pump Operation Logs and Daily Flows for S2.

Date	(cfs)*	acre-feet	Data Source	Pump Log
7/10/2001 Tuesday	268	**531**	DCVP	start at 10:49 AM, ends at 4:49 PM
7/11/2001 Wednesday	771	**1529**	DCVP	starts at 6:35 AM
7/12/2001 Thursday	1051.39	**2085**	DCVP	(continued)
7/13/2001 Friday	1054.73	**2092**	DCVP	(continued)
7/14/2001 Saturday	1080.21	**2143**	DCVP	(continued)
7/15/2001 Sunday	1699.35	**3371**	DCVP	(continued)
7/16/2001 Monday	1866.85	**3703**	DCVP	(continued)
7/17/2001 Tuesday	1400.51	**2778**	DCVP	(continued)
7/18/2001 Wednesday	1445.25	**2867**	DCVP	(continued)
7/19/2001 Thursday	1534.51	**3044**	DCVP	(continued)
7/20/2001 Friday	1108.57	**2199**	DCVP	ends at 8:35 PM, starts at 8:40 PM
7/21/2001 Saturday	1104.84	**2191**	DCVP	(continued)
7/22/2001 Sunday	1095.25	**2172**	DCVP	(continued)
7/23/2001 Monday	1701.52	**3375**	DCVP	(continued)
7/24/2001 Tuesday	2138.24	**4241**	DCVP	(continued)
7/25/2001 Wednesday	1950.27	**3868**	DCVP	(continued)
7/26/2001 Thursday	1629.68	**3232**	DCVP	(continued)
7/27/2001 Friday	2219.07	**4401**	DCVP	(continued)
7/28/2001 Saturday	1449.97	**2876**	DCVP	(continued)
7/29/2001 Sunday	1841.66	**3653**	DCVP	(continued)
7/30/2001 Monday	2182.38	**4329**	DCVP	(continued)
7/31/2001 Tuesday	1800.23	**3571**	DCVP	(continued)
Sum	**32393**	**64251**		

note: Flow data are from DCVP estimations, which are provisional and subject to change, in the District's DBHYDRO Database..

Table 2b. Pump Operation Logs and Daily Flows for S3.

Date	(cfs)*	acre-feet	Data Source	Pump Log
7/10/2001 Tuesday	0	**0**	DCVP	
7/11/2001 Wednesday	0	**0**	DCVP	
7/12/2001 Thursday	392.76	**779**	DCVP	starts at 6:10 AM, ends at 5:00 PM
7/13/2001 Friday	600.33	**1191**	*	starts at 7:55 AM
7/14/2001 Saturday	570.08	**1131**	*	ends at 2:55 PM
7/15/2001 Sunday	585.00	**1160**	DCVP	starts at 5:55 AM, ends at 6:45 PM
7/16/2001 Monday	946.95	**1878**	DCVP	starts at 7:17 AM
7/17/2001 Tuesday	1165.47	**2312**	DCVP	(continued)
7/18/2001 Wednesday	1273.60	**2526**	DCVP	(continued)
7/19/2001 Thursday	1016.27	**2016**	DCVP	(continued)
7/20/2001 Friday	909.54	**1804**	DCVP	(continued)
7/21/2001 Saturday	903.78	**1793**	DCVP	(continued)
7/22/2001 Sunday	909.84	**1805**	DCVP	(continued)
7/23/2001 Monday	1440.57	**2857**	DCVP	(continued)
7/24/2001 Tuesday	1690.42	**3353**	DCVP	(continued)
7/25/2001 Wednesday	1834.40	**3638**	DCVP	(continued)
7/26/2001 Thursday	1867.75	**3705**	DCVP	(continued)
7/27/2001 Friday	1498.75	**2973**	DCVP	(continued)
7/28/2001 Saturday	571.20	**1133**	DCVP	ends at 2:55 PM
7/29/2001 Sunday	353.03	**700**	DCVP	starts at 1:30 PM, ends at 2:53 PM
7/30/2001 Monday	1232.29	**2444**	DCVP	starts at 0:05 AM
7/31/2001 Tuesday	611.71	**1213**	DCVP	ends at 2:50 PM
Sum	**20374**	**40411**		

note: July 13th and 14th flows are prelimary estimations. All other flow data are from DCVP estimations, which are provisional and subject to change, in the District's DBHYDRO Database.

Table 3a. S2 Daily Flow, Total Phosphorus (TP), and Total Nitrogen (TN) Concentration and Loads for July 2001.

Date	Flow	Total Phosphorus (TP)			Total Nitrogen (TN)		
	(acre-feet)	grab (mg/L)	composite (mg/L)	loads (1000kg)	grab (mg/L)	composite (mg/L)	loads (1000kg)
7/10/2001	531	0.052		0.038	2.203		1.740
7/11/2001	1529			0.109			5.007
7/12/2001	2085		0.058	0.149		2.655	6.829
7/13/2001	2092			0.183			7.300
7/14/2001	2143		0.071	0.188		2.829	7.477
7/15/2001	3371			0.412			15.504
7/16/2001	3703	0.075	0.099	0.452	3.584	3.729	17.032
7/17/2001	2778			0.377			14.079
7/18/2001	2867		0.110	0.389		4.109	14.529
7/19/2001	3044			0.435			14.465
7/20/2001	2199	0.087	0.116	0.315	4.203	3.853	10.450
7/21/2001	2191			0.203			8.674
7/22/2001	2172		0.075	0.201		3.209	8.599
7/23/2001	3375			0.333			14.345
7/24/2001	4241	0.097	0.080	0.419	4.425	3.446	18.027
7/25/2001	3868			0.549			25.542
7/26/2001	3232		0.115	0.459		5.353	21.343
7/27/2001	4401	0.113		0.537	5.196		25.148
7/28/2001	2876		0.099	0.351		4.632	16.432
7/29/2001	3653			0.424			16.288
7/30/2001	4329	0.105	0.094	0.502	3.486	3.615	19.302
7/31/2001	3571		0.080	0.352		2.954	13.011
Sum	**64251**			**7**			**301**

note: All flow data are provisional estimations.
note: Loads are calculated using the auto sampler concentrations, which are flow proportional composite samples.

Table 3b. S3 Daily Flow, Total Phosphorus (TP), and Total Nitrogen (TN) Concentration and Loads for July 2001.

Date	Flow	Total Phosphorus (TP)			Total Nitrogen (TN)		
	(acre-feet)	grab (mg/L)	composite (mg/L)	loads (1000kg)	grab (mg/L)	composite (mg/L)	loads (1000kg)
7/10/2001	0			0.000			0.000
7/11/2001	0			0.000			0.000
7/12/2001	779	0.035		0.047	2.854	2.624	2.521
7/13/2001	1191			0.072			3.929
7/14/2001	1131		0.049	0.068			3.731
7/15/2001	1160			0.069			3.829
7/16/2001	1878	0.09	0.048	0.111	3.359	2.675	6.197
7/17/2001	2312			0.191			10.995
7/18/2001	2526		0.067	0.209		3.856	12.015
7/19/2001	2016			0.157			11.263
7/20/2001	1804	0.036	0.063	0.140	4.876	4.53	10.080
7/21/2001	1793			0.077			9.391
7/22/2001	1805		0.035	0.078		4.247	9.454
7/23/2001	2857			0.169			11.944
7/24/2001	3353	0.078	0.048	0.199	3.858	3.389	14.016
7/25/2001	3638			0.287			17.499
7/26/2001	3705		0.064	0.292		3.899	17.817
7/27/2001	2973	0.068		0.231	3.521		11.118
7/28/2001	1133		0.063	0.088		3.032	4.237
7/29/2001	700			0.067			2.232
7/30/2001	2444	0.073	0.078	0.235	2.495	2.584	7.790
7/31/2001	1213		0.064	0.096		2.260	3.382
Sum	**40411**			**3**			**173**

note: All flow data are provisional estimations.
note: Loads are calculated using the auto sampler concentrations, which are flow proportional composite samples.

Table 4a. Water Quality Data Summary at S2 for July 2001 Backpumping Events.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical						
Temperature (°C)	6	25.5	29.5	28.2	1.4	
Specific Conductivity (µmhos/cm)	6	1020	1103	1062	35	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	6	2.2	5.8	3.2	1.4	Not less than 5.0 mg/L
Water pH (units)	6	7.0	7.9	7.3	0.3	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	6	4.6	16.0	9.7	4.8	Less than or equal to 29 NTU above background
Color (PCU)	6	88	167	133	27	
Total Suspended Solids (mg/L)	4	6.8	24.8	13.0	8.0	
Total Dissolved Solids (mg/L)	5	634.0	750.0	694.8	44.3	
Hardness (mg/L as CaCO3)	9	384.8	464.6	412.4	23.7	
Alkalinity (mg/L as CaCO3)	6	309.8	330.8	316.6	7.6	
Nutrients						
Total Nitrogen (mg/L)	6	2.2	5.2	3.8	1.0	
Total Kjeldahl Nitrogen (mg/L)	6	2.2	3.6	2.9	0.5	
Total Dissolved Kjeldahl Nitrogen (mg/L)	4	1.9	3.0	2.7	0.6	
Nitrate+Nitrite as N (mg/L)	6	0.023	1.610	0.979	0.564	
Nitrite as N (mg/L)	6	<0.004	0.121	0.068	0.040	
Nitrate as N(mg/L)	5	0.698	1.489	1.090	0.326	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	6	0.038	0.526	0.292	0.176	
Un-ionized Ammonia as NH_3 (mg/L)	6	0.001	0.009	0.005	0.003	Equal or less than 0.02 mg/L as NH_3
Total Phosphorus (mg/L)	6	0.055	0.113	0.089	0.021	
Orthophosphate as P (mg/L)	6	0.007	0.060	0.046	0.021	
Total Dissolved Phosphorus (mg/L)	4	0.014	0.067	0.052	0.025	
Silica (mg/L)	5	13.836	18.386	15.991	2.004	
Major Ions						
Chloride (mg/L)	6	92.480	115.120	104.697	7.885	Equal or less than 250 mg/L
Sulfate (mg/L)	5	54.210	99.030	76.226	16.180	
Sodium (mg/L)	9	53.962	79.972	66.591	8.115	
Potassium (mg/L)	9	6.620	9.473	7.911	0.766	
Calcium (mg/L)	9	105.067	126.850	111.327	6.678	
Magnesium (mg/L)	9	29.744	35.902	32.625	1.905	
Trace Metals						
Total Arsenic (µg/L)	5	4.715	5.11	4.939	0.192	Less than or equal to 50 µg/L
Total Cadmium (µg/L)	5	<0.3	0.342	<0.3	0.086	Less than or equal to calculated value
Total Copper (µg/L)	5	2.112	3.511	3.03	0.547	Less than or equal to calculated value
Total Iron (µg/L)	5	89.977	239.012	149.294	61.398	Less than or equal to 300 µg/L
Total Lead (µg/L)	5	<0.8	<0.8	<0.8	0	Less than or equal to calculated value
Total Zinc (µg/L)	5	<4	<4	<4	0	Less than or equal to calculated value

Table4a (continued). Water Quality Data Summary at S2 for July 2001 Backpumping Events.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Phytoplankton Indicators						
Chlorophyll a (µg/L)	4	10.4	60.4	23.9	24.4	
Chlorophyll a2 (µg/L)	4	7.2	54.6	19.4	23.5	
Chlorophyll b (µg/L)	4	<1	1.5	<1	0.5	
Chlorophyll c (µg/L)	4	<1	4.3	1.9	1.7	
Pheophytin a (µg/L)	4	4.8	8.7	6.3	1.7	
Carotenoid (µg/L)	4	5.3	26.6	11.6	10.1	
Total Organic Carbon (mg/L)	4	32.8	46.3	39.9	5.7	
Dissolved Organic Carbon (mg/L)	4	33.1	47.7	40.2	6.1	

Table 4b. Pesticide Data at S2 for July 2001 Backpumping Events.

Parameters	Sampling Dates					FAC 62-302 Class I Criteria
	7/10/2001	7/16/2001	7/20/2001	7/25/2001	7/27/2001*	
Pesticides						
ametryn (µg/L)	0.046	0.065	0.078	0.16	0.072	
atrazine (µg/L)	0.66	0.36	0.41	1.9	0.28	
atrazine desethyl (µg/L)	0.059	0.053	0.067	0.12	0.031	
atrazine desisopropyl (µg/L)	0.010	0.013	0.018	0.032	0.018	
bromacil (µg/L)	BDL	BDL	BDL	BDL	BDL	
diazinon (µg/L)	BDL	BDL	BDL	BDL	BDL	
hexazinone (µg/L)	BDL	BDL	BDL	BDL	BDL	
malathion (µg/L)	BDL	BDL	BDL	BDL	BDL	less than or equal to 0.1 µg/L
metolachlor (µg/L)	BDL	0.17	BDL	BDL	BDL	
Norflurazon (µg/L)	BDL	BDL	BDL	BDL	BDL	
Parathion Methyl (µg/L)	BDL	BDL	BDL	BDL	BDL	
simazine (µg/L)	BDL	BDL	BDL	0.019	BDL	

*** average of duplicate values**
BDL = below detection limit

Table 5a. Water Quality Data Summary at S3 for July 2001 Backpumping Events.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical						
Temperature (°C)	6	26.1	30.0	28.6	1.3	
Specific Conductivity (µmhos/cm)	6	761	962	892	77	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	6	3.0	5.7	3.9	0.9	Not less than 5.0 mg/L
Water pH (units)	6	7.1	7.8	7.4	0.3	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	6	3.7	14.2	8.6	4.4	Less than or equal to 29 NTU above background
Color (PCU)	6	105	137	123	11	
Total Suspended Solids (mg/L)	5	-1.0	14.8	8.8	6.3	
Total Dissolved Solids (mg/L)	5	518.0	655.0	578.2	54.2	
Hardness (mg/L as CaCO3)	9	259.1	362.4	339.1	34.5	
Alkalinity (mg/L as CaCO3)	6	215.2	263.3	248.7	20.0	
Nutrients						
Total Nitrogen (mg/L)	6	2.5	4.9	3.5	0.8	
Total Kjeldahl Nitrogen (mg/L)	6	2.0	3.1	2.6	0.4	
Total Dissolved Kjeldahl Nitrogen (mg/L)	4	2.1	2.9	2.4	0.4	
Nitrate+Nitrite as N (mg/L)	6	0.404	2.006	0.846	0.598	
Nitrite as N (mg/L)	6	0.021	0.072	0.041	0.019	
Nitrate as N (mg/L)	6	0.371	1.934	0.806	0.581	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	6	0.077	0.312	0.173	0.088	
Un-ionized Ammonia as NH_3 (mg/L)	6	0.001	0.008	0.004	0.003	Equal or less than 0.02 mg/L as NH_3
Total Phosphorus (mg/L)	6	0.035	0.090	0.063	0.023	
Orthophosphate as P (mg/L)	6	0.006	0.030	0.018	0.011	
Total Dissolved Phosphorus (mg/L)	4	0.012	0.035	0.023	0.012	
Silica (mg/L)	5	8.337	11.222	9.717	1.393	
Major Ions						
Chloride (mg/L)	6	81.610	98.580	91.122	7.797	Equal or less than 250 mg/L
Sulfate (mg/L)	5	49.210	78.880	66.172	11.596	
Sodium (mg/L)	9	48.686	61.302	54.931	5.283	
Potassium (mg/L)	9	5.170	7.276	6.690	0.627	
Calcium (mg/L)	9	84.882	113.767	104.335	9.010	
Magnesium (mg/L)	9	11.442	22.582	19.134	3.685	
Trace Metals						
Total Arsenic (µg/L)	5	3.521	5.519	4.409	0.848	Less than or equal to 50 µg/L
Total Cadmium (µg/L)	5	<0.3	<0.3	<0.3	0.000	Less than or equal to calculated value
Total Copper (µg/L)	5	2.018	3.006	2.530	0.428	Less than or equal to calculated value
Total Iron (µg/L)	5	69.638	285.260	187.157	81.772	Less than or equal to 300 µg/L
Total Lead (µg/L)	5	<0.8	<0.8	<0.8	0.000	Less than or equal to calculated value
Total Zinc (µg/L)	5	<4	<4	<4	0.000	Less than or equal to calculated value

Table 5a (continued). Water Quality Data Summary at S3 for July 2001 Backpumping Events.

Phytoplankton Indicators						
Chlorophyll a (µg/L)	4	11.6	15.5	13.2	1.7	
Chlorophyll a2 (µg/L)	4	7.9	12.2	10.1	1.8	
Chlorophyll b (µg/L)	4	<1	2.2	1.1	0.8	
Chlorophyll c (µg/L)	4	<1	3.2	1.6	1.1	
Pheophytin a (µg/L)	4	2.4	5.8	4.5	1.5	
Carotenoid (µg/L)	4	5.1	7.7	6.8	1.2	
Total Organic Carbon (mg/L)	4	34.2	41.6	37.3	3.4	
Dissolved Organic Carbon (mg/L)	4	34.9	42.7	38.2	3.3	

Table 5b. Pesticide Data at S3 for July 2001 Backpumping Events.

Parameters	Sampling Dates					FAC 62-302 Class I Criteria
	7/12/2001*	7/16/2001	7/20/2001	7/25/2001*	7/27/2001	
Pesticides						
ametryn (µg/L)	0.048	0.051	0.062	0.052	0.038	
atrazine (µg/L)	1.9	0.25	0.37	0.27	0.14	
atrazine desethyl (µg/L)	0.093	0.048	0.060	0.042	BDL	
atrazine desisopropyl (µg/L)	0.021	0.015	0.017	0.013	BDL	
bromacil (µg/L)	BDL	BDL	BDL	BDL	BDL	
diazinon (µg/L)	BDL	BDL	BDL	BDL	BDL	
hexazinone (µg/L)	BDL	BDL	BDL	BDL	BDL	
malathion (µg/L)	BDL	BDL	0.040	BDL	BDL	less than or equal to 0.1 µg/L
metolachlor (µg/L)	BDL	BDL	BDL	BDL	BDL	
Norflurazon (µg/L)	BDL	BDL	BDL	BDL	BDL	
Parathion Methyl (µg/L)	BDL	BDL	BDL	BDL	BDL	
simazine (µg/L)	BDL	BDL	BDL	BDL	BDL	

*** average of duplicate values**

BDL = below detection limit

Table 6a. Water Quality Data Summary at S77 During July 2001 Backflow Events.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical						
Temperature (°C)	4	28.9	33.2	30.4	1.9	
Specific Conductivity (µmhos/cm)	4	562	659	622	42	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	3	4.8	11.8	7.8	3.6	Not less than 5.0 mg/L
Water pH (units)	4	7.1	8.5	7.9	0.6	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	4	2.8	7.5	4.5	2.1	Less than or equal to 29 NTU above background
Color (PCU)	4	81	148	102	31	
Total Suspended Solids (mg/L)	4	4.8	17.2	9.5	5.5	
Total Dissolved Solids (mg/L)	1			383.0		
Hardness (mg/L as CaCO3)	2	238.2	242.7	240.4		
Alkalinity (mg/L as CaCO3)	4	171.1	200.5	191.5	13.7	
Nutrients						
Total Nitrogen (mg/L)	4	1.7	2.3	1.8	0.3	
Total Kjeldahl Nitrogen (mg/L)	4	1.5	2.3	1.8	0.3	
Nitrate+Nitrite as N (mg/L)	4	<0.004	0.16	0.052	0.073	
Nitrite as N (mg/L)	4	<0.004	0.036	0.013	0.015	
Nitrate as N (mg/L)	3	0.012	0.124	0.051	0.063	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	4	<0.009	0.049	0.018	0.021	
Un-ionized Ammonia as NH_3 (mg/L)	4		0.004	0.002	0.001	Equal or less than 0.02 mg/L as NH_3
Total Phosphorus (mg/L)	4	0.105	0.241	0.151	0.062	
Orthophosphate as P (mg/L)	4	0.031	0.076	0.055	0.019	
Silica (mg/L)	1			11.582		
Major Ions						
Chloride (mg/L)	4	50.630	63.060	58.995	5.771	Equal or less than 250 mg/L
Sulfate (mg/L)	1			32.170		
Sodium (mg/L)	2	34.598	35.641	35.119		
Potassium (mg/L)	2	6.655	6.976	6.816		
Calcium (mg/L)	2	79.198	80.018	79.608		
Magnesium (mg/L)	2	9.811	10.414	10.112		
Trace Metals						
Total Arsenic (µg/L)	1			2.175		Less than or equal to 50 µg/L
Total Cadmium (µg/L)	1			<0.3		Less than or equal to calculated value
Total Copper (µg/L)	1			1.535		Less than or equal to calculated value
Total Iron (µg/L)	1			70.403		Less than or equal to 300 µg/L
Total Lead (µg/L)	1			<0.8		Less than or equal to calculated value
Total Zinc (µg/L)	1			<4		Less than or equal to calculated value

Table 6b. Pesticide Data at S77 for July 2001 Backflow Events.

Parameters	Sampling Dates					FAC 62-302 Class I Criteria
	7/10/2001					
Pesticides						
ametryn (µg/L)	0.060					
atrazine (µg/L)	0.10					
atrazine desethyl (µg/L)	0.026					
atrazine desisopropyl (µg/L)	0.011					
bromacil (µg/L)	0.26					
diazinon (µg/L)	BDL					
hexazinone (µg/L)	0.027					
malathion (µg/L)	BDL					less than or equal to 0.1 µg/L
metolachlor (µg/L)	BDL					
Norflurazon (µg/L)	0.25					
Parathion Methyl (µg/L)	BDL					
simazine (µg/L)	0.040					

*** average of duplicate values**

BDL = below detection limit

Table 7a. Water Quality Data Summary at S308 During July 2001 Backflow Events.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical						
Temperature (°C)	4	28.4	29.8	29.4	0.7	
Specific Conductivity (µmhos/cm)	4	617	849	744	98	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	4	3.2	4.8	3.8	0.7	Not less than 5.0 mg/L
Water pH (units)	4	7.0	7.6	7.3	0.3	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	4	3.8	18.5	11.3	6.3	Less than or equal to 29 NTU above background
Color (PCU)	4	77	168	112	40	
Total Suspended Solids (mg/L)	4	4.6	23.2	15.4	7.8	
Total Dissolved Solids (mg/L)	1			478.0		
Hardness (mg/L as CaCO3)	2	250.0	265.2	257.6		
Alkalinity (mg/L as CaCO3)	4	143.4	190.9	172.5	21.5	
Nutrients						
Total Nitrogen (mg/L)	4	1.6	2.1	1.8	0.2	
Total Kjeldahl Nitrogen (mg/L)	4	1.3	1.8	1.6	0.2	
Nitrate+Nitrite as N (mg/L)	4	0.157	0.333	0.231	0.074	
Nitrite as N (mg/L)	4	0.018	0.046	0.032	0.012	
Nitrate as N (mg/L)	4	0.139	0.287	0.199	0.063	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	4	0.215	0.279	0.245	0.027	
Un-ionized Ammonia as NH_3 (mg/L)	4	0.002	0.007	0.005	0.003	Equal or less than 0.02 mg/L as NH_3
Total Phosphorus (mg/L)	4	0.213	0.319	0.282	0.047	
Orthophosphate as P (mg/L)	4	0.131	0.261	0.204	0.055	
Silica (mg/L)	1			11.515		
Major Ions						
Chloride (mg/L)	4	70.730	104.860	88.210	14.561	Equal or less than 250 mg/L
Sulfate (mg/L)	1			59.200		
Sodium (mg/L)	2	50.912	61.473	56.192		
Potassium (mg/L)	2	6.981	9.310	8.146		
Calcium (mg/L)	2	81.290	86.101	83.695		
Magnesium (mg/L)	2	11.424	12.192	11.808		
Trace Metals						
Total Arsenic (µg/L)	1			1.926		Less than or equal to 50 µg/L
Total Cadmium (µg/L)	1			<0.3		Less than or equal to calculated value
Total Copper (µg/L)	1			4.573		Less than or equal to calculated value
Total Iron (µg/L)	1			694.776		Less than or equal to 300 µg/L
Total Lead (µg/L)	1			<0.8		Less than or equal to calculated value
Total Zinc (µg/L)	1			<4		Less than or equal to calculated value

Table 7b. Pesticide Data at S308 for July 2001 Backflow Events.

Parameters	Sampling Dates					FAC 62-302 Class I Criteria
	7/10/2001					
Pesticides						
ametryn (µg/L)	BDL					
atrazine (µg/L)	BDL					
atrazine desethyl (µg/L)	BDL					
atrazine desisopropyl (µg/L)	0.014					
bromacil (µg/L)	0.51					
diazinon (µg/L)	BDL					
hexazinone (µg/L)	BDL					
malathion (µg/L)	BDL					less than or equal to 0.1 µg/L
metolachlor (µg/L)	BDL					
Norflurazon (µg/L)	1.0					
Parathion Methyl (µg/L)	BDL					
simazine (µg/L)	0.096					

*** average of duplicate values**

BDL = below detection limit

Table 8a. Water Quality Data Summary at CULV10A (L8) During July 2001 Backflow Events.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical						
Temperature (°C)	4	28.4	30.6	29.6	0.9	
Specific Conductivity (µmhos/cm)	4	510	852	622	157	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	4	2.0	4.5	3.2	1.0	Not less than 5.0 mg/L
Water pH (units)	4	7.0	7.6	7.3	0.2	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	4	10.8	46.2	25.1	16.4	Less than or equal to 29 NTU above background
Color (PCU)	4	40	140	81	48	
Total Suspended Solids (mg/L)	4	17.2	97.0	50.9	35.7	
Total Dissolved Solids (mg/L)	1			519.0		
Hardness (mg/L as CaCO3)	2	199.5	275.3	237.4		
Alkalinity (mg/L as CaCO3)	4	145.4	179.3	166.2	15.0	
Nutrients						
Total Nitrogen (mg/L)	4	1.1	2.6	1.7	0.7	
Total Kjeldahl Nitrogen (mg/L)	4	1.0	2.5	1.7	0.6	
Nitrate+Nitrite as N (mg/L)	4	0.050	0.128	0.084	0.034	
Nitrite as N (mg/L)	4	0.005	0.015	0.010	0.005	
Nitrate as N (mg/L)	4	0.045	0.113	0.075	0.029	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	4	0.050	0.084	0.075	0.017	
Un-ionized Ammonia as NH_3 (mg/L)	4	0.001	0.002	0.002	0.001	Equal or less than 0.02 mg/L as NH_3
Total Phosphorus (mg/L)	4	0.069	0.163	0.117	0.040	
Orthophosphate as P (mg/L)	4	0.012	0.038	0.024	0.012	
Silica (mg/L)	1			14.764		
Major Ions						
Chloride (mg/L)	4	51.520	115.910	71.945	29.610	Equal or less than 250 mg/L
Sulfate (mg/L)	1			43.360		
Sodium (mg/L)	2	37.075	77.381	57.228		
Potassium (mg/L)	2	1.729	4.687	3.208		
Calcium (mg/L)	2	71.716	90.385	81.051		
Magnesium (mg/L)	2	4.951	12.047	8.499		
Trace Metals						
Total Arsenic (µg/L)	1			1.566		Less than or equal to 50 µg/L
Total Cadmium (µg/L)	1			<0.3		Less than or equal to calculated value
Total Copper (µg/L)	1			<1.2		Less than or equal to calculated value
Total Iron (µg/L)	1			650.665		Less than or equal to 300 µg/L
Total Lead (µg/L)	1			<0.8		Less than or equal to calculated value
Total Zinc (µg/L)	1			<4		Less than or equal to calculated value

Table 8b. Pesticide Data at CULV10A (L8) for July 2001 Backflow Events.

Parameters	Sampling Dates					FAC 62-302 Class I Criteria
	7/10/2001*					
Pesticides						
ametryn (µg/L)	0.11					
atrazine (µg/L)	BDL					
atrazine desethyl (µg/L)	0.012					
atrazine desisopropyl (µg/L)	BDL					
bromacil (µg/L)	BDL					
diazinon (µg/L)	0.049					
hexazinone (µg/L)	BDL					
malathion (µg/L)	BDL					less than or equal to 0.1 µg/L
metolachlor (µg/L)	BDL					
Norflurazon (µg/L)	BDL					
Parathion Methyl (µg/L)	BDL					
simazine (µg/L)	BDL					

*** average of duplicate values**

BDL = below detection limit

Table 9a. Water Quality Data Summary at Downstream Monitoring Locations During July Backpumping Events - S2DOWN.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical						
Temperature (°C)	6	25.5	28.6	27.9	1.2	
Specific Conductivity (µmhos/cm)	6	934	1129	1012	67	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	6	1.9	4.7	3.3	1.0	Not less than 5.0 mg/L
Water pH (units)	6	7.0	7.5	7.2	0.2	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	6	7.3	17.3	11.7	3.5	Less than or equal to 29 NTU above background
Secchi Disk Depth (meters)	6	0.4	0.7	0.5	0.1	
Color (PCU)	6	96	163	121	27	
Total Suspended Solids (mg/L)	6	8.8	19.2	15.0	3.9	
Total Dissolved Solids (mg/L)	6	578.0	739.0	647.7	53.9	
Hardness (mg/L as CaCO3)	9	330.4	423.1	368.4	28.2	
Alkalinity (mg/L as CaCO3)	6	246.7	330.5	290.3	30.1	
Nutrients						
Total Nitrogen (mg/L)	6	2.8	5.0	3.7	0.9	
Total Kjeldahl Nitrogen (mg/L)	6	2.3	3.5	2.8	0.4	
Total Dissolved Kjeldahl Nitro	6	1.9	3.2	2.4	0.5	
Nitrate+Nitrite as N (mg/L)	6	0.246	1.497	0.870	0.533	
Nitrite as N (mg/L)	6	0.031	0.095	0.063	0.029	
Nitrate as N (mg/L)	6	0.208	1.402	0.806	0.505	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	6	0.024	0.620	0.261	0.200	
Un-ionized Ammonia as NH_3 (mg/L)	6	0.001	0.005	0.003	0.002	Equal or less than 0.02 mg/L as NH_3
Total Phosphorus (mg/L)	6	0.070	0.108	0.092	0.016	
Orthophosphate as P (mg/L)	6	0.006	0.060	0.036	0.025	
Total Dissolved Phosphorus (mg/L)	6	0.012	0.065	0.041	0.024	
Silica (mg/L)	6	10.736	19.495	14.542	2.836	
Major Ions						
Chloride (mg/L)	6	93.42	105.93	100.775	5.328	Equal or less than 250 mg/L
Sulfate (mg/L)	6	55.19	102.26	70.813	17.012	
Sodium (mg/L)	9	54.673	76.01	63.111	6.382	
Potassium (mg/L)	9	6.778	8.516	7.451	0.636	
Calcium (mg/L)	9	93.464	113.471	102.724	6.178	
Magnesium (mg/L)	9	20.648	33.951	28.128	3.605	
Trace Metals						
Total Arsenic (µg/L)	4	4.35	5.386	4.849	0.43	Less than or equal to 50 µg/L
Total Cadmium (µg/L)	4	<0.3	<0.3	<0.3	0	Less than or equal to calculated value
Total Copper (µg/L)	4	2.689	3.122	2.858	0.19	Less than or equal to calculated value
Total Iron (µg/L)	4	149.484	298.094	201.311	70.137	Less than or equal to 300 µg/L
Total Lead (µg/L)	4	<0.8	<0.8	<0.8	0	Less than or equal to calculated value
Total Zinc (µg/L)	4	<4	<4	<4	0	Less than or equal to calculated value

Table 9a (continued). Water Quality Data Summary at S2DOWN for July 2001 Backpumping Events.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Phytoplankton Indicators						
Chlorophyll a (µg/L)	6	10.4	139.2	42.5	49.1	
Chlorophyll a2 (µg/L)	6	6.0	125.4	35.5	45.5	
Chlorophyll b (µg/L)	6	-1.0	3.7	1.3	1.2	
Chlorophyll c (µg/L)	6	-1.0	10.2	3.9	3.8	
Pheophytin a (µg/L)	6	4.2	14.3	9.3	3.9	
Carotenoid (µg/L)	6	7.3	44.0	16.1	14.3	
Total Organic Carbon (mg/L)	6	30.9	40.7	35.5	4.4	
Dissolved Organic Carbon (mg/L)	6	30.7	42.6	36.4	5.3	

Table 9b. Pesticide Data at S2DOWN for July 2001 Backpumping Events.

Parameters	Sampling Dates					FAC 62-302 Class I Criteria
	7/17/2001	7/20/2001	7/24/2001	7/27/2001		
Pesticides						
ametryn (µg/L)	0.090	0.072	0.065	0.063		
atrazine (µg/L)	0.48	0.33	0.49	0.29		
atrazine desethyl (µg/L)	0.061	0.052	0.033	0.031		
atrazine desisopropyl (µg/L)	0.024	0.017	0.012	0.017		
bromacil (µg/L)	BDL	BDL	BDL	BDL		
diazinon (µg/L)	BDL	BDL	BDL	BDL		
hexazinone (µg/L)	0.025	BDL	BDL	BDL		
malathion (µg/L)	BDL	BDL	BDL	BDL		less than or equal to 0.1 µg/L
metolachlor (µg/L)	BDL	BDL	BDL	BDL		
Norflurazon (µg/L)	0.24	BDL	BDL	BDL		
Parathion Methyl (µg/L)	BDL	BDL	BDL	BDL		
simazine (µg/L)	0.042	BDL	BDL	BDL		

*** average of duplicate values**

BDL = below detection limit

Table 9c. Water Quality Data Summary at Downstream Monitoring Locations During July Backpumping Events - S3DOWN.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical						
Temperature (°C)	6	26.1	29.6	28.6	1.3	
Specific Conductivity (µmhos/cm)	6	828	981	924	59	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	6	3.0	4.2	3.5	0.5	Not less than 5.0 mg/L
Water pH (units)	6	7.0	7.5	7.2	0.2	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	6	5.3	10.7	7.2	2.2	Less than or equal to 29 NTU above background
Secchi Disk Depth (meters)	6	0.6	0.9	0.7	0.1	
Color (PCU)	6	100	137	122	14	
Total Suspended Solids (mg/L)	5	4.8	14.8	9.4	4.0	
Total Dissolved Solids (mg/L)	6	547.0	663.0	603.7	43.6	
Hardness (mg/L as CaCO3)	9	278.2	374.8	336.9	33.8	
Alkalinity (mg/L as CaCO3)	6	220.9	274.2	254.4	19.0	
Nutrients						
Total Nitrogen (mg/L)	6	2.7	5.1	3.7	1.0	
Total Kjeldahl Nitrogen (mg/L)	6	2.3	3.3	2.8	0.4	
Total Dissolved Kjeldahl Nitro	6	1.8	2.8	2.3	0.4	
Nitrate+Nitrite as N (mg/L)	6	0.205	1.812	0.919	0.655	
Nitrite as N (mg/L)	6	0.018	0.075	0.043	0.024	
Nitrate as N (mg/L)	6	0.187	1.737	0.876	0.634	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	6	0.081	0.318	0.166	0.085	
Un-ionized Ammonia as NH_3 (mg/L)	6	0.001	0.004	0.002	0.001	Equal or less than 0.02 mg/L as NH_3
Total Phosphorus (mg/L)	6	0.042	0.070	0.057	0.011	
Orthophosphate as P (mg/L)	5	0.007	0.043	0.020	0.016	
Total Dissolved Phosphorus (mg/L)	6	0.012	0.050	0.022	0.016	
Silica (mg/L)	6	8.320	10.808	9.517	1.170	
Major Ions						
Chloride (mg/L)	6	87.77	108.48	96.665	7.758	Equal or less than 250 mg/L
Sulfate (mg/L)	6	42.5	77.38	64.34	12.445	
Sodium (mg/L)	9	48.69	64.542	56.947	5.761	
Potassium (mg/L)	9	5.069	7.442	6.619	0.832	
Calcium (mg/L)	9	90.096	112.413	103.856	8.893	
Magnesium (mg/L)	9	12.915	22.89	19.153	3.355	
Trace Metals						
Total Arsenic (µg/L)	4	3.326	5.029	4.265	0.824	Less than or equal to 50 µg/L
Total Cadmium (µg/L)	4	<0.3	<0.3	<0.3	0	Less than or equal to calculated value
Total Copper (µg/L)	4	2.509	3.358	2.886	0.353	Less than or equal to calculated value
Total Iron (µg/L)	4	175.581	476.304	287.181	137.415	Less than or equal to 300 µg/L
Total Lead (µg/L)	4	<0.8	<0.8	<0.8	0	Less than or equal to calculated value
Total Zinc (µg/L)	4	<4	<4	<4	0	Less than or equal to calculated value

Table 9c (continued). Water Quality Data Summary at S3DOWN for July 2001 Backpumping Events.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Phytoplankton Indicators						
Chlorophyll a (µg/L)	6	7.8	71.1	25.3	23.0	
Chlorophyll a2 (µg/L)	6	5.3	65.2	21.2	22.1	
Chlorophyll b (µg/L)	6	<1	1.9	<1	0.6	
Chlorophyll c (µg/L)	6	<1	6.2	2.5	2.0	
Pheophytin a (µg/L)	6	3.8	8.2	5.6	1.7	
Carotenoid (µg/L)	6	4.4	25.2	10.5	7.4	
Total Organic Carbon (mg/L)	6	34.2	42.1	36.9	2.9	
Dissolved Organic Carbon (mg/L)	6	33.7	41.6	37.2	2.9	

Table 9d. Pesticide Data at S3DOWN for July 2001 Backpumping Events.

Parameters	Sampling Dates					FAC 62-302 Class I Criteria
	7/18/2001*	7/20/2001	7/24/2001	7/27/2001		
Pesticides						
ametryn (µg/L)	0.049	0.065	0.058	0.043		
atrazine (µg/L)	0.26	0.34	0.24	0.15		
atrazine desethyl (µg/L)	0.050	0.054	0.037	0.019		
atrazine desisopropyl (µg/L)	0.010	0.017	0.010	0.0098		
bromacil (µg/L)	BDL	BDL	BDL	BDL		
diazinon (µg/L)	BDL	BDL	BDL	BDL		
hexazinone (µg/L)	BDL	BDL	BDL	BDL		
malathion (µg/L)	0.030	0.031	BDL	BDL		less than or equal to 0.1 µg/L
metolachlor (µg/L)	BDL	BDL	BDL	BDL		
Norflurazon (µg/L)	BDL	BDL	BDL	BDL		
Parathion Methyl (µg/L)	BDL	BDL	BDL	0.052		
simazine (µg/L)	BDL	BDL	BDL	BDL		

*** average of duplicate values**

BDL = below detection limit

Table 10a. Water Quality Data Summary at Cuts in the Rim Canal During July Backpumping Events - CUT1.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical						
Temperature (°C)	6	27.1	29.5	29.0	0.9	
Specific Conductivity (µmhos/cm)	6	657	1112	904	145	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	6	3.5	6.3	4.6	1.1	Not less than 5.0 mg/L
Water pH (units)	6	7.2	7.6	7.3	0.2	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	6	5.3	11.1	7.6	2.5	Less than or equal to 29 NTU above background
Secchi Disk Depth (meters)	5	0.4	0.7	0.6	0.1	
Color (PCU)	6	63	124	107	22	
Total Suspended Solids (mg/L)	6	4.4	18.4	9.8	5.3	
Total Dissolved Solids (mg/L)	6	425.0	704.0	579.2	92.4	
Hardness (mg/L as CaCO3)	9	223.7	385.2	318.8	48.5	
Alkalinity (mg/L as CaCO3)	6	172.8	272.8	235.3	34.3	
Nutrients						
Total Nitrogen (mg/L)	6	2.7	4.3	3.4	0.5	
Total Kjeldahl Nitrogen (mg/L)	6	2.3	3.0	2.7	0.2	
Total Dissolved Kjeldahl Nitro	6	1.3	2.9	2.2	0.5	
Nitrate+Nitrite as N (mg/L)	6	0.028	1.282	0.669	0.422	
Nitrite as N (mg/L)	6	0.007	0.108	0.051	0.033	
Nitrate as N (mg/L)	6	0.021	1.174	0.618	0.393	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	6	0.024	0.405	0.200	0.129	
Un-ionized Ammonia as NH_3 (mg/L)	6	0.001	0.009	0.004	0.003	Equal or less than 0.02 mg/L as NH_3
Total Phosphorus (mg/L)	6	0.056	0.196	0.091	0.055	
Orthophosphate as P (mg/L)	5	0.008	0.030	0.016	0.009	
Total Dissolved Phosphorus (mg/L)	6	0.013	0.036	0.023	0.008	
Silica (mg/L)	6	8.210	13.836	11.026	2.239	
Major Ions						
Chloride (mg/L)	6	69.59	122.81	99.648	17.481	Equal or less than 250 mg/L
Sulfate (mg/L)	6	41.27	92.91	63.86	20.505	
Sodium (mg/L)	9	39.017	83.865	62.805	13.11	
Potassium (mg/L)	9	5.49	8.507	7.013	1.098	
Calcium (mg/L)	9	69.677	113.773	97.304	12.6	
Magnesium (mg/L)	9	12.064	24.551	18.259	4.476	
Trace Metals						
Total Arsenic (µg/L)	4	3.12	5.732	4.228	1.092	Less than or equal to 50 µg/L
Total Cadmium (µg/L)	4	<0.3	<0.3	<0.3	0	Less than or equal to calculated value
Total Copper (µg/L)	4	1.909	2.687	2.326	0.338	Less than or equal to calculated value
Total Iron (µg/L)	4	76.267	216.583	144.559	57.326	Less than or equal to 300 µg/L
Total Lead (µg/L)	4	<0.8	<0.8	<0.8	0	Less than or equal to calculated value
Total Zinc (µg/L)	4	<4	<4	<4	0	Less than or equal to calculated value

Table10a (continued). Water Quality Data Summary at CUT1 for July 2001 Backflow Events.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Phytoplankton Indicators						
Chlorophyll a (µg/L)	6	11.8	167.7	57.8	57.7	
Chlorophyll a2 (µg/L)	6	10.2	149.6	49.8	52.1	
Chlorophyll b (µg/L)	6	<1	4.4	2.0	1.7	
Chlorophyll c (µg/L)	6	1.5	13.6	5.3	4.3	
Pheophytin a (µg/L)	6	2.1	20.2	10.3	6.7	
Carotenoid (µg/L)	6	5.0	56.8	21.1	18.6	
Total Organic Carbon (mg/L)	6	24.0	39.2	34.0	5.4	
Dissolved Organic Carbon (mg/L)	6	23.5	37.9	33.9	5.5	

Table 10b. Pesticide Data at CUT1 for July 2001 Backflow Events.

Parameters	Sampling Dates					FAC 62-302 Class I Criteria
	7/18/2001	7/20/2001*	7/24/2001	7/27/2001		
Pesticides						
ametryn (µg/L)	0.065	0.059	0.062	0.042		
atrazine (µg/L)	0.30	0.22	0.22	0.17		
atrazine desethyl (µg/L)	0.049	0.037	0.033	0.034		
atrazine desisopropyl (µg/L)	BDL	0.012	0.011	0.0091		
bromacil (µg/L)	BDL	BDL	BDL	BDL		
diazinon (µg/L)	BDL	BDL	BDL	BDL		
hexazinone (µg/L)	BDL	BDL	BDL	BDL		
malathion (µg/L)	BDL	BDL	BDL	BDL		less than or equal to 0.1 µg/L
metolachlor (µg/L)	BDL	BDL	BDL	BDL		
Norflurazon (µg/L)	BDL	BDL	BDL	BDL		
Parathion Methyl (µg/L)	BDL	BDL	BDL	BDL		
simazine (µg/L)	BDL	BDL	BDL	BDL		

*** average of duplicate values**

BDL = below detection limit

Table 10c. Water Quality Data Summary at Cuts in the Rim Canal During July Backpumping Events - CUT2.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical						
Temperature (°C)	1			31.8		
Specific Conductivity (µmhos/cm)	1			872		Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	1			4.6		Not less than 5.0 mg/L
Water pH (units)	1			7.3		Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	1			5.7		Less than or equal to 29 NTU above background
Color (PCU)	1			118		
Total Suspended Solids (mg/L)	1			4.0		
Total Dissolved Solids (mg/L)	1			580.0		
Hardness (mg/L as CaCO3)	1			310.9		
Alkalinity (mg/L as CaCO3)	1			231.7		
Nutrients						
Total Nitrogen (mg/L)	1			3.233		
Total Kjeldahl Nitrogen (mg/L)	1			2.323		
Total Dissolved Kjeldahl Nitrogen (mg/L)	1			2.244		
Nitrate+Nitrite as N (mg/L)	1			0.91		
Nitrite as N (mg/L)	1			0.043		
Nitrate as N (mg/L)	1			0.867		Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	1			0.082		
Un-ionized Ammonia as NH_3 (mg/L)	1			0.002		Equal or less than 0.02 mg/L as NH_3
Total Phosphorus (mg/L)	1			0.057		
Orthophosphate as P (mg/L)	1			0.023		
Total Dissolved Phosphorus (mg/L)	1			0.031		
Silica (mg/L)	1			8.374		
Major Ions						
Chloride (mg/L)	1			98.250		Equal or less than 250 mg/L
Sulfate (mg/L)	1			47.770		
Sodium (mg/L)	1			59.852		
Potassium (mg/L)	1			6.110		
Calcium (mg/L)	1			99.425		
Magnesium (mg/L)	1			15.222		
Trace Metals						
Total Arsenic (µg/L)	0					Less than or equal to 50 µg/L
Total Cadmium (µg/L)	0					Less than or equal to calculated value
Total Copper (µg/L)	0					Less than or equal to calculated value
Total Iron (µg/L)	0					Less than or equal to 300 µg/L
Total Lead (µg/L)	0					Less than or equal to calculated value
Total Zinc (µg/L)	0					Less than or equal to calculated value

Table 10c (continued). Water Quality Data Summary at CUT2 for July 2001 Backflow Events.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Phytoplankton Indicators						
Chlorophyll a (µg/L)	1			14.1		
Chlorophyll a2 (µg/L)	1			8.3		
Chlorophyll b (µg/L)	1			1.7		
Chlorophyll c (µg/L)	1			2.2		
Pheophytin a (µg/L)	1			9.2		
Carotenoid (µg/L)	1			5.9		
Total Organic Carbon (mg/L)	1			37.3		
Dissolved Organic Carbon (mg/L)	1			38.1		

Table 10d. Water Quality Data Summary at Cuts in the Rim Canal During July Backpumping Events - CUT3.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Physical						
Temperature (°C)	6	28.5	31.2	29.6	1.0	
Specific Conductivity (µmhos/cm)	6	918	1024	976	43	Not greater than 50% above background or 1,275 µmhos/cm
Dissolved Oxygen (mg/L)	6	4.4	8.5	5.9	1.5	Not less than 5.0 mg/L
Water pH (units)	6	7.2	7.9	7.5	0.3	Not less than 6.0 or greater than 8.5 units
Turbidity (NTU)	6	9.2	23.5	13.7	5.3	Less than or equal to 29 NTU above background
Secchi Disk Depth (meters)	6	0.3	0.5	0.5	0.1	
Color (PCU)	6	91	139	108	18	
Total Suspended Solids (mg/L)	6	10.0	45.0	19.2	13.1	
Total Dissolved Solids (mg/L)	6	570.0	660.0	628.2	36.5	
Hardness (mg/L as CaCO3)	9	317.6	380.4	348.3	23.6	
Alkalinity (mg/L as CaCO3)	6	246.4	299.7	268.2	21.5	
Nutrients						
Total Nitrogen (mg/L)	6	3.0	4.4	3.7	0.6	
Total Kjeldahl Nitrogen (mg/L)	6	2.3	3.9	3.0	0.5	
Total Dissolved Kjeldahl Nitro	6	1.6	2.7	2.2	0.4	
Nitrate+Nitrite as N (mg/L)	6	0.041	1.196	0.706	0.479	
Nitrite as N (mg/L)	6	0.012	0.135	0.073	0.048	
Nitrate as N (mg/L)	6	0.029	1.077	0.633	0.432	Equal or less than 10 mg/L as N
Ammonium as N (mg/L)	6	0.012	0.300	0.159	0.097	
Un-ionized Ammonia as NH_3 (mg/L)	6	0.001	0.009	0.004	0.003	Equal or less than 0.02 mg/L as NH_3
Total Phosphorus (mg/L)	6	0.073	0.210	0.105	0.052	
Orthophosphate as P (mg/L)	6	0.006	0.032	0.015	0.010	
Total Dissolved Phosphorus	6	0.013	0.034	0.021	0.008	
Silica (mg/L)	6	10.738	14.696	12.774	1.698	
Major Ions						
Chloride (mg/L)	6	97.700	109.240	102.800	4.257	Equal or less than 250 mg/L
Sulfate (mg/L)	6	60.470	80.280	68.173	7.024	
Sodium (mg/L)	9	59.031	73.595	64.386	5.012	
Potassium (mg/L)	9	6.681	7.740	6.950	0.322	
Calcium (mg/L)	9	89.096	108.347	99.675	6.006	
Magnesium (mg/L)	9	20.514	30.031	24.054	3.639	
Trace Metals						
Total Arsenic (µg/L)	4	4.479	4.937	4.730	0.194	Less than or equal to 50 µg/L
Total Cadmium (µg/L)	4	<0.3	<0.3	<0.3	0.000	Less than or equal to calculated value
Total Copper (µg/L)	4	2.552	3.455	2.895	0.418	Less than or equal to calculated value
Total Iron (µg/L)	4	96.332	507.758	236.006	184.535	Less than or equal to 300 µg/L
Total Lead (µg/L)	4	<0.8	<0.8	<0.8	0.000	Less than or equal to calculated value
Total Zinc (µg/L)	4	<4	<4	<4	0.000	Less than or equal to calculated value

Table 10d (continued). Water Quality Data Summary at CUT3 for July 2001 Backflow Events.

Parameters	n	min	max	avg	S.D.	FAC 62-302 Class I Criteria
Phytoplankton Indicators						
Chlorophyll a (µg/L)	6	17.5	332.3	94.6	118.154	
Chlorophyll a2 (µg/L)	6	14.1	286.8	81.4	102.325	
Chlorophyll b (µg/L)	6	<1	5.3	3.1	2.071	
Chlorophyll c (µg/L)	6	1.3	22.5	8.5	7.288	
Pheophytin a (µg/L)	6	4.8	55	16.8	18.866	
Carotenoid (µg/L)	6	7	128.9	37.4	45.405	
Total Organic Carbon (mg/L)	6	30.78	41.98	35.8	4.052	
Dissolved Organic Carbon (mg/L)	6	29.96	42.92	35.3	4.614	

Table 10e. Pesticide Data at CUT3 for July 2001 Backflow Events.

Parameters	Sampling Dates					FAC 62-302 Class I Criteria
	7/18/2001	7/20/2001	7/24/2001	7/27/2001		
Pesticides						
ametryn (µg/L)	0.081	0.077	0.055	0.057		
atrazine (µg/L)	0.73	0.30	0.25	0.24		
atrazine desethyl (µg/L)	0.079	0.047	0.041	0.026		
atrazine desisopropyl (µg/L)	0.023	0.016	0.015	0.012		
bromacil (µg/L)	BDL	BDL	BDL	BDL		
diazinon (µg/L)	BDL	BDL	BDL	BDL		
hexazinone (µg/L)	BDL	BDL	BDL	BDL		
malathion (µg/L)	BDL	BDL	BDL	BDL		less than or equal to 0.1 µg/L
metolachlor (µg/L)	BDL	BDL	BDL	BDL		
Norflurazon (µg/L)	0.11	0.024	BDL	BDL		
Parathion Methyl (µg/L)	BDL	BDL	BDL	BDL		
simazine (µg/L)	0.025	BDL	BDL	BDL		

*** average of duplicate values**

BDL = below detection limit

Table 11. Water Quality Data at at the Rim Canal During July Backpumping Events.

Monitoring Site	Parameters	n	min	max	avg	S.D.
RC1	***Physical***					
	Temperature (°C)	6	26.66	29.31	28.357	0.95
	Specific Conductivity (µmhos/cm)	6	1008	1120	1070.5	45.72
	Dissolved Oxygen (mg/L)	6	2.36	4.07	3.102	0.632
	Water pH (units)	6	7.09	7.34	7.183	0.09
	Turbidity (NTU)	6	8.37	18	11.282	3.479
	Secchi Disk Depth (meters)	6	0.5	0.7	0.567	0.082
	Color (PCU)	6	89	154	123.333	21.778
RC3	***Physical***					
	Temperature (°C)	6	27.89	30.72	29.34	0.933
	Specific Conductivity (µmhos/cm)	6	770	1018	912.667	79.804
	Dissolved Oxygen (mg/L)	6	3.49	8.89	6.582	2.251
	Water pH (units)	6	7.25	8	7.53	0.303
	Turbidity (NTU)	6	4.99	25.1	11.412	7.451
	Secchi Disk Depth (meters)	6	0.3	0.6	0.483	0.117
	Color (PCU)	6	80	127	106.167	19.61
RC6	***Physical***					
	Temperature (°C)	5	27.02	30.4	28.808	1.284
	Specific Conductivity (µmhos/cm)	5	592	824	700.2	95.933
	Dissolved Oxygen (mg/L)	5	2.27	6.97	4.108	1.814
	Water pH (units)	5	7.02	7.38	7.192	0.159
	Turbidity (NTU)	5	5.49	10.2	8.534	1.798
	Secchi Disk Depth (meters)	4	0.5	0.7	0.625	0.096
	Color (PCU)	5	82	117	98.2	17.398
RC29	***Physical***					
	Temperature (°C)	6	26	29.06	28.082	1.072
	Specific Conductivity (µmhos/cm)	6	1003	1145	1060.333	48.429
	Dissolved Oxygen (mg/L)	6	2.15	3.67	2.948	0.603
	Water pH (units)	6	7.04	7.26	7.142	0.087
	Turbidity (NTU)	6	6.79	16.4	9.742	3.52
	Secchi Disk Depth (meters)	6	0.3	0.7	0.533	0.137
	Color (PCU)	6	92	160	126.667	22.993

Table 12. Water Quality Data at Municipal Water Intakes During July 2001 Backpumping Events

Monitoring Site	Parameters	n	min	max	avg	S.D.
Bell Glades Intakes	***Physical***					
	Temperature (°C)	6	25.6	28.9	27.9	1.2
	Specific Conductivity (µmhos/cm)	6	983	1151	1042	61
	Dissolved Oxygen (mg/L)	6	1.9	3.5	2.9	0.6
	Water pH (units)	6	7.0	7.2	7.1	0.1
	Secchi Disk Depth (meters)	6	0.3	0.8	0.5	0.2
	Color (PCU)	6	96	165	131	22
	Phytoplankton Indicators					
	Total Organic Carbon (mg/L)	6	33.0	43.5	38.5	3.5
	Dissolved Organic Carbon (mg/L)	6	31.2	44.2	38.6	4.2
Pahokee Intakes	***Physical***					
	Temperature (°C)	6	25.6	30.5	28.9	1.8
	Specific Conductivity (µmhos/cm)	6	651	813	729	66
	Dissolved Oxygen (mg/L)	6	5.3	7.5	6.3	0.9
	Water pH (units)	6	7.8	8.3	8.0	0.2
	Color (PCU)	6	23	68	40	18
	Phytoplankton Indicators					
	Total Organic Carbon (mg/L)	6	16.6	25.2	20.5	3.2
	Dissolved Organic Carbon (mg/L)	6	16.2	24.7	20.4	3.5
South Bay Intakes	***Physical***					
	Temperature (°C)	6	28.9	30.3	29.4	0.6
	Specific Conductivity (µmhos/cm)	6	898	1032	944	52
	Dissolved Oxygen (mg/L)	6	3.7	9.0	6.1	2.3
	Water pH (units)	6	7.3	8.0	7.5	0.3
	Secchi Disk Depth	6	0.3	0.6	0.5	0.1
	Color (PCU)	6	87	117	103	13
	Phytoplankton Indicators					
	Total Organic Carbon (mg/L)	6	30.1	38.4	35.1	3.1
	Dissolved Organic Carbon (mg/L)	6	28.7	42.8	35.3	5.0

Table 13. Ultra-Trace Mercury Data for June 2001 Backpumping Events.

units in nannogram/L

STATION	DATE	Total Mercury (THG)	Total Methyl Mercury (TMHG)
S2	6/8/2001	2.990	0.126
S2	6/12/2001	4.776	0.237
S2	6/25/2001	1.810	0.222
S2	6/28/2001	N/D	0.185
S3	6/5/2001	1.160	0.120
S3	6/6/2001	1.590	0.096
S3	6/7/2001	1.357	0.094
S3	6/8/2001	1.580	0.098
S3	6/10/2001	2.070	0.113
S3	6/12/2001	1.687	0.127
S3	6/22/2001	1.710	0.332
S3	6/25/2001	1.590	<0.014
S3	6/28/2001	2.030	0.124

N/D: No data available because the measurement did not meet the QA/QC criteria.

Table 14. July 2001 Daily Lake Stage and Rainfall for Lake Okeechobee and Vicinity.

Stage: COE Data. Average-daily lake average. In feet-NGVD.
Rainfall: SFWMD Provisional 24-Hour Rainfall In Inches
Ending 7am EST (8am EDT) On The Indicated Date

DATE	STAGE (feet)	BASIN 24-HOUR RAINFALL (inchs)							
		EAA West	EAA East	Lake Okeechobee	Upper Kissimmee	Lower Kissimmee	East Caloos.	MartinSt.Lucie County	Palm Beach County
1-Jul-01	9.26	0.03	0.02	0.07	0.07	0.09	0.28	0.01	0.02
2-Jul-01	9.24	0.01	0.01	0.00	0.06	0.02	0.03	0.00	0.00
3-Jul-01	9.23	0.08	0.01	0.00	0.01	0.01	0.00	0.00	0.01
4-Jul-01	9.20	0.03	0.00	0.07	0.06	0.12	0.16	0.08	0.00
5-Jul-01	9.20	0.28	0.46	0.20	0.03	0.69	0.24	0.36	0.19
6-Jul-01	9.20	0.01	0.00	0.01	0.89	0.20	0.01	0.00	0.00
7-Jul-01	9.22	0.00	0.15	0.25	0.02	0.24	0.10	0.06	0.01
8-Jul-01	9.20	0.03	0.23	0.06	0.03	0.35	0.28	0.00	0.06
9-Jul-01	9.21	0.12	0.01	0.49	0.64	0.45	1.12	0.61	0.27
10-Jul-01	9.23	1.04	1.09	0.23	0.73	0.24	0.32	0.08	0.68
11-Jul-01	9.26	0.30	0.47	1.10	0.22	0.74	1.80	1.83	0.20
12-Jul-01	9.30	0.34	0.16	0.26	0.01	0.28	0.82	0.51	0.60
13-Jul-01	9.31	0.15	0.21	0.18	0.25	0.15	0.50	0.12	0.20
14-Jul-01	9.39	0.19	0.26	0.45	0.23	0.30	0.52	0.29	0.12
15-Jul-01	9.48	0.90	0.70	0.95	1.32	1.25	1.36	0.98	0.75
16-Jul-01	9.55	0.16	0.24	0.51	0.01	0.18	0.48	0.99	0.84
17-Jul-01	9.66	0.15	0.26	0.62	0.01	0.31	0.16	0.56	0.06
18-Jul-01	9.66	0.38	0.22	0.25	0.92	0.21	0.03	0.74	0.52
19-Jul-01	9.82	0.23	0.26	0.19	0.90	0.64	0.29	0.96	0.35
20-Jul-01	9.87	0.04	0.20	0.30	0.28	0.27	0.17	0.25	0.02
21-Jul-01	9.95	0.06	0.15	0.42	0.16	0.14	0.08	0.38	0.53
22-Jul-01	10.10	0.62	0.43	0.71	0.44	0.67	0.84	0.69	0.37
23-Jul-01	10.07	0.36	0.33	0.80	0.09	0.25	0.90	0.14	0.18
24-Jul-01	10.13	1.13	1.91	0.33	0.05	0.15	0.94	1.20	2.72
25-Jul-01	10.20	0.04	0.00	0.01	0.08	0.11	0.26	0.01	0.01
26-Jul-01	10.13	0.15	0.17	0.25	0.59	0.55	1.44	0.12	0.41
27-Jul-01	10.20	0.01	0.01	0.04	0.03	0.08	0.19	0.06	0.08
28-Jul-01	10.35	0.09	0.16	0.06	0.27	0.02	0.09	0.30	0.07
29-Jul-01	10.41	0.12	0.01	0.25	0.02	0.11	0.01	0.02	0.02
30-Jul-01	10.44	0.09	0.11	0.00	0.00	0.00	0.01	0.22	0.11
31-Jul-01	10.53	0.00	0.00	0.01	0.02	0.07	0.01	0.14	0.01
sum	**N/A**	**7.14**	**8.24**	**9.07**	**8.44**	**8.89**	**13.44**	**11.71**	**9.41**

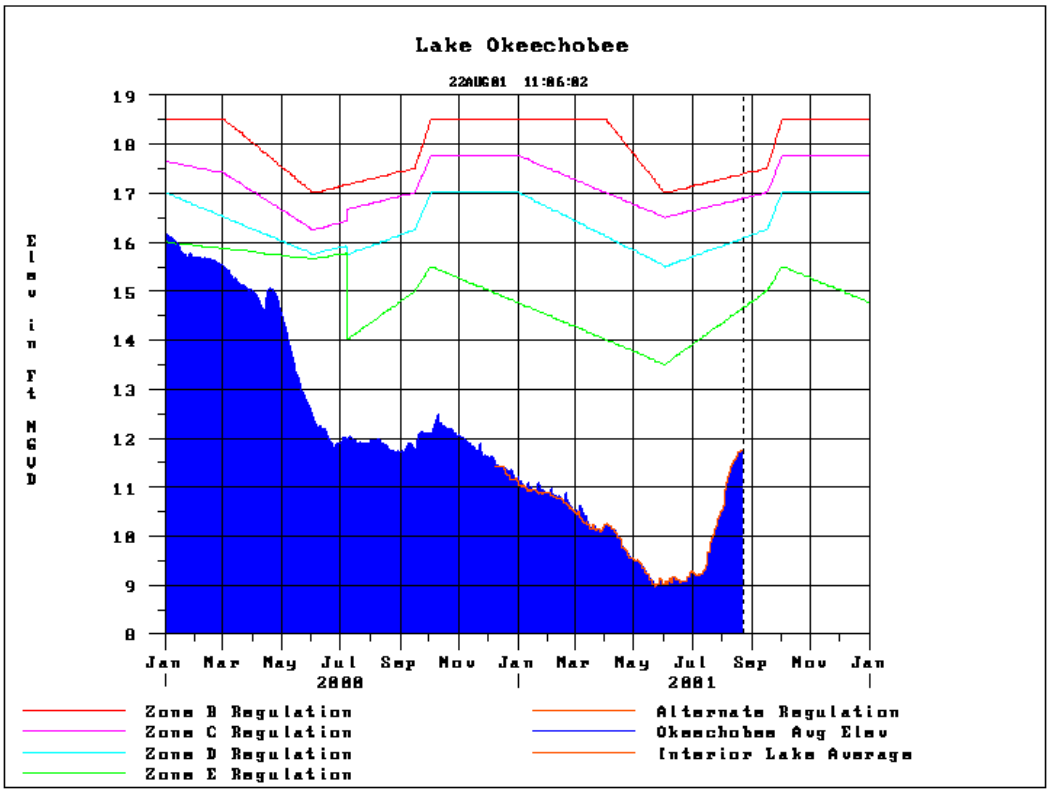

Figure 1. Lake Okeechobee Stage.